

Appendix F

Ecology Technical Report

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Eastern Outfall Pressure Main (EOPM) Replacement Project

04-Sep-2025
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Eastern Outfall Pressure Main (EOPM) Replacement Project

Client: Townsville City Council

ABN: 44 741 992 072

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Executive Summary

This report has been prepared for Townsville City Council (TCC) and outlines the ecology technical evaluation for the design phase of the Eastern Outfall Pressure Main Project (the Project). The scope of work included a baseline assessment of ecological values and identifies potential Project impacts. The assessment has informed the Project design development and will support relevant statutory approvals at a State and Commonwealth level.

Ecological values within the study area include remnant vegetation communities that support a range of habitat values for flora and fauna species, including conservation significant fauna species. Cleared areas associated with existing roads and agricultural land also occur throughout the study area and present existing connectivity barriers.

A targeted field survey conducted in February 2023 observed following conservation significant species within the study area, located outside the Project area:

- Eastern curlew (*Numenius madagascariensis*) – critically endangered and migratory under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), endangered under the *Nature Conservation Act 1992* (NC Act)
- Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*) – vulnerable and migratory under the EPBC Act, vulnerable under the NC Act
- Whimbrel (*Numenius phaeopus*) – migratory under the EPBC Act, special least concern under the NC Act
- Sharp-tailed sandpiper (*Calidris acuminata*) – migratory under the EPBC Act, special least concern under the NC Act
- Caspian tern (*Hydroprogne caspia*) – migratory under the EPBC Act, special least concern under the NC Act
- Crested tern (*Thalasseus bergii*) – migratory under the EPBC Act, special least concern under the NC Act.

Potential direct and indirect impacts to ecological values, up to approximately 7.06 ha, may occur as a result of the Project. However, the Project design has avoided environmental impacts through habitat type 1 by under-boring Ross River, clay pan and mangrove areas, which likely provide habitat for conservation-significant species. A maximum of 5.4 ha of remnant vegetation within the disturbance footprint will be impacted, with only 0.84 ha being permanent to accommodate a permanent access track.

An impact assessment for known, likely and potentially occurring Matters of National Environmental Significance (MNES) within the study area was completed applying a two-step process. An initial screening assessment step identified six species recommended for further assessment of significant impacts (eastern curlew, great knot, whimbrel, water mouse, Western Alaskan bar-tailed godwit and sharp-tailed sandpiper) and in addition 'migratory shorebird species' and 'migratory terrestrial bird species' were assessed to further support the Project approvals pathway. These species were further assessed applying *Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013). This second significant impact assessment step found that significant impacts to MNES was unlikely, on the basis that:

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

A significant impact assessment was also conducted for World Heritage properties and National Heritage places, which determined it is unlikely that the Project will have a significant impact on the Great Barrier Reef World Heritage Area or Great Barrier Reef National Heritage Area.

It is recommended that the Project is referred to DCCEE, to formally confirm if assessment and approval under the EPBC Act is required.

Several Matters of State Environmental Significance (MSES) values were also identified within the study area, namely regulated vegetation, essential habitat, connectivity areas, protected wildlife habitat, protected areas, waterways providing fish passage and marine plants. Where required, these MSES values were subject to an impact assessment as per the MSES Significant Residual Impact Guidelines (Department of State Development, Infrastructure and Planning, 2014). The assessment determined the Project is likely to have a significant residual impact on marine plants. A development application will be required, including a Marine Plant Report, for significant residual impacts on marine plants. To compensate for the significant residual impact, offsets may be required.

1.0 Introduction

1.1 Project context

AECOM Australia Pty Ltd (AECOM) has been commissioned by Townsville City Council (TCC) to undertake an ecology field survey to identify the existing ecological values, potential Project risks, mitigation measures and associated legislative requirements for the Eastern Outfall Pressure Main Replacement Project (the Project). This report documents the outcomes of this survey, identifies potential Project risks on existing ecological values listed under State and Commonwealth legislation and recommends management and mitigation measures to reduce identified risks as a result of Project activities.

The Project will replace the existing EOPM sewer pipeline that predominantly services Townsville's eastern suburbs. The existing pipeline runs from South Townsville, across the Ross River to the Cleveland Bay Purification Plant (CBPP) and forms a crucial part of the existing Townsville sewerage network. The Project is critical public utility infrastructure that will service continued residential expansion and urban consolidation within the 'Eastern' and 'Western' sewer systems in Townsville.

The replacement does not follow the alignment of the existing EOPM, which is further east and will be decommissioned. The Project is mostly located within the Infrastructure Corridors Precinct within the Townsville State Development Area (TSDA). This Precinct is intended for the continued operation and establishment of linear infrastructure, including utility services, to service land uses within the TSDA. The Project has been planned to occur within this precinct to achieve co-location with other existing linear infrastructure and align with the planned land use intent of the Precinct.

1.2 Project description and location

To support the expansion of residential development in the eastern suburbs of Townsville, north of the Ross River and to replace aging infrastructure, TCC propose to replace the EOPM pipeline situated between South Townsville and the CBPP. In recent years, TCC has identified that the EOPM between the Ross River crossing and CBPP is in poor condition and requires extensive maintenance, which, given its age, is not feasible, so a replacement is proposed, with the existing infrastructure to be decommissioned at a later stage as a separate action.

The pressure main predominantly services Townsville's eastern suburbs and transfers the sewage across Ross River upstream of the John McIntyre Bridge to the CBPP. The Project connects to existing sewage infrastructure at Sixth Street (east), South Townsville in the north, and the intersection of Racecourse Road and Southern Port Road, Stuart in the south. The Project alignment crosses the Ross River, extending south adjacent to the Southern Port Road (also known as Ron McLean Drive and the Townsville Port Access Road (TPAR)) and runs parallel to the EOPM at a distance of 200-1500 metres (m) west before connecting to the Western Outfall Pressure Main and Southern Suburbs Rising Main at the intersection of Southern Port Road and Racecourse Road (Cleveland Bay Treatment Plant Access Road). The EOPM infrastructure from the proposed cut-in point at Sixth Street (east) and the connection at CBPP will be decommissioned with the intention of being left in situ. An overview of the Project location is presented in Figure 1.

The following works will be undertaken as part of this Project:

- Preparatory and site establishment works comprising:
 - Construction of access tracks and laydown areas
 - Clearing and grubbing
 - Erosion control and stormwater management
- Under-boring Ross River, the area of mangroves on the south bank, and an area of mudflat in the southern section of the alignment, using Horizontal Directional Drilling (HDD), which includes development of launch and receival pits.
- Open trench construction for the remainder of the new pipeline.
- Backfilling of the open trench following pipework installation.

- Permanent access track construction, approximately 4 m wide, adjacent to the trenched section of the pipeline.
- Rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.

1.3 Project area and study area

The Project begins in Sixth Street (east), the intersection of the existing TCC Southern Suburbs Rising Main and the Southern Port Road, 2 kilometres (km) south-east of the Townsville central business district on Ross Island. The alignment then crosses the Ross River, extending south adjacent to Southern Port Road, and connects to the Southern Suburbs Rising Main at the intersection of Southern Port Road and Racecourse Road (Cleveland Bay Treatment Plant Access Road). The replacement pipeline will be installed parallel to the EOPM and offset at a distance of 200-1500 m.

The Project runs adjacent Ron McLean Drive, beginning approximately 2 kilometres (km) south-east of the Townsville central business district on Ross Island and continuing to the mainland. The Project will traverse multiple properties of different tenure. The Project does not propose any land acquisitions for the purpose of the construction and operation of the Project.

The Project area is the current concept footprint for the Project as of April 2025, comprising a 30 m wide corridor, laydown areas and access tracks. A 30 m wide construction corridor has been adopted for the open trenched sections of the pipeline. This is wider than the usual 25 m corridor for similar Projects, due to the anticipated soft ground conditions and the safety considerations of working around the excavation.

The Project area represents a maximum clearing footprint for the Project, resulting in a total impact area of approximately 7.06 ha. This comprises 6.22 ha of temporary impacts and 0.84 ha of permanent disturbances associated with proposed access tracks. The Project area has incorporated disturbances related to the following activities required for construction:

- Excavation of the trench to depths of around 2.5 m in soft muds and sandy soils which will require benching/battering back and clearances for the zone of influence of the excavation. Trench dewatering equipment will also be required to maintain suitable pipe laying conditions and trench integrity to prevent collapses.
- Width for excavator and truck movements
- Stringing and welding of the HDPE pipeline adjacent to the trench for the subsequent placement in the trench.
- A windrow of the topsoil which will be placed adjacent to the benched excavation
- The excavation spoil stockpile which may require treatment for acid sulfate soils.
- A 4 m-wide permanent access track running alongside to the east of the proposed alignment which may be utilised for construction and maintenance activities. It is assumed that existing roads and access tracks will also be utilised for the Project's construction in addition to these new tracks.

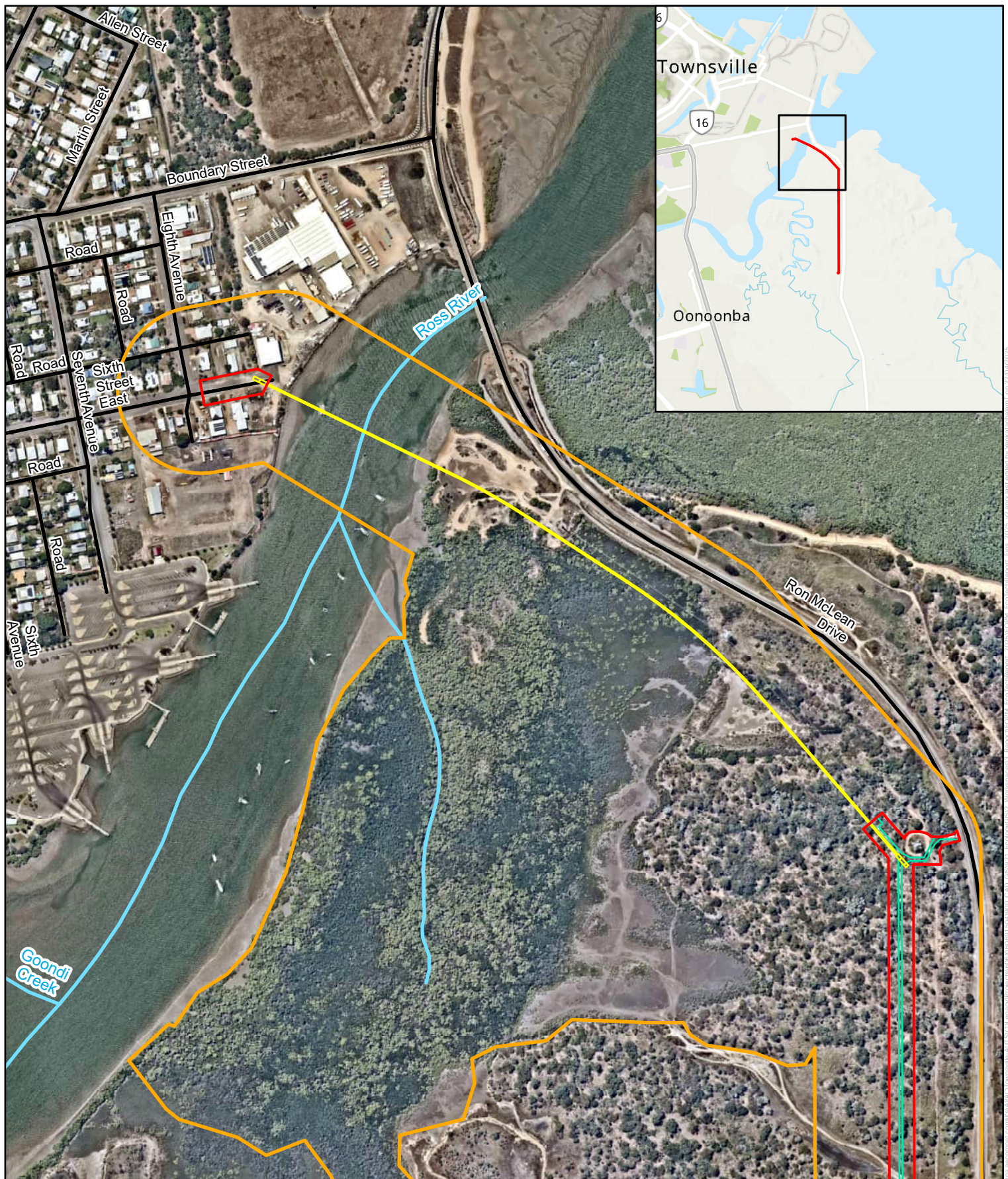
The Project will include under-boring at two locations to avoid direct impact:

- Across Ross River and the mangroves on the south bank (approximately 900 m section)
- An area of mudflats in the southern section of the alignment (approximately 420 m section)

The under-bored sections are excluded from the Project area, except at the entry and exit pits to account for impacts caused by above-surface boring equipment.

The study area comprises a 100 m buffer either side of the proposed Project area, as well as an additional area of mangroves and claypans between the Project area and Ross River to provide further information about ecological value and species utilisation in this area. The study area is 138.9 ha.

The Project area and study area are shown in Figure 1.



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Legend

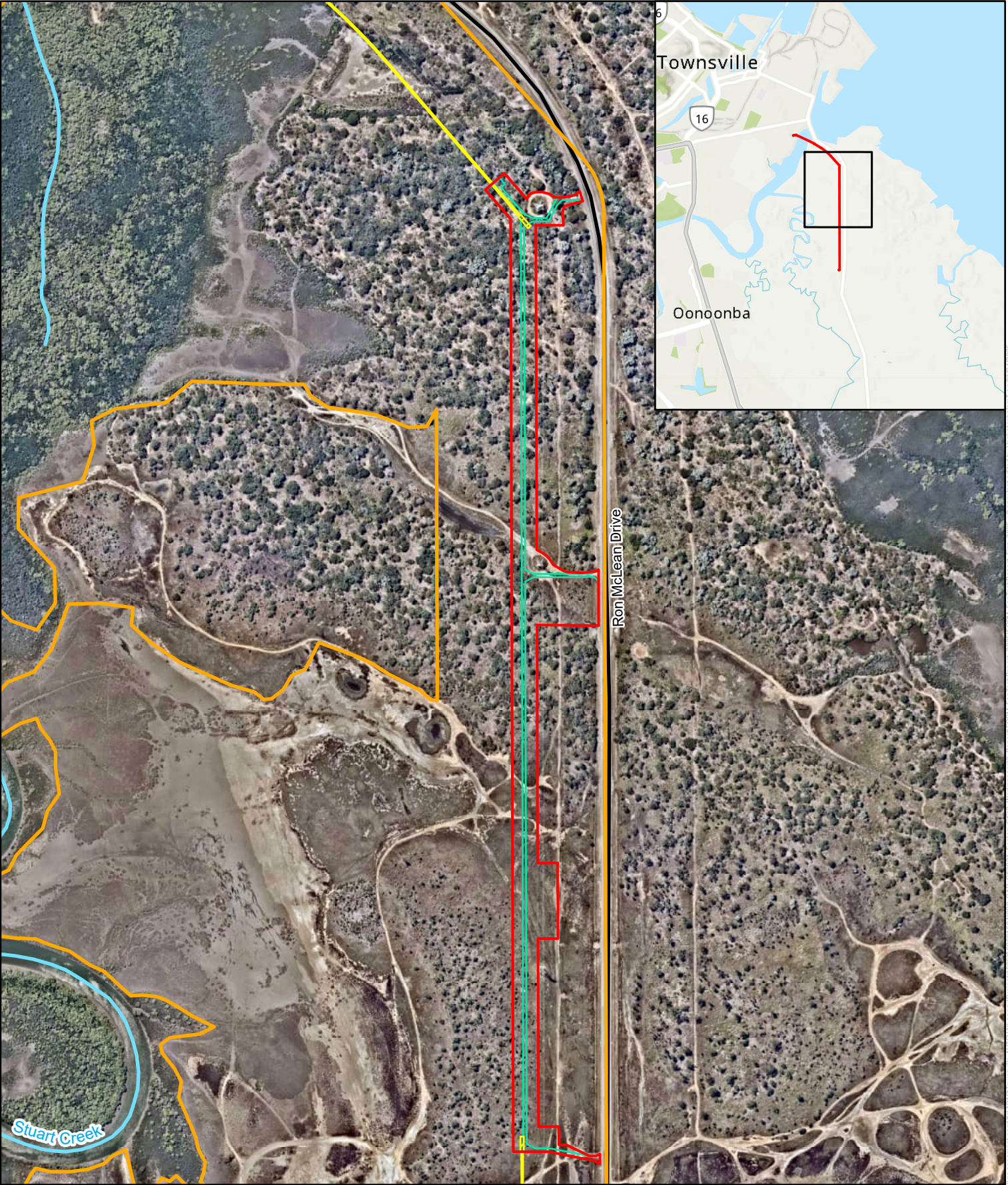
- | | |
|---|--|
| Project area | Study area |
| Permanent access tracks | Roads |
| Under-boring | Watercourses |
| Entry and exit pits | |

**Eastern Outfall Pressure Main
Figure 1-1**

Project Area

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AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 1-2**

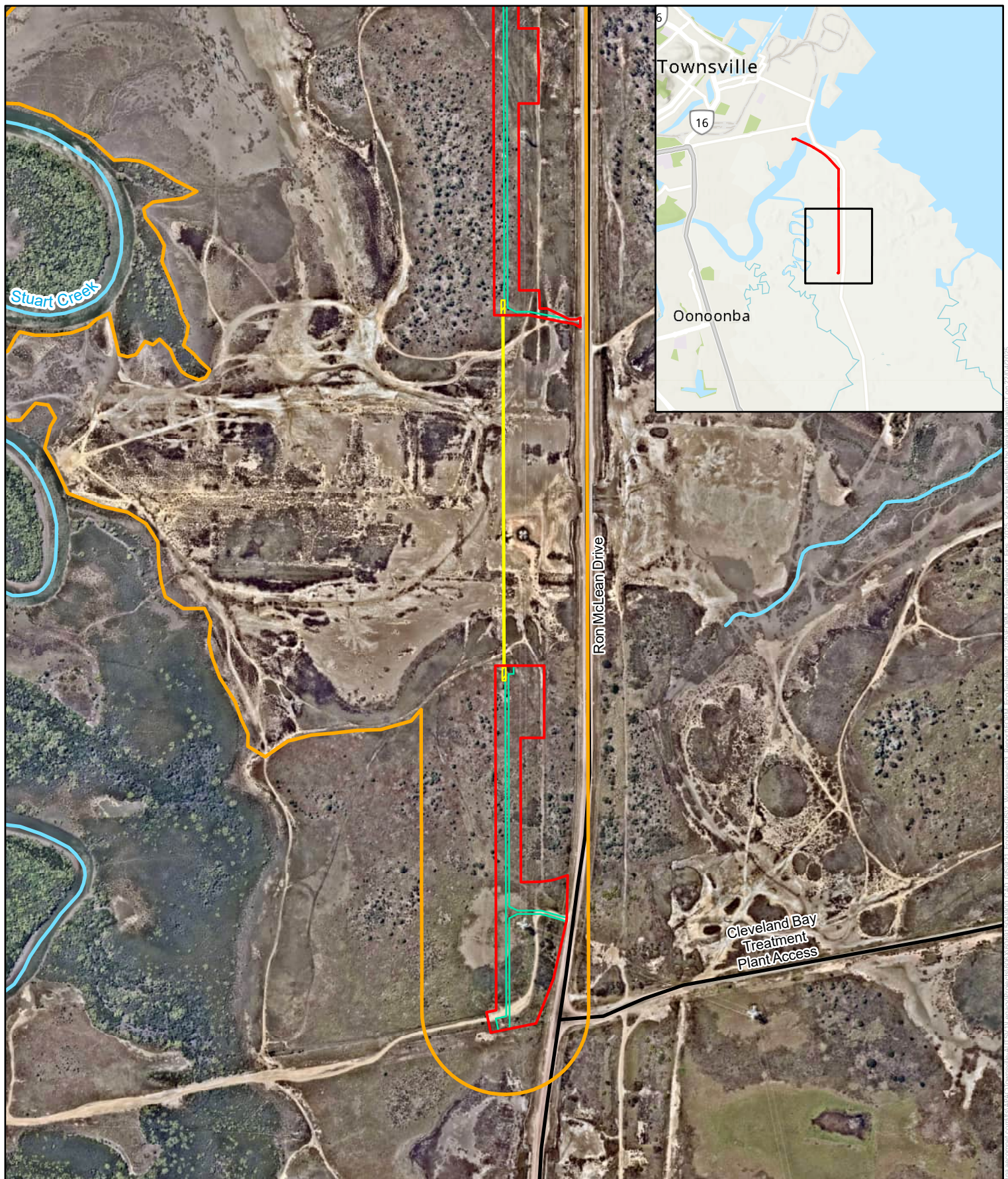
Project Area

Legend

- | | |
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|  Project area |  Study area |
|  Permanent access tracks |  Roads |
|  Under-boring |  Watercourses |
|  Entry and exit pits | |

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AECOM



0 100 200
metres

Legend

- | | |
|---|--|
| Project area | Study area |
| Permanent access tracks | Roads |
| Under-boring | Watercourses |
| Entry and exit pits | |

**Eastern Outfall Pressure Main
Figure 1-3**

Project Area

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1.4 Objectives and investigation scope

The objective of this ecological assessment is to identify the ecological values within the study area, assess the potential Project impacts to these values and recommend mitigation measures to reduce the likelihood of impact.

Specifically, the scope of work for the ecological assessment of the study area comprises the following:

- Flora:
 - identification and description of flora and vegetation communities
 - verification of the presence and extent of regulated vegetation and Regional Ecosystems (REs) mapped by the Queensland herbarium
 - determination of the presence and extent of any threatened ecological communities (TECs)
 - assessment of the likelihood of occurrence of conservation significant flora species
 - verification of the presence or suitable habitat of listed threatened flora species identified from database searches
 - identification of non-native flora, with an emphasis on identifying any infestations of Weeds of National Significance (WoNS) or species declared under State legislation.
- Fauna:
 - identification and description of fauna habitats, particularly habitats that can support conservation significant fauna species
 - assessment of the likelihood of occurrence of conservation significant fauna species
 - verification of the presence or suitable habitat for listed threatened or migratory fauna species, particularly breeding habitat through habitat assessment, migratory shorebird surveys and the deployment of camera traps
 - identification of the presence and values of riverine, wetland and aquatic habitats, including suitability to support threatened and migratory species
 - assessment of essential habitat and fish passage under the *Vegetation Management Act 1999* and *Fisheries Act 1994*
 - identification of any pest fauna species, particularly those declared under Queensland legislation.
- Undertake significant impact assessment of Matters of National Environmental Significance (MNES) for species potentially impacted by the Project to determine if the Project requires a referral under the EPBC Act.
- Undertake a significant residual impact assessment for Matters of State Environmental Significance (MSES).

Consideration of statutory approvals that are triggered by the Project at a local, State and Commonwealth level are not included in the scope of this report and will be detailed in a separate Environment and Planning Review report (AECOM, 2024). Extent and impacts to marine plants occurring within the Project area will be covered in a separate Marine Plants report (AECOM, 2025).

The current report is based upon the results of field surveys conducted in February 2023 and has been updated in April 2025 to capture a footprint design change.

1.5 Structure of this report

This report is structured as follows:

- Section 2.0: Legislative and Policy Context
- Section 3.0: Assessment Methodology
- Section 4.0: Assessment Results
- Section 5.0: Matters of National Environmental Significance
- Section 6.0: Matters of State Environmental Significance
- Section 7.0: Potential Environmental Impacts
- Section 8.0: Avoidance, Minimisation, Mitigation and Management
- Section 9.0: MNES Significant Impact Assessments
- Section 10.0: Summary and Conclusions
- Section 11.0: References

This report is supported by the following appendices:

- Appendix A: Figures
- Appendix B: Desktop Assessment Reports
- Appendix C: Flora and Fauna Species Lists
- Appendix D: Likelihood of Occurrence Assessment
- Appendix E: MNES Significant Impact Assessment
- Appendix F: MSES Significant Impact Assessment.
- Appendix G: MNES Survey Effort.

2.0 Legislative and policy context

2.1 Commonwealth

2.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a process for environmental assessment and approval of proposed actions that have, will have or are likely to have a significant impact on MNES or on Commonwealth land. The EPBC Act identifies 'nationally significant' animals, plants, habitats, and places as MNES to be protected. The Project area intersects locations with potential to support habitat for MNES. To assess potential impacts of land use changes and new developments, a significant impact assessment informed by desktop and field investigations was undertaken against the EPBC Act significant impact guidelines as described in Section 3.5.2.

MNES comprise:

- World Heritage Properties
- National Heritage Places
- Wetlands of International Importance (listed under the Ramsar Convention)
- The Great Barrier Reef Marine Park
- Commonwealth Marine Areas
- Listed Threatened Species
- Listed TECs
- Migratory Species (listed under international agreements)
- Nuclear Actions (including uranium mines)
- A Water Resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, a referral to the Department of Climate Change, Energy the Environment and Water (DCCEEW) is required if a Project has the potential to cause a 'significant impact' on MNES. The determination is made with reference to the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (Department of the Environment, 2013) and other EPBC Act policy statements, including significant impact guidelines for individual threatened species, groups of species and threatened ecological communities and migratory species.

A screening assessment has been completed for the Project to identify MNES values requiring further assessment under EPBC Act *Significant Impact Guidelines 1.1* (Department of the Environment, 2013). This assessment included a review of potential impacts and consequences to MNES within the Project area relating to relevant threatened species, ecological communities, and migratory species (Section 5.0) and informed the need for further assessment under the EPBC Act.

If a significant residual impact on MNES values as a result of Project activities is identified, referral of the Project to DCCEEW under the EPBC Act is required. This process allows DCCEEW to decide if the Project can continue without further assessment or conditions (not a controlled action), or that the Project is likely to impact MNES and requires conditions or further assessment (controlled action). If impacts to MNES values cannot be avoided, mitigated or managed by the proponent, financial or land-based offsets under the EPBC Act environmental offsets policy may be required.

2.1.2 **Weeds of National Significance**

One of the primary objectives of the EPBC Act is to conserve Australian biodiversity which includes provisions for managing invasive species as threatening processes. The EPBC Act recognises Weeds of National Significance (WONS), which threaten natural landscapes, waterways, and coastal areas by displacing native species, contributing to land degradation, and reducing farm and forestry productivity.

The Australian Weeds Strategy was developed by the Commonwealth in conjunction with all State and Territory governments to provide a national framework for the management of weeds and to reduce associated impacts on the environment. Under the strategy, 32 of Australia's most significant weed species are listed as WoNS based on their invasiveness and potential for spread, as well as environmental, social and economic impacts. National management strategies and manuals have been published for all WoNS. WoNS identified within the study area are listed in Section 4.2.10.

2.2 Queensland

2.2.1 Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) prohibits the taking or destruction, without authorisation, of protected flora and fauna species in the wild. All native plants and animals in Queensland are protected under Section 71 of the NC Act. The Act also provides a legislative basis for research, community education, dedicating, declaring and managing protected areas, and protecting native wildlife and its habitat.

Threatened species are listed under the NC Act in the *Nature Conservation (Animals) Regulation 2020* and the *Nature Conservation (Plants) Regulation 2020*. Additionally, some Least Concern species are protected under the NC Act for their cultural significance or their inclusion within international migratory bird agreements. These include echidna (*Tachyglossus aculeatus*), platypus (*Ornithorhynchus anatinus*) and migratory bird species listed under the Bonn Convention, Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) and Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Appropriate authorisations or permits under the NC Act are required prior to clearing of listed conservation significant plant species, interfering with an animal breeding place, or removing protected animals unless the activity is exempt. Section 4.3.1 discusses animal breeding places within the Project area.

Activities that affect protected plants are regulated under the subordinate *Nature Conservation (Plants) Regulation 2020* which requires a flora survey be carried out where areas of clearing are to occur within 'High Risk Areas' shown on the 'Flora Survey Trigger Map'. High Risk Areas generally include suitable regional ecosystems within 2 km radius of known locations of critically endangered, endangered, vulnerable, or near threatened (CEVNT) plants listed under the NC Act and contain habitat likely to have one or more endangered plant species. The Flora Survey Guideline specifies the method of assessment and report format required under the NC Act (Department of Environment and Science, 2020a).

The Project area is not located within a mapped high risk areas for Protected Plants under the NC Act. Furthermore, no NC Act listed plants were identified during the field survey.

It is expected that a Low Risk and High Risk species management program (SMP) will be sought for the Project prior to construction commencing.

2.2.2 Environmental Protection Act 1994

The objective of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

The EP Act provides the key legislative framework for the protection of the environment in Queensland. Section 319 of the EP Act imposes a 'general environmental duty', which specifies that a person must not undertake any activity that may harm the environment without taking reasonable and practical measures to prevent or minimise the harm.

All Project activities will be undertaken in accordance with the EP Act and the general environmental duty requirements. A key management measure to ensure this will be the implementation of the Project's CEMP. A preliminary CEMP has been developed and is provided in Appendix E of the MNES Report.

2.2.3 ***Vegetation Management Act 1999***

The *Vegetation Management Act 1999* (VM Act) regulates the clearing of native vegetation in Queensland and is administered by the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (DNRMMRD).

The VM Act categorises and defines native vegetation as remnant (Category B), high value regrowth (HVR) (Category C), reef regrowth watercourse vegetation (Category R) and non-remnant (Category X). Remnant vegetation is further classified into a RE based on bioregion, landform and dominant canopy species.

Under the VM Act all REs are assigned a Vegetation Management Class (VM class) of 'Endangered', 'Of Concern', or 'Least Concern' based on the current mapped extent remaining compared to its pre-clearing extent. Section 4.2.1 discusses vegetation communities and regional ecosystems within the study area, Section 4.2.2 examines regulated vegetation.

The VM Act also maps:

- Essential habitat - Remnant (category B) and High Value Regrowth (category C) vegetation in which 'endangered' and 'vulnerable' species listed under the NC Act have been known to occur. Essential habitat is discussed in Section 4.3.3 of the report.
- VM Act mapped wetlands
- VM Act mapped watercourses.

The Project traverses Category R, Category B, and Category X mapped vegetation. It also crosses essential habitat and the Ross River, which is a VM-mapped watercourse; however, this watercourse will not be impacted due to the HDD under-bore beneath it.

Two operational works development approvals are being sought for the Project (one for the TSDA and one for the remaining areas). A relevant purpose determination is currently undergoing assessment by the DNRMMRD.

2.2.4 ***Biosecurity Act 2014***

The *Biosecurity Act 2014* (Biosecurity Act) provides a framework for an effective biosecurity system for Queensland, to ensure the safety and quality of animal feed, fertilisers, and other agricultural inputs, and to help align responses to biosecurity risks in the State with national and international obligations which is administered by the Department of Primary Industries (DPI).

Restricted matter is a biosecurity matter found in Queensland and has a significant impact on human health, social amenity, the economy, or the environment. Prohibited matter is biosecurity matter that is not found in Queensland but would have a significant adverse impact on our health, way of life, the economy, or the environment if it entered the state. Under the Act, invasive plants and animals are categorised as either a 'Prohibited Matter' or a 'Restricted Matter'. Restricted matter (flora) is discussed within Section 4.2.10 and restricted matter (fauna) is discussed within Section 4.3.4.

TCC and the Contractor have an obligation under the Biosecurity Act to keep the land free of weeds and pests. The CEMP developed for the Project, will include a weed and pest management plan and ensure the general biosecurity obligations are upheld during delivery, and measures for reporting prohibited or restricted matter are established.

2.2.5 ***Fisheries Act 1994***

The *Fisheries Act 1994* (Fisheries Act) and the Fisheries Regulation 1995 govern both commercial and recreational fishing activities and provide for the management, use, development and protection of fisheries resources and fish habitats, and the management of aquaculture activities. This includes removal, damage or disturbance to marine plants, including mangroves, plants on tidal lands and plants adjacent to marine plants, including saltmarsh and melaleucas. *Fisheries Act 1994* waterways within the study area are discussed in Section 4.3.4.

An operational works development permit is being sought for the removal, damage and destruction of marine plants for the Project. As the Project will be under-bored under the Ross River and will not create a barrier affecting the bed or banks of the fisheries waterway, a development permit for operational works for waterway barrier works is not required.

Waterway barrier works and fish passage are discussed within Section 4.3.5. Marine plants occurring within the study area are discussed in Section 4.2.8.

2.2.6 Queensland Environmental Offsets Framework

The environmental offsets framework in Queensland includes the *Environmental Offsets Act 2014* (EO Act), the Environmental Offsets Regulation 2014 (EO Regulation) and the Queensland Environmental Offsets Policy (EO Policy).

MSES are defined under the EO Regulation and comprise:

- regulated vegetation
- connectivity areas (non-urban areas)
- wetlands and watercourses
- designated precincts in strategic environmental areas
- protected wildlife habitat
- protected areas (national parks, regional parks; and nature refuges)
- declared fish habitat areas and highly protected zones of state marine parks
- waterways providing for fish passage
- marine plants
- legally secured offsets areas.

An environmental offset condition may be imposed under various State assessment frameworks (such as the *Planning Act 2016* and EP Act for an activity prescribed under the EO Act), if the Project will, or is likely to have a significant residual impact on a prescribed environmental matter that is a MSES.

A self-assessment of the Project against the Significant Residual Impact Guideline (*Sustainable Planning Act 2009*, now *Planning Act 2016*) is required to determine whether the Project will have a significant residual impact on MSES. It is noted that the SRI Guideline as per the *Planning Act 2016* is the relevant guideline for the Project given a development permit for operational works (removal of marine plants) is expected to be triggered.

3.0 Assessment methodology

A desktop assessment was undertaken to characterise and identify potential flora and fauna values that may be present in the study area.

3.1.1 Previous studies

The desktop assessment included a review of literature, including the following previous studies:

- Eastern Outfall Pressure Main Ecological Assessment (Biotropica, 2022)
- Eastern Outfall Pressure Main Flora and Fauna Assessment (RPS, 2015)
- Townsville Eastern Access Rail Corridor (TEARC): Self-assessment under the Commonwealth EPBC Act 1999 (NRA, 2021).
- TEARC: Technical Report: Ecology (AECOM, 2020)
- TPAR Biodiversity Management Plan 2014 (Department of Transport and Main Roads, 2014)
- Shorebird Monitoring Study for the Townsville Port Expansion Project November 2019 to February 2020 (NRA, 2020).

3.1.2 Public datasets

The desktop assessment included a review of the following searches of publicly available datasets and online mapping, which were initially conducted in May 2023, and updated in March 2025 to capture any desktop-level changes since the field surveys:

- EPBC Act Online Protected Matters Search Tool (PMST) to identify MNES that may occur within the study area (Department of Climate Change, Energy, the Environment and Water, 2023b, 2025a).
- Wildlife Online database to identify flora and fauna species recorded within or surrounding the study area (Department of Environment and Science, 2023c; Department of Environment, Tourism, Science and Innovation, 2025).
- Atlas of Living Australia (ALA) database to identify locations of previously recorded flora and fauna species within or surrounding the study area (Atlas of Living Australia, 2023, 2025).
- Regulated Vegetation Management Map to determine the extent of Category A, Category B, Category C and Category R vegetation within and surrounding the study area (Department of Resources, 2023a).
- DNRMMRRD Vegetation Management REs map including essential habitat, watercourse and wetland mapping (Department of Resources, 2023b).
- The Queensland Herbarium Regional Ecosystem Description Database (REDD) for RE descriptions and geological and land zone descriptions (version 13) and re-checked in 2025 (version 13.1) (Queensland Herbarium, 2023, 2024).
- Department of Environment, Tourism, Science and Innovation (DETSI) map of Queensland wetland environmental values to identify high ecological significance wetlands and general ecological significance wetlands (Department of Environment and Science, 2023a).
- DETSI Protected Plants Flora Survey Trigger Map to identify the high-risk areas for protected plants (Department of Environment and Science, 2023b).
- Species distribution maps from various current field guides.

Information collected as part of the desktop assessment was reviewed and used in the preparation of the field survey, to determine appropriate survey techniques.

A 20 km search buffer was applied on the boundary of the Project area for the PMST search and on a central coordinate (-19.2859, 146.8406) for the WildNet search.

3.2 Likelihood of occurrence assessment

A likelihood of occurrence assessment was undertaken for conservation significant species and communities identified during the desktop review. This assessment highlighted values that may be present in the study area which required targeted effort during the field survey.

Once the field survey was completed, ground-truthed vegetation communities and habitat was used to re-assess the likelihood of occurrence and the suitability of the study area for each value. The assessment was further re-assessed and revised in March 2025 to consider the latest species listings and updated desktop-level records of the species in the study area.

The final likelihood of occurrence assessment is presented in Appendix D. The likelihood of occurrence assessment has built upon previous assessments by Biotropica and RPS (Section 3.1.1), and updated with additional species included in the latest desktop searches. Aquatic species (e.g. large sawfish (*Pristis pristis*) and turtles (*Elseya irwini* and *Lepidochelys olivacea*)) have been excluded from the likelihood of occurrence assessment due to the construction methodology resulting in anticipated avoidance of impacts to these species.

During desktop and post-field stages, each species was assessed against the categories defined below.

1. **Known:** Species was recorded in the study area during the field assessment, and/or previous, reliable records occur within the study area.
2. **Likely:** Species was not recorded during the field surveys or previously, however there are reliable species records within or adjacent to the study area, and suitable habitat is present.
3. **Potential:** Species was not recorded during the field surveys or previously, however there are reliable species records within the broader area and habitat may be suitable or marginal in the study area.
4. **Unlikely:** Habitat may be suitable or marginal in the study area, however no species records exist within the broader area, and the species distribution is not close to the study area. Or suitable habitat does not exist in the study area, there are no records of the species in the surrounding area, species distribution is not close to the study area.

3.3 Field assessment

Field assessments were undertaken across the study area in February 2023 using the information collected as part of the desktop assessment to determine appropriate survey techniques. The methodology is described below.

3.3.1 Flora

3.3.1.1 Vegetation community assessment

The extent, classification and condition of ground-truthed vegetation communities within the study area was validated in accordance with the *Methodology for surveying and mapping regional ecosystem and vegetation communities in Queensland* (Neldner *et al.*, 2022). This involved traversing vegetation communities on foot throughout the study area and undertaking quaternary level assessments. In addition, flora observations were utilised to assist in the classification, mapping and identification of regional ecosystems and flora species across the study area.

Quaternary-level sites were used to verify vegetation communities by confirming dominant characteristic species and other components as per Neldner *et al.* (2022). Evidence of previous disturbance, incidence of introduced species and general observations on soil type and ecological integrity were noted for each survey site. Several geo-referenced digital photographs were taken at each plot as a reference.

The following information was collected at each quaternary site:

- Site location (GPS co-ordinate), site photos, date and observer
- Vegetation structure, which included identifying the different strata (i.e. emergent, tree, shrub and ground layers and the height and cover values of each stratum)

- RE verification and condition.

The flora survey sites including flora observations and quaternary level assessments are displayed in Figure 2 in Appendix A.

3.3.1.2 Specimen identification and nomenclature

Specimens of plant taxa that could not be identified in the field were collected and preserved in accordance with the requirements of the Queensland Herbarium (Queensland Herbarium, 2016). Specimens were then identified using herbaria keys and other identification reference books as well as through comparison with the herbarium reference collection. Nomenclature used in this report follows the Queensland Herbarium flora census (Brown, 2021). Exotic flora species are signified in text by an asterisk (*) and comprise species classified as naturalised from the flora census.

3.3.2 Fauna

Survey of fauna species was undertaken using standard methodologies for the systematic survey of terrestrial fauna in eastern Australia (Eyre *et al.*, 2018). Methods employed during the field program included:

- Habitat assessments
- Bird census
- Active searches and incidental observations
- Remote camera traps.

Further information regarding each of these methods and survey effort is detailed below.

The fauna survey sites including habitat assessments, camera trap sites and migratory shorebird survey locations are displayed in Figure 2.

3.3.2.1 Habitat assessments

Habitat assessments were undertaken to characterise the fauna habitat values within the study area. These assessments provide an indication of habitat suitability and likely utilisation for fauna species, particularly listed conservation significant fauna. Habitat attributes recorded during the assessment included:

- Vegetation structure and dominant species, including a description of canopy, shrub and ground layer structure and composition
- Presence and abundance of tree hollows and stags
- Presence and abundance of woody debris such as habitat logs and ground timber
- Presence, abundance and depth of leaf litter
- Rocky habitat such as surface rocks, boulders, crevices, overhangs and caves
- Proximity to water (both permanent and ephemeral)
- Disturbance from invasive weeds/pests
- Other disturbances such as grazing pressure, clearing, thinning or fire
- Any other significant habitat features or values present.

Searches for signs of animal activity, including tracks, scats, scratches, bones, fur, feathers, nests, foraging holes and diggings were also undertaken during the habitat assessments. Active searches, incidental observations and visual and auditory survey of birds were also conducted at assessment locations.

Targeted habitat assessments were undertaken for species such as migratory birds and water mouse (*Xeromys myoides*) to determine the habitat features and quality available throughout the study area.

3.3.2.2 Migratory shorebirds

Beach areas, sand and mudflats, mangrove forests, samphire forblands and grasslands and watercourses within and adjacent to the Project area were targeted for migratory shorebird surveys and habitat assessments according to the methods prescribed by the EPBC Act *Industry Guidelines for Avoiding, Assessing and Mitigating Impacts on Migratory Shorebirds* (Department of the Environment and Energy, 2017).

Visual observations were made of bird identity, abundance, behaviour and species' richness. Observations were carried out at dawn, midday and dusk during low, high and mid-tides (Appendix C-2Appendix B). The survey timing was within the recommended survey period for migratory shorebirds as per the EPBC Act Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Department of the Environment and Energy, 2017).

3.3.2.3 Active searches and incidental observations

Active searches were undertaken at each habitat assessment site for signs of reptiles, amphibians, small mammals and bird species. This included scanning the trees and ground, searching beneath microhabitat such as rocks, fallen timber and peeling bark, digging through leaf litter and soil at tree bases and flushing birds from areas with a dense or grassy ground cover. Signs of fauna utilisation may include diggings, scats, tracks, bird feathers, and latrine sites, which were attributed to the appropriate species where possible.

3.3.2.4 Remote camera targeting water mouse

Survey guidelines for the water mouse are dependent on if the species is known or unknown. As previous surveys did not identify the species in the area, survey effort was based on presence being unknown. Survey guidelines recommend the following:

- Conducted by a suitably qualified person with requisite approvals and experience in mammal surveys in tidal wetlands
- Account for tidal variability
- Maximize the chance of detecting the species
- Determine the context within the broader landscape
- Account for uncertainty and error.

Primary survey techniques include habitat assessment, daytime searching, Elliot trapping and camera trapping. It is recommended that all primary techniques for the species are undertaken.

Survey effort for the Project included habitat assessment, daytime searching and camera trapping. These methods were considered sufficient based on previous surveys undertaken within the Project area and surrounding location for the development of the Southern Port Road and rail corridor for the port which had extensive trapping surveys.

Survey techniques were undertaken within the mangrove portion of the Project area in tidally inundated areas. White flash remote cameras were deployed to determine the presence of water mouse as well as any incidental species in the study area the locations of the cameras is shown in Figure 2. Four cameras were set and baited with pilchards, for a total of six consecutive nights from 8 to 14 February 2023. The photographs from the remote cameras were analysed by an ecologist to determine the identity of any species photographed.

3.3.3 Target species survey effort

The desktop assessment identified several threatened and migratory fauna species as either being 'likely' or having 'potential' to occur within the study area and surrounds. Appendix G identifies species that were the subject of targeted survey effort, including a summary of the survey guideline requirement, and the survey effort employed for each species within the study area.

Fauna surveys were undertaken with consideration of:

- Survey guidelines for Australia's threatened birds (Department of the Environment, Water, Heritage and the Arts, 2010b).
- Survey guidelines for Australia's threatened mammals (Department of Sustainability, Environment, Water, Population and Communities, 2011).
- Referral guideline for 14 birds listed as migratory species under the EPBC Act (Department of the Environment, 2015b)
- Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Department of the Environment and Energy, 2017)
- Queensland Government's Terrestrial Fauna Survey Guidelines for Queensland (Eyre *et al.*, 2018)
- Species-specific survey guidelines and information sourced from literature, particularly the Species Profile and Threats Database (SPRAT) (Department of Climate Change, Energy, the Environment and Water, 2023c, 2025b).

The final column in Appendix G assesses the degree to which the field surveys met the survey guidelines detailed above. 'Requirements met' indicates that survey effort to detect the species meets the prescribed survey guidelines. 'Requirements partially met' indicates that while effort has been spent to detect the species and determine habitat suitability and utilisation, additional effort or different survey techniques would be required to meet the prescribed survey guidelines. Where the survey effort was not met for a target species, habitat assessments were conducted to inform the potential habitat utilisation by the species within the study area.

3.4 Limitations

All field assessments are subject to limitations in the detection success of targeted species, particularly when conducted as a single event rather than ongoing over a long period of time. These limitations may result in 'false-absence' records where a species is not recorded but is present. However, to account for this a likelihood of occurrence assessment was undertaken in which the information from the survey was considered along with other information sources to determine the likelihood of occurrence.

Limitations associated with the flora field survey relate to the variability of vegetation communities across the survey location, as well as the detectability and presence of species at different times (e.g. flowering periods and emergence of annual species). While the timing of the survey was optimum, it should be recognised that a single field study cannot confirm that every species was detected. However, the survey was sufficient in characterising vegetation communities and habitat values within the study area.

This report has assessed the pressure main location and associated clearing area, alongside potential laydown areas. This assessment does not consider access tracks or additional clearing requirements outside the Project area.

The location of the study area provided inherent limitations regarding access and species identification. Due to the safety risk posed by crocodiles, works within tidally influenced mangroves and dense grasses in low lying areas were avoided. Additionally, some areas of the alignment were not accessible due to field surveys being undertaken in the wet season. This limitation was managed by developing an understanding of the vegetation communities present within these areas through desktop mapping and field surveys of adjacent and similar locations within the study area.

3.5 Impact assessment for Matters of National Environmental Significance

MNES known, likely or having potential to occur within the Project area were subjected to a two-step process, to assess the potential for significant impacts.

The first step was a screening assessment, which involved reviewing the nature and magnitude, as well as likely consequences of potential Project impacts. The findings of the screening assessment indicated the MNES' vulnerability to potential impacts, and whether further assessment via the significant impact assessment process was recommended to determine potential significant impacts.

For the purpose of the impact assessments, it has been assumed that the Project area is the maximum direct impact required for the Project, and under-bored sections present indirect impacts only. The full significant impact assessment is presented in Appendix E.

3.5.1 Screening assessment

Potential direct and indirect Project impacts on MNES within the Project area were assessed against a 'worst-case' scenario. To determine the anticipated consequence, the nature and magnitude of potential Project impacts were assessed against three consequence levels which contained multiple criteria. To determine the likelihood, the potential for species presence was assessed. These scores were then reviewed against a screening assessment matrix. MNES triggered further assessment if the risk matrix resulted in a 'potential' risk rating, whilst MNES with a 'low' risk rating required no further assessment. The screening assessment framework, including likelihood and consequence criteria for specific MNES is detailed in Appendix E.

3.5.2 Significant impact assessment

Significant impact assessments were undertaken in accordance with the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013). The approach and specific significant impact criteria utilised is outlined in Appendix E.

3.6 Impact assessment for Matters of State Environmental Significance

A significant residual impact assessment was undertaken for MSES identified within the Project area, in accordance with the criteria provided in the Significant Residual Impact Guidelines (Department of State Development, Infrastructure and Planning, 2014).

Significant residual impact assessments for the relevant MSES values were completed using ground-truthed data, such as REs and habitat types per species for protected wildlife habitat. The exception to this is the Landscape Fragmentation and Connectivity (LFC) Tool (version 1.4), which uses State RE mapping by default.

MSES present within the Project area are identified in Section 6.0. The complete significant residual impact assessment for MSES values is presented in Appendix F.

4.0 Assessment results

4.1 Regional context

4.1.1 Bioregion and Subregion

The study area occurs within the Brigalow Belt Bioregion, which covers the 500-759 mm rainfall area between the Queensland – New South Wales border in the south, to Townsville in the north. The Bioregion is characterised by the tree species *Acacia harpophylla* (brigalow) that forms forest and woodland on clay soils. However, the bioregion comprises a range of ecosystems including eucalypt forest and woodland, grassland, dry rainforest, cypress pine woodland and riparian communities (Sattler and Williams, 1999).

Within the Brigalow Belt Bioregion, the study area occurs within the Townsville Plains subregion (11.1). This includes the coastal flats of the Ross, Black and Bohle rivers, which flow from the eastern slopes of Hervey range.

4.1.2 Surface geology and land zone

The Queensland DoR detailed 1:100,000 regional surface geological mapping identified the study area contains three geological units (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development, 2023) described in Table 1. The study area also contains water associated with Ross River.

Table 1 Major surface geology units

Geological unit code	Age	Lithological summary	Dominant Soil	General Location within Study area
Qhct	Holocene	Silt, mud, sand and minor salt; coastal tidal flats, mangrove flats, supratidal flats, saltpans and grasslands.	Miscellaneous unconsolidated sediments	Along the Ross River and adjacent mangroves and claypans.
Qhcb	Holocene	Moderately well-sorted, fine to coarse-grained quartzose to shelly sand and some gravel: beach ridges and cheniers.	Sand	To the north of the study area in the elevated section between the mangroves and Southern Port Road as well as on the western bank of the Ross River.
Qpa	Pleistocene	Clay, silt, sand and gravel; flood-plain alluvium on high terraces	Alluvium	Intersects the Project alignment at the southern and central sections.

Land zones are categories that describe the major geologies, the associated landforms and geomorphic processes, and are an important component of the RE classification scheme. Two land zones (Table 2) have been identified and are broadly consistent with the surface geology mapping.

Table 2 Land zones present within the Project area

Land zone	Definition (Wilson and Taylor 2012)
1	Quaternary estuarine and marine deposits subject to periodic inundation by marine waters. Includes mangroves, saltpans, off-shore tidal flats and tidal beaches. Soils are predominantly Hydrosols (saline muds, clays and sands) or beach sand.
2	Quaternary coastal dunes and beach ridges. Includes degraded dunes, sand plains and swales, lakes and swamps enclosed by dunes, as well as coral and sand cays. Soils are predominantly Rudosols and Tenosols (siliceous or calcareous sands), Podosols and Organosols.

Acid sulfate soils (ASS) were identified as potentially occurring by the Limited Stage 1 Preliminary Site Investigation for the Project. While previous ASS assessments have not been undertaken, the Project is

mapped as having potential of ASS occurrence in low lying areas such as the mangroves and claypans (AECOM, 2023).

4.1.3 Climate

The Townsville area has a tropical climate but lower rainfall than surrounding areas. The average annual rainfall is 1,143 mm, most of which falls in the six month monsoon (wet) season between November to April. Due to the nature of tropical lows and thunderstorms, there is considerable variation from year to year.

The summer months in Townsville are hot and humid with thunderstorms starting in late October or November. Monsoon rains occur from late December until early April which produce the highest rainfalls, during this season Tropical Cyclones can threaten the region. The winter months are dominated by south east trade winds and mostly fine weather.

Historical rainfall data from Townsville Aero (Station Number: 032040) shows the highest rainfall for the year is recorded in the summer months, with the yearly maximum recorded in February (301.5 mm mean). Lower rainfall is generally recorded in the months of June to October, with the yearly minimum in September (10.2 mm mean). Maximum temperatures in the low 30s (Celsius (°C)) are recorded from October to March, with minimum temperatures of around 15°C recorded in July and August (Bureau of Meteorology, 2023).

4.1.4 Survey timing and weather conditions

The field survey was conducted from 8 to 10 February 2023, with camera traps deployed until 14 February 2023. Weather observations during the field survey are shown in Table 3.

Table 3 Climate conditions during field surveys (Bureau of Meteorology, 2023)

Survey Date	Rainfall Townsville Aero (Station Number: 032040)	Temperature	
		Min °C	Max °C

4.2 Flora

4.2.1 Vegetation communities

State RE mapping for the study area identified five REs with status ranging from least concern to endangered under the VM Act, as well as large areas of non-remnant vegetation. Results of the field survey confirmed the presence of the five REs and non-remnant vegetation. The ground-truthed REs are described and presented in Figure 3 (Appendix A) and summarised in Table 4. The Project area includes both temporary and permanent impact areas as defined in Section 1.3.

Several sections along the road corridor and powerline easement were identified as non-remnant. The northern section of the alignment crossing REs 11.1.4 and 11.2.2 will be under-bored, therefore these communities do not occur within the Project area. Most of the area of RE 11.1.2 does not occur within the Project area, except a small area in the south associated with an access track off the Southern Port Road.

REs were grouped based on species composition and landform to describe four ecologically distinct vegetation communities present within the study area, which are mapped in Figure 4 (Appendix A) and summarised in Table 4. A detailed description of each vegetation community is provided in the following sections.

Table 4 Vegetation communities present in the study area and Project area

Vegetation Community / Habitat Type	RE	RE Short Description	VM Act Class ¹	BD Status ²	Condition	Study area (ha)	Project area (ha)
1) Bare saltpans and / or areas of sparse forblands and / or tussock grasslands (Broad Vegetation Group (BVG): 35b).	11.1.1	<i>Sporobolus virginicus</i> grassland on marine clay plains.	Least concern	No concern at present	Remnant	23.8	3.30
	11.1.2	Samphire forbland on marine clay plains.	Least concern	No concern at present	Remnant	44.3	0.08
2) Closed forests and low closed forests dominated by mangroves (BVG: 35a).	11.1.4	Mangrove low open forest and/or woodland on marine clay plains.	Least concern	No concern at present	Remnant	34.5	0.00
3) Complex of open shrublands on strand and foredunes (BVG: 28a).	11.2.2	Complex of <i>Ipomoea pes-caprae subsp. brasiliensis</i> and <i>Spinifex sericeus</i> and <i>Casuarina equisetifolia</i> low woodland and herbland on fore dunes.	Of concern	Of concern	Regrowth	0.2	0.00
4) Open forests and low open forests in seasonally inundated swamps (BVG: 22b).	11.2.5	Corymbia-Melaleuca woodland complex of beach ridges and swales.	Least concern	No concern at present	Remnant	16.9	2.09
Estuary						3.8	0.00
Non-remnant						15.4	1.59
Total						138.9	7.06

4.2.1.1 Bare salt pans and/or areas of sparse forblands and/or tussock grasslands (BVG: 35b).

This vegetation community occurs on low lying clay and saltpan within the study area. The vegetation was typically a dominant groundcover layer consisting of sparse forbland or *Sporobolus virginicus* grassland (Plate 1). Sparse forbland typically contained a codominant ground layer of *Tecticornia spp.*, *Dissocarpus biflorus* and *Fimbristylis polytrichoides*. Canopy and shrub layers were largely absent throughout the area.

Grasslands within the study area contained codominant *Sporobolus virginicus*, *Cyperus subulatus* and *Eleocharis spiralis* (Plate 2). A very sparse canopy layer was present consisting of *Melaleuca viridiflora* and *Corymbia tessellaris* species. The shrub layer was generally absent throughout this area. Introduced species in this area typically included *Ziziphus mauritiana** amongst the *Melaleuca* and *Corymbia* species, *Megathyrsus maximus** in poorly drained areas and *Sporobolus pyramidalis**.



Plate 1 Bare salt pans



Plate 2 *Sporobolus virginicus* grassland

4.2.1.2 Complex of shrublands and grasslands on strand and foredunes

This vegetation community occurs in the northern extent of the study area between the Southern Port Road and the Ross River. The vegetation community consisted of a shrub layer of scattered *Avicennia marina*, with a groundcover layer of *Heteropogon contortus*, *Eragrostis interrupta* and *Crotalaria medicaginea* on sand dunes (Plate 3).

Introduced species typically included *Melinis repens**, particularly along the road corridor.

The section of the alignment traversing this community will be under-bored, therefore this community does not occur within the Project area.



Plate 3 Open shrubland on strand and foredunes

4.2.1.3 Closed forests and low closed forests dominated by mangroves

This vegetation community occurs on tidally inundated mudflats to the north of the study area, adjacent to the Ross River and Southern Port Road. The vegetation typically consisted of dense mangrove species including *Avicennia maria*, *Rhizophora stylosa*, *Lumnitzera racemosa* and *Ceriops spp.* Groundcover was present in the form of mangrove roots (Plate 4).

Introduced species in this community were rare, but included *Megathyrsus maximus**

The section of the alignment traversing this community will be under-bored, therefore this community does not occur within the Project area.



Plate 4 Closed forests and low closed forests dominated by mangroves

4.2.1.4 Open forests and low open forests in seasonally inundated swamps

This vegetation community typically occurs along raised beach dunes throughout the study area, predominantly located to the northern extent of the study area. The canopy layer in this community was sparse and consisted of *Corymbia tessellaris*, *Acacia crassicarpa* and *Melaleuca viridiflora* between 14 m and 16 m in height (Plate 5).

The sparse shrub layer consisted of *Pandanus cookii*, *Jasminum didymium*, *Clerodendrum floribundum* and *Cryptostegia grandiflora**. The groundcover layer consisted predominately of dense introduced species including *Melinis repens**, *Passiflora foetida** and *Megathyrsus maximus**.



Plate 5 Melaleuca woodland on alluvial plains

4.2.1.5 Non-remnant

The non-remnant sections of the study area typically occurred in areas of clearing for the road reserve and powerline. Species present in these areas largely comprised sparse regrowth *Corymbia tessellaris* and *Melaleuca viridiflora* dominated by *Leucaena leucocephala** and *Megathyrsus maximus**.

4.2.2 Regulated vegetation

The DoR Vegetation Management Report identified three vegetation management categories occurring within the study area (Department of Resources, 2023b):

- Category B (remnant vegetation), throughout the Project area. This is predominantly present to the south of the Ross River in areas of mangrove, vegetated woodland and saltpans (refer to Section 4.2.1).
- Category R (reef-regrowth watercourse vegetation), mapped at the northern extent of the study area on the north and south bank of Ross River.
- Category X (non-remnant vegetation) to the centre and north of the alignment.

The field survey found that the desktop mapping of regulated vegetation within the study area was generally representative of the conditions on the ground apart from the following areas:

- The area of Category X vegetation mapped in the centre of the alignment was found to be remnant.
- The area of Category R vegetation to the northern side of the Ross River was found to be non-remnant consisting of concrete and rock cladding.
- Non-remnant vegetation was mapped along the cleared access tracks, roads reserve, powerline easements and fence lines. The Southern Port Road was mapped as Category B, this area and several other easements and access tracks were ground-truthed as non-remnant. An area in the centre of the alignment mapped as non-remnant, field surveys identified this area as remnant.
- Category B vegetation was ground-truthed within the remainder of the study area except on the south bank of Ross River adjacent to the Southern Port Road where the pipeline crosses the river, which contains Category C (associated with high-value regrowth RE 11.2.2).
- The Project area consists of Category B and Category X vegetation.

The total areas of each regulated vegetation category within the Project area and study area are provided in Table 5.

Table 5 Regulated vegetation categories within the study area and Project area

RVM category	Area (ha)	
	Study area	Project area
Category B	119.57	5.47
Category C	0.23	0.00
Category X	15.39	1.59
Water	3.77	0.00
Total	138.96	7.06

4.2.3 Regulated vegetation within a defined distance to a watercourse

Within the study area, Ross River and its tributaries are mapped and were confirmed during the field surveys, as containing regulated vegetation (Category B) within a defined distance to a watercourse.

4.2.4 Regulated vegetation within 100 m of a wetland

There is no regulated vegetation within 100 m of a wetland mapped within the study area. Field surveys confirmed Queensland government mapping.

4.2.5 Threatened ecological communities

The desktop assessment identified the *semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar bioregions* TEC as potentially occurring within the study area. However, no TECs were identified during field surveys within the study area.

The detailed likelihood of occurrence assessment is provided in Appendix D.

4.2.6 Flora species diversity

The field surveys identified the presence of 53 taxa representing 17 families, with the full species list provided in Appendix C. The dominant families were *Poaceae* (15 taxa), followed by *Leguminosae* (9 taxa) and *Chenopodiaceae* (5 taxa).

4.2.7 Conservation significant flora species

The desktop assessment identified 15 conservation significant flora species as having the potential to occur within 20 km of the study area. However, no conservation significant species were identified during the field survey.

Only one NC Act listed plant is considered to have potential to occur within the study area (*Paspalidium udum*). This species was not detected during surveys, however it is considered a difficult to detect species (Collett and Williams, 2007) and the species' known populations in the Town Common occur in similar habitat which is also present in the study area.

All other conservation significant plants are considered unlikely to occur within the study area. The detailed likelihood of occurrence assessment is provided in Appendix D.

Table 6 Flora results of the likelihood of occurrence assessment for the study area

Species	EPBC Act status	NC Act status	Likelihood of occurrence
<i>Paspalidium udum</i>	-	V	Potential

¹ Conservation status under the EPBC Act where CE=Critically Endangered, E=Endangered, V=Vulnerable, Mi = Migratory.

² Conservation status under the NC Act where CE=Critically Endangered, E=Endangered, V=Vulnerable, SLC=Special Least Concern, LC=Least Concern.

4.2.8 Protected plants

The study area is not mapped as a 'high risk area' on the Protected Plants Flora Survey Trigger Map (Appendix B). No NC Act listed plants were identified during the field survey.

4.2.9 Marine plants

Marine plants are defined under *the Fisheries Act 1994* (Section 2.2.5). Marine plants were identified during the field survey to the north and south of the Project area associated with RE 11.1.1, 11.1.2 and 11.1.4. These species included *Tecticornia spp.*, *Dissocarpus biflorus*, *Fimbristylis polytrichoides* and *Sporobolus virginicus*. Species present below the Highest Astronomical Tide (HAT) line included marine plants which are described in a separate marine plants report.

4.2.10 Introduced flora species

A total of 29 introduced species including two WoNS were identified as potentially occurring by the desktop assessment. The field survey identified the following restricted species within the study area (Table 7).

Table 7 Weed species within the study area

Scientific Name	Common Name	Biosecurity Act Status	WoNS
<i>Cryptostegia grandiflora</i> *	Rubber vine	Restricted Matter Category 3	Yes
<i>Ziziphus mauritiana</i> *	Chinee apple	Restricted Matter Category 3	No

4.3 Fauna

A total of 74 native fauna species were recorded during the field survey comprised of 68 birds, five mammals and one amphibian. The full list of species is provided in Appendix C.

Fauna habitat in the study area primarily comprises grassland or forbland, mangrove forest and wooded areas associated with the sand berms. There are cleared areas along the powerline easement and access tracks representing low value habitat. Fauna habitat within the study area is presented in Figure 4 of Appendix A.

Habitat has been subjected to disturbance from weeds, pests, erosion and other edge effects associated with the Southern Port Road. However, microhabitat features are present within each of the habitat types, which provides habitat opportunities for several species. Table 4 and Table 8 outline the habitat types recorded within the study area.

Table 8 Fauna habitat types and descriptions

Habitat Type	Associated RE	Description	Study area (ha)	Project area (ha)
1) Bare saltpans and / or areas of sparse forblands and / or tussock grasslands (BVG: 35b).	11.1.1	This community offers a simple structure of vegetation compared to other communities in the landscape. There is predominantly a forb or grassland area available with sparse <i>Melaleuca</i> or <i>Corymbia</i> species present. The vegetation structure is tidally inundated and offers defensive line of sight and marginal foraging opportunities for migratory bird species such as the eastern curlew, Alaskan bar-tailed godwit, rufous fantail, satin flycatcher, oriental cuckoo, black-faced monarch and other migratory shorebird species. It is impacted by disturbance including powerline and pipeline easements, and unlawful 4WD activity.	68.1	3.38
	11.1.2			
2) Closed forests and low closed forests dominated by mangroves (BVG: 35a).	11.1.4	This community is tidally inundated and contains dense and open mangrove forests on marine clays. The tidal inundation is an important feature for fish, crabs and other marine species. The species may also provide foraging opportunities for species such as juvenile estuarine crocodiles and potentially water mouse. This habitat area hosts a flying fox roost adjacent to the study area.	34.5	0.00
3) Shrublands and grasslands on strand and foredunes. (BVG: 28a).	11.2.2	This small patch of regrowth grassland provides marginal foraging habitat for coastal species in the form of shrub and grasslands. This habitat was restricted to a small mosaic of patches in the north of the study area adjacent to the Ross River.	0.2	0.00
4) Open forests and low open forests in seasonally inundated swamps (BVG: 22b).	11.2.5	This community offers scattered shelter opportunities, such as hollows which would be suitable for arboreal species including the brushtail possum. The eucalypt canopy provides foraging resources for birds and bats. Structural complexity such as canopy, subcanopy, shrubs and grasses are present, however much of the ground and shrub layer is dominated by exotic species. Regardless, this may provide an important shelter resource for smaller birds and mammals.	16.9	2.09
5) Estuary	-	This area would provide foraging opportunities to marine species. The habitat is known to support estuarine crocodiles, dugongs and turtles and provides important foraging resources for migratory shorebirds.	3.8	0.00
6) Non-remnant	-	Non-remnant areas in within the study area included features such as road reserve, powerline easements and cleared areas. Some regrowth tree species are present in these areas, but the dominant species is typically weeds.	15.4	1.59

4.3.1 Fauna species diversity

The field surveys identified the presence of 74 fauna taxa including 68 birds, five mammals and one amphibian, with the full species list provided in Appendix C.

4.3.2 Conservation significant fauna species

The desktop assessment identified 94 threatened fauna species listed under the EPBC Act and / or NC Act with the potential to occur within the study area (Appendix D) which included 63 migratory species listed under the EPBC Act (Appendix B). The likelihood of occurrence assessment for these species is provided in Appendix D.

The following species were observed in the study area, located outside the Project area:

- Eastern curlew (*Numenius madagascariensis*), listed as critically endangered and migratory under the EPBC Act, and critically endangered under the NC Act
- Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*), listed as endangered and migratory under the EPBC Act, and endangered under the NC Act
- Sharp-tailed sandpiper (*Calidris acuminata*) listed as vulnerable and migratory under the EPBC Act, and vulnerable under the NC Act
- Whimbrel (*Numenius phaeopus*), osprey (*Pandion haliaetus* syn. *Pandion cristatus*), Caspian tern (*Hydroprogne caspia*) and crested tern (*Thalasseus bergii*) listed as migratory under the EPBC Act
- Short-beaked echidna (*Tachyglossus aculeatus*) listed as special least concern under the NC Act.

In addition, 44 conservation significant species were assessed as likely or potentially occurring in the study area (Table 9). A total of 28 migratory species are likely to occur, and 12 migratory species have the potential to occur in the study area.

The white-throated needletail and fork-tailed swift are predominantly aerial species which were considered as likely flyover visitors, therefore they would only sporadically utilise the airspace above the study area. Vegetation within the study area is unsuitable for these species to roost or forage.

The likelihood of occurrence assessment is provided in Appendix D.

Table 9 Fauna results of the likelihood of occurrence assessment for the study area

Species	Status		Habitat Types	
	EPBC Act ¹	NC Act ²	Potential	Habitat Type (Table 8)
Aerial				
White-throated needletail (<i>Hirundapus caudacutus</i>)	V / Mi	V	Likely	1,2,3,4,5 (Flyover only)
Fork-tailed swift (<i>Apus pacificus</i>)	Mi	SLC	Likely	1,2,3,4,5 (Flyover only)
Birds				
Sharp-tailed sandpiper (<i>Calidris acuminata</i>)	V / Mi	V	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Western Alaskan bar-tailed godwit (<i>Limosa lapponica baueri</i>)	E / Mi	E	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Eastern curlew (<i>Numenius madagascariensis</i>)	CE / Mi	CR	Known	1 (foraging and roosting), 3 (marginal foraging)
Ruddy turnstone (<i>Arenaria interpres</i>)	V / Mi	V	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)

Species	Status		Habitat Types	
	EPBC Act ¹	NC Act ²	Potential	Habitat Type (Table 8)
Red knot (<i>Calidris canutus</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Curlew sandpiper (<i>Calidris ferruginea</i>)	CR / Mi	CE	Likely	1 (foraging and roosting), 3 (marginal foraging)
Great knot (<i>Calidris tenuirostris</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Greater sand plover (<i>Charadrius leschenaultii</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Lesser sand plover (<i>Charadrius mongolus</i>)	E / Mi	E	Likely	1 (foraging and roosting), 3 (marginal foraging)
Beach stone-curlew (<i>Esacus magnirostris</i>)	-	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Black-tailed godwit (<i>Limosa limosa</i>)	E / Mi	E	Likely	1 (foraging and roosting), 3 (marginal foraging)
Grey plover (<i>Pluvialis squatarola</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Australian painted-snipe (<i>Rostratula australis</i>)	E	E	Likely	1 (foraging and roosting), 3 (marginal foraging)
Little tern (<i>Sternula albigula</i>)	V / Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Common greenshank (<i>Tringa nebularia</i>)	E / Mi	E	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Terek sandpiper (<i>Xenus cinereus</i>)	V / Mi	V	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Latham's snipe (<i>Gallinago hardwickii</i>)	V / Mi	V	Potential	1 (marginal foraging and roosting)
Migratory birds				
Whimbrel (<i>Numenius phaeopus</i>)	Mi	SLC	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Osprey (<i>Pandion haliaetus</i> syn. <i>Pandion cristatus</i>)	Mi	SLC	Known	1,2,3,4,5 (marginal breeding and foraging)
Crested tern (<i>Thalasseus bergii</i>)	Mi	SLC	Known	1 (foraging and roosting), 3 (marginal foraging)
Caspian tern (<i>Hydroprogne caspia</i>)	Mi	SLC	Known	1 (foraging and roosting), 3 (marginal foraging)
Common sandpiper (<i>Actitis hypoleucos</i>)	Mi	SLC	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Sanderling (<i>Calidris alba</i>)	Mi	SLC	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)

Species	Status		Habitat Types	
	EPBC Act ¹	NC Act ²	Potential	Habitat Type (Table 8)
Broad-billed sandpiper (<i>Calidris falcinellus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Pectoral sandpiper (<i>Calidris melanotos</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Red-necked stint (<i>Calidris ruficollis</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Oriental plover (<i>Charadrius veredus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
White-winged black tern (<i>Chlidonias leucopterus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging) 5 (foraging and dispersal)
Oriental cuckoo (<i>Cuculus optatus</i>)	Mi	SLC	Likely	4 (marginal breeding, foraging and dispersal)
Gull-billed tern (<i>Gelochelidon nilotica</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Oriental pratincole (<i>Glareola maldivarum</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Little curlew (<i>Numenius minutus</i>)	Mi	SLC	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)
Pacific golden plover (<i>Pluvialis fulva</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Common tern (<i>Sterna hirundo</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Marsh sandpiper (<i>Tringa stagnatilis</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Double-banded plover (<i>Charadrius bicinctus</i>)	Mi	SLC	Potential	1 (foraging and roosting), 3 (marginal foraging)
Lesser frigatebird (<i>Fregata ariel</i>)	Mi	SLC	Potential	5 (marginal foraging)
Great frigatebird (<i>Fregata minor</i>)	Mi	SLC	Potential	5 (marginal foraging)
Yellow wagtail (<i>Motacilla flava</i>)	Mi	SLC	Potential	1 (foraging and roosting), 2 (marginal foraging) 3 (marginal foraging)
Glossy ibis (<i>Plegadis falcinellus</i>)	Mi	SLC	Potential	1 (foraging and roosting),
Brown booby (<i>Sula leucogaster</i>)	Mi	SLC	Potential	5 (foraging and dispersal)
Grey-tailed tattler (<i>Tringa brevipes</i>)	Mi	SLC	Potential	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Wood sandpiper (<i>Tringa glareola</i>)	Mi	SLC	Potential	1 (foraging and roosting), 3 (marginal foraging)
Wandering tattler (<i>Tringa incana</i>)	Mi	SLC	Potential	3 (marginal foraging)

Species	Status		Habitat Types	
	EPBC Act ¹	NC Act ²	Potential	Habitat Type (Table 8)
Brown noddy (<i>Anous stolidus</i>)	Mi	SLC	Potential	5 (foraging and dispersal)
Mammals				
Short-beaked echidna (<i>Tachyglossus aculeatus</i>)	-	SLC	Known	1,2,3,5 (breeding, foraging and dispersal)
Bare-rumped sheath-tail bat (<i>Saccolaimus saccolaimus nudiclunatus</i>)	V	E	Potential	4 (marginal foraging and dispersal)
Water mouse (<i>Xeromys myoides</i>)	V	V	Potential	2 (breeding foraging and dispersal)
Reptiles				
Saltwater crocodile (<i>Crocodylus porosus</i>)	Mi	V	Likely	2,5 (foraging and dispersal)

¹ E = Endangered; V = Vulnerable; Mi = Migratory

² E = Endangered; V = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern.

4.3.3 Essential habitat

Essential habitat is identified from a combination of species habitat models and buffered species records. Essential habitat for protected wildlife is an area of vegetation identified as assessable vegetation on the Regulated Vegetation Management Map:

- that has at least three 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
- in which the protected wildlife, at any stage of its life cycle, is located.

The Project area includes mapped essential habitat for the following species:

- eastern curlew
- Western Alaskan bar-tailed godwit
- great knot
- estuarine crocodile.

These areas are mapped throughout the Project area to the southern side of the Ross River.

4.3.4 Introduced fauna species

A total of two introduced species listed under the *Biosecurity Act 2014* were identified within the study area (Table 10).

Table 10 Introduced pest species listed under the *Biosecurity Act 2014*

Common Name	Scientific Name	Biosecurity Act 2014 Category
Feral pig	<i>Sus scrofa</i> *	Category 3, 4, 6
Dog	<i>Canis lupus familiaris</i> *	Category 3, 4, 6

Introduced fauna recorded during field surveys that are not listed under the *Biosecurity Act 2014* included the brown rat (*Rattus norvegicus**). Other introduced fauna species likely to occur within the study area include the house mouse (*Mus musculus**), feral cat (*Felis catus**), European fox (*Vulpes vulpes**) black rat (*Rattus rattus**), or European rabbit (*Oryctolagus cuniculus**).

4.3.5 Fish passage

Constructing or raising barrier works in a waterway will trigger development applications if they are not considered accepted development under the DAF *Accepted Development Requirements for operational works that is constructing or raising waterway barrier works* (ADR) (Department of Agriculture and Fisheries, 2018). A key consideration in a waterway barrier application is providing for appropriate fish passage. Waterway determinations under the *Fisheries Act 1994* use several colours to identify their level of risk of impact on fisheries. These are as follows (Department of Agriculture and Fisheries, 2023):

- low risk (green)
- moderate risk (amber)
- high risk (red)
- major risk (purple)
- tidal (grey).

The study area is mapped as a tidal (grey) area for fish passage.

4.4 Wetlands and watercourses

The Project is located at the mouth of the Ross River in north Queensland. The Ross catchment covers 1,707 km² (1% of the Burdekin region). Rainfall averages in the region 1,124 mm a year, which results in river discharges to the coast of about 543 GL each year (Queensland Government and Australian Government, 2017). This river acts as an important movement corridor and provides habitat for a wide array of species in the region.

There are no other streams or wetlands within the study area outside of the Ross River.

4.5 Landscape connectivity

A review of the Queensland Biodiversity Protection Area (BPA) corridor mapping identified State level biodiversity areas occurring within the study area (Queensland Department of Environment and Science, 2018). Fauna have limited movement opportunities throughout the study area, particularly due to the lack of cover and concealment in the areas of claypans and grasslands. The Southern Port Road is a substantial barrier to movement for fauna in the area.

The mangroves along the Ross River provide important corridors for landscape connectivity, this tidal riparian vegetation is generally in good condition, however, weeds such as *Megathyrsus maximus** and pest animals including feral pigs and dogs are present. Invasive weed species may impede life-cycle dependent migrations for economically important fish species such as barramundi, sea mullet and long-fin eels (WetlandInfo, 2025).

5.0 Matters of National Environmental Significance

A summary of MNES values identified within the study area are presented in Table 11.

Table 11 MNES within the study area

MNES Value	Eastern Outfall Pressure Main MNES	
	Value Present?	Comments
World heritage Properties	Yes	Great Barrier Reef World Heritage Area is present in the estuary section of the study area. This area will be under bored, therefore potential Project impacts to the estuary are considered negligible.
National heritage Places	Yes	Great Barrier Reef National Heritage Area is present in the estuary section of the study area. This area will be under bored, therefore potential Projects impacts to the estuary are considered negligible.
Wetlands of international importance (listed under the Ramsar convention)	No	Bowling green bay is within 20 km of the study area.
Listed threatened species and ecological communities	Yes	Threatened fauna species are confirmed to occur within the study area (Sections 4.2.6 and 4.3.1)
Migratory species	Yes	Migratory shorebird roosting habitat and marginal foraging habitat is present within the study area (Section 4.3.1)
Commonwealth marine areas	No	N/A
Great Barrier Reef Marine Park	No	Great Barrier Reef Marine Park is not present in the study area.
Commonwealth Land	No	Several Defence establishments are within 20 km of the study area.
Nuclear Actions	No	N/A
Protection of water resources from coal seam gas development and large coal mining development	No	N/A

6.0 Matters of State Environmental Significance

A summary of MSES values identified within the study area are presented in Table 12. Where the value is considered present, assessment against the Significant Residual Impact Guidelines in relation to the Project activities is discussed in Appendix F.

Table 12 MSES values located within and immediately adjacent to the study area

Ecological Value	Value Present?	Comments
Regulated vegetation (endangered or of concern REs)	Yes	Regrowth RE 11.2.2 (Of concern) is present within the study area.
Regulated vegetation (within a mapped wetland)	No	N/A
Regulated vegetation (intersecting a watercourse)	No	The section of the Ross River that the Project intersects is not a watercourse under the <i>Water Act 2000</i> as it is tidally influenced.
Regulated vegetation: Essential habitat	Yes	The Project intersects essential habitat for migratory species and the estuarine crocodile.
Connectivity areas	No	The geospatial LFC Connectivity tool did not identify an impact to connectivity areas.
Wetlands and watercourses (wetland protection area (WPA), wetlands of high ecological significance (HES); or wetlands or watercourses in a high ecological value (HEV) water)	No	N/A
Designated precincts in Strategic Environmental Areas	No	N/A
Protected wildlife habitat	Yes	The Project intersects confirmed habitat for conservation significant species (Sections 4.2.6 and 4.3.1).
Protected areas (national parks, regional parks; and nature refuges)	Yes	Great Barrier Reef World Heritage Area is present in the estuary section of the study area. Furthermore, while not considered a national park, regional park or nature refuge, the Project partially intersects an environmental reserve created as part of the TPAR EPBC referral (lot 302 SP223355). This is represented and managed by DETSI.
Fish habitat areas and highly protected zones of State Marine Parks	No	N/A
Waterways providing for fish passage	Yes	The study area is predominately mapped as tidal (grey) for waterway barrier works.
Marine plants	Yes	The Project area intersects marine plants below HAT.
Legally secured offset areas	No	While the environmental reserve (Lot 302 SP223355) was provided as part of the EPBC process, it is not formally considered an offset under the EPBC Act, the EPBC Act risk remains only for the potential presence, or presence of threatened species and migratory species or their habitat (i.e. the on-ground existing values).

7.0 Potential Environmental Impacts

The most significant impacts on ecological values from the Project will occur through disturbance of vegetation and microhabitat features during construction. Further information on the potential impacts associated with the Project is outlined below, as well as mitigation measures to minimise the potential impacts on flora and fauna values. The impacts discussed below assumes the Project area is the maximum direct impact required for the Project.

The current design of the Project includes under boring most of the claypan (RE 11.1.2) to the centre of the Project area, beneath the estuary of Ross River, the mangroves (RE 11.1.4) on the southern bank of Ross River and shrublands on dunes (RE 11.2.2) located at the point of pipeline crossing on the south bank of the River. The total length of under-bored pipeline is approximately 1320 m (44% of the total alignment length).

Where habitat clearing will not occur, these habitat types have been denoted with an asterisk (*) and are not considered at risk of direct impact.

Under bored sections are still subject to possible indirect impacts, which are detailed in Section 7.1.1.4.

7.1 Construction phase

7.1.1 Direct impacts

7.1.1.1 Vegetation clearing and habitat loss

Project design has been developed and refined to maximise use of disturbed areas, and to avoid and minimise vegetation clearing wherever feasible, however, due to the requirements of the Project, removal of native vegetation cannot be completely avoided.

The disturbance footprint has been aligned where possible with existing easements and access tracks which have been subject to previous vegetation removal and ground disturbance. Most of these easements have become highly degraded and providing minimal ecological value. HDD construction techniques will minimise and avoid impacts to vegetation where possible and the micro-siting of the entry and exit points will be refined to minimise requirements for clearing.

With these clearing avoiding measures in place, up to 5.47 ha of remnant vegetation may be cleared for the Project which is habitat for MNES listed threatened and migratory species. The impact of this loss varies for each species according to its utilisation of the Study Area and habitat requirements.

The maximum areas of vegetation clearing by vegetation community is shown in Table 13.

Table 13 Potential maximum clearing impacts to vegetation communities and habitat types in the Project area

Vegetation community	RE	VM Act class	BD Status	Condition	Project area (ha)	
					Temporary impact	Permanent impact
1) Bare saltpans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)	11.1.1	Least concern	No concern at present	Remnant	2.95	0.43
	11.1.2	Least concern	No concern at present	Remnant		
2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)*	11.1.4*	Least concern	No concern at present	Remnant	0.00	0.00
3) Complex of open shrublands and grasslands on strand and foredunes. (BVG: 28a)*	11.2.2*	Of concern	Of concern	Regrowth	0.00	0.00
4) Open forests and low open forests in	11.2.5	Least concern	No concern at present	Remnant	1.80	0.29

Vegetation community	RE	VM Act class	BD Status	Condition	Project area (ha)	
					Temporary impact	Permanent impact
seasonally inundated swamps (BVG: 22b).						
5) Estuary					0.00	0.00
6) Non-remnant					1.47	0.12
Total					6.22	0.84
					7.06	

* These REs will be under-bored and direct impacts avoided

7.1.1.2 Loss or alteration of conservation significant flora and fauna habitat

The maximum required clearing will impact on approximately 5.47 ha of remnant vegetated habitat for conservation significant species. The impact of this loss varies for each species according to its utilisation of the study area and habitat requirements. This is assessed for each known, likely or potentially occurring conservation significant species in Table 14.

Although direct impacts to certain habitat types will be avoided (see Table 13), to remain conservative, species utilisation of habitat types is considered in the broader study area as this indicates potential for species to occur in the vicinity, including the Project area.

Table 14 Potential impacts to conservation significant species habitat

Species	EPBC Act status ¹	NC Act status ²	Likelihood of occurrence	Habitat type utilisation	Direct impacts within the Project area (ha)
Birds					
Sharp-tailed sandpiper (<i>Calidris acuminata</i>)	V / Mi	V	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Western Alaskan bar-tailed godwit (<i>Limosa lapponica baueri</i>)	E / Mi	E	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Eastern curlew (<i>Numenius madagascariensis</i>)	CE / Mi	CR	Known	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Ruddy turnstone (<i>Arenaria interpres</i>)	V / Mi	V	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)	3.38 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Red knot (<i>Calidris canutus</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Curlew sandpiper (<i>Calidris ferruginea</i>)	CR / Mi	CE	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Great knot (<i>Calidris tenuirostris</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Greater sand plover (<i>Charadrius leschenaultii</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Lesser sand plover (<i>Charadrius mongolus</i>)	E / Mi	E	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Beach stone-curlew (<i>Esacus magnirostris</i>)	-	V	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
White-throated needletail	V / Mi	V	Likely	1,2,3,4,5 (flyover only)	5.47 ha (flyover only)

Species	EPBC Act status ¹	NC Act status ²	Likelihood of occurrence	Habitat type utilisation	Direct impacts within the Project area (ha)
<i>(Hirundapus caudacutus)</i>					
Black-tailed godwit <i>(Limosa limosa)</i>	E / Mi	E	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Grey plover <i>(Pluvialis squatarola)</i>	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Australian painted-snipe <i>(Rostratula australis)</i>	E	E	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Little tern <i>(Sternula albifrons)</i>	V / Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Common greenshank <i>(Tringa nebularia)</i>	E / Mi	E	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Terek sandpiper <i>(Xenus cinereus)</i>	V / Mi	V	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Latham's snipe <i>(Gallinago hardwickii)</i>	V, Mi	V	Potential	1 (marginal foraging and roosting)	3.38 ha remnant foraging and roosting
Migratory Birds					
Caspian tern <i>(Hydroprogne caspia)</i>	Mi	SLC	Known	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Whimbrel <i>(Numenius phaeopus)</i>	Mi	SLC	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Osprey <i>(Pandion haliaetus syn. Pandion cristatus)</i>	Mi	SLC	Known	1,2,3,4,5 (marginal breeding, foraging and dispersal)	5.47 ha marginal breeding foraging and dispersal

Species	EPBC Act status ¹	NC Act status ²	Likelihood of occurrence	Habitat type utilisation	Direct impacts within the Project area (ha)
Crested tern (<i>Thalasseus bergii</i>)	Mi	SLC	Known	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Common sandpiper (<i>Actitis hypoleucos</i>)	Mi	SLC	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Fork-tailed swift (<i>Apus pacificus</i>)	Mi	SLC	Likely	1,2,3,4,5 (flyover only)	5.47 ha (flyover only)
Sanderling (<i>Calidris alba</i>)	Mi	SLC	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)	3.38 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Broad-billed sandpiper (<i>Calidris falcinellus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Pectoral sandpiper (<i>Calidris melanotos</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Red-necked stint (<i>Calidris ruficollis</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Oriental plover (<i>Charadrius veredus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
White-winged black tern (<i>Chlidonias leucopterus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging) 5 (foraging and dispersal)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Oriental cuckoo (<i>Cuculus optatus</i>)	Mi	SLC	Likely	4 (marginal breeding, foraging and dispersal)	2.1 ha remnant marginal foraging and dispersal
Gull-billed tern (<i>Gelochelidon nilotica</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Oriental pratincole (<i>Glareola maldivarum</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Little curlew	Mi	SLC	Likely	1 (marginal foraging and roosting),	3.38 ha remnant foraging and roosting

Species	EPBC Act status ¹	NC Act status ²	Likelihood of occurrence	Habitat type utilisation	Direct impacts within the Project area (ha)
<i>(Numenius minutus)</i>				3 (marginal foraging)	0.00 ha regrowth marginal foraging
Pacific golden plover (<i>Pluvialis fulva</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Common tern (<i>Sterna hirundo</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Marsh sandpiper (<i>Tringa stagnatilis</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Brown noddy (<i>Anous stolidus</i>)	Mi	SLC	Potential	5 (foraging and dispersal)	0.00 ha foraging and dispersal
Double-banded plover (<i>Charadrius bicinctus</i>)	Mi	SLC	Potential	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging
Lesser frigatebird (<i>Fregata ariel</i>)	Mi	SLC	Potential	5 (marginal foraging)	0.00 ha foraging and dispersal
Great frigatebird (<i>Fregata minor</i>)	Mi	SLC	Potential	5 (marginal foraging)	0.00 ha foraging and dispersal
Yellow wagtail (<i>Motacilla flava</i>)	Mi	SLC	Potential	1 (foraging and roosting), 2 (marginal foraging) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging 0.00 ha regrowth marginal foraging
Glossy ibis (<i>Plegadis falcinellus</i>)	Mi	SLC	Potential	1 (foraging and roosting),	3.38 ha remnant foraging and roosting
Brown booby (<i>Sula leucogaster</i>)	Mi	SLC	Potential	5 (foraging and dispersal)	0.00 ha foraging and dispersal
Grey-tailed tattler (<i>Tringa brevipes</i>)	Mi	SLC	Potential	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha remnant marginal foraging and roosting 0.00 ha regrowth marginal foraging
Wood sandpiper (<i>Tringa glareola</i>)	Mi	SLC	Potential	1 (foraging and roosting), 3 (marginal foraging)	3.38 ha remnant foraging and roosting 0.00 ha regrowth marginal foraging

Species	EPBC Act status ¹	NC Act status ²	Likelihood of occurrence	Habitat type utilisation	Direct impacts within the Project area (ha)
Wandering tattler (<i>Tringa incana</i>)	Mi	SLC	Potential	3 (marginal foraging)	0.00 ha regrowth marginal foraging
Mammals					
Short-beaked echidna (<i>Tachyglossus aculeatus</i>)	-	SLC	Known	1,2,3,4 (breeding, foraging and dispersal)	5.47 ha breeding, foraging and dispersal
Bare-rumped sheath-tail bat (<i>Saccolaimus saccolaimus nudiclunatus</i>)	V	E	Potential	4 (marginal foraging and dispersal)	2.1 ha remnant foraging and dispersal
Water mouse (<i>Xeromys myoides</i>)	V	V	Potential	2 (breeding foraging and dispersal)	0.00 ha remnant breeding, foraging and dispersal
Reptiles					
Saltwater crocodile (<i>Crocodylus porosus</i>)	Mi	V	Likely	2,5 (foraging and dispersal)	0.00 ha (foraging and dispersal)
Total direct impacts to potential species habitat within the Project area					5.47 ha

¹ E = Endangered; V = Vulnerable; Mi = Migratory² E = Endangered; V = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern.

7.1.1.3 Habitat fragmentation

Fragmentation of habitat can impact on species' populations through several mechanisms including:

- Increasing edge effects
- Reducing gene flow between small, isolated populations, reducing the potential for species to adapt to environmental change
- Loss or severe modification of the interactions between species.

The removal of vegetation for the Project is primarily restricted to the habitat edge directly adjacent to the Southern Port Road and the Powerlink corridor which already presents an insurmountable barrier for some species. Clearing for the Project activities is likely to leave a strip of isolated vegetation between the Project area and the Southern Port Road, road corridor. While the powerline corridor presents an aerial barrier, the vegetation in the study area is predominantly ground cover tidal vegetation (beach scrub, forbs, saltpans and tidal grassland). As such, vegetation removal for the Project may result in a change to the shape or scale of remaining habitat fragments. This change is likely to be predominantly temporary as the pipeline will be buried post construction. However, permanent disturbance will occur associated with the permanent access track running parallel to the pipeline alignment (totalling 0.84 ha).

Given the small area of permanent impact and the existing impact due to the presence of the Southern Port Road immediately adjacent, impacts to the isolated vegetation is considered unlikely to reach an extent that it would reduce the carrying capacity or ecological function of the habitat for native species beyond existing levels.

Activity during construction may temporarily affect movement of some species. However, significant habitat fragmentation already exists in the study area associated with current road and powerline infrastructure, which may already act as barriers to movement for species sensitive to disturbance.

7.1.1.4 Disturbance, injury and mortality of fauna

Clearing of vegetation can result in injury or mortality of fauna, particularly ground dwelling fauna and arboreal mammals and reptiles as well as nesting birds. However, given the size of the Project area, presence of disturbance vectors, the sparseness of the vegetation and its habitat value, the impact on fauna populations is considered minimal.

Trenching may cause direct impacts to fauna species, with animals trapped within the trench confines. This may result in exposure to predation, drowning in tidally inundated areas, exhaustion and starvation.

Clearing of the pipeline corridor may cause indirect impacts to fauna species, such as an elevated risk of predation and altered dispersal behaviours (i.e. avoidance given the increased distance to cross). However, this is predominantly temporary as the pipeline will be buried post construction. A small area of permanent impact (0.84 ha) will occur associated with new access tracks running parallel to the pipeline, which are expected to be utilized during construction and for maintenance activities.

7.1.2 Indirect impacts

7.1.2.1 Impacts to fish passage

The Ross River is classified as a tidal (grey) waterway under the Fisheries Act. The Project alignment will be under bored in this location, and will not impact the bed or banks of the Fisheries Act waterway. Furthermore, works are not anticipated to act as a barrier to fish during tidal flows as they occur on the outer edge of the tidally influenced area and outside the bed and banks of the Ross River.

7.1.2.2 Weed species

Activities that may increase the risk of establishment of new weed infestations and proliferation of existing weeds include the following:

- Soil disturbance through vegetation clearance and construction activities
- Areas of ground remaining bare for extended periods will establish weed species where there is little competition from other species

- Increased vehicular traffic through the area during construction
- Importation of construction materials to the site which may harbour introduced species.

Weed infestations can degrade vegetation communities by increasing competition with native species, increasing fuel loads, reducing floristic diversity, altering the vegetation structure and habitat for native fauna species.

7.1.2.3 Pests and feral fauna

Three pest fauna species were identified during ecological surveys (brown rat, feral pig, feral dog) and the study area may support populations of a range of other species including: feral cat, cane toad, black rat, house mouse and European rabbit.

Given the limited extent of clearing and the ability of most of the potentially present feral species to persist in highly diverse habitats, it is unlikely that Project activities will result in the further proliferation of these species.

Trenching in the construction phase of the Project may enhance conditions which are favourable for the establishment and or proliferation of cane toad. Where trenches are inundated by rainfalls, this may increase artificial aquatic habitat, producing favourable conditions for cane toad breeding and proliferation. Lethal toxic poisoning through ingestion of the cane toad has been identified as the cause of local extinctions of northern quoll.

7.1.2.4 Activity and noise

During the construction phase, there will be an increase in noise and activity in the Project area as machinery undertakes clearing and other activities. When activity and noise is occurring in areas adjoining retained habitat, potential impacts may include:

- Reduced foraging ability by auditory predators due to increased background noise
- Increased risk of predation by visual predators due to increased background noise
- Increased potential for collisions with vehicles
- Human visitation causing disturbance to foraging or breeding behaviours.

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

Existing noise and lighting conditions in the Project area are typical of land adjacent to a high-speed motorway environment and are restricted to that created by passing vehicles. Construction and earthmoving associated with the Project, including vibrations during under-boring, may potentially cause disturbance to some fauna which may result in the temporary avoidance of the area for the duration of these activities. However these impacts, if they occur, are likely to be transitory.

7.1.2.5 Increased dust

Deposition of dust, sand and soil resulting from construction may have potential impacts on vegetation if excessive levels are sustained over extended periods. When dust settles on plant foliage it can reduce the amount of light penetration on the leaf surface, block and damage stomata, and slow rates of gas exchange and water loss (Farmer, 1993). Reduction in the ability to photosynthesise due to physical effects may result in reduced growth rates of vegetation and decreases in floral vigour and overall community health.

Given the level of works proposed and its duration, extensive dust impacts are considered unlikely.

7.2 Operation and maintenance phase

Potential impacts on MNES associated with the operation phase of the Project are considered to be very low as activities will be limited to periodic maintenance. Traversing maintenance vehicles may inadvertently introduce weeds and potentially collide with ground dwelling MNES resulting in injury or mortality.

8.0 Mitigation measures

Mitigation measures are presented below according to the mitigation hierarchy (avoid, minimise, and manage) to reduce or eliminate potential impacts to MNES and MSES relevant to the Project.

8.1 Avoidance and minimisation

The Project has been designed to avoid, to the greatest extent possible, areas of ecological value. This was achieved using the following approaches:

- Prioritising the co-location of the new pipeline alongside existing disturbance such as the Southern Port Road, powerline easement and existing EOPM infrastructure.
- The construction methodology will include under boring at areas with high ecological value. Recommendations made in an earlier design phase to increase the length of under-bored pipeline to avoid environmental impacts have been implemented in the latest design.

The initial design included only 300 m of under-boring in the Ross River section, which has now increased to over 900 m, avoiding impacts to high-value mangrove and forbland vegetation as well. Increasing the length of under-boring has also reduced the direct impact area by approximately 1.5 ha. The construction methodologies for HDD and open trenching have in-built mitigations within their procedures to avoid and minimise potential impacts from the activities as much as possible. Any residual risks linked to the construction phase will be managed through the implementation of a final CEMP by the selected construction contractor.

8.2 Construction mitigation and management measures

8.2.1 Vegetation clearing

Where removal of remnant vegetation cannot be avoided, a range of measures will be implemented to mitigate and manage the extent of impact to native vegetation communities. These include:

- Topsoil will be removed, stockpiled and reapplied in the same land zone from where it was removed for any rehabilitation works.
- Ensure the development of the design minimises clearing in sensitive environments, specifically riparian areas and areas ground-truthed as remnant to the greatest extent possible. Where clearing is required, landscape designs provide for the reinstatement of vegetation species that align with pre-clearing regional ecosystems and habitat for local fauna species.
- Construction workers will be inducted and trained to ensure they are aware of vegetation management measures including:
 - Clearing requirements and penalties (for over-clearing)
 - Exclusion zones
 - Sensitive areas
 - Approval conditions.
- If threatened flora locations are identified during construction and are to be retained within the disturbance footprint, they will be clearly marked out within the site induction. Further, the siting of infrastructure will avoid areas that may contain threatened flora species as a priority and where possible.
- A weed management program will be implemented. This includes the treatment of weeds prior to clearing and management of stockpiles (storage areas) to avoid the spread of weeds.

8.2.2 Loss or alteration of fauna habitat and habitat fragmentation

While the extent of vegetation clearing for the proposed works will mean that impacts to fauna and their habitat will occur, it will be managed through a range of measures including:

- Engaging suitably qualified fauna spotter-catchers to undertake pre-clearance habitat searches and be present during vegetation clearing activities to minimise fauna harm.

- Clear guidance in the final CEMP on areas to be cleared and retained, methods for clearing, role of the spotter-catcher and other relevant environmental protection matters.
- Identification and mapping of clear no-go zones to avoid disturbance to areas of sensitive vegetation and habitat; such as identified nests, potential breeding places, trees that are to be retained and important microhabitat for conservation significant species. Important microhabitat that will be avoided wherever possible including hollow bearing trees.
- Identification and clear marking of habitat trees that can be retained without compromising safety.
- Considering relocation of habitat features such as felled trees and logs to other areas where practical to provide microhabitat for fauna.
- Maintaining connectivity and fauna passage will be a priority at each design stage going forward. This will include staging works such that temporary barriers to fauna movement during construction (i.e. trenches) are restricted to smaller portions of the Project area at any one time.
- Planning and conducting vegetation clearing in a sequential manner, to allow fauna to escape to adjacent native vegetation.
- Minimising impacts to fish passage, migration and movement barriers where possible during design and construction of the instream works. Waterway works should be paused or completed, and bunds removed during highest astronomical tide.
- A Weed and Pest Management Plan will be developed and included in the CEMP, which will include the control of terrestrial and aquatic weeds and pests.

8.2.3 Disturbance, injury and mortality of fauna

Proposed mitigation measures to reduce the likelihood of injury or mortality to fauna include the following:

- Engage suitably qualified fauna spotter-catchers to undertake pre-clearance habitat searches and be present during vegetation clearing activities to minimise fauna harm. This should be undertaken in the woodland and mangrove areas of the Project. Fauna spotter-catchers will be used to capture and relocate fauna prior to clearing.
- Maintain a clear escape path at all times for ground fauna during construction works.
- Maintain a record of any injured, sick and dead vertebrate fauna before (by fauna spotter-catchers), during and after construction and operation. Any fauna injured by Project activities should be transported to a vet or recognised wildlife carer.
- Limit vegetation clearing and under-boring to daytime hours to reduce impacts from construction light, noise and vibration on nocturnal species.
- Monitor trenches regularly during construction to reduce the risk of fauna entrapment. Cover trenches and provide fauna furniture for escape opportunities where possible.
- Clear signage and enforcement of a speed limit on the access tracks to reduce potential for collisions leading to injury and death of fauna species that may occur on the tracks.

As outlined in the *Requirements for tampering with a protected animal breeding place in Queensland* (Department of Environment and Science, 2020b), a High-Risk Species Management Program (SMP) is required for the following species:

- Least concern animals that are colonial breeders, and therefore whose broader populations are at greater risk from the impacts of events at a single location.
- Special least concern animals (as prescribed in the Nature Conservation (Animals) Regulation 2020 (the Animals Regulation)).
- Near Threatened, Vulnerable, Endangered, Critically Endangered, or Extinct in the Wild Animals (as prescribed in the Animals Regulation).

While a Low Risk SMP will also be required for:

- Least concern animals (that aren't colonial breeders).

8.2.4 Introduction or spread of weeds and feral animals

The risk of the potential impacts related to the establishment and proliferation of weeds and feral animals should be mitigated and managed, through measures including in the CEMP. The Plan should include:

- Develop weed and pest management and mitigation measures prior to any works commencing. Consider measures to mitigate the establishment and or proliferation of cane toad, feral cats, feral dogs and weed species that are considered restricted matter.
- Identify the location of WONS and category 3 restricted invasive weeds in or adjacent to the Project area.
- Implement appropriate equipment hygiene practices, wash down protocols and inspections to prevent the spread of weeds and pathogens in accordance with the Biosecurity Act.
- Ensure that vehicles, machinery, and other plant and equipment are free from contaminants such as soil and weed seeds, to prevent the potential spread of weeds, infestations and/or pathogens (i.e., infectious agents).
- Implement appropriate erosion and sediment control measures (e.g., a containment dam, sandbags, silt curtains, etc.) to minimise potential contamination of aquatic and other receiving environments.
- Monitor trenches regularly during construction to identify ponding and potential cane toad breeding. If evidence of cane toad breeding is found, an eradication strategy will be developed to mitigate the proliferation of this species.
- The general biosecurity obligation under the Biosecurity Act requires a person to take reasonable and practical measures to minimise biosecurity risks.
- Pre-construction assessment and treatment of weed infestations in and around proposed site office and laydown areas, access routes and areas to be cleared.
- Site personnel and sub-contractors will be informed of Project biosecurity management practices and areas identified as high risk for spread of weeds through site inductions.
- Promote the awareness of weed management, by inclusion of weed issues, pictures, and procedures around the Project's common use areas.
- Management methods to control spread of weeds considered to be Restricted Matters must be in keeping with regional management practice or DPI pest control prescriptions.
- Construction machinery and equipment clean-up will be undertaken in a manner that isolates pollutants and prevents them from contaminating watercourses or surrounding areas.
- Undertake weed monitoring to identify and appropriately manage weeds.

8.2.5 Species-specific measures

Mitigation measures specific to the potentially occurring conservation significant species are detailed in Table 15.

Table 15 Species-specific mitigation measures

Value	Mitigation measure
Migratory bird species	• Pre-clearance surveys by a fauna spotter catcher will be undertaken in mapped habitat areas. • Weed wash down requirements for all vehicles coming into and exiting the study area. This will be strictly implemented as part of the Project CEMP to avoid the spread of weed species in and around the study area. • Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for

Value	Mitigation measure
	the entire study area and will have stringent focus around waterways and tidally inundated areas. • A 'soft' ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species. • The construction works near sensitive environmental areas should be conducted during daylight hours only to mitigate impacts to fauna species from noise and light. • Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful. • If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides. • If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.
Water mouse	• Pre-clearance surveys by a fauna spotter catcher will be undertaken in mapped habitat areas. • Weed wash down requirements for all vehicles coming into and exiting the study area. This will be strictly implemented as part of the Projects CEMP to avoid the spread of weed species in and around the study area. • Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire study area and will have stringent focus around waterways and tidally inundated areas. • Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful. • The construction works near sensitive environmental areas should be conducted during daylight hours only to mitigate impacts to fauna species from noise and light. • Clear signage and enforcement of a speed limit on the access tracks to reduce potential for collisions leading to injury and death of fauna species that may occur on the tracks.
Short-beaked echidna	• To mitigate the death of any short-beaked echidnas during construction, open trenches will be checked for trapped fauna in the morning and at the end of the day by a spotter catcher. • Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful. • Clear signage and enforcement of a speed limit on the access tracks to reduce potential for collisions leading to injury and death of fauna species that may occur on the tracks.

8.2.6 Disturbance of ASS

ASS have been identified as a potential exposure pathway for ecological receptors if works are not managed appropriately. Risks of ASS exposure should be managed within the CEMP to ensure that ecological receptors are not impacted.

8.2.7 Activity and noise

During the construction phase, activity in the disturbance footprint will increase, creating noise, generating dust, and spilling light as personnel and machinery undertake clearing and construction activities.

When activity and noise is occurring in areas adjoining retained habitat, potential mitigation measures will include:

- The selected Contractor will be required to develop a final CEMP, which will:
 - Outline the noise, vibration, and light mitigation measures such as:
 - Identify the appropriate construction noise targets, vibration limits and light escape targets informed by a baseline assessment conducted nearby
 - Nominate the measures to minimise adverse noise, vibration and light impacts to nearby sensitive receptors
 - Perform routine maintenance on construction vehicles to minimise noise and vibrations
 - Night works construction should be minimised near tidal zones and vegetated areas larger than a hectare, and will consider vehicle headlight tracking, night works lighting and security lighting to minimise light spill to sensitive receptors
 - Noise, vibration, and light-intensive activities will consider nearby sensitive receptors and implement appropriate mitigation measures such as scheduling work mid-morning or mid-afternoon
 - Comply with all federal, state, and local standards
 - A communications register will be used to record any complaints.
 - Outline the dust and poor air quality management strategies such as:
 - Dust and particulate concentrations to meet the *Environmental Protection (Air) Policy 2019* (EPP Air) requirements
 - Daily visual monitoring for dust production
 - Monthly dust deposition gauges
 - Maintaining construction equipment to ensure exhaust emissions are minimised where practicable
 - Use of water trucks on unsealed haul roads for dust suppression
 - Use of chute, screens, covers, etc. to limit dust generation from offloading/handling materials
 - Dust from open sources such as stockpiles can be mitigated by compaction, enclosures, covers and increasing moisture content. Other measures may include locating stockpiles behind a wind break, using water sprays or binders to avoid the wind lifting the material.
- Considerations and management of interactions with fauna.
- The use of targeted lighting during night works to reduce 'light spill' into adjacent high value habitat.

8.3 Operation and maintenance phase

Any impacts during this phase would be mitigated through implementation of the CEMP and specific controls like weed hygiene procedures and site speed limits.

8.4 Monitoring and reporting

Ongoing monitoring and reporting will be undertaken by the Construction Contractor during construction activities. The monitoring and reporting regime will help track mitigation measures and the impacts the construction activities have on the environment. The routine monitoring regime includes:

- Informal daily site observations are to be recorded in site diaries
- Exclusion/buffer zones, barriers and excavations will be routinely inspected and maintained for trapped fauna
- General monitoring of construction area and activities for evidence of adverse impact
- Photographic evidence of the mitigation measures (management practices) during substantial flora removal or pruning.

The reporting regime will detail the outcomes of the monitoring regime (above) while also including:

- Field observations, fauna relocations and any other incidents involving flora and fauna will be reported (into a suitable reporting system) and communicated to all staff during toolbox, pre-starts, and team meetings.
- Flora and fauna complaints will be treated as an incident. The cause and impacts of the issues will be determined, documented and mitigation measures implemented to address them.
- Project specific Species Management Plans/Programs reporting to be completed in accordance with the specific Species Management Plans conditions.
- Incidents that have caused or likely to cause material harm will be reported to DETSI.

9.0 MNES Significant Impact Assessment

Potential impacts have been considered for MNES that are known to occur within the study area or assessed as potentially present. This includes threatened and migratory species and associated habitats. MNES identified as unlikely to be present have not been further considered.

For the purpose of this assessment, it has been assumed that the Project area is the maximum direct impact required for the Project.

9.1 Screening assessment

As detailed in Section 3.5, MNES values within the study area may be directly or indirectly impacted by the development of the Project. However, the overall risk to MNES values, that is the risk of Project impacts constituting an impact which is “important, notable, or of consequence, having regard to its context or intensity”, will differ based on a combination of factors including the community or species’ ecological characteristics and the likely consequence of such impacts.

As such, MNES values listed in Section 5.0 were screened in accordance with the framework detailed in Section 3.5.2 to identify MNES that are at low risk of potential Project impacts, and MNES that are at potential risk and require further assessment. The detailed screening assessments are presented in Appendix E, with results presented in Table 16.

Findings of the screening assessment determined six MNES species required further assessment. This was based on species listing status, possibility of meeting migratory shorebird flyway populations, cryptic nature or potential presence within the Project area. Two additional SIAs were undertaken for ‘migratory shorebird species’ (grouped as detailed in **Table 40**) and ‘migratory terrestrial bird species’ (as detailed in **Table 45**) to further support the Project’s approvals pathway.

Table 16 Outcome of screening assessments for MNES species and communities

Species	Likelihood of occurrence	Habitat type utilisation	Screening Assessment Outcome
Eastern curlew (<i>Numenius madagascariensis</i>)	Known	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, however further assessment recommended for certainty (Appendix E)
Great knot (<i>Calidris tenuirostris</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, however further assessment recommended for certainty (Appendix E)
Whimbrel (<i>Numenius phaeopus</i>)	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	Low risk – significant impact is unlikely, however further assessment recommended for certainty (Appendix E)
Water mouse (<i>Xeromys myoides</i>)	Potential	2 (breeding foraging and dispersal)	Low risk – significant impact is unlikely, however further assessment recommended for certainty (Appendix E)
Western Alaskan bar-tailed godwit (<i>Limosa lapponica baueri</i>)	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	Low risk – significant impact is unlikely, however further assessment recommended for certainty (Appendix E)
White-throated needletail (<i>Hirundapus caudacutus</i>)	Likely	1,2,3,4,5 (flyover only)	Low risk – significant impact is unlikely, no further assessment recommended
Curlew sandpiper (<i>Calidris ferruginea</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended

Species	Likelihood of occurrence	Habitat type utilisation	Screening Assessment Outcome
Lesser sand plover (<i>Charadrius mongolus</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Red knot (<i>Calidris canutus</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Australian painted-snipe (<i>Rostratula australis</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Greater sand plover (<i>Charadrius leschenaultia</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Sharp-tailed sandpiper (<i>Calidris acuminata</i>)	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	Low risk – significant impact is unlikely, however further assessment recommended for certainty (Appendix E)
Caspian tern (<i>Hydroprogne caspia</i>)	Known	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Crested tern (<i>Thalasseus bergii</i>)	Known	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Osprey (<i>Pandion haliaetus</i> syn. <i>Pandion cristatus</i>)	Known	1,2,3,4,5 (marginal breeding, foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended
Fork-tailed swift (<i>Apus pacificus</i>)	Likely	1,2,3,4,5 (flyover only)	Low risk – significant impact is unlikely, no further assessment recommended
Pacific golden plover (<i>Pluvialis fulva</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Marsh sandpiper (<i>Tringa stagnatilis</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Common greenshank (<i>Tringa nebularia</i>)	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Sanderling (<i>Calidris alba</i>)	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Little tern (<i>Sternula albifrons</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Oriental plover (<i>Charadrius veredus</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Little curlew (<i>Numenius minutus</i>)	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended

Species	Likelihood of occurrence	Habitat type utilisation	Screening Assessment Outcome
Ruddy turnstone (<i>Arenaria interpres</i>)	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Black-tailed godwit (<i>Limosa limosa</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Terek sandpiper (<i>Xenus cinereus</i>)	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Common sandpiper (<i>Actitis hypoleucos</i>)	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Oriental cuckoo (<i>Cuculus optatus</i>)	Likely	4 (marginal breeding, foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended
Grey plover (<i>Pluvialis squatarola</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Red-necked stint (<i>Calidris ruficollis</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Pectoral sandpiper (<i>Calidris melanotos</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Oriental pratincole (<i>Glareola maldivarum</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
White-winged black tern (<i>Chlidonias leucopterus</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging) 5 (foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended
Gull-billed tern (<i>Gelochelidon nilotica</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Common tern (<i>Sterna hirundo</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Broad-billed sandpiper (<i>Calidris falcinellus</i>)	Likely	1 (foraging and roosting), 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Grey-tailed tattler (<i>Tringa brevipes</i>)	Potential	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Glossy ibis (<i>Plegadis falcinellus</i>)	Potential	1 (foraging and roosting),	Low risk – significant impact is unlikely, no further assessment recommended

Species	Likelihood of occurrence	Habitat type utilisation	Screening Assessment Outcome
Brown noddy (<i>Anous stolidus</i>)	Potential	5 (foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended
Lesser frigatebird (<i>Fregata ariel</i>)	Potential	5 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Great frigatebird (<i>Fregata minor</i>)	Potential	5 (marginal foraging)	Low risk – significant impact is unlikely, no further assessment recommended
Brown booby (<i>Sula leucogaster</i>)	Potential	5 (foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended
Latham's snipe (<i>Gallinago hardwickii</i>)	Potential	1 (marginal foraging and roosting)	Low risk – significant impact is unlikely, no further assessment recommended
Bare-rumped sheath-tail bat (<i>Saccolaimus nudiclunatus</i>)	Potential	4 (marginal foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended
Short-beaked echidna (<i>Tachyglossus aculeatus</i>)	Known	1,2,3,4 (breeding, foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended
Saltwater crocodile (<i>Crocodylus porosus</i>)	Likely	2,5 (foraging and dispersal)	Low risk – significant impact is unlikely, no further assessment recommended

9.2 Significant Impact Assessment

Despite a low risk of impacts identified for MNES species in the screening assessment, six species underwent a significant impact assessment (in addition to two groups of migratory birds). The results of the screening assessment and subsequent significant impact assessment are summarised in Appendix E. The results of this assessment supported the screening assessment; therefore, no species are considered to be at a risk of significant impact. This is due to the following factors:

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

A significant impact assessment was also conducted for World Heritage properties and National Heritage places, which determined it is unlikely that the Project will have a significant impact on the Great Barrier Reef World Heritage Area or Great Barrier Reef National Heritage Area.

10.0 Summary and Conclusions

This report has been prepared for TCC and outlines the ecology technical evaluation for the design phase of the Project. The scope of work included a baseline assessment of ecological values and identifies potential Project impacts. The assessment has informed the Project design development and will support required statutory approvals at a State and Commonwealth level.

Ecological values within the study area include remnant vegetation communities that support a range of habitat values for flora and fauna species, including conservation significant fauna species. Cleared areas associated with existing roads and agricultural land also occur throughout the study area and present existing connectivity barriers.

The following species were observed in the study area, located outside the Project area:

- Eastern curlew (*Numenius madagascariensis*), listed as critically endangered and migratory under the EPBC Act, and critically endangered under the NC Act
- Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*), listed as endangered and migratory under the EPBC Act, and endangered under the NC Act
- Sharp-tailed sandpiper (*Calidris acuminata*) listed as vulnerable and migratory under the EPBC Act, and vulnerable under the NC Act
- Whimbrel (*Numenius phaeopus*), osprey (*Pandion haliaetus* syn. *Pandion cristatus*), Caspian tern (*Hydroprogne caspia*) and crested tern (*Thalasseus bergii*) listed as migratory under the EPBC Act
- Short-beaked echidna (*Tachyglossus aculeatus*) listed as special least concern under the NC Act.

Potential direct and indirect impacts to ecological values, up to approximately 7.06 ha, may occur as a result of the Project. However, the Project design has avoided environmental impacts through habitat type 1 by under-boring the Ross River, clay pan and mangrove areas, which likely provide habitat for conservation-significant species. Only 0.84 ha of the total 7.06 ha disturbance footprint will be permanently impacted as a result of the proposed permanent access tracks. The remaining disturbed areas will have topsoil reinstated to allow for natural regeneration.

An impact assessment for known, likely and potentially occurring MNES within the study area was completed applying a two-step process. An initial screening assessment step identified six species recommended for further assessment of significant impacts (in addition to two groups of migratory birds). These species were further assessed applying *Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013). This second significant impact assessment step found that significant impacts to MNES was unlikely, on the basis that:

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

The significance assessment determined it is unlikely that the Project will have a significant impact on the Great Barrier Reef World Heritage Area or Great Barrier Reef National Heritage Area.

It is recommended that the Project is referred to DCCEEW, to formally confirm if assessment and approval under the EPBC Act is required.

Several MSES values were also identified within the study area, namely regulated vegetation, essential habitat, connectivity areas, protected wildlife habitat, protected areas, waterways providing fish passage and marine plants. Where required, these MSES values were subject to an impact assessment as per the MSES Significant Residual Impact Guidelines. The assessment determined the Project is likely to have a significant residual impact on marine plants. A development application will be required, including a Marine Plant Report, for significant residual impacts on marine plants. To compensate for the significant residual impact, offsets may be required.

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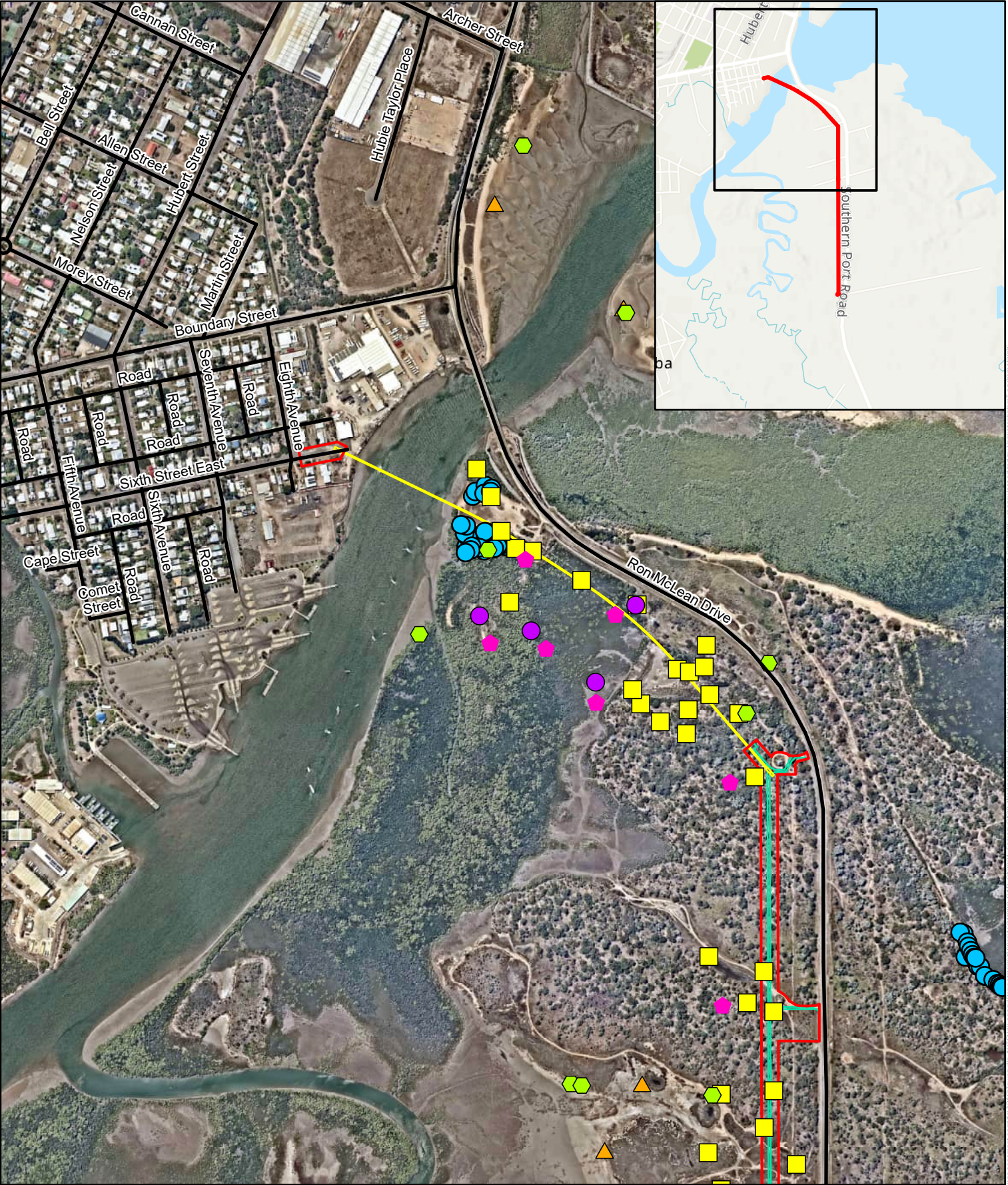
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Appendix A

Report Figures



AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 2-1**

Survey Sites

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Roads

Survey sites

- Camera trap sites (AECOM, 2023)

- ◆ Habitat assessment
- ◆ Fauna observation points
- ▲ Migratory shorebird survey sites
- Quaternary site
- Water mouse trapping sites (TEARC, 2019)

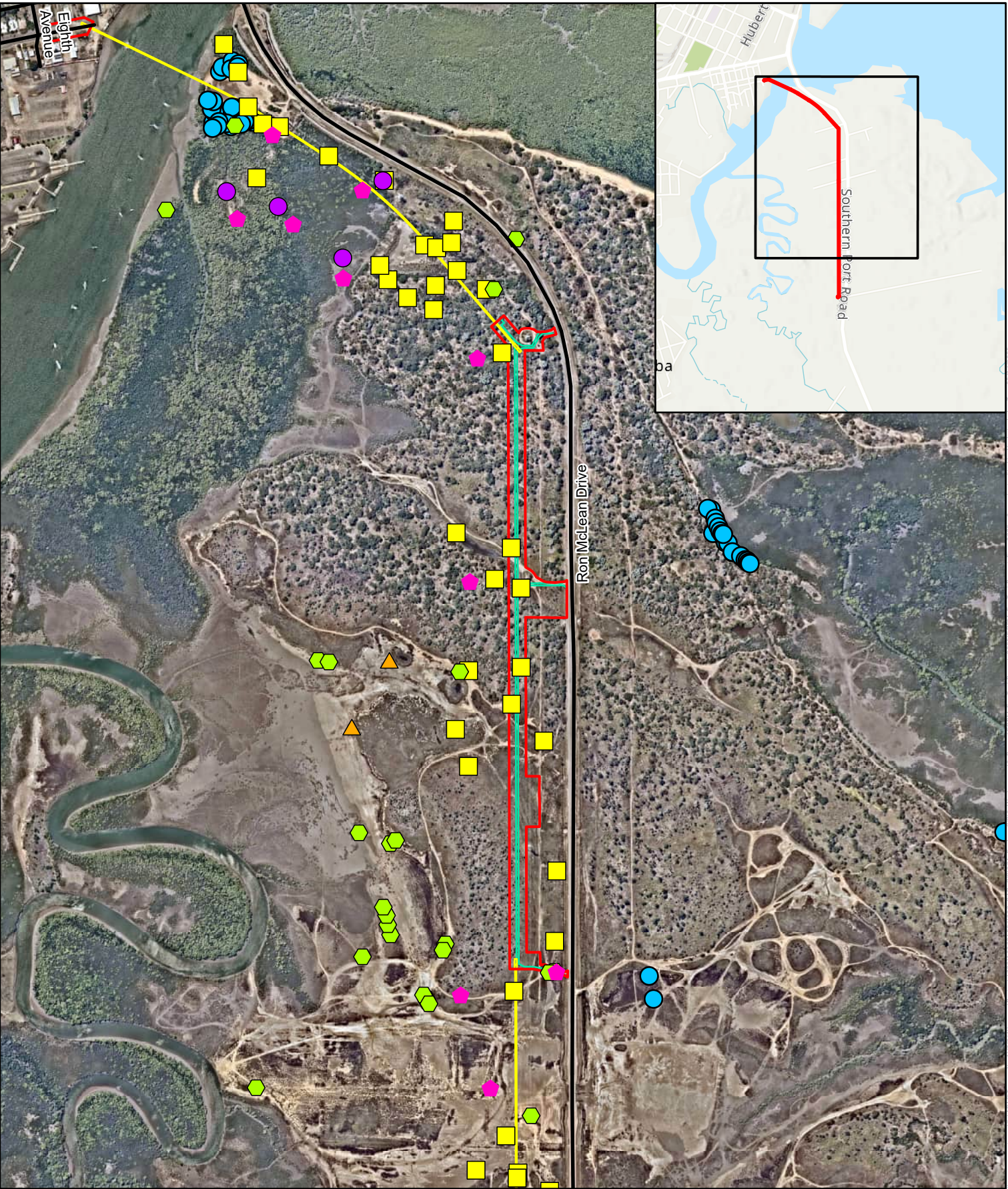
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AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 2-2**

Survey Sites

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Roads
- Habitat assessment
- Fauna observation points
- Migratory shorebird survey sites
- Quaternary site
- Water mouse trapping sites (TEARC, 2019)
- Camera trap sites (AECOM, 2023)

Survey sites

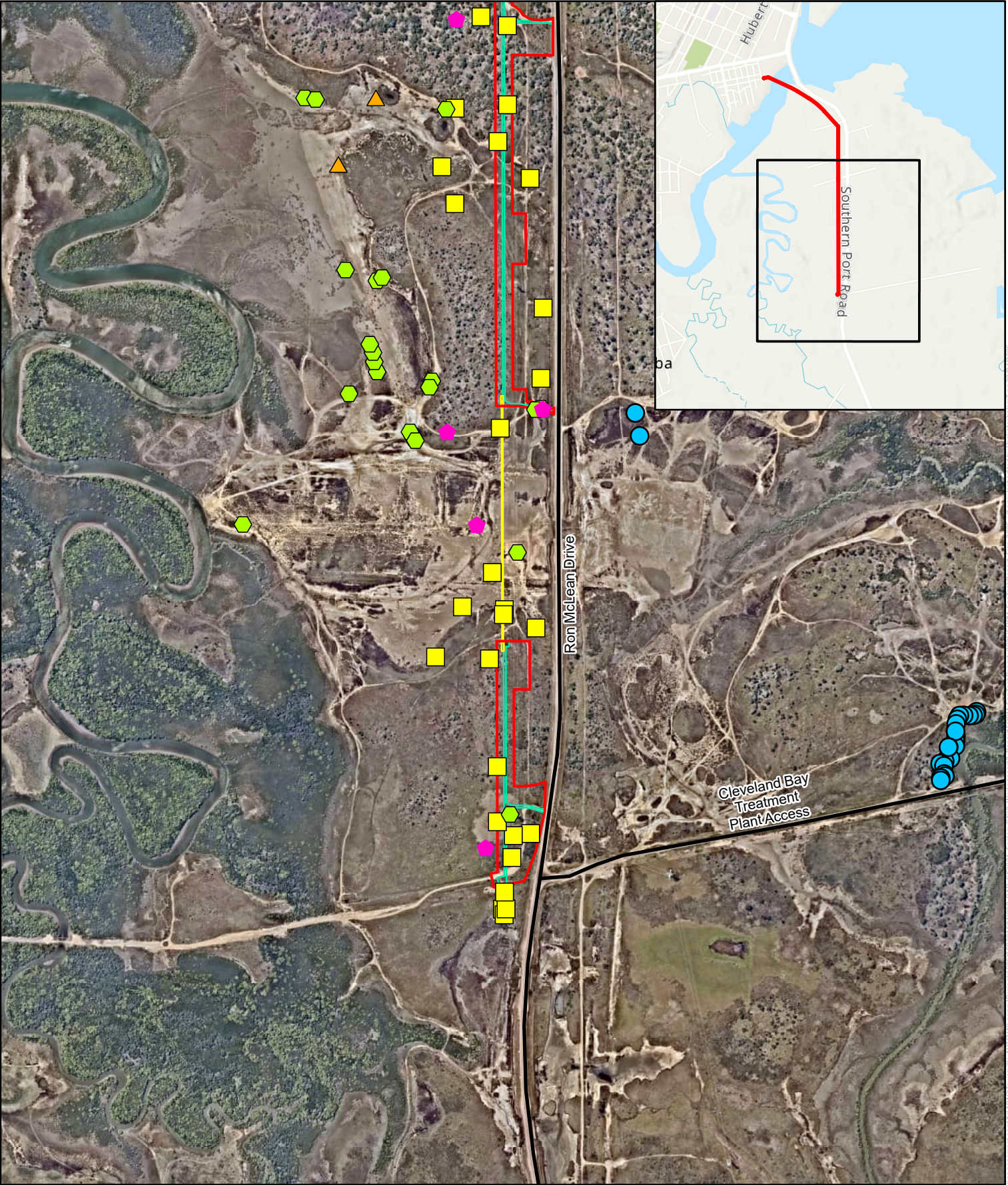
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AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 2-3**

Survey Sites

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Roads

Survey sites

- Camera trap sites (AECOM, 2023)

- Habitat assessment
- Fauna observation points
- Migratory shorebird survey sites
- Quaternary site
- Water mouse trapping sites (TEARC, 2019)

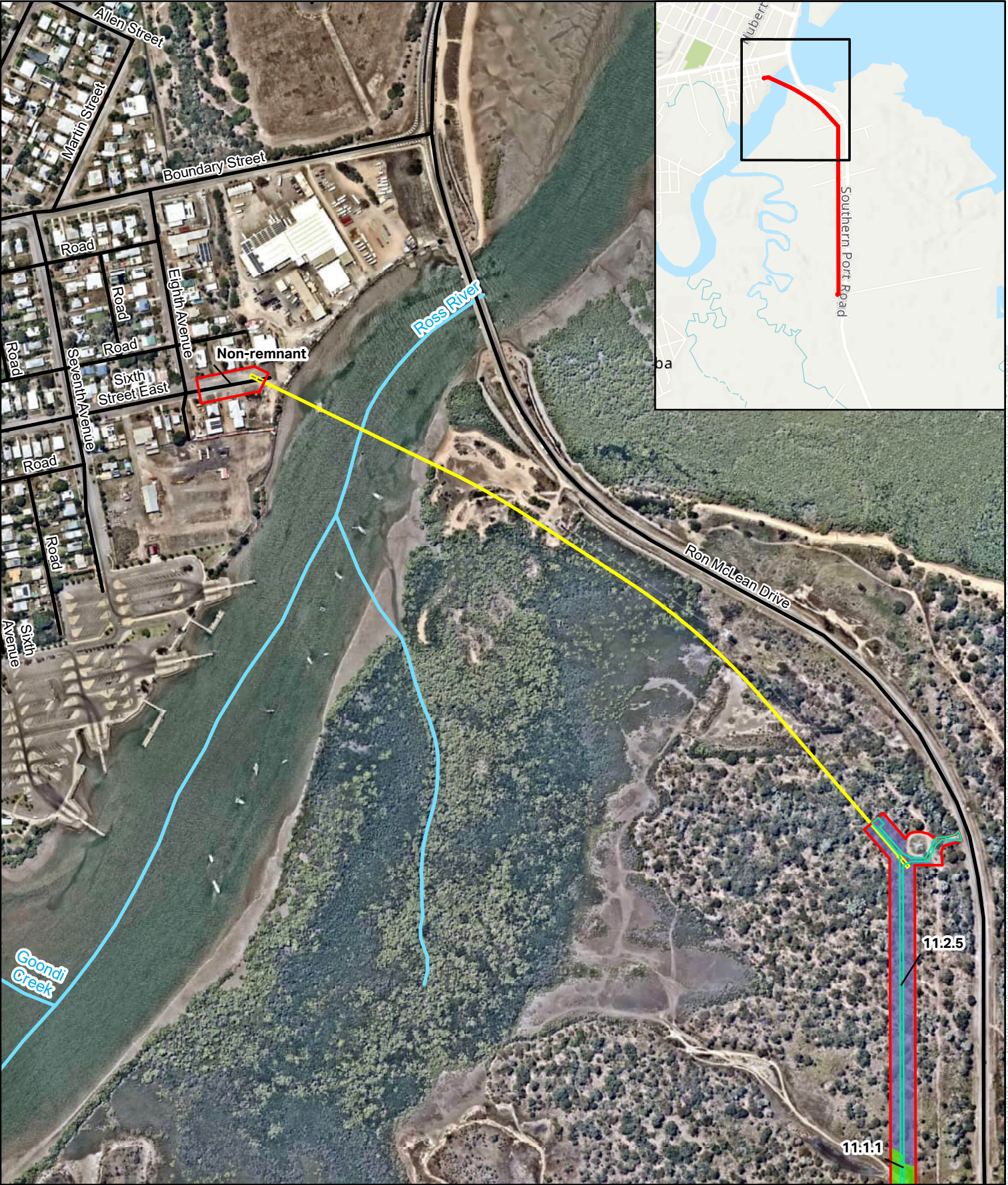
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Eastern Outfall Pressure Main

Figure 3-1

Ground-truthed

Regional Ecosystems

Legend

-  Project area
-  Permanent access tracks
-  Under-boring
-  Entry and exit pits
-  Roads
-  Watercourses

Regional Ecosystem

-  11.1.1 *Sporobolus virginicus* grassland on marine clay plains
-  11.1.2 Samphire forbland on marine clay plains
-  11.2.5 *Corymbia-Melaleuca* woodland complex of beach ridges and swales
-  Non-remnant

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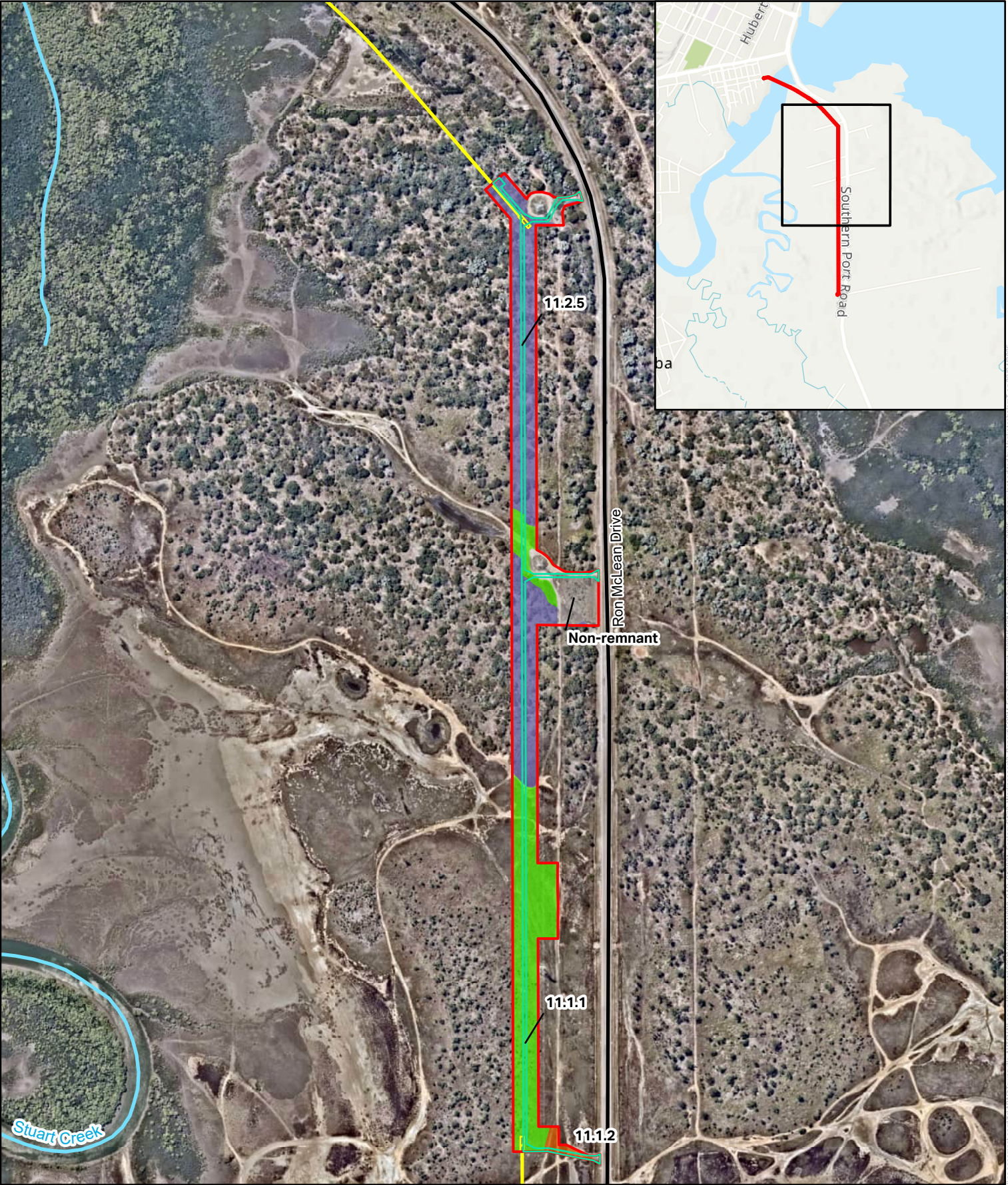
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AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 3-2
Ground-truthed
Regional Ecosystems**

Legend

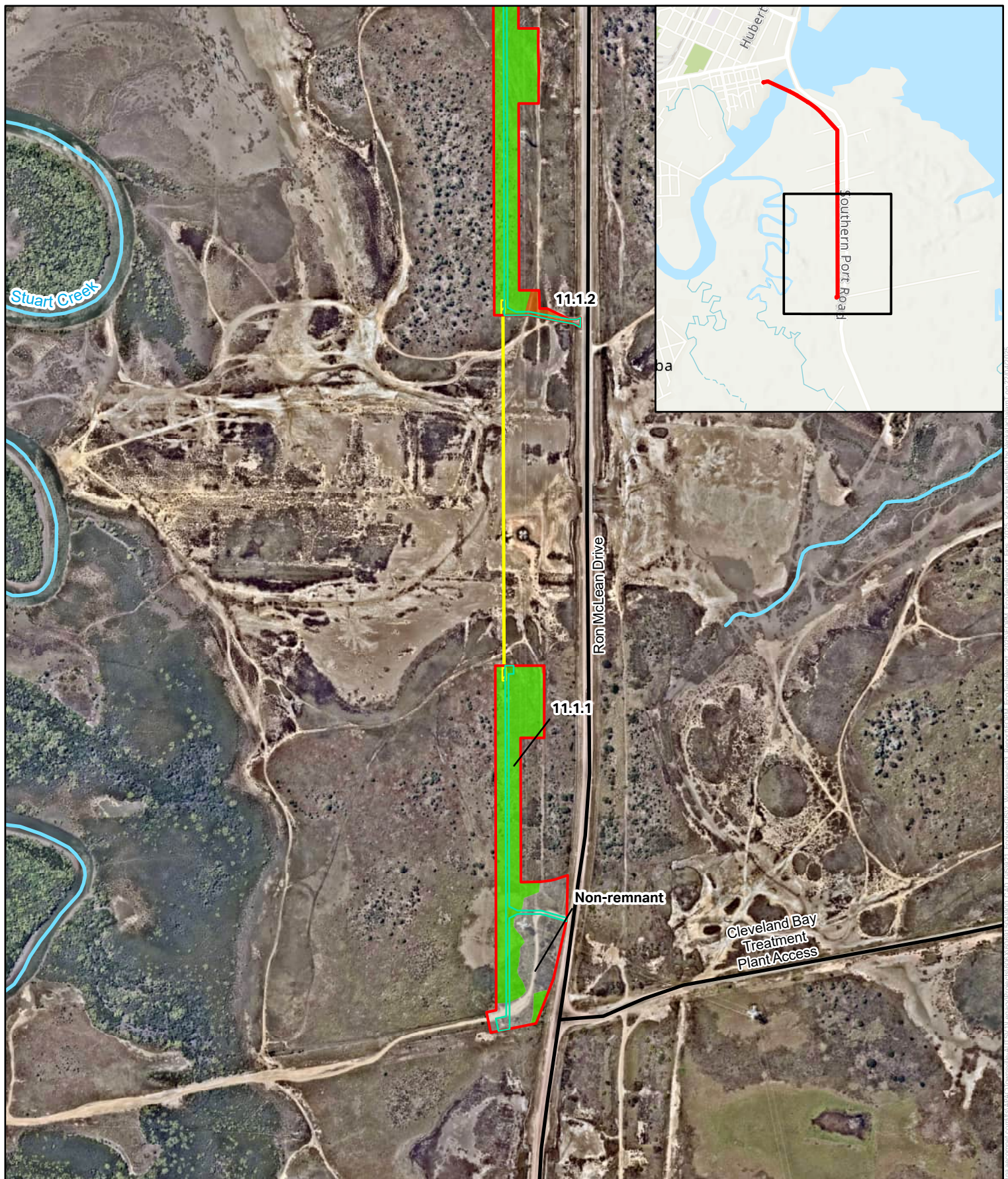
- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Roads
- Watercourses

Regional Ecosystem

- 11.1.1 *Sporobolus virginicus* grassland on marine clay plains
- 11.1.2 Samphire forbland on marine clay plains
- 11.2.5 *Corymbia-Melaleuca* woodland complex of beach ridges and swales
- Non-remnant

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AECOM



0 100 200
metres

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Roads
- Watercourses

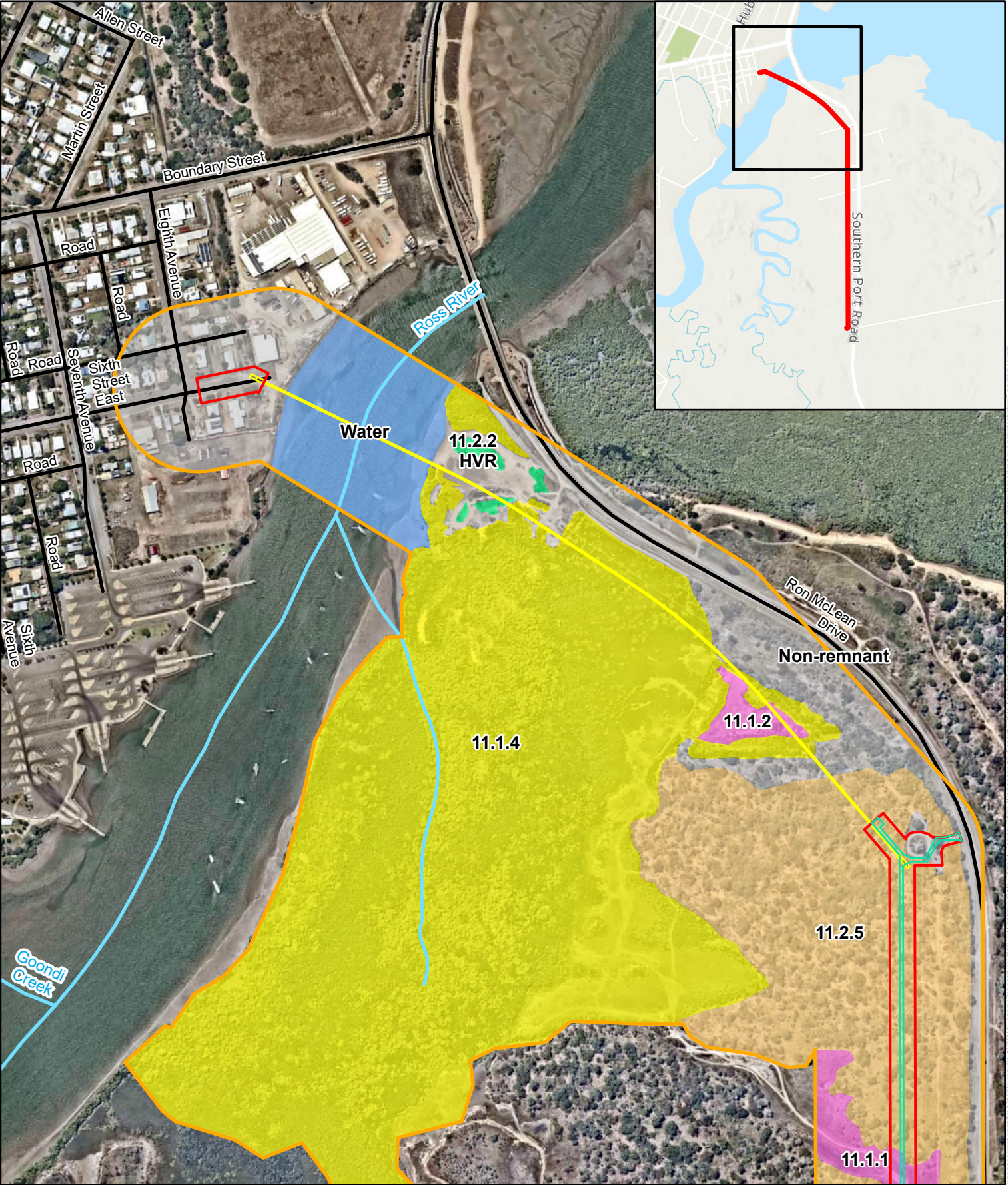
Regional Ecosystem

- 11.1.1 *Sporobolus virginicus* grassland on marine clay plains
- 11.1.2 Sampshire forbland on marine clay plains
- 11.2.5 *Corymbia-Melaleuca* woodland complex of beach ridges and swales
- Non-remnant

**Eastern Outfall Pressure Main
Figure 3-3
Ground-truthed
Regional Ecosystems**

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AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 4 - 1**

Vegetation Communities

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Roads
- Watercourses

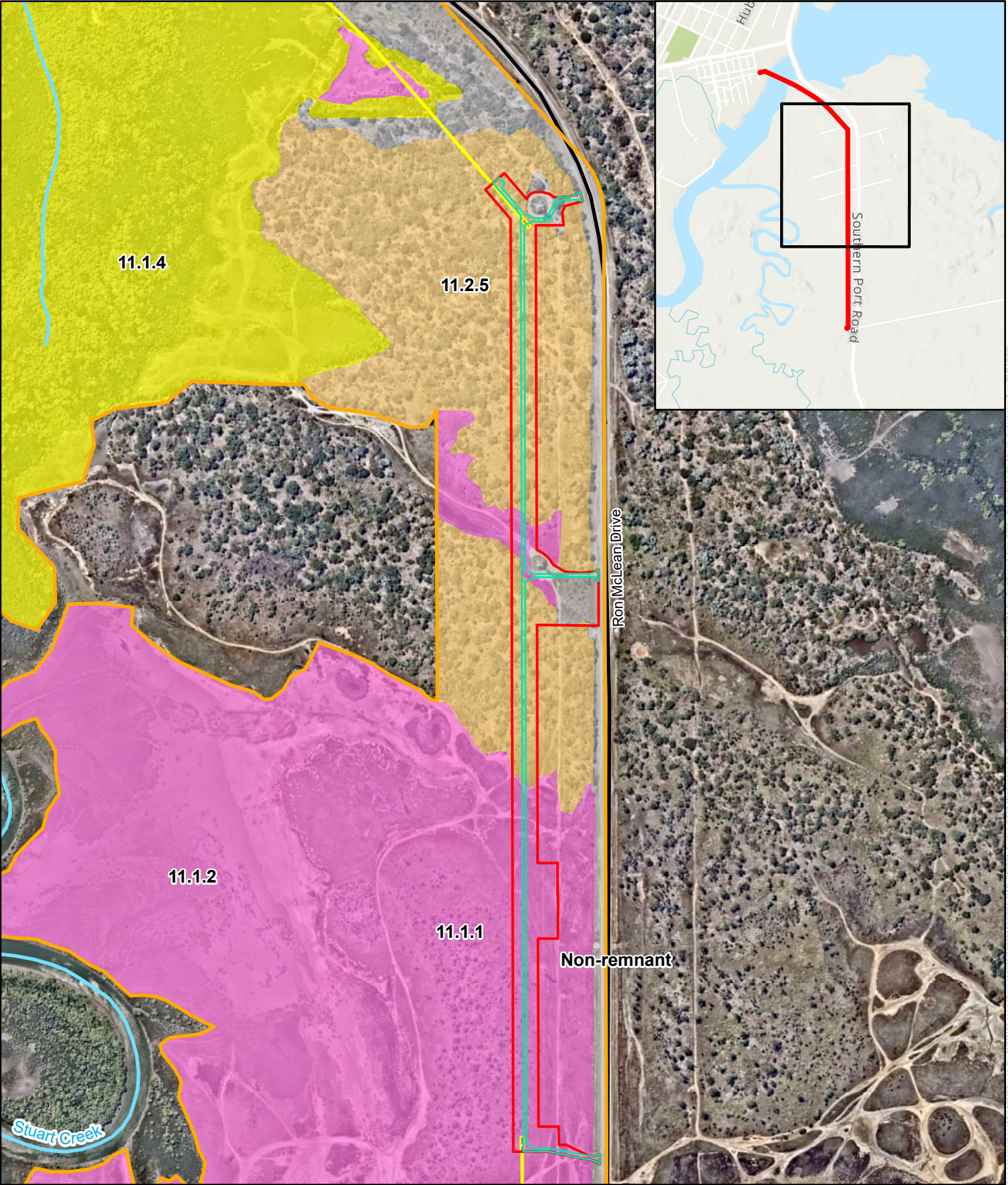
Vegetation Communities

- 1) Bare salt pans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)

- 2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)
- 3) Complex of open shrublands on strand and foredunes (BVG: 28a).
- 4) Open forests and low open forests in seasonally inundated swamps (BVG: 22b).
- 5) Estuary
- 6) Non-remnant

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AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 4 - 2**

Vegetation Communities

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Roads
- Watercourses

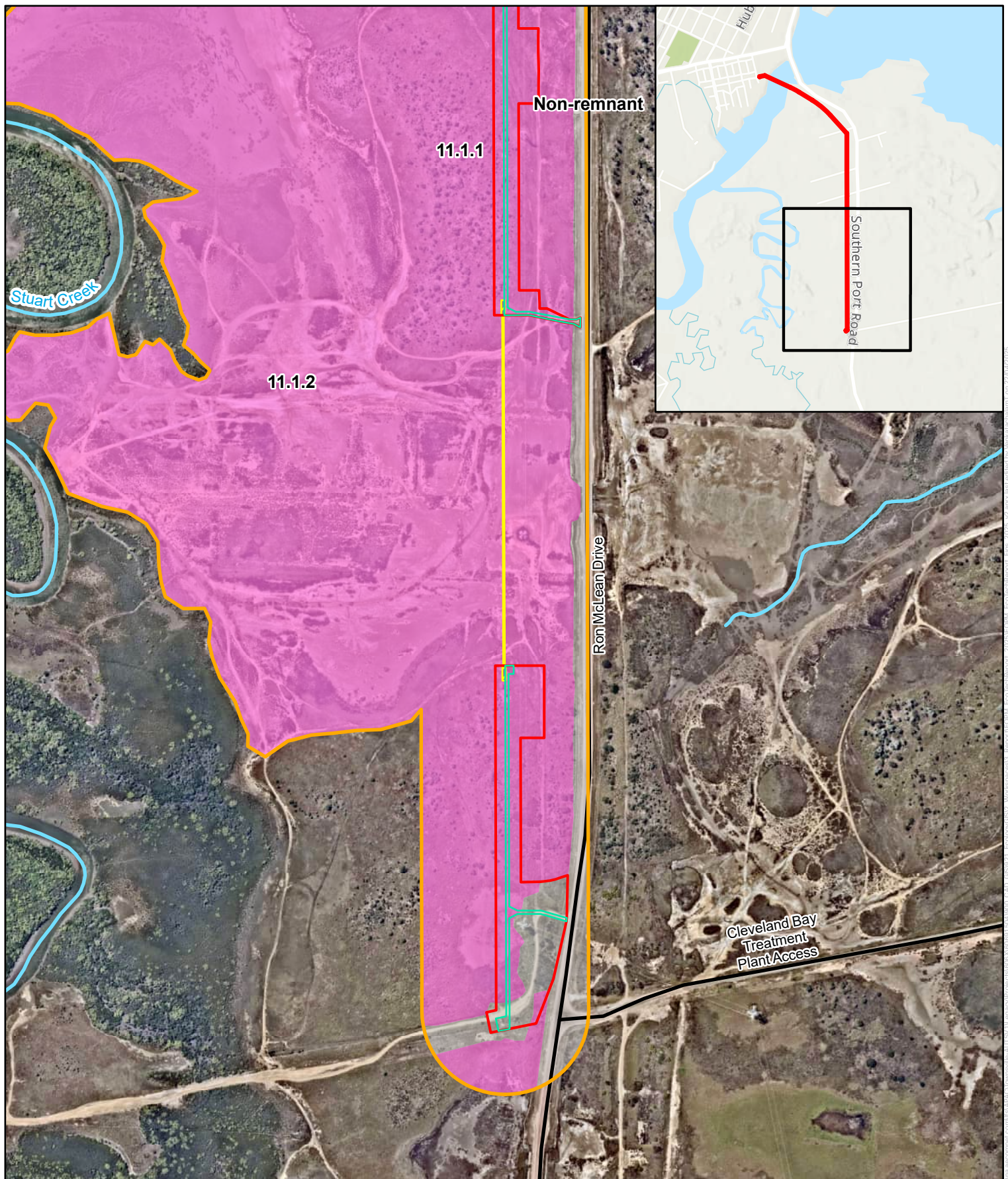
Vegetation Communities

- 1) Bare salt pans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)

- 2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)
- 3) Complex of open shrublands on strand and foredunes (BVG: 28a).
- 4) Open forests and low open forests in seasonally inundated swamps (BVG: 22b).
- 5) Estuary
- 6) Non-remnant

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AECOM



0 100 200
metres

**Eastern Outfall Pressure Main
Figure 4 - 3**

Vegetation Communities

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Roads
- Watercourses

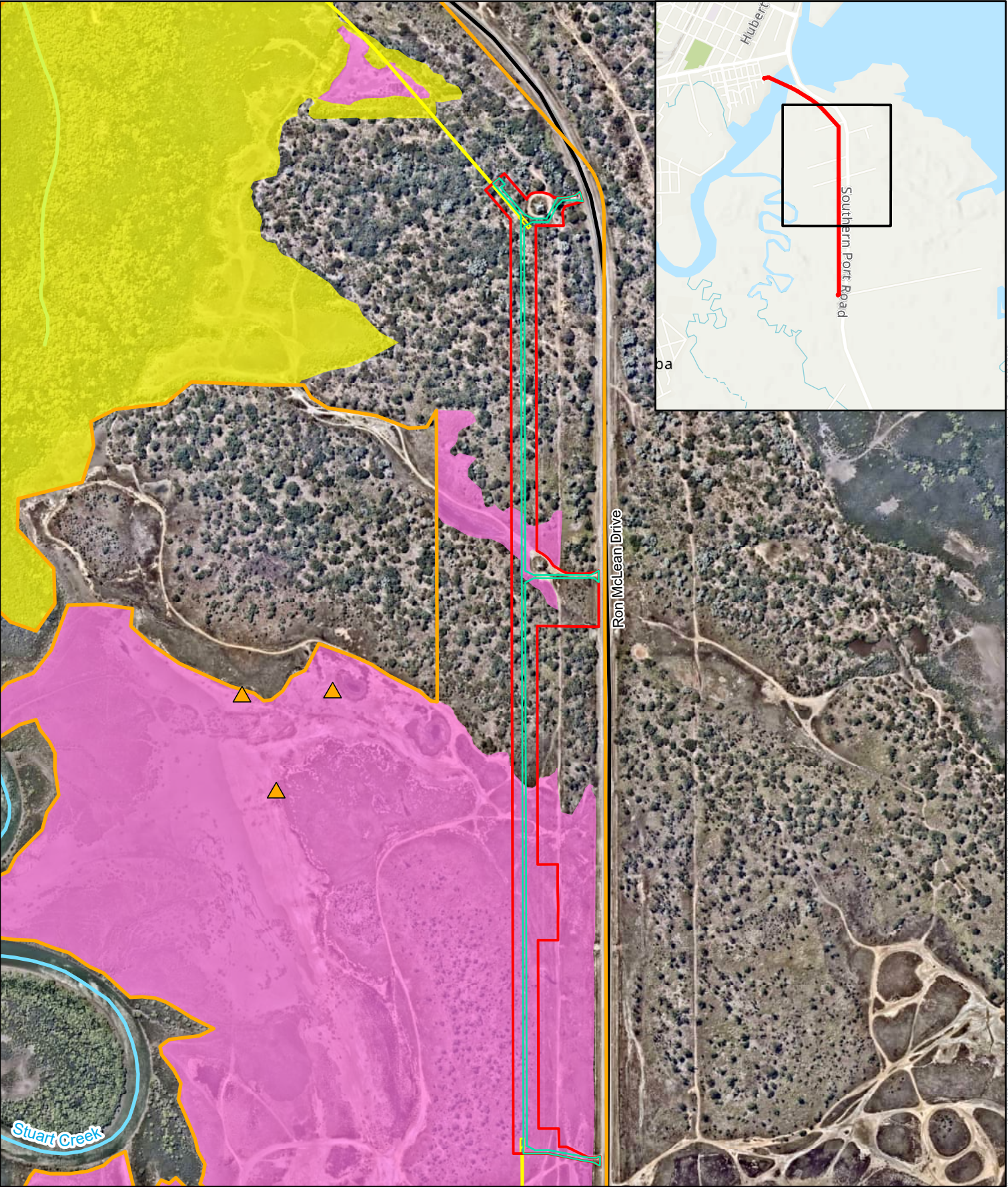
Vegetation Communities

- 1) Bare salt pans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)

- 2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)
- 3) Complex of open shrublands on strand and foredunes (BVG: 28a).
- 4) Open forests and low open forests in seasonally inundated swamps (BVG: 22b).
- 5) Estuary
- 6) Non-remnant

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AECOM



0 100 200
Meters

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Roads
- Watercourses

- ▲ Eastern curlew sightings

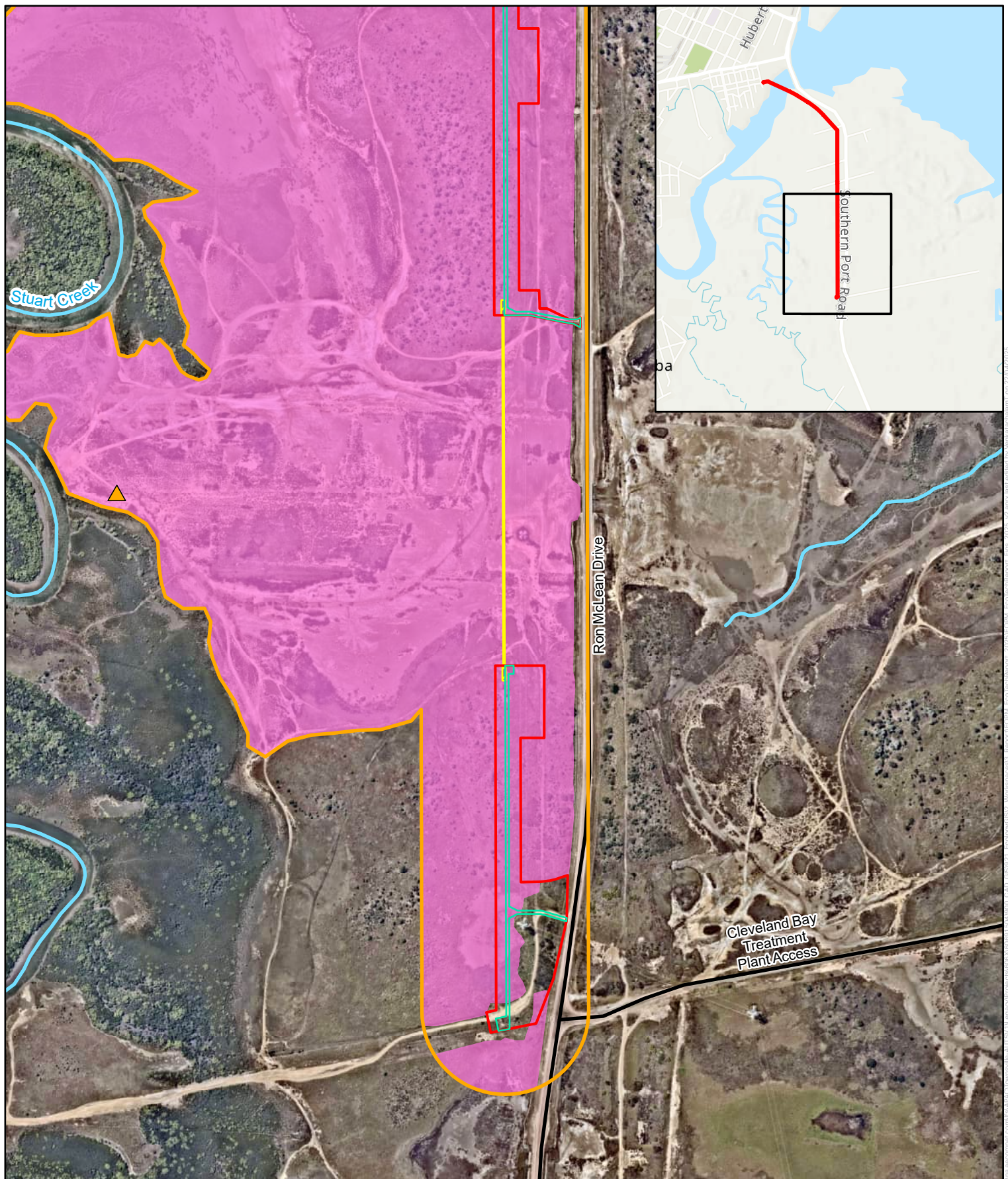
Vegetation Communities

- 1) Bare salt pans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)
- 2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)

Eastern Outfall Pressure Main
Figure 5-2
Eastern curlew and
great knot habitat

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AECOM



0 100 200
Meters

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Roads

- Watercourses
- ▲ Eastern curlew sightings

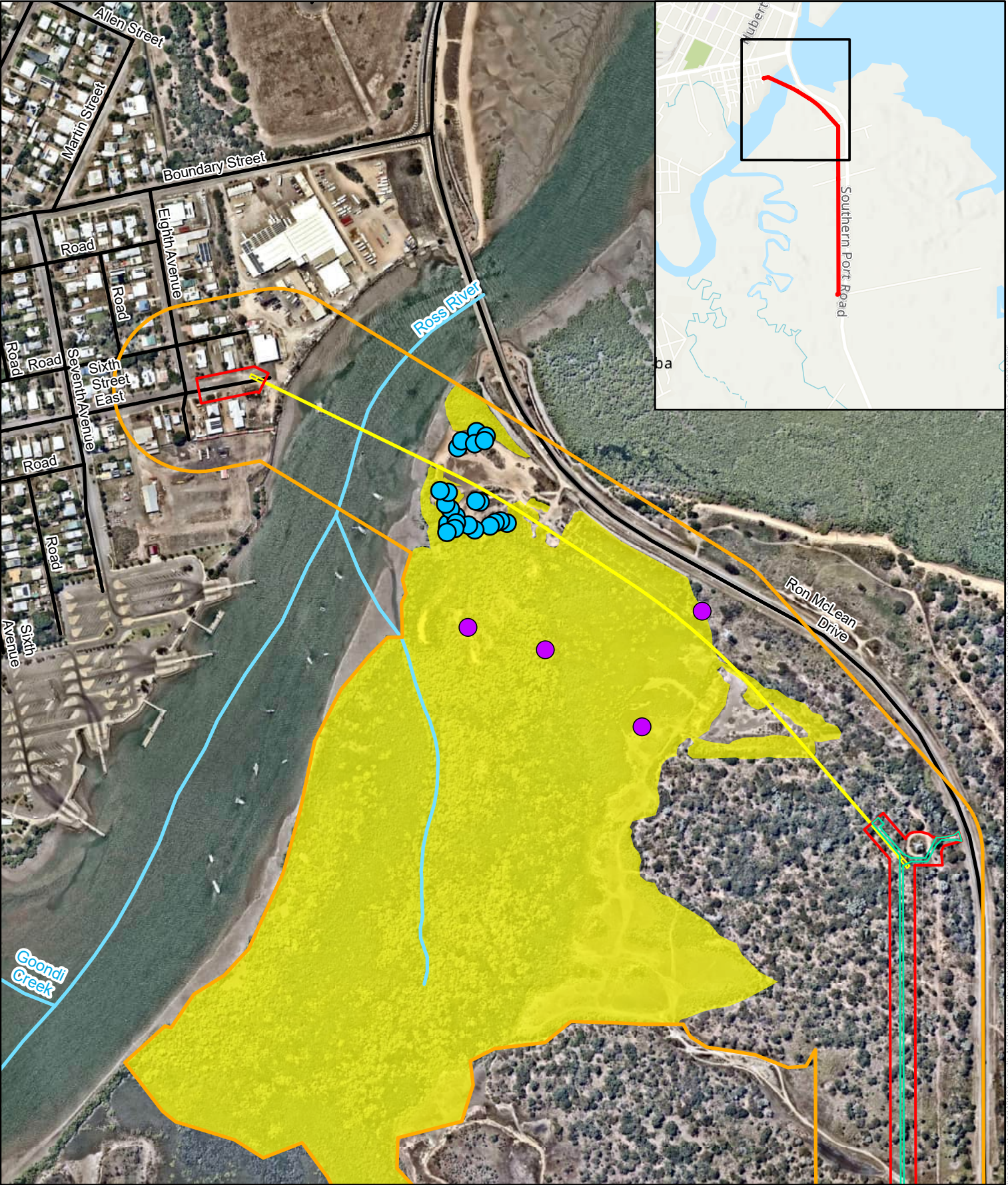
Vegetation Communities

- 1) Bare saltpans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)

Eastern Outfall Pressure Main
Figure 5-3
Eastern curlew and great knot habitat

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AECOM

0100200

Meters

N

Eastern Outfall Pressure Main

Figure 6-1

Water mouse habitat

Project area

Permanent access tracks

Under-boring

Entry and exit pits

Study area

Watercourses

Roads

Camera trap sites (AECOM, 2023)

Water mouse trapping sites (TEARC, 2019)

Vegetation Communities

2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)

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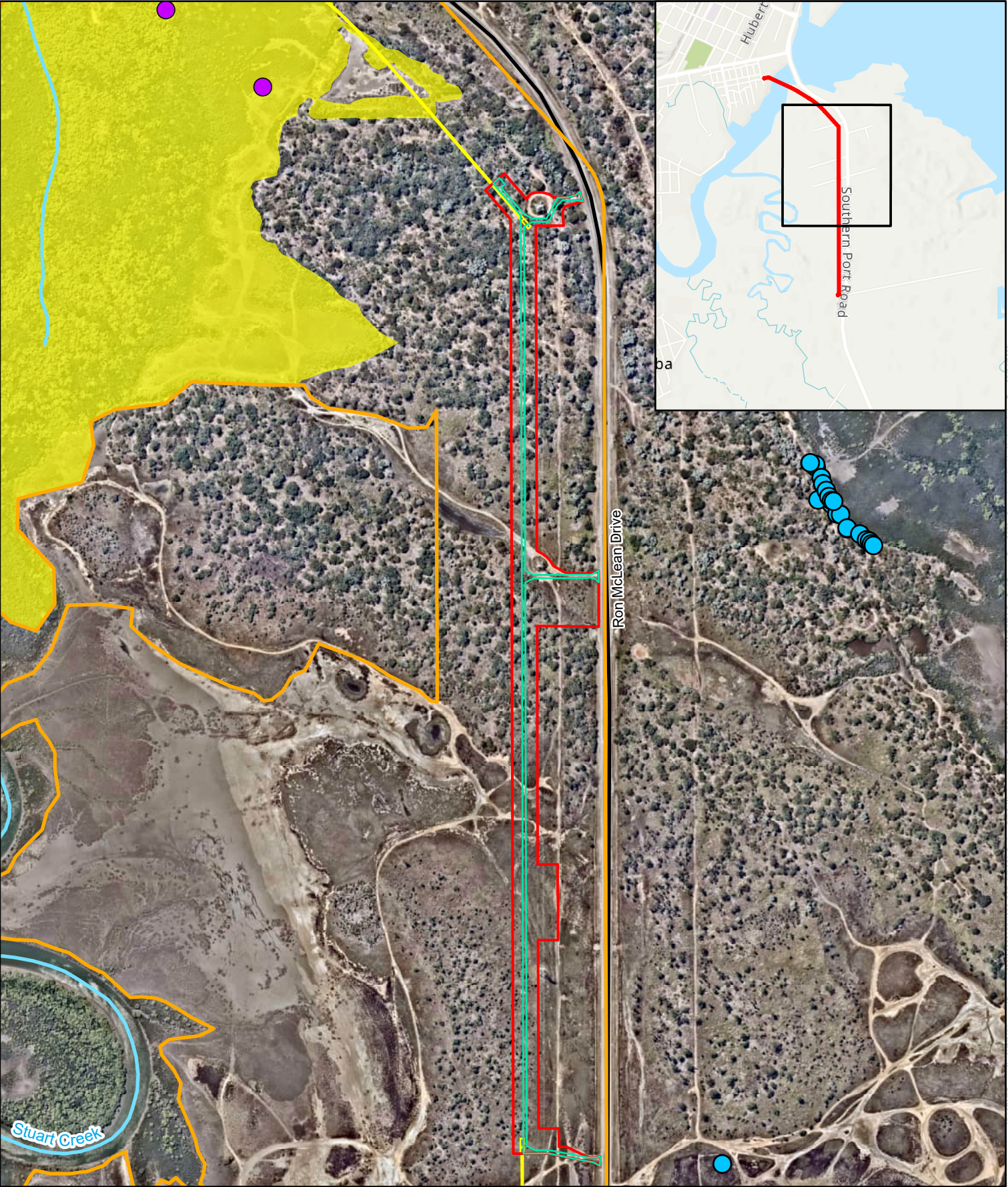
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AECOM



0 100 200
Meters

**Eastern Outfall Pressure Main
Figure 6-2**

Water mouse habitat

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Watercourses
- Roads

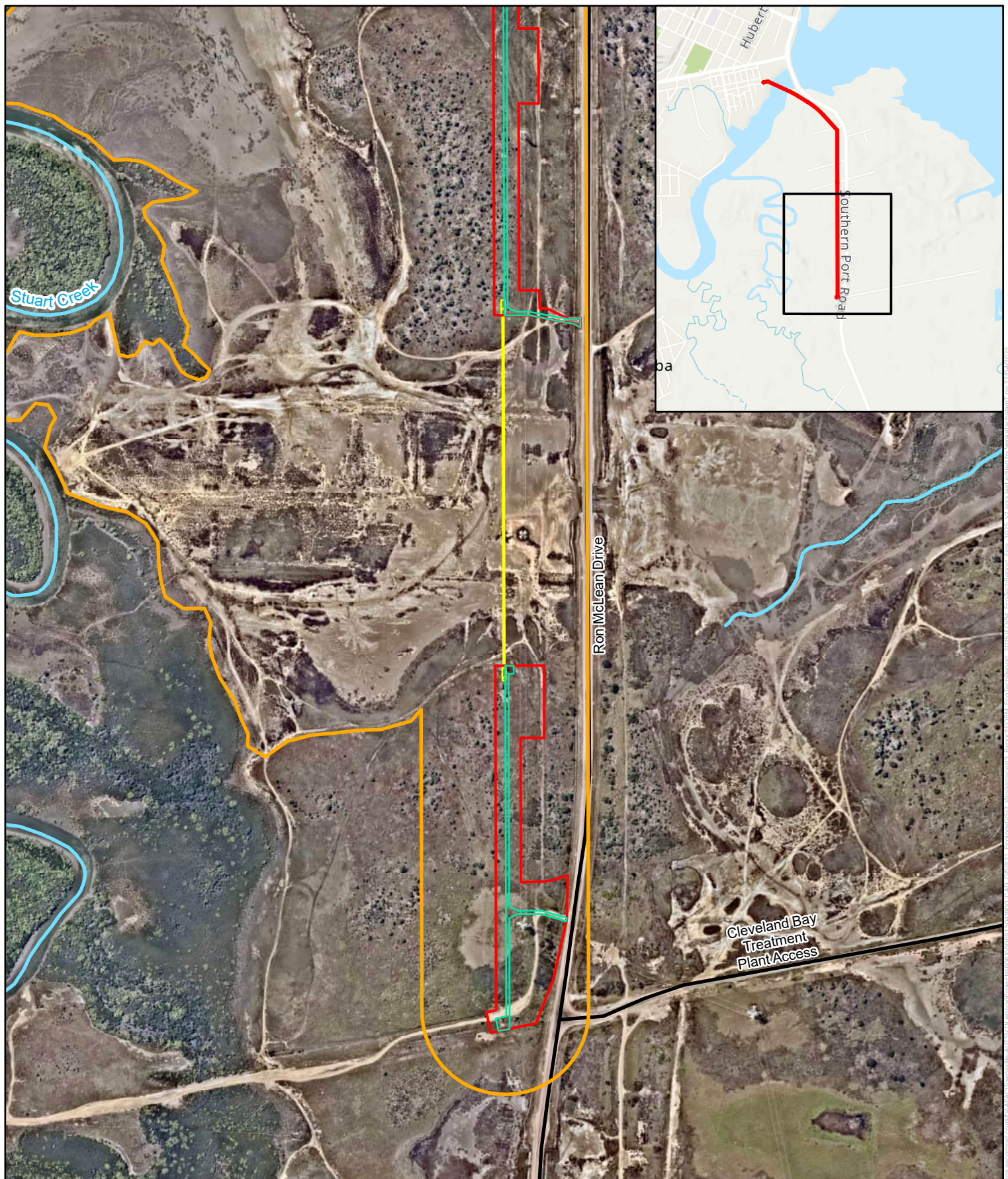
- Camera trap sites (AECOM, 2023)
- Water mouse trapping sites (TEARC, 2019)

Vegetation Communities

- 2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)

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AECOM



0 100 200
Meters

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area

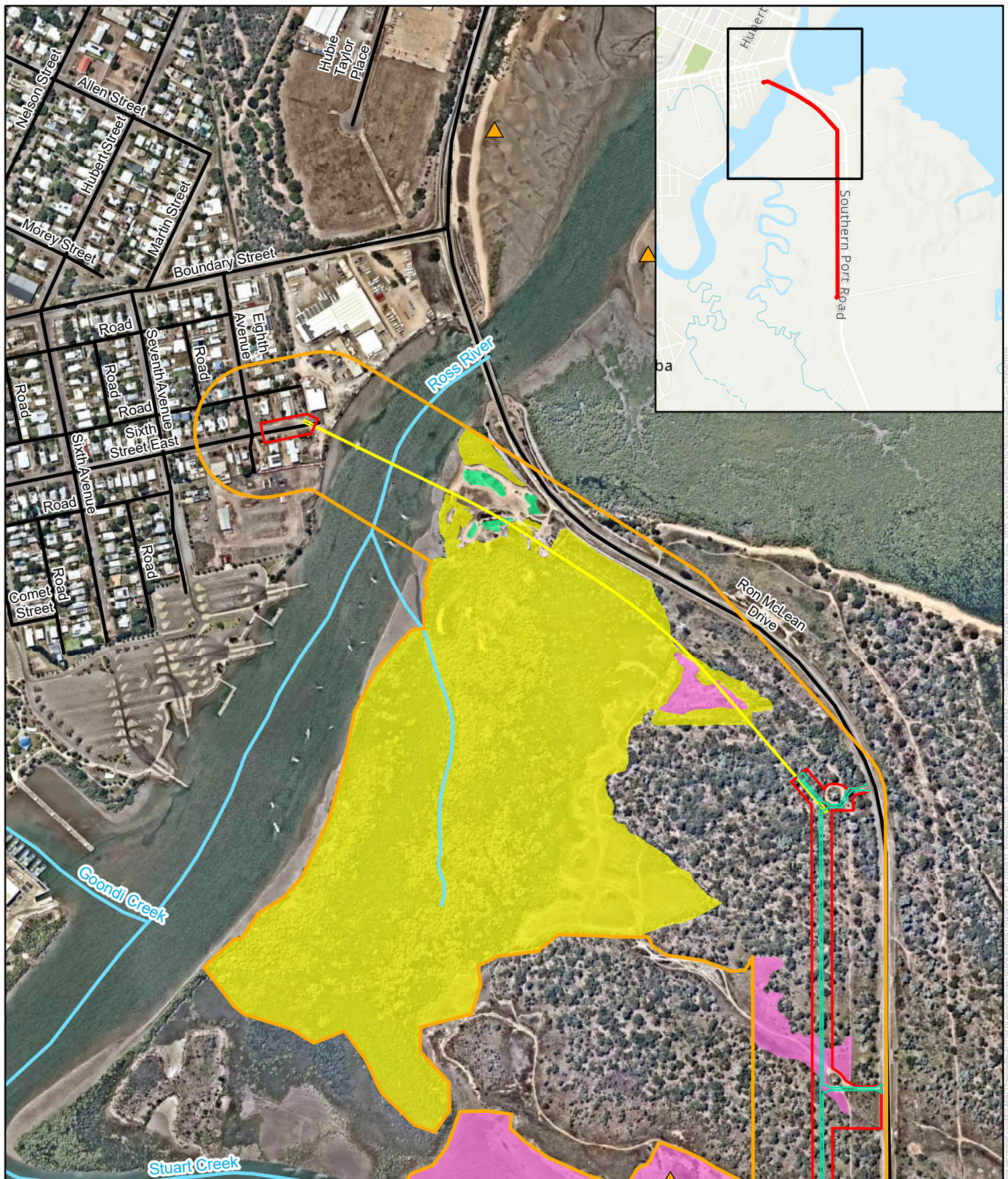
- Watercourses
- Roads
- Water mouse trapping sites (TEARC, 2019)

**Eastern Outfall Pressure Main
Figure 6-3**

Water mouse habitat

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AECOM



0 100 200
Meters

**Eastern Outfall Pressure Main
Figure 6-1**

Whimbrel habitat

Legend

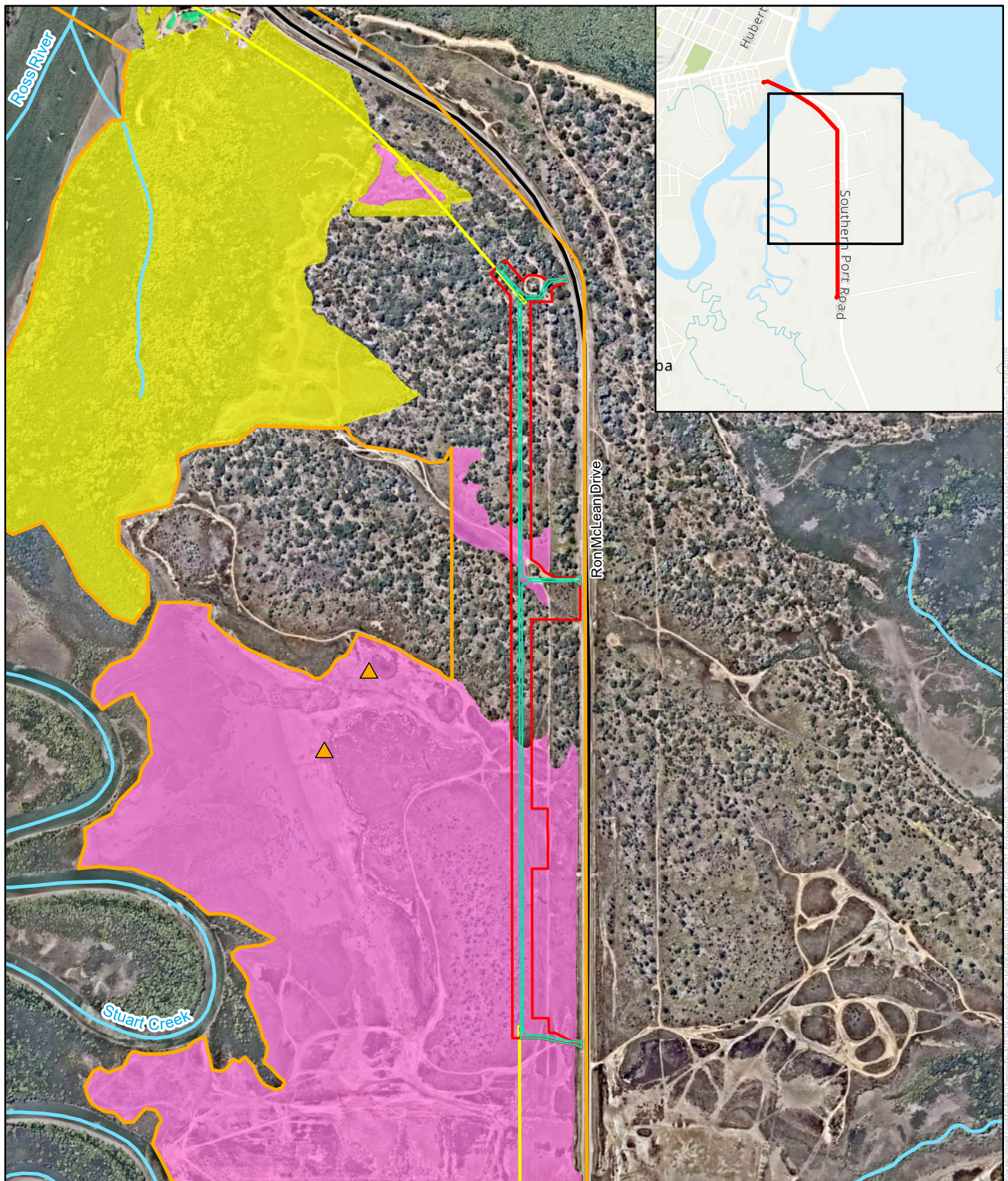
- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Watercourses
- Roads
- ▲ Whimbrel sighting

Vegetation Communities

- 1) Bare salt pans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)
- 2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)
- 3) Complex of open shrublands on strand and foredunes (BVG: 28a).

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AECOM



0 100 200
Meters

**Eastern Outfall Pressure Main
Figure 6-2**

Whimbrel habitat

Legend

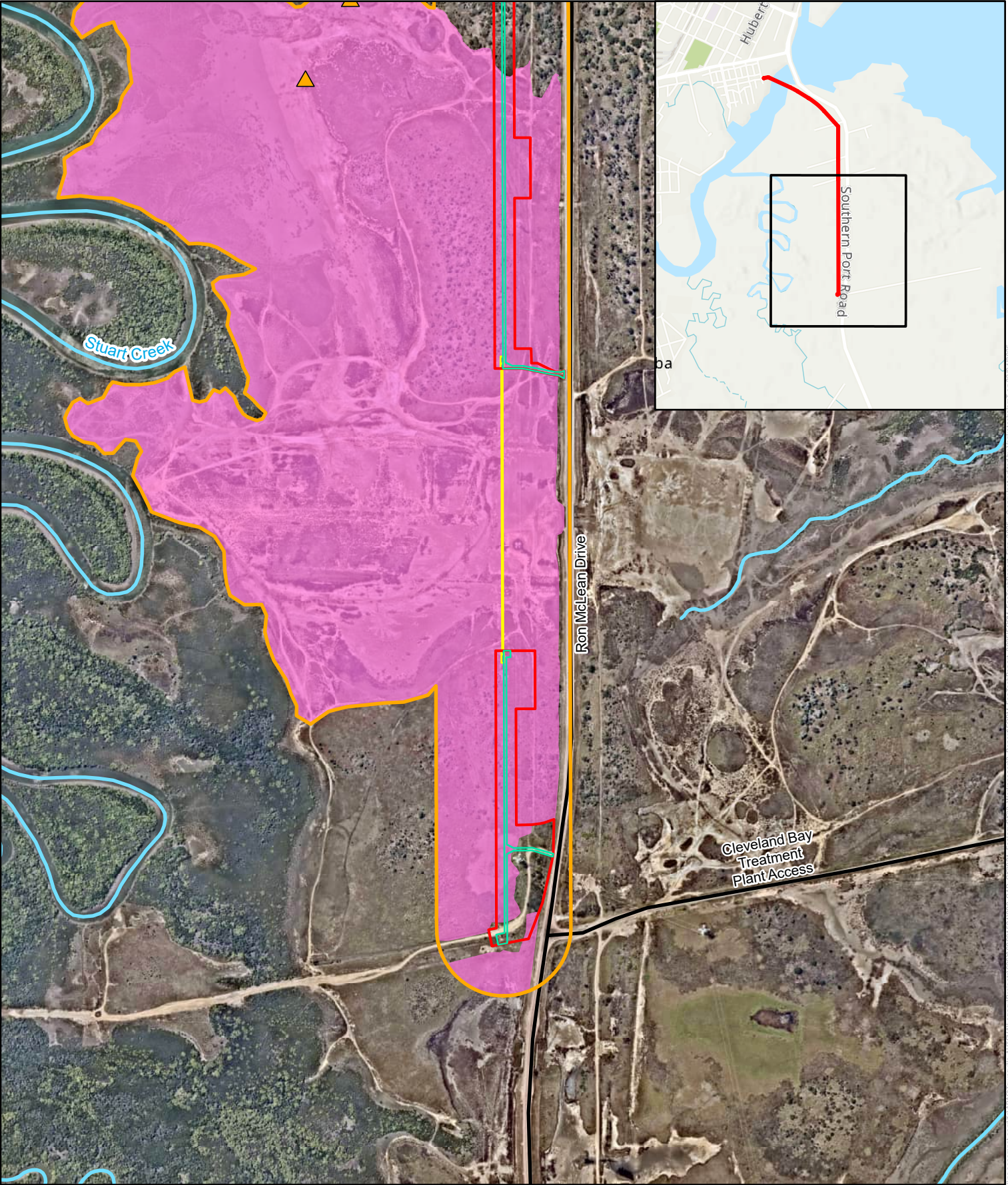
- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Watercourses
- Roads
- ▲ Whimbrel sighting

Vegetation Communities

- 1) Bare salt pans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)
- 2) Closed forests and low closed forests dominated by mangroves (BVG: 35a)
- 3) Complex of open shrublands on strand and foredunes (BVG: 28a).

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AECOM



0 100 200
Meters

Legend

- Project area
- Permanent access tracks
- Under-boring
- Entry and exit pits
- Study area
- Watercourses

- Roads
 - ▲ Whimbrel sighting
- Vegetation Communities**

- 1) Bare salt pans and / or areas of sparse forblands and/or tussock grasslands (BVG: 35b)

**Eastern Outfall Pressure Main
Figure 6-3**

Whimbrel habitat

Project: 60691504
Created by: TV
Last updated: 22/04/2025 1:46 PM

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Appendix B

Desktop Assessment Reports



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 19-Mar-2025

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	13
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	62
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	86
Commonwealth Heritage Places:	None
Listed Marine Species:	111
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	18
Regional Forest Agreements:	None
Nationally Important Wetlands:	5
EPBC Act Referrals:	86
Key Ecological Features (Marine):	None
Biologically Important Areas:	6
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties			[Resource Information]
Name	State	Legal Status	Buffer Status
Great Barrier Reef	QLD	Declared property	In feature area

National Heritage Places			[Resource Information]
Name	State	Legal Status	Buffer Status
Natural			
Great Barrier Reef	QLD	Listed place	In feature area

Wetlands of International Importance (Ramsar Wetlands)			[Resource Information]
Ramsar Site Name		Proximity	Buffer Status
Bowling green bay		Within Ramsar site	In feature area

Great Barrier Reef Marine Park			[Resource Information]
Zone Type	Zone ID	IUCN	Buffer Status
Conservation Park	CP-19-4057	IV	In buffer area only
Conservation Park	CP-19-4058	IV	In buffer area only
Conservation Park	CP-19-4059	IV	In buffer area only
General Use	GU-16-6004	VI	In buffer area only
Habitat Protection	HP-19-5161	VI	In buffer area only
Habitat Protection	HP-19-5162	VI	In buffer area only
Habitat Protection	HP-19-5163	VI	In buffer area only
Marine National Park	MNP-19-1089	II	In buffer area only
Marine National Park	MNP-19-1090	II	In buffer area only
Marine National Park	MNP-19-1091	II	In buffer area only
Marine National Park	MNP-19-1092	II	In buffer area only
Marine National Park	MNP-19-1093	II	In buffer area only
Marine National Park	MNP-19-1094	II	In buffer area only

Listed Threatened Ecological Communities

[Resource Information]

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only

Listed Threatened Species

[Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Erythroriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In feature area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding likely to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat known to occur within area	In feature area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area
Hipposideros semoni Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petauroides minor Greater Glider (northern), Greater Glider (north-eastern Queensland) [92008]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petrogale sharmani Mount Claro Rock Wallaby, Sharman's Rock Wallaby [59281]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Rhinolophus robertsi Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat known to occur within area	In feature area
Sousa sahalensis Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area	In feature area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			
Backhousia tetraptera [91337]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus paedoglauca Mt Stuart Ironbark [56188]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Leichhardtia araujacea [91900]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leichhardtia brevifolia listed as Marsdenia brevifolia [91893]	Vulnerable	Species or species habitat known to occur within area	In feature area
Myrmecodia beccarii Ant Plant [11852]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Omphalea celata [64586]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Phlegmariurus tetrastichoides Square Tassel Fern [86555]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Solanum graniticum Granite Nightshade [84819]	Endangered	Species or species habitat may occur within area	In buffer area only
Tephrosia leveillei [16946]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area
Elseya irwini Irwin's Turtle, White-headed Snapping Turtle [78961]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
Varanus mertensi Mertens' Water Monitor, Mertens's Water Monitor [1568]	Endangered	Species or species habitat may occur within area	In feature area

SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
Sternula albifrons Little Tern [82849]	Vulnerable	Breeding likely to occur within area	In feature area
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]	Endangered	Species or species habitat known to occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]		Species or species habitat may occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharias taurus Grey Nurse Shark [64469]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sousa sahalensis as Sousa chinensis Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Foraging, feeding or related behaviour known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In feature area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In feature area
Limicola falcinellus Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In feature area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area	In feature area
Tringa incana Wandering Tattler [831]		Foraging, feeding or related behaviour known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In feature area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands

[[Resource Information](#)]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - AMAROO - MAGNETIC ISLAND [30246]	QLD	In buffer area only
Defence - Commonwealth Centre [31864]	QLD	In buffer area only
Defence - Commonwealth Centre [31867]	QLD	In buffer area only
Defence - Commonwealth Centre [31865]	QLD	In buffer area only
Defence - Commonwealth Centre [31868]	QLD	In buffer area only
Defence - Commonwealth Centre [31869]	QLD	In buffer area only
Defence - Commonwealth Centre [31866]	QLD	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - Commonwealth Centre [31876]	QLD	In buffer area only
Defence - Commonwealth Centre [31874]	QLD	In buffer area only
Defence - Commonwealth Centre [31870]	QLD	In buffer area only
Defence - Commonwealth Centre [31871]	QLD	In buffer area only
Defence - Commonwealth Centre [31875]	QLD	In buffer area only
Defence - Commonwealth Centre [31873]	QLD	In buffer area only
Defence - Commonwealth Centre [31872]	QLD	In buffer area only
Defence - DEFENCE COMMUNITY ORGANISATION [31951]	QLD	In buffer area only
Defence - DEFENCE COMMUNITY ORGANISATION [31952]	QLD	In buffer area only
Defence - JEZZINE BARRACKS - TOWNSVILLE [30248]	QLD	In buffer area only
Defence - JEZZINE BARRACKS - TOWNSVILLE [30247]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31288]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31289]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31282]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31283]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31280]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31281]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31287]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31284]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31286]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31299]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31285]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31303]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31294]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31298]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31295]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31297]	QLD	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - LAVARACK BARRACKS - TOWNSVILLE [31296]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31291]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31290]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31293]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31292]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31302]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31301]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31300]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31304]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31276]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31277]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31278]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31279]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31274]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31275]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31857]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31858]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31859]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31850]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31856]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31855]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31852]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31851]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31854]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31853]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31849]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31848]	QLD	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - NORTH WARD TRAINING DEPOT - TOWNSVILLE [30005]	QLD	In buffer area only
Defence - NORTH WARD TRAINING DEPOT - TOWNSVILLE [30003]	QLD	In buffer area only
Defence - NORTH WARD TRAINING DEPOT - TOWNSVILLE [30004]	QLD	In buffer area only
Defence - ROSS ISLAND BARRACKS [31965]	QLD	In buffer area only
Defence - TOWNSVILLE - AP28 TACAN [31840]	QLD	In buffer area only
Defence - TOWNSVILLE - AP28 TACAN [31841]	QLD	In buffer area only
Defence - TOWNSVILLE - AP37 NAVAID [31842]	QLD	In buffer area only
Defence - TOWNSVILLE - AP40 BOHLE RIVER TRANS STATION [31822]	QLD	In buffer area only
Defence - TOWNSVILLE - AP40 BOHLE RIVER TRANS STATION [31823]	QLD	In buffer area only
Defence - TOWNSVILLE - AP7 SPORTS GROUND [31837]	QLD	In buffer area only
Defence - TOWNSVILLE - AP7 SPORTS GROUND [31836]	QLD	In buffer area only
Defence - TOWNSVILLE - AP7 SPORTS GROUND [31838]	QLD	In buffer area only
Defence - TOWNSVILLE - AP7 SPORTS GROUND [31839]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31828]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31829]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31826]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31827]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31824]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31834]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31825]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31831]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31833]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31830]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31835]	QLD	In buffer area only
Defence - TOWNSVILLE - RAAF BASE [31832]	QLD	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Arenaria interpres Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Charadrius dubius Little Ringed Plover [896]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area overfly marine area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Limicola falcinellus Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]	Endangered	Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area overfly marine area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pluvialis fulva Pacific Golden Plover [25545]	Vulnerable	Roosting known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area overfly marine area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]		Species or species habitat known to occur within area overfly marine area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding likely to occur within area	In feature area
Stiltia isabella Australian Pratincole [818]	Vulnerable	Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa incana as Heteroscelus incanus Wandering Tattler [831]		Foraging, feeding or related behaviour known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In feature area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area	In feature area
Fish			
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In feature area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area	In feature area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In feature area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In feature area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In feature area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In feature area
Corythoichthys intestinalis Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area	In feature area
Corythoichthys paxtoni Paxton's Pipefish [66204]		Species or species habitat may occur within area	In feature area
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species habitat may occur within area	In feature area
Cosmocampus darrosanus D'Arros Pipefish [66207]		Species or species habitat may occur within area	In feature area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In feature area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In feature area
Halicampus dunckeri Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area	In feature area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area	In feature area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In feature area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area	In feature area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
Hippocampus bargibanti Pygmy Seahorse [66721]		Species or species habitat may occur within area	In feature area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
Hippocampus zebra Zebra Seahorse [66241]		Species or species habitat may occur within area	In feature area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area	In feature area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area	In feature area
Nannocampus pictus Painted Pipefish, Reef Pipefish [66263]		Species or species habitat may occur within area	In feature area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In feature area
Mammal			
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In feature area
Reptile			
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In feature area
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In feature area
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In feature area
Hydrophis hardwickii as Lapemis hardwickii Spine-bellied Sea Snake [93516]		Species or species habitat may occur within area	In feature area
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In feature area
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area	In feature area
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In feature area
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area	In feature area
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area	In feature area
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In feature area
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis zweifeli as Enhydrina schistosa Australian Beaked Sea Snake [93514]		Species or species habitat may occur within area	In feature area
Laticauda colubrina Yellow-lipped Sea Krait [1092]		Species or species habitat may occur within area	In feature area
Laticauda laticaudata a sea krait [1093]		Species or species habitat may occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area

Whales and Other Cetaceans		[Resource Information]	
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Sousa sahalensis Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Bohle River	Fish Habitat Area (B)	QLD	In buffer area only
Bolger Bay	Nature Refuge	QLD	In buffer area only
Bolger Bay	Conservation Park	QLD	In buffer area only
Bowling Green Bay	National Park	QLD	In buffer area only
Cape Pallarenda	Conservation Park	QLD	In buffer area only
Cleveland Bay	Fish Habitat Area (A)	QLD	In feature area
Cleveland Bay - Magnetic Island	Dugong Protection Area (A)	QLD	In feature area
Endeavour Creek	Nature Refuge	QLD	In buffer area only
Great Barrier Reef Coast	Marine Park	QLD	In buffer area only
Horseshoe Bay	Nature Refuge	QLD	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Horseshoe Bay Lagoon	Conservation Park	QLD	In buffer area only
Magnetic Island	NRS Addition - Gazettal in Progress	QLD	In buffer area only
Magnetic Island	National Park	QLD	In buffer area only
Magnetic Island 1	Conservation Park	QLD	In buffer area only
Magnetic Island 2	Conservation Park	QLD	In buffer area only
Pinnacles	National Park	QLD	In buffer area only
Stuart Creek	Nature Refuge	QLD	In buffer area only
Townsville Town Common	Conservation Park	QLD	In buffer area only

Nationally Important Wetlands		[Resource Information]	
Wetland Name		State	Buffer Status
Bowling Green Bay		QLD	In buffer area only
Burdekin - Townsville Coastal Aggregation		QLD	In feature area
Great Barrier Reef Marine Park		QLD	In buffer area only
RAAF Townsville		QLD	In buffer area only
Ross River Reservoir		QLD	In buffer area only

EPBC Act Referrals			[Resource Information]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Bohle Plains Renewable Energy Precinct	2021/9042		Post-Approval	In buffer area only
Expansion of Prawn Farm	2002/672		Completed	In buffer area only
Ring road construction	2001/531		Completed	In buffer area only
Stuart Industrial Subdivision	2021/8890		Post-Approval	In buffer area only
WITHDRAWN BEFORE VALIDATION Cleveland Bay	2020/8733		Referral Validation	In buffer area only

Controlled action				
"The Oaks" Planned Residential Community	2009/4711	Controlled Action	Further Information Request	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
275kV and 132 kV transmission line from Ross Substation to Townsville South Substation	2001/221	Controlled Action	Post-Approval	In buffer area only
Cleveland Bay Industrial Park	2020/8810	Controlled Action	Post-Approval	In buffer area only
Construction of residence including pool, driveway, gardens and shed	2009/4723	Controlled Action	Post-Approval	In buffer area only
Creation of 93 residential lots and parklands in stages 1A and 1B, Willowbend,	2009/5011	Controlled Action	Post-Approval	In buffer area only
Development and Construction of Rocky Springs Masterplanned Community	2007/3574	Controlled Action	Post-Approval	In buffer area only
Final Stages of Oak Valley Subdivision	2007/3762	Controlled Action	Post-Approval	In buffer area only
Gas pipeline	2002/728	Controlled Action	Post-Approval	In buffer area only
House Construction	2008/4194	Controlled Action	Post-Approval	In buffer area only
Mt Low Developments Master Planned Community	2012/6351	Controlled Action	Post-Approval	In buffer area only
North Queensland Power Project	2001/412	Controlled Action	Completed	In buffer area only
Port of Townsville - Port Expansion Project	2011/5979	Controlled Action	Post-Approval	In buffer area only
Private House, Pool, Driveway and Gardens Construction	2008/4415	Controlled Action	Post-Approval	In buffer area only
Private House, Pool & Shed Construction	2008/4407	Controlled Action	Post-Approval	In buffer area only
Private House Construction	2008/4339	Controlled Action	Post-Approval	In buffer area only
Radical Bay Tourist Development	2002/713	Controlled Action	Post-Approval	In buffer area only
Residential development on a 929ha site located adjacent to the Bohle River and Bruce Highway	2004/1610	Controlled Action	Post-Approval	In buffer area only
Sanctum West Master Planned Community, near Townsville, Qld	2017/8067	Controlled Action	Post-Approval	In buffer area only
Talisman Saber 2005 Military Exercise	2004/1819	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Townsville City Council Ross River Dam to Douglas Water Treatment Plant Pipeline Project	2021/9002	Controlled Action	Proposed Decision	In buffer area only
Townsville Commercial Marine Precinct	2008/4497	Controlled Action	Post-Approval	In feature area
Townsville Eastern Access Rail Corridor	2021/9003	Controlled Action	Assessment Approach	In feature area
Townsville Ocean Terminal	2006/3089	Controlled Action	Completed	In buffer area only
Townsville Port Access Project (Road and Rail)	2003/1011	Controlled Action	Post-Approval	In feature area
Townsville Ring Road, Section 4, QLD	2012/6562	Controlled Action	Post-Approval	In buffer area only
Two Residential Premises on Lot 7, Chisholm Trail, Oak Valley	2009/5194	Controlled Action	Completed	In buffer area only
Not controlled action				
Blakey's Crossing sediment basins	2005/2027	Not Controlled Action	Completed	In buffer area only
Clearing of land for master planning	2002/705	Not Controlled Action	Completed	In buffer area only
Cleveland Bay Purification Plant Outfall Upgrade Project, Townsville, Qld	2016/7821	Not Controlled Action	Completed	In buffer area only
Cleveland Bay WasteWater Treatment Facility and Water Reclamation Facility	2006/2882	Not Controlled Action	Completed	In feature area
Construction & operation of new intermodal terminal & freight distribution, Townsville, Qld	2015/7424	Not Controlled Action	Completed	In buffer area only
Construction of a western access road, Julago, Qld	2015/7534	Not Controlled Action	Completed	In buffer area only
Construction of North Shore Boulevard and Lionel Turner Drive	2009/4758	Not Controlled Action	Completed	In buffer area only
Construction of Residential Apartments at 146 Sooning St Bright Point Nelly Bay	2004/1796	Not Controlled Action	Completed	In buffer area only
Demolition of Building 2 for construction of internal road network	2013/6763	Not Controlled Action	Completed	In buffer area only
Electricity Substation	2010/5519	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Fibre Optic Cable Installation	2000/68	Not Controlled Action	Completed	In buffer area only
Horseshoe Bay Multiple Dwelling and Caretaker's Unit Development	2007/3886	Not Controlled Action	Completed	In buffer area only
House Construction at Horseshoe Bay, Magnetic Island	2008/4048	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Industrial Development and Reconfiguration of the Lot	2009/4949	Not Controlled Action	Completed	In buffer area only
Installation of additional mobile telecommunications infrastrucutre	2005/2120	Not Controlled Action	Completed	In buffer area only
Lot 22 Nobby Head subdivision	2002/897	Not Controlled Action	Completed	In buffer area only
Magnetic Island Waste Transfer Station	2012/6497	Not Controlled Action	Completed	In buffer area only
Magnetic Island Water Reuse Project	2019/8536	Not Controlled Action	Completed	In buffer area only
Mobile Telephone Communications Facility, 'Arkies' Hotel, Hayles Avenue, Arcadia	2002/878	Not Controlled Action	Completed	In buffer area only
Mobile Telephone Communications Facility Yule Street	2002/902	Not Controlled Action	Completed	In buffer area only
New Base Station Telecommunications Facility	2008/3957	Not Controlled Action	Completed	In buffer area only
River Grove Residential Development	2009/4717	Not Controlled Action	Completed	In buffer area only
Riverway project	2003/1152	Not Controlled Action	Completed	In buffer area only
Ross River Dam Upgrade Project - Stages 2-5	2005/2246	Not Controlled Action	Completed	In buffer area only
Subdivision of Lot 12 on SP243847 Elliot Springs Estate, Townsville, Qld	2019/8436	Not Controlled Action	Completed	In buffer area only
Telecommunications Facility	2003/964	Not Controlled Action	Completed	In buffer area only
Telecommunications facility, Arkies Hotel, Arcadia	2005/2056	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Telecommunications Facility, Horseshoe Bay	2005/2057	Not Controlled Action	Completed	In buffer area only
Telecommunications Tower Construction	2002/877	Not Controlled Action	Completed	In buffer area only
Tompkins Road Industrial Development	2009/5245	Not Controlled Action	Completed	In buffer area only
Toonpan Water Treatment Plant and Distribution Pipeline	2007/3675	Not Controlled Action	Completed	In buffer area only
Townsville Northern Access Intersections upgrade, Bruce Highway, Townsville, Qld	2016/7690	Not Controlled Action	Completed	In buffer area only
Townsville RAAF Base Effluent Reuse Pipeline Upgrade	2000/111	Not Controlled Action	Completed	In buffer area only
Townsville Recreational Boating Park	2012/6375	Not Controlled Action	Completed	In feature area
Townsville Ring Road 5	2020/8625	Not Controlled Action	Completed	In buffer area only
Townsville South Power Station	2005/2047	Not Controlled Action	Completed	In buffer area only
Townsville Wastewater Upgrade Project	2009/4795	Not Controlled Action	Completed	In buffer area only
Upgrade of Horseshoe Bay Sewage Treatment Plant	2004/1727	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
275kV Transmission Line from Ross substation to Strathmore Substation (approx 180km)	2008/4390	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Berth 12 Port of Townsville	2011/5863	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Construction of residence including pool, driveway, gardens and shed	2009/4724	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Construct residence and access road on Lot 5 on SP189975 Chisholm Trail	2009/5096	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Extension to existing Extractive Industry, Roseneath Quarry	2009/4984	Not Controlled Action (Particular	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)		Manner)		
Magnetic Island Submarine and Overland Electricity Cable, QLD	2012/6584	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Offshore Powerboat Race	2012/6390	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Offshore Powerboat Race	2011/5874	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Offshore Powerboat Race	2013/6758	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Offshore Power Boat Race	2009/4820	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Offshore powerboat race between Virago Shoal and Townsville Marina	2010/5504	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Townsville South to East power line & substation	2006/2626	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Referral decision				
Development of a residential and commercial project	2011/5966	Referral Decision	Completed	In buffer area only
Establishment of Residential Community	2009/4935	Referral Decision	Completed	In buffer area only
Lot 5 Chisholm Trail	2009/4940	Referral Decision	Completed	In buffer area only
Wastewater Upgrade and Transfer to Mt St John Water Treatment Plant	2009/4755	Referral Decision	Completed	In buffer area only
Biologically Important Areas			[Resource Information]	
Scientific Name		Behaviour	Presence	Buffer Status
Dolphins				

Scientific Name	Behaviour	Presence	Buffer Status
Sousa chinensis Indo-Pacific Humpback Dolphin [50]	Breeding	Known to occur	In feature area
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In buffer area only
Tursiops aduncus Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur	In feature area
Marine Turtles			
Natator depressus Flatback Turtle [59257]	Nesting	Known to occur	In feature area
Seabirds			
Sterna sumatrana Black-naped Tern [800]	Breeding	Known to occur	In buffer area only
Whales			
Megaptera novaeangliae Humpback Whale [38]	Breeding and calving	Known to occur	In feature area

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

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

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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: -19.2859

Longitude: 146.8406

Distance: 20

Email: taruna.venkatachalam@aecom.com

Date submitted: Wednesday 19 Mar 2025 13:40:54

Date extracted: Wednesday 19 Mar 2025 13:50:02

The number of records retrieved = 2026

Disclaimer

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

The State of Queensland disclaims all responsibility for information contained in this product and all liability (including liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	Y			296/3
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		44/18
animals	amphibians	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog		C		17/6
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		46/2
animals	amphibians	Hylidae	<i>Litoria bicolor</i>	northern sedgefrog		C		38/10
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		426/11
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		216/7
animals	amphibians	Hylidae	<i>Litoria gracilenta</i>	graceful treefrog		C		82
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		167/10
animals	amphibians	Hylidae	<i>Litoria infrafrenata</i>	white lipped treefrog		C		51
animals	amphibians	Hylidae	<i>Litoria lesueuri sensu lato</i>	stony creek frog		C		2
animals	amphibians	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog		C		56/3
animals	amphibians	Hylidae	<i>Litoria rothii</i>	eastern laughing treefrog		C		138/10
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		405/7
animals	amphibians	Hylidae	<i>Litoria sp.</i>			C		1
animals	amphibians	Hylidae	<i>Litoria wilcoxii</i>	eastern stony creek frog		C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	marbled frog		C		70
animals	amphibians	Limnodynastidae	<i>Limnodynastes peronii</i>	striped marshfrog		C		3
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		62
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		5
animals	amphibians	Limnodynastidae	<i>Notaden melanoscaphus</i>	brown shovelfoot		C		3
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		237/13
animals	amphibians	Myobatrachidae	<i>Crinia deserticola</i>	chirping froglet		C		38/4
animals	amphibians	Myobatrachidae	<i>Uperoleia mimula</i>	mimicking gungan		C		48/13
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		1
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		1
animals	birds	Acanthizidae	<i>Gerygone levigaster</i>	mangrove gerygone		C		217
animals	birds	Acanthizidae	<i>Gerygone magnirostris</i>	large-billed gerygone		C		72
animals	birds	Acanthizidae	<i>Gerygone mouki</i>	brown gerygone		C		7
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		29
animals	birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone		C		50/1
animals	birds	Acanthizidae	<i>Sericornis citreogularis</i>	yellow-throated scrubwren		C		1
animals	birds	Acanthizidae	<i>Smicornis brevirostris</i>	weebill		C		11
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		58
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		202
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		26
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		122
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		136/2
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier		C		50
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		13
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		61
animals	birds	Accipitridae	<i>Elanus scriptus</i>	letter-winged kite		C		1
animals	birds	Accipitridae	<i>Erythroriorchis radiatus</i>	red goshawk		E	E	2
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		418
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahminy kite		C		692
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		811

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Accipitridae	<i>Hamirostra melanosternon</i>	black-breasted buzzard		C		1
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		15
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		8
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		953/4
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		112
animals	birds	Acrocephalidae	<i>Acrocephalus orientalis</i>	oriental reed-warbler		SL		6
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		12
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		200
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		46/1
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		47
animals	birds	Alcedinidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		557/1
animals	birds	Alcedinidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		310
animals	birds	Alcedinidae	<i>Tanysiptera sylvia</i>	buff-breasted paradise-kingfisher		C		3
animals	birds	Alcedinidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		398/1
animals	birds	Alcedinidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		27
animals	birds	Alcedinidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		430
animals	birds	Alcedinidae	<i>Todiramphus sordidus</i>	Torresian kingfisher		C		36
animals	birds	Anatidae	<i>Anas castanea</i>	chestnut teal		C		12
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		102
animals	birds	Anatidae	<i>Anas platyrhynchos</i>	northern mallard	Y			1
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		438
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		90
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		32
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		70
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		111
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		128
animals	birds	Anatidae	<i>Malacorhynchus membranaceus</i>	pink-eared duck		C		14
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		46/1
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		14
animals	birds	Anatidae	<i>Oxyura australis</i>	blue-billed duck		C		1
animals	birds	Anatidae	<i>Radjah radjah</i>	radjah shelduck		C		5
animals	birds	Anatidae	<i>Spatula querquedula</i>	garganey		SL		3
animals	birds	Anatidae	<i>Spatula rhynchotis</i>	Australasian shoveler		C		3
animals	birds	Anatidae	<i>Stictonetta naevosa</i>	freckled duck		C		4
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		479
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		369
animals	birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet		C		28
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		32
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	7
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		771
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		470/1
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		78
animals	birds	Ardeidae	<i>Ardea sumatrana</i>	great-billed heron		C		4
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		245
animals	birds	Ardeidae	<i>Butorides striata</i>	striated heron		C		403
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		693

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		515
animals	birds	Ardeidae	<i>Egretta picata</i>	pied heron		C		19
animals	birds	Ardeidae	<i>Egretta sacra</i>	eastern reef egret		C		219
animals	birds	Ardeidae	<i>Ixobrychus dubius</i>	Australian little bittern		C		4
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		28
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		127
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		42
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		783
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		2
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		5
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		19
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	pied butcherbird		C		281
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		9
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		670
animals	birds	Artamidae	<i>Melloria quoyi</i>	black butcherbird		C		73
animals	birds	Artamidae	<i>Strepera graculina</i>	pied currawong		C		160
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		511/3
animals	birds	Burhinidae	<i>Esacus magnirostris</i>	beach stone-curlew		V		128
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		776/1
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		419/1
animals	birds	Cacatuidae	<i>Cacatua tenuirostris</i>	long-billed corella	Y	C		4
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		606
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii banksii</i>	red-tailed black-cockatoo (Cape York & Eastern Aust)		C		1
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		165
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		18
animals	birds	Campephagidae	<i>Coracina lineata</i>	barred cuckoo-shrike		C		3
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		3
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		774
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		635/2
animals	birds	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird		C		25
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		447/2
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		85
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		34
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		2
animals	birds	Charadriidae	<i>Charadrius bicinctus</i>	double-banded plover		SL		1
animals	birds	Charadriidae	<i>Charadrius dubius</i>	little ringed plover		SL		3
animals	birds	Charadriidae	<i>Charadrius hiaticula</i>	common ringed plover		C		1
animals	birds	Charadriidae	<i>Charadrius leschenaultii</i>	greater sand plover		V	V	158
animals	birds	Charadriidae	<i>Charadrius mongolus</i>	lesser sand plover		E	E	145
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		353
animals	birds	Charadriidae	<i>Charadrius sp.</i>			C		10
animals	birds	Charadriidae	<i>Charadrius veredus</i>	oriental plover		SL		5
animals	birds	Charadriidae	<i>Elseyornis melanops</i>	black-fronted dotterel		C		280
animals	birds	Charadriidae	<i>Erythronyx cinctus</i>	red-kneed dotterel		C		24
animals	birds	Charadriidae	<i>Pluvialis fulva</i>	Pacific golden plover		SL		84

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animals	birds	Charadriidae	<i>Pluvialis squatarola</i>	grey plover		V	V	67
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		975/1
animals	birds	Charadriidae	<i>Vanellus miles miles</i>	masked lapwing (northern subspecies)		C		23
animals	birds	Charadriidae	<i>Vanellus tricolor</i>	banded lapwing		C		4
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		247
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		682
animals	birds	Cisticolidae	<i>Cisticola juncidis laveryi</i>	zitting cisticola		C		1
animals	birds	Climacteridae	<i>Cormobates leucophaea minor</i>	white-throated treecreeper (northern)		C		1
animals	birds	Columbidae	<i>Chalcophaps longirostris</i>	Pacific emerald dove		C		62
animals	birds	Columbidae	<i>Columba leucomela</i>	white-headed pigeon		C		3
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			358
animals	birds	Columbidae	<i>Ducula bicolor</i>	pied imperial-pigeon		C		309/5
animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		17
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		383/4
animals	birds	Columbidae	<i>Geopelia placida</i>	peaceful dove		C		3390/11
animals	birds	Columbidae	<i>Geophaps scripta</i>	squatter pigeon		C		16
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	21
animals	birds	Columbidae	<i>Leucosarcia melanoleuca</i>	wonga pigeon		C		1
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		16
animals	birds	Columbidae	<i>Macropygia phasianella</i>	brown cuckoo-dove		C		17
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		186
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		6
animals	birds	Columbidae	<i>Ptilinopus magnificus</i>	wompoo fruit-dove		C		17
animals	birds	Columbidae	<i>Ptilinopus regina</i>	rose-crowned fruit-dove		C		27/1
animals	birds	Columbidae	<i>Ptilinopus superbus</i>	superb fruit-dove		C		26
animals	birds	Columbidae	<i>Spilopelia chinensis</i>	spotted dove	Y			90
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		264
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		1
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		2
animals	birds	Corvidae	<i>Corvus bennetti</i>	little crow		C		1
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		269/1
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		606/1
animals	birds	Corvidae	<i>Corvus sp.</i>			C		25
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		53
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		45/1
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		366
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		610
animals	birds	Cuculidae	<i>Chalcites basalus</i>	Horsfield's bronze-cuckoo		C		70/2
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		30
animals	birds	Cuculidae	<i>Chalcites minutillus</i>	little bronze-cuckoo		C		77
animals	birds	Cuculidae	<i>Chalcites minutillus russatus</i>	Gould's bronze-cuckoo		C		34
animals	birds	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo		C		3
animals	birds	Cuculidae	<i>Cuculus optatus</i>	oriental cuckoo		SL		25
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		364/1
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		289
animals	birds	Dicaeidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		719

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animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		889
animals	birds	Dicruridae	<i>Dicrurus bracteatus bracteatus</i>	spangled drongo (eastern Australia)		C		6
animals	birds	Estrildidae	<i>Chloebia gouldiae</i>	Gouldian finch		E	E	1
animals	birds	Estrildidae	<i>Heteromunia pectoralis</i>	pictorella mannikin		C		2
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		227
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			550
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		24
animals	birds	Estrildidae	<i>Neochmia phaeton</i>	crimson finch		C		99/2
animals	birds	Estrildidae	<i>Neochmia phaeton phaeton</i>	crimson finch		C		1
animals	birds	Estrildidae	<i>Neochmia ruficauda</i>	star finch		C		1
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		16
animals	birds	Estrildidae	<i>Poephila cincta</i>	black-throated finch		C		2
animals	birds	Estrildidae	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)		E	E	91
animals	birds	Estrildidae	<i>Poephila personata</i>	masked finch		C		2
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		275/2
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		355
animals	birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar		C		4
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		11
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		104
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		270/1
animals	birds	Falconidae	<i>Falco hypoleucos</i>	grey falcon		V	V	1
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		210
animals	birds	Falconidae	<i>Falco peregrinus macropus</i>	Australian peregrine falcon		C		52
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		2
animals	birds	Fregatidae	<i>Fregata ariel</i>	lesser frigatebird		SL		15
animals	birds	Fregatidae	<i>Fregata minor</i>	great frigatebird		SL		2
animals	birds	Glareolidae	<i>Glareola maldivarum</i>	oriental pratincole		SL		7
animals	birds	Glareolidae	<i>Stiltia isabella</i>	Australian pratincole		C		20
animals	birds	Gruidae	<i>Antigone antigone</i>	sarus crane		C		2
animals	birds	Gruidae	<i>Antigone rubicunda</i>	broilga		C		220
animals	birds	Haematopodidae	<i>Haematopus fuliginosus</i>	sooty oystercatcher		C		51
animals	birds	Haematopodidae	<i>Haematopus longirostris</i>	Australian pied oystercatcher		C		342
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		850
animals	birds	Hirundinidae	<i>Hirundo rustica</i>	barn swallow		SL		3
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		494
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		39
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		127
animals	birds	Laridae	<i>Anous minutus</i>	black noddy		C		5/1
animals	birds	Laridae	<i>Anous stolidus</i>	brown noddy		SL		2
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		30
animals	birds	Laridae	<i>Chlidonias leucopterus</i>	white-winged black tern		SL		11
animals	birds	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull		C		970/3
animals	birds	Laridae	<i>Gelochelidon macrotarsa</i>	Australian tern		C		400
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		527
animals	birds	Laridae	<i>Larus crassirostris</i>	black-tailed gull		C		2

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animals	birds	Laridae	<i>Leucophaeus pipixcan</i>	Franklin's gull		C		2
animals	birds	Laridae	<i>Onychoprion anaethetus</i>	bridled tern		SL		19
animals	birds	Laridae	<i>Onychoprion fuscatus</i>	sooty tern		C		2
animals	birds	Laridae	<i>Sterna dougallii</i>	roseate tern		SL		1
animals	birds	Laridae	<i>Sterna hirundo</i>	common tern		SL		19
animals	birds	Laridae	<i>Sterna sumatrana</i>	black-naped tern		SL		12
animals	birds	Laridae	<i>Sternula albifrons</i>	little tern		SL	V	158
animals	birds	Laridae	<i>Thalasseus bengalensis</i>	lesser crested tern		C		112
animals	birds	Laridae	<i>Thalasseus bergii</i>	crested tern		SL		279
animals	birds	Locustellidae	<i>Cincloramphus cruralis</i>	brown songlark		C		3
animals	birds	Locustellidae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		8
animals	birds	Locustellidae	<i>Cincloramphus timoriensis</i>	tawny grassbird		C		66
animals	birds	Locustellidae	<i>Poodytes gramineus</i>	little grassbird		C		10
animals	birds	Maluridae	<i>Malurus amabilis</i>	lovely fairy-wren		C		1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		378
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		160
animals	birds	Megapodiidae	<i>Megapodius reinwardt</i>	orange-footed scrubfowl		C		110
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		4
animals	birds	Meliphagidae	<i>Anthochaera carunculata</i>	red wattlebird		C		1
animals	birds	Meliphagidae	<i>Bolemoreus frenatus</i>	bridled honeyeater		C		1
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		5
animals	birds	Meliphagidae	<i>Cissomela pectoralis</i>	banded honeyeater		C		2
animals	birds	Meliphagidae	<i>Conopophila albogularis</i>	rufous-banded honeyeater		C		1
animals	birds	Meliphagidae	<i>Conopophila rufogularis</i>	rufous-throated honeyeater		C		170
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		605
animals	birds	Meliphagidae	<i>Epthianura aurifrons</i>	orange chat		C		3
animals	birds	Meliphagidae	<i>Epthianura tricolor</i>	crimson chat		C		1
animals	birds	Meliphagidae	<i>Gavicalis fasciogularis</i>	mangrove honeyeater		C		53
animals	birds	Meliphagidae	<i>Gavicalis versicolor</i>	varied honeyeater		C		222
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		7
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		851
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		78
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		12
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		50
animals	birds	Meliphagidae	<i>Meliphaga notata</i>	yellow-spotted honeyeater		C		57
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		644
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		12
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		4
animals	birds	Meliphagidae	<i>Microptilotis gracilis</i>	graceful honeyeater		C		5
animals	birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater		C		200
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		31
animals	birds	Meliphagidae	<i>Philemon argenticeps</i>	silver-crowned friarbird		C		4
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		726/1
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		300/1
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		132
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		4

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animals	birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater		C		5
animals	birds	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater		C		1
animals	birds	Meliphagidae	<i>Ramsayornis fasciatus</i>	bar-breasted honeyeater		C		2
animals	birds	Meliphagidae	<i>Ramsayornis modestus</i>	brown-backed honeyeater		C		389
animals	birds	Meliphagidae	<i>Stomiopera flava</i>	yellow honeyeater		C		778
animals	birds	Meliphagidae	<i>Stomiopera unicolor</i>	white-gaped honeyeater		C		534/2
animals	birds	Meliphagidae	<i>Sugomel nigrum</i>	black honeyeater		C		1
animals	birds	Meliphagidae	<i>Xanthotis macleayanus</i>	Macleay's honeyeater		C		1
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		1007
animals	birds	Monarchidae	<i>Arses kaupi</i>	ped monarch		C		1
animals	birds	Monarchidae	<i>Carterornis leucotis</i>	white-eared monarch		C		45
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	maggie-lark		C		1048
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		C		26
animals	birds	Monarchidae	<i>Myiagra alecto</i>	shining flycatcher		C		30
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		C		18
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		19
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		556/1
animals	birds	Monarchidae	<i>Myiagra ruficollis</i>	broad-billed flycatcher		C		1
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		C		113
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		289
animals	birds	Motacillidae	<i>Motacilla cinerea</i>	grey wagtail		SL		1
animals	birds	Motacillidae	<i>Motacilla flava sensu lato</i>	yellow wagtail		SL		3
animals	birds	Nectariniidae	<i>Cinnyris jugularis</i>	olive-backed sunbird		C		829/4
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		2
animals	birds	Oceanitidae	<i>Pelagodroma marina</i>	white-faced storm-petrel		C		2
animals	birds	Oriolidae	<i>Oriolus flavocinctus</i>	green oriole		C		2
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		167/1
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		822/4
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		51
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		12
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		177/2
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		9/1
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		200
animals	birds	Pachycephalidae	<i>Pachycephala simplex peninsulae</i>	grey whistler		C		1
animals	birds	Pandionidae	<i>Pandion haliaetus cristatus</i>	eastern osprey		SL		327
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		1
animals	birds	Pardalotidae	<i>Pardalotus rubricatus</i>	red-browed pardalote		C		1
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		150
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			633
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		542
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		4
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		2
animals	birds	Petroicidae	<i>Microeca flavigaster</i>	lemon-bellied flycatcher		C		53
animals	birds	Petroicidae	<i>Peneoenanthe pulverulenta</i>	mangrove robin		C		15
animals	birds	Petroicidae	<i>Poecilodryas superciliosa</i>	white-browed robin		C		27/1
animals	birds	Petroicidae	<i>Tregellasia capito</i>	pale-yellow robin		C		3

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animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		468
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		67
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		518
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		182
animals	birds	Phasianidae	<i>Coturnix pectoralis</i>	stubble quail		C		1
animals	birds	Phasianidae	<i>Pavo cristatus</i>	Indian peafowl	Y			6
animals	birds	Phasianidae	<i>Synoicus chinensis</i>	king quail		C		5
animals	birds	Phasianidae	<i>Synoicus ypsilophorus</i>	brown quail		C		141
animals	birds	Pittidae	<i>Pitta versicolor</i>	noisy pitta		C		20
animals	birds	Podargidae	<i>Podargus papuensis</i>	Papuan frogmouth		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		83
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		10
animals	birds	Podicipedidae	<i>Poliiocephalus poliocephalus</i>	hoary-headed grebe		C		2
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		69
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		2
animals	birds	Procellariidae	<i>Ardenna pacifica</i>	wedge-tailed shearwater		V		6
animals	birds	Procellariidae	<i>Ardenna tenuirostris</i>	short-tailed shearwater		SL		4/3
animals	birds	Procellariidae	<i>Macronectes giganteus</i>	southern giant-petrel		E	E	4
animals	birds	Psittaculidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		57
animals	birds	Psittaculidae	<i>Cyclopsitta diophthalma macleayana</i>	Macleay's fig-parrot		V		3
animals	birds	Psittaculidae	<i>Melopsittacus undulatus</i>	budgerigar		C		7
animals	birds	Psittaculidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		9
animals	birds	Psittaculidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		241/2
animals	birds	Psittaculidae	<i>Platycercus venustus</i>	northern rosella		C		1
animals	birds	Psittaculidae	<i>Psephotus haematonotus</i>	red-rumped parrot		C		1
animals	birds	Psittaculidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		275
animals	birds	Psittaculidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		1085
animals	birds	Psittaculidae	<i>Trichoglossus rubritorquis</i>	red-collared lorikeet		C		1
animals	birds	Ptilonorhynchidae	<i>Chlamydera maculata</i>	spotted bowerbird		C		8
animals	birds	Ptilonorhynchidae	<i>Chlamydera nuchalis</i>	great bowerbird		C		894/5
animals	birds	Ptilonorhynchidae	<i>Scenopoeetes dentirostris</i>	tooth-billed bowerbird		C		1
animals	birds	Rallidae	<i>Amaurornis cinerea</i>	white-browed crake		C		42
animals	birds	Rallidae	<i>Amaurornis moluccana</i>	pale-vented bush-hen		C		16
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		18
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		51
animals	birds	Rallidae	<i>Gallirallus philippensis</i>	buff-banded rail		C		31
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		85
animals	birds	Rallidae	<i>Porzana fluminea</i>	Australian spotted crake		C		6
animals	birds	Rallidae	<i>Rallina tricolor</i>	red-necked crake		C		1
animals	birds	Rallidae	<i>Tribonyx ventralis</i>	black-tailed native-hen		C		2
animals	birds	Rallidae	<i>Zapornia pusilla</i>	Baillon's crake		C		10
animals	birds	Rallidae	<i>Zapornia tabuensis</i>	spotless crake		C		3
animals	birds	Recurvirostridae	<i>Himantopus leucocephalus</i>	pied stilt		C		274
animals	birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	red-necked avocet		C		17
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		336
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		236

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animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		C		108
animals	birds	Rhipiduridae	<i>Rhipidura rufiventris</i>	northern fantail		C		3
animals	birds	Rostratulidae	<i>Rostratula australis</i>	Australian painted-snipe		E	E	12
animals	birds	Scolopacidae	<i>Actitis hypoleucos</i>	common sandpiper		SL		111
animals	birds	Scolopacidae	<i>Arenaria interpres</i>	ruddy turnstone		V	V	27
animals	birds	Scolopacidae	<i>Calidris acuminata</i>	sharp-tailed sandpiper		V	V	192
animals	birds	Scolopacidae	<i>Calidris alba</i>	sanderling		SL		15
animals	birds	Scolopacidae	<i>Calidris canutus</i>	red knot		V	V	78
animals	birds	Scolopacidae	<i>Calidris falcinellus</i>	broad-billed sandpiper		SL		5
animals	birds	Scolopacidae	<i>Calidris ferruginea</i>	curlew sandpiper		CR	CE	38
animals	birds	Scolopacidae	<i>Calidris melanotos</i>	pectoral sandpiper		SL		13
animals	birds	Scolopacidae	<i>Calidris pugnax</i>	ruff		SL		2
animals	birds	Scolopacidae	<i>Calidris ruficollis</i>	red-necked stint		SL		209
animals	birds	Scolopacidae	<i>Calidris tenuirostris</i>	great knot		V	V	251
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		V	V	38
animals	birds	Scolopacidae	<i>Gallinago sp.</i>			C		1
animals	birds	Scolopacidae	<i>Limnodromus semipalmatus</i>	Asian dowitcher		V	V	1
animals	birds	Scolopacidae	<i>Limosa lapponica baueri</i>	Western Alaskan bar-tailed godwit		E	E	414
animals	birds	Scolopacidae	<i>Limosa limosa</i>	black-tailed godwit		E	E	83
animals	birds	Scolopacidae	<i>Numenius madagascariensis</i>	eastern curlew		CR	CE	593
animals	birds	Scolopacidae	<i>Numenius minutus</i>	little curlew		SL		30
animals	birds	Scolopacidae	<i>Numenius phaeopus</i>	whimbrel		SL		608
animals	birds	Scolopacidae	<i>Tringa brevipes</i>	grey-tailed tattler		SL		359
animals	birds	Scolopacidae	<i>Tringa glareola</i>	wood sandpiper		SL		14
animals	birds	Scolopacidae	<i>Tringa incana</i>	wandering tattler		SL		4
animals	birds	Scolopacidae	<i>Tringa nebularia</i>	common greenshank		E	E	271
animals	birds	Scolopacidae	<i>Tringa sp.</i>			C		2
animals	birds	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper		SL		86
animals	birds	Scolopacidae	<i>Xenus cinereus</i>	terek sandpiper		V	V	76
animals	birds	Stercorariidae	<i>Stercorarius parasiticus</i>	Arctic jaeger		SL		1
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		86
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		179
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		C		10/1
animals	birds	Sturnidae	<i>Acridotheres tristis</i>	common myna	Y			655
animals	birds	Sturnidae	<i>Aplonis metallica</i>	metallic starling		C		5
animals	birds	Sturnidae	<i>Sturnus vulgaris</i>	common starling	Y			4
animals	birds	Sulidae	<i>Morus serrator</i>	Australasian gannet		C		1
animals	birds	Sulidae	<i>Sula dactylatra</i>	masked booby		SL		1
animals	birds	Sulidae	<i>Sula leucogaster</i>	brown booby		SL		29/1
animals	birds	Sulidae	<i>Sula sula</i>	red-footed booby		SL		2
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		63
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		485/1
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		55
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		1222
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		540
animals	birds	Turnicidae	<i>Turnix maculosus</i>	red-backed button-quail		C		15

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animals	birds	Turnicidae	<i>Turnix pyrrhorthorax</i>	red-chested button-quail		C		13
animals	birds	Turnicidae	<i>Turnix velox</i>	little button-quail		C		2
animals	birds	Tytonidae	<i>Tyto javanica</i>	eastern barn owl		C		13
animals	birds	Tytonidae	<i>Tyto longimembris</i>	eastern grass owl		C		3
animals	birds	Tytonidae	<i>Tyto novaehollandiae kimberli</i>	masked owl (northern subspecies)		V	V	1
animals	birds	Zosteropidae	<i>Zosterops lateralis</i>	silveryeye		C		21
animals	cartilaginous fishes	Aetobatidae	<i>Aetobatus ocellatus</i>	whitespotted eagle ray				1
animals	cartilaginous fishes	Mobulidae	<i>Mobula alfredi</i>	Alfred manta				1
animals	cartilaginous fishes	Sphyrnidae	<i>Sphyrna lewini</i>	scalloped hammerhead		E	CD	1
animals	insects	Aeshnidae	<i>Anax papuensis</i>	Australian Emperor				1
animals	insects	Coenagrionidae	<i>Ischnura heterosticta heterosticta</i>	common bluetail				1
animals	insects	Formicidae	<i>Oecophylla smaragdina</i>	green tree ant				1
animals	insects	Hesperiidae	<i>Cephrenes trichopepla</i>	yellow palm-dart				1
animals	insects	Hesperiidae	<i>Proeidosia polysema</i>	spinifex sand-skipper				1
animals	insects	Hesperiidae	<i>Suniana sp.</i>					1
animals	insects	Hesperiidae	<i>Suniana sunias</i>					1
animals	insects	Hesperiidae	<i>Taractrocera sp.</i>					1
animals	insects	Hesperiidae	<i>Trapezites iacchus</i>	brown ochre				1
animals	insects	Libellulidae	<i>Diplacodes trivialis</i>	chalky percher				1
animals	insects	Libellulidae	<i>Pantala flavescens</i>	wandering glider				1
animals	insects	Lycaenidae	<i>Candalides erinus erinus</i>	small dusky-blue				1
animals	insects	Lycaenidae	<i>Hypochrysops apelles apelles</i>	copper jewel				2
animals	insects	Lycaenidae	<i>Hypolycaena phorbas phorbas</i>	black-spotted flash				1
animals	insects	Lycaenidae	<i>Liphyra brassolis major</i>	moth butterfly		C		1/1
animals	insects	Lycaenidae	<i>Ogyris amaryllis</i>					1/1
animals	insects	Lycaenidae	<i>Ogyris zosine</i>	northern purple azure				1/1
animals	insects	Lycaenidae	<i>Theclinesthes serpentatus serpentatus</i>	salt-bush blue				1
animals	insects	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)				1
animals	insects	Nymphalidae	<i>Acraea andromacha andromacha</i>	glasswing				1
animals	insects	Nymphalidae	<i>Acraea terpsicore</i>	tawny coster				6
animals	insects	Nymphalidae	<i>Cupha prosope</i>					1
animals	insects	Nymphalidae	<i>Danaus affinis affinis</i>	swamp tiger				5
animals	insects	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer				1
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				4
animals	insects	Nymphalidae	<i>Hypolimnna alimena lamina</i>	blue-banded eggfly				2
animals	insects	Nymphalidae	<i>Hypolimnna bolina nerina</i>	varied eggfly				4
animals	insects	Nymphalidae	<i>Junonia hedonia zelima</i>	chocolate argus				2
animals	insects	Nymphalidae	<i>Junonia orithya albicincta</i>	blue argus				1
animals	insects	Nymphalidae	<i>Libythea geoffroyi nicevillei</i>	purple beak				2
animals	insects	Nymphalidae	<i>Melanitis leda bankia</i>	evening brown				2
animals	insects	Nymphalidae	<i>Mycalesis perseus perseus</i>	dingy bush-brown				4
animals	insects	Nymphalidae	<i>Tirumala hamata hamata</i>	blue tiger				1
animals	insects	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail				8
animals	insects	Papilionidae	<i>Graphium agamemnon ligatum</i>	green-spotted triangle				1
animals	insects	Papilionidae	<i>Graphium eury pylus lycaon</i>	pale triangle				1

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animals	insects	Papilionidae	<i>Ornithoptera euphorion</i>	Cairns birdwing		C		4
animals	insects	Papilionidae	<i>Ornithoptera priamus</i>	New Guinea birdwing		C		8
animals	insects	Papilionidae	<i>Pachliopta polydorus queenslandicus</i>	red-bodied swallowtail				3
animals	insects	Papilionidae	<i>Papilio aegeus</i>					2
animals	insects	Papilionidae	<i>Papilio ulysses joesa</i>	Ulysses butterfly		C		10
animals	insects	Pieridae	<i>Eurema brigitta australis</i>	no-brand grass-yellow				1
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				1
animals	mammals	Balaenopteridae	<i>Megaptera novaeangliae</i>	humpback whale		C		15
animals	mammals	Bovidae	<i>Bos sp.</i>	cattle	Y			1
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			1
animals	mammals	Canidae	<i>Canis familiaris</i>	dog	Y			8
animals	mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				13
animals	mammals	Canidae	<i>Canis sp.</i>		Y			2
animals	mammals	Canidae	<i>Vulpes vulpes</i>	red fox	Y			3
animals	mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	northern quoll		C	E	19
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		23/3
animals	mammals	Delphinidae	<i>Orcaella heinsohni</i>	Australian snubfin dolphin		V	V	46/26
animals	mammals	Delphinidae	<i>Sousa sahalensis</i>	Australian humpback dolphin		V	V	10/10
animals	mammals	Delphinidae	<i>Tursiops aduncus</i>	Indo-Pacific bottlenose dolphin		C		3/3
animals	mammals	Dugongidae	<i>Dugong dugon</i>	dugong		V		11/1
animals	mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheathtail bat		C		3
animals	mammals	Emballonuridae	<i>Saccolaimus saccolaimus nudicluniatus</i>	bare-rumped sheathtail bat		E	V	7/1
animals	mammals	Emballonuridae	<i>Saccolaimus sp.</i>			C		36
animals	mammals	Emballonuridae	<i>Taphozous sp.</i>			C		54
animals	mammals	Emballonuridae	<i>Taphozous troughtoni</i>	Troughton's sheathtail bat		C		1
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			10
animals	mammals	Hipposideridae	<i>Hipposideros ater aruensis</i>	eastern dusky leaf-nosed bat		C		3
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			1
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			3
animals	mammals	Macropodidae	<i>Lagorchestes conspicillatus</i>	spectacled hare-wallaby		C		3
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		9
animals	mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby		C		42/1
animals	mammals	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby		C		4
animals	mammals	Macropodidae	<i>Osphranter robustus</i>	common wallaroo		C		11
animals	mammals	Macropodidae	<i>Petrogale assimilis</i>	allied rock-wallaby		C		40/13
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		1
animals	mammals	Miniopteridae	<i>Miniopterus australis</i>	little bent-wing bat		C		57
animals	mammals	Miniopteridae	<i>Miniopterus orianae oceanensis</i>	eastern bent-wing bat		C		89/6
animals	mammals	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat		C		11
animals	mammals	Molossidae	<i>Chaerephon jobensis</i>	northern freetail bat		C		81
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat		C		62
animals	mammals	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat		C		92
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		17/2
animals	mammals	Muridae	<i>Leggadina lakedownensis</i>	Lakeland Downs mouse		C		1
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		19/6
animals	mammals	Muridae	<i>Melomys cervinipes</i>	fawn-footed melomys		C		3

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animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			66/7
animals	mammals	Muridae	<i>Pseudomys gracilicaudatus</i>	eastern chestnut mouse		C		8/1
animals	mammals	Muridae	<i>Pseudomys mimulus</i>	eastern delicate mouse		C		3
animals	mammals	Muridae	<i>Rattus rattus</i>	black rat	Y			6
animals	mammals	Muridae	<i>Rattus sordidus</i>	canefield rat		C		13/6
animals	mammals	Muridae	<i>Uromys caudimaculatus</i>	giant white-tailed rat		C		3/1
animals	mammals	Muridae	<i>Zyzomys argurus</i>	common rock-rat		C		1
animals	mammals	Ornithorhynchidae	<i>Ornithorhynchus anatinus</i>	platypus		SL		1
animals	mammals	Peramelidae	<i>Isodon macrourus</i>	northern brown bandicoot		C		19/1
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		6
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		52/13
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		E	E	85
animals	mammals	Physeteridae	<i>Physeter macrocephalus</i>	sperm whale		C		1/1
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		5
animals	mammals	Pteropodidae	<i>Nyctimene robinsoni</i>	eastern tube-nosed bat		C		2
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		25/6
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		9/1
animals	mammals	Pteropodidae	<i>Syconycteris australis</i>	eastern blossom bat		C		1
animals	mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	eastern horseshoe-bat		C		11
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			8
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		32
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		34
animals	mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		C		46
animals	mammals	Vespertilionidae	<i>Chalinolobus sp.</i>			C		1
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		3
animals	mammals	Vespertilionidae	<i>Nyctophilus bifax</i>	northern long-eared bat		C		1
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>			C		11
animals	mammals	Vespertilionidae	<i>Scotorepens balstoni</i>	inland broad-nosed bat		C		2
animals	mammals	Vespertilionidae	<i>Scotorepens sanborni</i>	northern broad-nosed bat		C		1
animals	mammals	Vespertilionidae	<i>Vespadelus pumilus</i>	eastern forest bat		C		5/4
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat		C		42
animals	ray-finned fishes	Ambassidae	<i>Ambassis agrammus</i>	sailfin glassfish				107
animals	ray-finned fishes	Ambassidae	<i>Ambassis macleayi</i>	Macleay's glassfish				1
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				56
animals	ray-finned fishes	Anguillidae	<i>Anguilla sp.</i>					3
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				287
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				1487
animals	ray-finned fishes	Belonidae	<i>Strongylura krefftii</i>	freshwater longtom				171
animals	ray-finned fishes	Centropomidae	<i>Lates calcarifer</i>	barramundi				1107
animals	ray-finned fishes	Cichlidae	<i>Amatitlania nigrofasciata</i>	convict cichlid	Y			5
animals	ray-finned fishes	Cichlidae	<i>Amphilophus labiatus</i>	red devil	Y			18
animals	ray-finned fishes	Cichlidae	<i>Oreochromis mossambica</i>	Mozambique mouthbrooder	Y			431
animals	ray-finned fishes	Cichlidae	<i>Tilapia mariae</i>	spotted tilapia	Y			2
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				649
animals	ray-finned fishes	Eleotridae	<i>Giuris margaritacea</i>	snakehead gudgeon				2
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				21

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animals	ray-finned fishes	Eleotridae	<i>Hypseleotris galii</i>	firetail gudgeon				10
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris sp.</i>					5
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris species 1</i>	Midgley's carp gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				4/1
animals	ray-finned fishes	Eleotridae	<i>Mogurnda mogurnda</i>	northern purplespotted gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Ophiocara porocephala</i>	spangled gudgeon				2
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				270
animals	ray-finned fishes	Gobiidae	<i>Awaous acritosus</i>	roman-nose goby				1
animals	ray-finned fishes	Gobiidae	<i>Chlamydogobius ranunculus</i>	tadpole goby				1/1
animals	ray-finned fishes	Gobiidae	<i>Glossogobius illimis</i>	false celebes goby				2
animals	ray-finned fishes	Gobiidae	<i>Redigobius bikolanus</i>	speckled goby				2
animals	ray-finned fishes	Kuhliidae	<i>Kuhlia rupestris</i>	jungle perch				2
animals	ray-finned fishes	Leiognathidae	<i>Leiognathus equulus</i>	common ponyfish				6
animals	ray-finned fishes	Lutjanidae	<i>Lutjanus argentimaculatus</i>	mangrove jack				101
animals	ray-finned fishes	Megalopidae	<i>Megalops cyprinoides</i>	oxeye herring				5
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				338/9
animals	ray-finned fishes	Mugilidae	<i>Liza subviridis</i>	greenback mullet				1
animals	ray-finned fishes	Mugilidae	<i>Mugil cephalus</i>	sea mullet				6
animals	ray-finned fishes	Percichthyidae	<i>Macquaria novemaculeata</i>	Australian bass				1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus ater</i>	black catfish				17
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtl</i>	Hyrtl's catfish				7
animals	ray-finned fishes	Plotosidae	<i>Porochilus rendahli</i>	Rendahl's catfish				8
animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	Y			8
animals	ray-finned fishes	Poeciliidae	<i>Poecilia reticulata</i>	guppy	Y			5
animals	ray-finned fishes	Pseudomugilidae	<i>Pseudomugil signifer</i>	Pacific blue eye				4/1
animals	ray-finned fishes	Synbranchidae	<i>Ophisternon gutturale</i>	swamp eel				1
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				257
animals	ray-finned fishes	Terapontidae	<i>Bidyanus bidyanus</i>	silver perch			E	1
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				23
animals	ray-finned fishes	Toxotidae	<i>Toxotes chatareus</i>	sevenspot archerfish				53
animals	ray-finned fishes	Toxotidae	<i>Toxotes jaculatrix</i>	banded archerfish				1
animals	reptiles	Acrochordidae	<i>Acrochordus granulatus</i>	little file snake			C	1
animals	reptiles	Agamidae	<i>Chlamydosaurus kingii</i>	frilled lizard			C	9/1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead			C	30/5
animals	reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi			C	2/1
animals	reptiles	Agamidae	<i>Diporiphora sp.</i>				C	1
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon			C	1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon			C	1
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python			C	15/2
animals	reptiles	Boidae	<i>Aspidites melanocephalus</i>	black-headed python			C	2
animals	reptiles	Boidae	<i>Liasis fuscus</i>	water python			C	7
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python			C	25/2
animals	reptiles	Boidae	<i>Simalia kinghorni</i>	amethystine python (Australian form)			C	3
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko			C	1
animals	reptiles	Carphodactylidae	<i>Phyllurus amnicola</i>	Mount Elliot broad-tailed gecko			V	1/1
animals	reptiles	Chelidae	<i>Chelodina canni</i>	Cann's longneck turtle			C	5/2

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animals	reptiles	Chelidae	<i>Elseya irwini</i>	Irwin's turtle		C	V	1/1
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		33
animals	reptiles	Chelidae	<i>Emydura macquarii macquarii</i>	Murray turtle		C		1/1
animals	reptiles	Chelidae	<i>Wollumbinia latisternum</i>	saw-shelled turtle		C		9/1
animals	reptiles	Cheloniidae	<i>Chelonia mydas</i>	green turtle		V	V	29
animals	reptiles	Cheloniidae	<i>Eretmochelys imbricata</i>	hawksbill turtle		E	V	2
animals	reptiles	Cheloniidae	<i>Natator depressus</i>	flatback turtle		V	V	1
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		14/1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		42/2
animals	reptiles	Colubridae	<i>Stegonotus australis</i>	slaty-grey snake		C		1/1
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		38/5
animals	reptiles	Crocodylidae	<i>Crocodylus johnstoni</i>	Australian freshwater crocodile		C		1
animals	reptiles	Crocodylidae	<i>Crocodylus porosus</i>	estuarine crocodile		V		16/2
animals	reptiles	Diplodactylidae	<i>Amalosia rhombifer sensu lato</i>	zigzag velvet gecko		C		11/6
animals	reptiles	Diplodactylidae	<i>Amalosia saxicola</i>	rock zigzag gecko		C		8/5
animals	reptiles	Diplodactylidae	<i>Diplodactylus platyurus</i>	eastern fat-tailed gecko		C		1
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		3
animals	reptiles	Diplodactylidae	<i>Oedura castelnaui</i>	northern velvet gecko		C		6/1
animals	reptiles	Diplodactylidae	<i>Oedura monilis</i>	ocellated velvet gecko		C		13/4
animals	reptiles	Diplodactylidae	<i>Oedura monilis sensu lato</i>	ocellated velvet gecko		C		3/1
animals	reptiles	Diplodactylidae	<i>Strophurus williamsi</i>	soft-spined gecko		C		1
animals	reptiles	Elapidae	<i>Acanthophis antarcticus</i>	common death adder		V		3
animals	reptiles	Elapidae	<i>Acanthophis praelongus</i>	northern death adder		C		1/1
animals	reptiles	Elapidae	<i>Cryptophis nigrostriatus</i>	black-striped snake		C		4/2
animals	reptiles	Elapidae	<i>Demansia papuensis</i>	greater black whipsnake		C		2/1
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		1
animals	reptiles	Elapidae	<i>Demansia sp.</i>			C		1
animals	reptiles	Elapidae	<i>Demansia torquata</i>	collared whipsnake		C		7/1
animals	reptiles	Elapidae	<i>Demansia vestigiata</i>	lesser black whipsnake		C		17/2
animals	reptiles	Elapidae	<i>Furina barnardi</i>	yellow-naped snake		C		1
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		2/1
animals	reptiles	Elapidae	<i>Furina ornata</i>	orange-naped snake		C		4/1
animals	reptiles	Elapidae	<i>Microcephalophis gracilis</i>	slender sea snake		C		1/1
animals	reptiles	Elapidae	<i>Oxyuranus scutellatus</i>	coastal taipan		C		3
animals	reptiles	Elapidae	<i>Pseudonaja nuchalis sensu lato</i>	western brown snake		C		2
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		6
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		45/12
animals	reptiles	Gekkonidae	<i>Hemidactylus frenatus</i>	house gecko	Y			34/5
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		56/2
animals	reptiles	Pygopodidae	<i>Delma labialis</i>	striped-tailed delma		C		7
animals	reptiles	Pygopodidae	<i>Delma tincta</i>	excitable delma		C		12/6
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		16/3
animals	reptiles	Pygopodidae	<i>Pygopus schraderi</i>	eastern hooded scaly-foot		C		1
animals	reptiles	Scincidae	<i>Bellatorias frerei</i>	major skink		C		3
animals	reptiles	Scincidae	<i>Carlia decora</i>	elegant rainbow skink		C		7/4
animals	reptiles	Scincidae	<i>Carlia jarnoldae</i>	lined rainbow-skink		C		74

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animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink		C		9/1
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		33/5
animals	reptiles	Scincidae	<i>Carlia rhomboidalis</i>	blue-throated rainbow-skink		C		11
animals	reptiles	Scincidae	<i>Carlia rostralis</i>	black-throated rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		10/1
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		19/4
animals	reptiles	Scincidae	<i>Carlia sp.</i>			C		2/1
animals	reptiles	Scincidae	<i>Carlia storri</i>	Storr's rainbow-skink		C		2
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		22/12
animals	reptiles	Scincidae	<i>Concinnia brachysoma</i>	northern bar-sided skink		C		2/1
animals	reptiles	Scincidae	<i>Concinnia sokosoma</i>	stout bar-sided skink		C		1
animals	reptiles	Scincidae	<i>Concinnia tenuis</i>	bar-sided skink		C		3/1
animals	reptiles	Scincidae	<i>Cryptoblepharus adamsi</i>	Adams' snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	metallic snake-eyed skink		C		4/1
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		2
animals	reptiles	Scincidae	<i>Cryptoblepharus sp.</i>			C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus</i>	striped snake-eyed skink		C		7
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus sensu lato</i>			C		20/8
animals	reptiles	Scincidae	<i>Ctenotus eutaenius</i>	black-backed yellow-lined ctenotus		C		1/1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		25
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		10
animals	reptiles	Scincidae	<i>Eulamprus quoyii</i>	eastern water skink		C		4
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		17/8
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		19/13
animals	reptiles	Scincidae	<i>Lampropholis mirabilis</i>	saxicoline sunskink		NT		15/4
animals	reptiles	Scincidae	<i>Lampropholis sp.</i>			C		1
animals	reptiles	Scincidae	<i>Lygisaurus aeratus sensu lato</i>			C		1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		7/1
animals	reptiles	Scincidae	<i>Lygisaurus laevis</i>	rainforest edge litter-skink		C		2/2
animals	reptiles	Scincidae	<i>Lygisaurus sesbrauna</i>	Eastern Cape litter-skink		C		1
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		11/5
animals	reptiles	Scincidae	<i>Pygmaeascincus sadlieri</i>	Magnetic Island dwarf skink		C		1
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		1
animals	reptiles	Scincidae	<i>Tiliqua scincoides scincoides</i>	eastern bluetongue		C		5
animals	reptiles	Typhlopidae	<i>Anilius torresianus</i>	north-eastern blind snake		C		1
animals	reptiles	Typhlopidae	<i>Indotyphlops braminus</i>	flowerpot blind snake	Y			4/1
animals	reptiles	Varanidae	<i>Varanus acanthurus</i>	ridge-tailed monitor		C		1/1
animals	reptiles	Varanidae	<i>Varanus gouldii</i>	sand monitor		C		10
animals	reptiles	Varanidae	<i>Varanus panoptes</i>	yellow-spotted monitor		C		5
animals	reptiles	Varanidae	<i>Varanus semiremex</i>	rusty monitor		C		5/2
animals	reptiles	Varanidae	<i>Varanus sp.</i>	goanna		C		6
animals	reptiles	Varanidae	<i>Varanus storri</i>	Storr's monitor		C		2/2
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		3
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		3
animals	uncertain	Indeterminate	<i>Indeterminate</i>	Unknown or Code Pending				47
bacteria	blue-green algae	Oscillatoriaceae	<i>Lyngbya semiplena</i>			C		1/1

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bacteria	blue-green algae	Oscillatoriaceae	<i>Phormidium</i>					1/1
chromists	brown algae	Dictyotaceae	<i>Dictyopteris australis</i>			C		2/2
chromists	brown algae	Dictyotaceae	<i>Dictyopteris delicatula</i>			C		2/2
chromists	brown algae	Dictyotaceae	<i>Dictyopteris woodwardia</i>			C		1/1
chromists	brown algae	Dictyotaceae	<i>Dictyota</i>					4/4
chromists	brown algae	Dictyotaceae	<i>Dictyota bartayresiana</i>			C		1/1
chromists	brown algae	Dictyotaceae	<i>Dictyota ciliolata</i>			C		2/2
chromists	brown algae	Dictyotaceae	<i>Padina</i>					1/1
chromists	brown algae	Dictyotaceae	<i>Padina australis</i>			C		2/2
chromists	brown algae	Dictyotaceae	<i>Padina tetraströmatica</i>			C		2/2
chromists	brown algae	Sargassaceae	<i>Sargassum</i>					4/4
chromists	brown algae	Sargassaceae	<i>Turbinaria</i>					1/1
chromists	brown algae	Scytosiphonaceae	<i>Colpomenia sinuosa</i>			C		1/1
chromists	dinoflagellates	Symbiodiniaceae	<i>Cladocopium proliferum</i>			C		1/1
fungi	Agaricomycetes	Agaricaceae	<i>Cyathus</i>					1/1
fungi	Agaricomycetes	Agaricaceae	<i>Cyathus stercoreus</i>			C		1/1
fungi	Agaricomycetes	Ganodermataceae	<i>Ganoderma</i>					1/1
fungi	Agaricomycetes	Sclerodermataceae	<i>Pisolithus albus</i>			C		1/1
fungi	Agaricomycetes	Sclerodermataceae	<i>Pisolithus marmoratus</i>			C		2/2
fungi	lecanoromycetes	Caliciaceae	<i>Dirinaria confluens</i>			C		1/1
fungi	lecanoromycetes	Caliciaceae	<i>Dirinaria flava</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema lobulascens</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria xanthoplaca</i>			C		1/1
fungi	lecanoromycetes	Ramalinaceae	<i>Ramalina confirmata</i>			C		1/1
fungi	lecanoromycetes	Ramalinaceae	<i>Ramalina subfraxinea</i> var. <i>norstictica</i>			C		2/2
fungi	lecanoromycetes	Ramalinaceae	<i>Ramalina subfraxinea</i> var. <i>subfraxinea</i>			C		1/1
plants	Bangiophyceae	Bangiaceae	<i>Pyropia denticulata</i>			C		1/1
plants	Charophyceae	Characeae	<i>Chara</i>					2/2
plants	Charophyceae	Characeae	<i>Nitella</i>					2/2
plants	Florideophyceae	Acrotylaceae	<i>Antrocentrum nigrescens</i>			C		1/1
plants	Florideophyceae	Caulacanthaceae	<i>Catenella nipae</i>			C		1/1
plants	Florideophyceae	Ceramiaceae	<i>Centroceras clavulatum</i>			C		1/1
plants	Florideophyceae	Ceramiaceae	<i>Ceramium</i>					1/1
plants	Florideophyceae	Ceramiaceae	<i>Ceramium cimbricum</i>			C		1/1
plants	Florideophyceae	Ceramiaceae	<i>Ceramium maryae</i>			C		1/1
plants	Florideophyceae	Champiaceae	<i>Coelothrix irregularis</i>			C		1/1
plants	Florideophyceae	Cystocloniaceae	<i>Hypnea boergesenii</i>			C		1/1
plants	Florideophyceae	Cystocloniaceae	<i>Hypnea cornuta</i>			C		1/1
plants	Florideophyceae	Cystocloniaceae	<i>Hypnea spinella</i>			C		1/1
plants	Florideophyceae	Cystocloniaceae	<i>Hypnea valentiae</i>			C		1/1
plants	Florideophyceae	Dasyaceae	<i>Heterosiphonia multiceps</i>			C		1/1
plants	Florideophyceae	Delesseriaceae	<i>Caloglossa leprieurii</i>			C		1/1
plants	Florideophyceae	Galaxauraceae	<i>Tricleocarpa cylindrica</i>			C		3/3
plants	Florideophyceae	Gelidiaceae	<i>Gelidium corneum</i>			C		1/1
plants	Florideophyceae	Gelidiaceae	<i>Gelidium crinale</i>			C		1/1
plants	Florideophyceae	Gracilariaceae	<i>Gracilaria</i>					3/3

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plants	Florideophyceae	Gracilariaceae	<i>Gracilaria edulis</i>			C		3/3
plants	Florideophyceae	Gracilariaceae	<i>Gracilaria eucheumoides</i>			C		1/1
plants	Florideophyceae	Gracilariaceae	<i>Gracilaria purpurascens</i>			C		1/1
plants	Florideophyceae	Lithophyllaceae	<i>Amphiroa fragilissima</i>			C		1/1
plants	Florideophyceae	Lomentariaceae	<i>Gelidiopsis variabilis</i>			C		2/2
plants	Florideophyceae	Phyllophoraceae	<i>Ahnfeltiopsis pygmaea</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Acanthophora muscoides</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Acanthophora spicifera</i>			C		3/3
plants	Florideophyceae	Rhodomelaceae	<i>Bostrychia radicans</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Bostrychia tenella subsp. tenella</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Chondria rainfordi</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Chondrophycus perforatus</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Chondrophycus succisus</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Laurencia</i>					2/2
plants	Florideophyceae	Rhodomelaceae	<i>Laurencia gracilis</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Laurencia nidifica</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Laurencia obtusa</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Laurencia papillosa</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Polysiphonia coacta</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Polysiphonia fragilis</i>			C		1/1
plants	Florideophyceae	Scinaiaceae	<i>Scinaia</i>					1/1
plants	Florideophyceae	Solieriaceae	<i>Sarconema filiforme</i>			C		2/2
plants	Florideophyceae	Solieriaceae	<i>Solieria</i>					1/1
plants	Ulvophyceae	Caulerpaceae	<i>Caulerpa racemosa</i>			C		1/1
plants	Ulvophyceae	Caulerpaceae	<i>Caulerpa racemosa var. laetevirens</i>			C		2/2
plants	Ulvophyceae	Caulerpaceae	<i>Caulerpa taxifolia</i>			C		1/1
plants	Ulvophyceae	Cladophoraceae	<i>Cladophora</i>					1/1
plants	Ulvophyceae	Cladophoraceae	<i>Cladophora herpestica</i>			C		2/2
plants	Ulvophyceae	Cladophoraceae	<i>Cladophora prolifera</i>			C		2/2
plants	Ulvophyceae	Cladophoraceae	<i>Rhizoclonium tortuosum</i>			C		1/1
plants	Ulvophyceae	Halimedaceae	<i>Halimeda opuntia</i>			C		1/1
plants	Ulvophyceae	Udoteaceae	<i>Udotea flabellum</i>			C		1/1
plants	Ulvophyceae	Ulvaceae	<i>Enteromorpha</i>					1/1
plants	Ulvophyceae	Ulvaceae	<i>Ulva flexuosa subsp. flexuosa</i>			C		1/1
plants	Ulvophyceae	Ulvaceae	<i>Ulva lactuca</i>			C		1/1
plants	Ulvophyceae	Ulvaceae	<i>Ulva rigida</i>			C		2/2
plants	Ulvophyceae	Ulvaceae	<i>Ulva sapor</i>			C		2/2
plants	Ulvophyceae	Valoniaceae	<i>Valonia aegagropila</i>			C		2/2
plants	land plants	Acanthaceae	<i>Asystasia gangetica subsp. gangetica</i>		Y			5/5
plants	land plants	Acanthaceae	<i>Avicennia marina</i>			C		2
plants	land plants	Acanthaceae	<i>Avicennia marina subsp. australasica</i>			C		1/1
plants	land plants	Acanthaceae	<i>Avicennia marina subsp. eucalyptifolia</i>			C		3/1
plants	land plants	Acanthaceae	<i>Barleria cristata</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Barleria lupulina</i>		Y			3/3
plants	land plants	Acanthaceae	<i>Barleria prionitis</i>		Y			2/2
plants	land plants	Acanthaceae	<i>Brunoniella acaulis subsp. acaulis</i>			C		3/3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		1
plants	land plants	Acanthaceae	<i>Dipteracanthus prostratus</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Harnieria hygrophiloides</i>	white karambal		C		3/3
plants	land plants	Acanthaceae	<i>Hygrophila angustifolia</i>			C		1/1
plants	land plants	Acanthaceae	<i>Hypoestes</i>					1/1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda</i>			C		1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda</i> var. <i>floribunda</i>			C		3/3
plants	land plants	Acanthaceae	<i>Justicia betonica</i>		Y			3/3
plants	land plants	Acanthaceae	<i>Nelsonia campestris</i>			C		2/2
plants	land plants	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens</i>			C		1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens</i> var. <i>adscendens</i>			C		1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens</i> var. <i>latifolia</i>			C		1/1
plants	land plants	Acanthaceae	<i>Ruellia simplex</i>		Y			2/2
plants	land plants	Acanthaceae	<i>Ruellia tuberosa</i>		Y			6/6
plants	land plants	Acanthaceae	<i>Strobilanthes reptans</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Thunbergia alata</i>	black-eyed Susan	Y			1/1
plants	land plants	Acanthaceae	<i>Thunbergia arnhemica</i>			C		1/1
plants	land plants	Acanthaceae	<i>Thunbergia fragrans</i>		Y			12/12
plants	land plants	Acanthaceae	<i>Thunbergia grandiflora</i>	sky flower	Y			4/4
plants	land plants	Agavaceae	<i>Agave angustifolia</i>		Y			1/1
plants	land plants	Aizoaceae	<i>Sesuvium portulacastrum</i>	sea purslane		C		4
plants	land plants	Aizoaceae	<i>Sesuvium portulacastrum</i> subsp. <i>portulacastrum</i>			C		2/2
plants	land plants	Aizoaceae	<i>Trianthema compactum</i>			C		2/2
plants	land plants	Aizoaceae	<i>Trianthema portulacastrum</i>	black pigweed	Y			2/2
plants	land plants	Aizoaceae	<i>Trianthema triquetrum</i>	red spinach		C		2/2
plants	land plants	Alismataceae	<i>Echinodorus cordifolius</i>		Y			1/1
plants	land plants	Alismataceae	<i>Hydrocleys nymphoides</i>		Y			1/1
plants	land plants	Alismataceae	<i>Limnocharis flava</i>	yellow burrhead	Y			3/2
plants	land plants	Alismataceae	<i>Sagittaria platyphylla</i>	sagittaria	Y			1/1
plants	land plants	Amaranthaceae	<i>Achyranthes aspera</i>			C		4/4
plants	land plants	Amaranthaceae	<i>Aerva javanica</i>		Y			1/1
plants	land plants	Amaranthaceae	<i>Alternanthera brasiliana</i>		Y			1/1
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata</i> var. <i>micrantha</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera ficoidea</i>		Y			8/7
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		2/1
plants	land plants	Amaranthaceae	<i>Amaranthus interruptus</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Celosia argentea</i>		Y			6/5
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		5/4
plants	land plants	Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed	Y			2/2
plants	land plants	Amaranthaceae	<i>Ptilotus parviflorus</i>			C		1/1
plants	land plants	Amaryllidaceae	<i>Crinum</i>					1
plants	land plants	Amaryllidaceae	<i>Crinum arenarium</i>			SL		1/1
plants	land plants	Amaryllidaceae	<i>Proiphys infundibularis</i>			SL		2/1
plants	land plants	Anacardiaceae	<i>Euroschinus falcata</i> var. <i>falcata</i>			C		1/1

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plants	land plants	Anacardiaceae	<i>Mangifera indica</i>	mango	Y			1
plants	land plants	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		9/5
plants	land plants	Anacardiaceae	<i>Schinus terebinthifolius</i>		Y			1/1
plants	land plants	Annonaceae	<i>Annona reticulata</i>	custard apple	Y			1/1
plants	land plants	Annonaceae	<i>Fitzalania heteropetala</i>			C		8/5
plants	land plants	Annonaceae	<i>Huberantha nitidissima</i>			C		4/3
plants	land plants	Annonaceae	<i>Melodorum crassipetalum</i>			C		5/5
plants	land plants	Annonaceae	<i>Melodorum leichhardtii</i>			C		1/1
plants	land plants	Annonaceae	<i>Xylopia maccraeae</i>			C		1/1
plants	land plants	Anthericaceae	<i>Chlorophytum laxum</i>	spider plant		C		1/1
plants	land plants	Apiaceae	<i>Centella asiatica</i>			C		1/1
plants	land plants	Apiaceae	<i>Cyclospermum leptophyllum</i>		Y			1/1
plants	land plants	Apiaceae	<i>Mackinlaya macrosciadea</i>	mackinlaya		C		2/2
plants	land plants	Apocynaceae	<i>Allamanda cathartica</i>	yellow allamanda	Y			1/1
plants	land plants	Apocynaceae	<i>Alyxia spicata</i>			C		2/2
plants	land plants	Apocynaceae	<i>Calotropis gigantea</i>		Y			1/1
plants	land plants	Apocynaceae	<i>Calotropis procera</i>		Y			1/1
plants	land plants	Apocynaceae	<i>Carissa lanceolata</i>			C		1
plants	land plants	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		1/1
plants	land plants	Apocynaceae	<i>Cascabela thevetia</i>	yellow oleander	Y			1/1
plants	land plants	Apocynaceae	<i>Catharanthus roseus</i>	pink periwinkle	Y			8/6
plants	land plants	Apocynaceae	<i>Ceropegia cumingiana</i>			C		1/1
plants	land plants	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			10/2
plants	land plants	Apocynaceae	<i>Cynanchum viminalis subsp. brunonianum</i>			C		1/1
plants	land plants	Apocynaceae	<i>Gymnanthera oblonga</i>			C		1/1
plants	land plants	Apocynaceae	<i>Ichnocarpus frutescens</i>			C		3/3
plants	land plants	Apocynaceae	<i>Leichhardtia brevifolia</i>			V	V	2/2
plants	land plants	Apocynaceae	<i>Leichhardtia microlepis</i>			C		2/2
plants	land plants	Apocynaceae	<i>Melodinus australis</i>	southern melodinus		C		1/1
plants	land plants	Apocynaceae	<i>Ochrosia elliptica</i>	northern ochrosia		C		2/2
plants	land plants	Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod		C		4/4
plants	land plants	Apocynaceae	<i>Parsonsia plaesiophylla</i>			C		2/2
plants	land plants	Apocynaceae	<i>Rauvolfia tetraphylla</i>		Y			3/3
plants	land plants	Apocynaceae	<i>Secamone elliptica</i>			C		3/3
plants	land plants	Apocynaceae	<i>Tabernaemontana orientalis</i>			C		3/1
plants	land plants	Apocynaceae	<i>Vincetoxicum carnosum</i>			C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum ovatum</i>			C		2/2
plants	land plants	Apocynaceae	<i>Vincetoxicum polyanthum</i>			C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum williamsii</i>			C		3/3
plants	land plants	Apocynaceae	<i>Wrightia saligna</i>			C		1/1
plants	land plants	Apocynaceae	<i>Wrightia versicolor</i>			C		1/1
plants	land plants	Aponogetonaceae	<i>Aponogeton queenslandicus</i>			SL		2/2
plants	land plants	Aquifoliaceae	<i>Ilex arnhemensis subsp. ferdinandi</i>			C		1/1
plants	land plants	Araceae	<i>Alocasia brisbanensis</i>			C		1/1
plants	land plants	Araceae	<i>Pistia stratiotes</i>	water lettuce	Y			1/1
plants	land plants	Araceae	<i>Typhonium flagelliforme</i>			C		1/1

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plants	land plants	Araliaceae	<i>Hydrocotyle acutiloba</i>			C		1/1
plants	land plants	Araliaceae	<i>Trachymene montana</i>			C		1/1
plants	land plants	Araucariaceae	<i>Araucaria cunninghamii</i> var. <i>cunninghamii</i>			C		3/3
plants	land plants	Arecaceae	<i>Livistona decora</i>			SL		5/3
plants	land plants	Aristolochiaceae	<i>Aristolochia elegans</i>	calico-flower	Y			1/1
plants	land plants	Aristolochiaceae	<i>Aristolochia pubera</i> var. <i>pubera</i>			C		5/5
plants	land plants	Aristolochiaceae	<i>Aristolochia ringens</i>		Y			1/1
plants	land plants	Aristolochiaceae	<i>Aristolochia thozetii</i>			C		2/2
plants	land plants	Aspleniaceae	<i>Asplenium nidus</i>			C		1/1
plants	land plants	Aspleniaceae	<i>Asplenium paleaceum</i>	scaly asplenium		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>Ageratum conyzoides</i>	billygoat weed	Y			1/1
plants	land plants	Asteraceae	<i>Apowollastonia spilanthes</i>			C		2/2
plants	land plants	Asteraceae	<i>Bidens alba</i> var. <i>radiata</i>		Y			2/2
plants	land plants	Asteraceae	<i>Bidens bipinnata</i>	bipinnate beggar's ticks	Y			3/3
plants	land plants	Asteraceae	<i>Blumea benthamiana</i>			C		1/1
plants	land plants	Asteraceae	<i>Blumea saxatilis</i>			C		1/1
plants	land plants	Asteraceae	<i>Calotis lappulacea</i>	yellow burr daisy		C		1/1
plants	land plants	Asteraceae	<i>Calyptocarpus vialis</i>	creeping cinderella weed	Y			1/1
plants	land plants	Asteraceae	<i>Camptacra barbata</i>			C		2/2
plants	land plants	Asteraceae	<i>Camptacra gracilis</i>			C		1/1
plants	land plants	Asteraceae	<i>Centipeda borealis</i>			C		2/2
plants	land plants	Asteraceae	<i>Chromolaena odorata</i>	Siam weed	Y			10/7
plants	land plants	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		1
plants	land plants	Asteraceae	<i>Coronidium rupicola</i>			C		2/2
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		3/3
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			3/3
plants	land plants	Asteraceae	<i>Eleutheranthera ruderalis</i>		Y			2/2
plants	land plants	Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i>		Y			2/2
plants	land plants	Asteraceae	<i>Erigeron bonariensis</i>		Y			2/2
plants	land plants	Asteraceae	<i>Erigeron pusillus</i>		Y			1/1
plants	land plants	Asteraceae	<i>Gamochaeta pensylvanica</i>		Y			2/2
plants	land plants	Asteraceae	<i>Gnaphalium polycaulon</i>		Y			1/1
plants	land plants	Asteraceae	<i>Peripleura bicolor</i>			C		3/3
plants	land plants	Asteraceae	<i>Peripleura scabra</i>			C		4/4
plants	land plants	Asteraceae	<i>Peripleura virgata</i>			C		1/1
plants	land plants	Asteraceae	<i>Phacellothrix cladochaeta</i>			C		1/1
plants	land plants	Asteraceae	<i>Pluchea rubelliflora</i>			C		3/3
plants	land plants	Asteraceae	<i>Porophyllum ruderales</i> subsp. <i>macrocephalum</i>		Y			1/1
plants	land plants	Asteraceae	<i>Praxelis clematidea</i>		Y			2/2
plants	land plants	Asteraceae	<i>Pseudelephantopus spicatus</i>		Y			1/1
plants	land plants	Asteraceae	<i>Pterocaulon ciliolum</i>			C		1/1
plants	land plants	Asteraceae	<i>Pterocaulon serrulatum</i> var. <i>serrulatum</i>			C		4/4
plants	land plants	Asteraceae	<i>Pterocaulon sphacelatum</i>	applebush		C		1
plants	land plants	Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle	Y			2/2

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plants	land plants	Asteraceae	<i>Sphaeromorphaea australis</i>			C		1
plants	land plants	Asteraceae	<i>Sphaeromorphaea subintegra</i>			C		1/1
plants	land plants	Asteraceae	<i>Sphagneticola trilobata</i>		Y			1/1
plants	land plants	Asteraceae	<i>Streptoglossa odora</i>			C		3/3
plants	land plants	Asteraceae	<i>Symphyotrichum subulatum</i>		Y			2/2
plants	land plants	Asteraceae	<i>Thymophylla tenuiloba</i>		Y			2/2
plants	land plants	Asteraceae	<i>Tithonia diversifolia</i>	Japanese sunflower	Y			2/2
plants	land plants	Asteraceae	<i>Tridax procumbens</i>	tridax daisy	Y			2/1
plants	land plants	Asteraceae	<i>Wollastonia uniflora</i>			C		1/1
plants	land plants	Asteraceae	<i>Xanthium occidentale</i>		Y			1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum</i>	golden everlasting daisy		C		1/1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum subsp. (Mount Elliot A.R.Bean 3593)</i>			C		1/1
plants	land plants	Asteraceae	<i>Zinnia elegans</i>		Y			1/1
plants	land plants	Bignoniaceae	<i>Dolichandra unguis-cati</i>	cat's claw creeper	Y			2/2
plants	land plants	Bignoniaceae	<i>Dolichandrone alternifolia</i>			C		1/1
plants	land plants	Bignoniaceae	<i>Tecoma stans var. stans</i>		Y			2/2
plants	land plants	Bixaceae	<i>Cochlospermum gillivraei</i>			C		8/6
plants	land plants	Blechnaceae	<i>Blechnum dissectum</i>			SL		1/1
plants	land plants	Blechnaceae	<i>Blechnum neohollandicum</i>			C		1/1
plants	land plants	Bombacaceae	<i>Lagunaria queenslandica</i>			C		1/1
plants	land plants	Boraginaceae	<i>Coldenia procumbens</i>			C		2/2
plants	land plants	Boraginaceae	<i>Heliotropium</i>					2
plants	land plants	Boraginaceae	<i>Heliotropium collinum</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium cunninghamii</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium indicum</i>		Y			3/3
plants	land plants	Boraginaceae	<i>Heliotropium leptaleum</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		2/2
plants	land plants	Boraginaceae	<i>Heliotropium pauciflorum</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium peninsulare</i>			C		6/6
plants	land plants	Boraginaceae	<i>Trichodesma zeylanicum</i>			C		1
plants	land plants	Boraginaceae	<i>Trichodesma zeylanicum var. zeylanicum</i>			C		2/2
plants	land plants	Brassicaceae	<i>Cardamine flexuosa</i>	wood bittercress	Y			1/1
plants	land plants	Brassicaceae	<i>Lepidium bonariense</i>	Argentine peppergrass	Y			1/1
plants	land plants	Brassicaceae	<i>Lepidium didymum</i>		Y			1/1
plants	land plants	Burseraceae	<i>Canarium australianum</i>			C		3
plants	land plants	Burseraceae	<i>Canarium australianum var. australianum</i>			C		3/3
plants	land plants	Burseraceae	<i>Canarium australianum var. glabrum</i>			C		1/1
plants	land plants	Burseraceae	<i>Garuga floribunda var. floribunda</i>			C		3/3
plants	land plants	Byttneriaceae	<i>Abroma molle</i>			C		1/1
plants	land plants	Byttneriaceae	<i>Seringia impressa</i>			C		1/1
plants	land plants	Byttneriaceae	<i>Waltheria indica</i>			C		2/2
plants	land plants	Cabombaceae	<i>Cabomba caroliniana var. caroliniana</i>	cabomba	Y			3/3
plants	land plants	Cactaceae	<i>Cereus uruguayanus</i>		Y			1/1
plants	land plants	Cactaceae	<i>Opuntia stricta</i>		Y			1/1
plants	land plants	Calymperaceae	<i>Calymperes tenerum</i>			C		1/1

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plants	land plants	Campanulaceae	<i>Lobelia leucotos</i>			SL		1/1
plants	land plants	Campanulaceae	<i>Wahlenbergia capillaris</i>			SL		1/1
plants	land plants	Campanulaceae	<i>Wahlenbergia caryophylloides</i>			SL		1/1
plants	land plants	Campanulaceae	<i>Wahlenbergia graniticola</i>	granite bluebell		SL		2/2
plants	land plants	Cannabaceae	<i>Aphananthe philippinensis</i>			C		1/1
plants	land plants	Cannabaceae	<i>Celtis paniculata</i>	native celtis		C		3/2
plants	land plants	Cannabaceae	<i>Trema tomentosa</i>			C		2/1
plants	land plants	Capparaceae	<i>Capparis arborea</i>	brush caper berry		C		2/2
plants	land plants	Capparaceae	<i>Capparis lucida</i>			C		2/1
plants	land plants	Capparaceae	<i>Capparis sepiaria</i>			C		1/1
plants	land plants	Caryophyllaceae	<i>Drymaria cordata subsp. cordata</i>		Y			2/2
plants	land plants	Caryophyllaceae	<i>Polycarpaea corymbosa</i>			C		3/3
plants	land plants	Caryophyllaceae	<i>Polycarpaea corymbosa var. corymbosa</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Allocasuarina torulosa</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Casuarina equisetifolia subsp. incana</i>			C		1/1
plants	land plants	Celastraceae	<i>Celastraceae</i>					1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		3/2
plants	land plants	Celastraceae	<i>Denhamia disperma</i>			C		3/3
plants	land plants	Celastraceae	<i>Elaeodendron melanocarpum</i>			C		3/3
plants	land plants	Ceratophyllaceae	<i>Ceratophyllum demersum</i>	hornwort		C		2/2
plants	land plants	Chenopodiaceae	<i>Atriplex muelleri</i>	lagoon saltbush		C		1/1
plants	land plants	Chenopodiaceae	<i>Chenopodium album</i>	fat-hen	Y			1/1
plants	land plants	Chenopodiaceae	<i>Dissocarpus biflorus</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Dissocarpus biflorus var. cephalocarpus</i>			C		2/2
plants	land plants	Chenopodiaceae	<i>Dysphania littoralis</i>	red crumbweed		C		1/1
plants	land plants	Chenopodiaceae	<i>Enchylaena tomentosa var. glabra</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Salsola australis</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Sclerolaena ventricosa</i>			C		1
plants	land plants	Chenopodiaceae	<i>Suaeda arbusculoides</i>			C		2/1
plants	land plants	Chenopodiaceae	<i>Suaeda australis</i>			C		6/2
plants	land plants	Chenopodiaceae	<i>Tecticornia</i>					1
plants	land plants	Chenopodiaceae	<i>Tecticornia australasica</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Tecticornia halocnemoides</i>			C		3
plants	land plants	Chenopodiaceae	<i>Tecticornia indica</i>			C		4/1
plants	land plants	Chenopodiaceae	<i>Tecticornia indica subsp. leiostachya</i>			C		1
plants	land plants	Chenopodiaceae	<i>Tecticornia pergranulata</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Tecticornia pergranulata subsp. queenslandica</i>			C		1/1
plants	land plants	Cleomaceae	<i>Arivela tetrandra</i>			C		1/1
plants	land plants	Cleomaceae	<i>Arivela viscosa</i>			C		2/2
plants	land plants	Cleomaceae	<i>Gynandropsis gynandra</i>		Y			2/2
plants	land plants	Cleomaceae	<i>Tarenaya aculeata</i>		Y			1/1
plants	land plants	Colchicaceae	<i>Gloriosa superba</i>	glory lily	Y			1/1
plants	land plants	Combretaceae	<i>Lumnitzera racemosa</i>			C		6/3
plants	land plants	Combretaceae	<i>Terminalia arenicola</i>	beach almond		C		3/3
plants	land plants	Combretaceae	<i>Terminalia melanocarpa</i>			C		2/2
plants	land plants	Combretaceae	<i>Terminalia muelleri</i>			C		4/4

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plants	land plants	Combretaceae	<i>Terminalia porphyrocarpa</i>			C		4/4
plants	land plants	Combretaceae	<i>Terminalia sericocarpa</i>	damson		C		3/2
plants	land plants	Commelinaceae	<i>Commelina ciliata</i>			C		1/1
plants	land plants	Commelinaceae	<i>Commelina ensifolia</i>	scurvy grass		C		7/7
plants	land plants	Commelinaceae	<i>Commelina lanceolata</i>			C		2/2
plants	land plants	Commelinaceae	<i>Murdannia graminea</i>	murdannia		C		1/1
plants	land plants	Commelinaceae	<i>Murdannia nudiflora</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Argyreia nervosa</i>		Y			6/6
plants	land plants	Convolvulaceae	<i>Bonamia dietrichiana</i>			C		9/8
plants	land plants	Convolvulaceae	<i>Bonamia media</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Cressa australis</i>			C		3/3
plants	land plants	Convolvulaceae	<i>Cuscuta chinensis</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Distimake dissectus</i>		Y			4/4
plants	land plants	Convolvulaceae	<i>Distimake quinquefolius</i>		Y			5/5
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides</i>			C		2/1
plants	land plants	Convolvulaceae	<i>Evolvulus nummularius</i>		Y			4/4
plants	land plants	Convolvulaceae	<i>Ipomoea</i>			C		1
plants	land plants	Convolvulaceae	<i>Ipomoea abrupta</i>			C		4/4
plants	land plants	Convolvulaceae	<i>Ipomoea aquatica</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea carnea subsp. fistulosa</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Ipomoea coptica</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea eriocarpa</i>			C		2/2
plants	land plants	Convolvulaceae	<i>Ipomoea funicularis</i>			C		2/2
plants	land plants	Convolvulaceae	<i>Ipomoea hederifolia</i>		Y			2/1
plants	land plants	Convolvulaceae	<i>Ipomoea mauritiana</i>			C		2/2
plants	land plants	Convolvulaceae	<i>Ipomoea nil</i>		Y			3/3
plants	land plants	Convolvulaceae	<i>Ipomoea pes-caprae subsp. brasiliensis</i>	goatsfoot		C		3/3
plants	land plants	Convolvulaceae	<i>Ipomoea plebeia</i>	bellvine		C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea polymorpha</i>			C		2/2
plants	land plants	Convolvulaceae	<i>Ipomoea triloba</i>		Y			3/3
plants	land plants	Convolvulaceae	<i>Jacquemontia paniculata</i>			C		8/8
plants	land plants	Cornaceae	<i>Alangium polyosmoides subsp. tomentosum</i>			C		1/1
plants	land plants	Crassulaceae	<i>Bryophyllum delagoense</i>		Y			2
plants	land plants	Crassulaceae	<i>Bryophyllum x houghtonii</i>		Y			1/1
plants	land plants	Cucurbitaceae	<i>Coccinia grandis</i>		Y			4/4
plants	land plants	Cucurbitaceae	<i>Momordica balsamina</i>	balsam apple	Y			2/2
plants	land plants	Cucurbitaceae	<i>Momordica charantia</i>	balsam pear	Y			1/1
plants	land plants	Cunoniaceae	<i>Ackama australiensis</i>			C		1/1
plants	land plants	Cyatheaceae	<i>Alsophila australis</i>			C		1/1
plants	land plants	Cycadaceae	<i>Cycas</i>					1
plants	land plants	Cycadaceae	<i>Cycas media subsp. media</i>			SL		2/2
plants	land plants	Cymodoceaceae	<i>Cymodocea serrulata</i>			SL		1/1
plants	land plants	Cymodoceaceae	<i>Halodule uninervis</i>			SL		2/2
plants	land plants	Cymodoceaceae	<i>Syringodium isoetifolium</i>			SL		1/1
plants	land plants	Cyperaceae	<i>Abildgaardia ovata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Bulbostylis barbata</i>			C		6/6

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plants	land plants	Cyperaceae	<i>Carex maculata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus</i>					1
plants	land plants	Cyperaceae	<i>Cyperus alaticaulis</i>			C		1
plants	land plants	Cyperaceae	<i>Cyperus alopecuroides</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus aquatilis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus aromaticus</i>		Y			1/1
plants	land plants	Cyperaceae	<i>Cyperus brevifolius</i>	Mullumbimby couch	Y			1/1
plants	land plants	Cyperaceae	<i>Cyperus bulbosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus compressus</i>		Y			1/1
plants	land plants	Cyperaceae	<i>Cyperus conicus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus conicus</i> var. <i>conicus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus cuspidatus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus cyperoides</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus dietrichiae</i> var. <i>brevibracteatus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus difformis</i>	rice sedge		C		4/4
plants	land plants	Cyperaceae	<i>Cyperus digitatus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus enervis</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus fulvus</i>			C		4/4
plants	land plants	Cyperaceae	<i>Cyperus gracilis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus haspan</i> subsp. <i>haspan</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus involucratus</i>		Y			1/1
plants	land plants	Cyperaceae	<i>Cyperus iria</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus javanicus</i>			C		5/5
plants	land plants	Cyperaceae	<i>Cyperus leiocaulon</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus leptocarpus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus pedunculatus</i>			C		3/3
plants	land plants	Cyperaceae	<i>Cyperus perangustus</i>			C		4/4
plants	land plants	Cyperaceae	<i>Cyperus platystylis</i>			C		3/3
plants	land plants	Cyperaceae	<i>Cyperus polystachyos</i> var. <i>laxiflorus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus pulchellus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus pumilus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus scaber</i>			C		3/3
plants	land plants	Cyperaceae	<i>Cyperus scariosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus squarrosus</i>	bearded flatsedge		C		1/1
plants	land plants	Cyperaceae	<i>Cyperus stoloniferus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus subulatus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus tetracarpus</i>			C		2/1
plants	land plants	Cyperaceae	<i>Cyperus trinervis</i>			C		3/3
plants	land plants	Cyperaceae	<i>Cyperus zollingeri</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis</i>					1
plants	land plants	Cyperaceae	<i>Eleocharis philippinensis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis spiralis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis sundaica</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis</i>					2
plants	land plants	Cyperaceae	<i>Fimbristylis acicularis</i>			C		2/2
plants	land plants	Cyperaceae	<i>Fimbristylis aestivalis</i>			C		1/1

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plants	land plants	Cyperaceae	<i>Fimbristylis bisumbellata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis cinnamometorum</i>			C		4/4
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush		C		10/10
plants	land plants	Cyperaceae	<i>Fimbristylis ferruginea</i>			C		3/3
plants	land plants	Cyperaceae	<i>Fimbristylis littoralis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis polytrichoides</i>			C		7/7
plants	land plants	Cyperaceae	<i>Fimbristylis schoenoides</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis subaristata</i>			C		2/2
plants	land plants	Cyperaceae	<i>Fimbristylis tristachya</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fuirena ciliaris</i>			C		2/2
plants	land plants	Cyperaceae	<i>Fuirena umbellata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Lepidosperma laterale</i>			C		1/1
plants	land plants	Cyperaceae	<i>Rhynchospora heterochaeta</i>			C		1/1
plants	land plants	Cyperaceae	<i>Rhynchospora leae</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenoplectiella mucronata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenoplectus</i>					1
plants	land plants	Cyperaceae	<i>Schoenoplectus tabernaemontani</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenus falcatus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria brownii</i>			C		4/3
plants	land plants	Cyperaceae	<i>Scleria levis</i>			C		2/2
plants	land plants	Cyperaceae	<i>Scleria mackaviensis</i>			C		3/3
plants	land plants	Cyperaceae	<i>Scleria novae-hollandiae</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria rugosa</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>			C		6/6
plants	land plants	Cyperaceae	<i>Tetraria capillaris</i>			C		2/2
plants	land plants	Davalliaceae	<i>Davallia denticulata</i>			C		5/5
plants	land plants	Dennstaedtiaceae	<i>Pteridium esculentum</i>	common bracken		C		1/1
plants	land plants	Dennstaedtiaceae	<i>Pteridium semihastatum</i>			C		1/1
plants	land plants	Dicksoniaceae	<i>Calochlaena dubia</i>			C		1/1
plants	land plants	Dioscoreaceae	<i>Dioscorea bulbifera</i>			C		1/1
plants	land plants	Dioscoreaceae	<i>Dioscorea bulbifera</i> var. <i>bulbifera</i>			C		1/1
plants	land plants	Dracaenaceae	<i>Sansevieria trifasciata</i> var. <i>trifasciata</i>		Y			2/2
plants	land plants	Droseraceae	<i>Drosera serpens</i>			SL		4/3
plants	land plants	Dryopteridaceae	<i>Lastreopsis tenera</i>			SL		2/2
plants	land plants	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		8/6
plants	land plants	Ebenaceae	<i>Diospyros pentamera</i>	myrtle ebony		C		1/1
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus largiflorens</i> subsp. <i>largiflorens</i>			C		1/1
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus obovatus</i> subsp. <i>obovatus</i>			C		1/1
plants	land plants	Ericaceae	<i>Styphelia lucens</i>			C		4/4
plants	land plants	Erpodiaceae	<i>Venturiella coronata</i> subsp. <i>australiensis</i>			C		1/1
plants	land plants	Escalloniaceae	<i>Polyosma rhytophloia</i>			C		3/3
plants	land plants	Euphorbiaceae	<i>Claoxylon tenerifolium</i> subsp. <i>tenerifolium</i>			C		3/3
plants	land plants	Euphorbiaceae	<i>Croton arnhemicus</i>			C		3/3
plants	land plants	Euphorbiaceae	<i>Croton insularis</i>	Queensland cascarilla		C		1/1
plants	land plants	Euphorbiaceae	<i>Croton magneticus</i>			E		11/9
plants	land plants	Euphorbiaceae	<i>Croton phebaloides</i>	narrow-leaved croton		C		1/1

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plants	land plants	Euphorbiaceae	<i>Euphorbia bifida</i>			C		9/9
plants	land plants	Euphorbiaceae	<i>Euphorbia cyathophora</i>	dwarf poinsettia	Y			3/3
plants	land plants	Euphorbiaceae	<i>Euphorbia dallachyana</i>			C		2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia hassallii</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia heterophylla</i>		Y			3/3
plants	land plants	Euphorbiaceae	<i>Euphorbia hirta</i>		Y			4/4
plants	land plants	Euphorbiaceae	<i>Euphorbia hyssopifolia</i>		Y			6/6
plants	land plants	Euphorbiaceae	<i>Euphorbia mitchelliana</i> var. <i>mitchelliana</i>			C		2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia prostrata</i>		Y			4/4
plants	land plants	Euphorbiaceae	<i>Euphorbia schultzei</i> var. <i>schultzei</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia serpens</i>		Y			2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>tannensis</i>			C		3/3
plants	land plants	Euphorbiaceae	<i>Euphorbia thymifolia</i>		Y			3/3
plants	land plants	Euphorbiaceae	<i>Euphorbia tithymaloides</i> subsp. <i>smallii</i>		Y			1/1
plants	land plants	Euphorbiaceae	<i>Excoecaria agallocha</i>	milky mangrove		C		2/1
plants	land plants	Euphorbiaceae	<i>Homalanthus populifolius</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	Y			4/3
plants	land plants	Euphorbiaceae	<i>Macaranga tanarius</i>	macaranga		C		1/1
plants	land plants	Euphorbiaceae	<i>Mallotus discolor</i>	white kamala		C		3/2
plants	land plants	Euphorbiaceae	<i>Mallotus ficifolius</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Mallotus nesophilus</i>			C		9/8
plants	land plants	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		4/1
plants	land plants	Euphorbiaceae	<i>Manihot esculenta</i>		Y			1/1
plants	land plants	Euphorbiaceae	<i>Microstachys chamaelea</i>			C		5/5
plants	land plants	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			1/1
plants	land plants	Euphorbiaceae	<i>Tragia novae-hollandiae</i>	stinging-vine		C		1/1
plants	land plants	Fossombroniaceae	<i>Fossombronia papillata</i>			C		1/1
plants	land plants	Gentianaceae	<i>Canscora diffusa</i>			C		1/1
plants	land plants	Gentianaceae	<i>Schenkia australis</i>			C		2/2
plants	land plants	Gleicheniaceae	<i>Dicranopteris linearis</i> var. <i>linearis</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia mystrophylla</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia pilosa</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia purpurascens</i>			C		1/1
plants	land plants	Haemodoraceae	<i>Haemodorum coccineum</i>			C		5/4
plants	land plants	Haloragaceae	<i>Gonocarpus acanthocarpus</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella</i>					1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i>			C		2/2
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i> var. <i>fragrans</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella nervosa</i>			C		2/2
plants	land plants	Hemerocallidaceae	<i>Geitonoplesium cymosum</i>	scrambling lily		C		1/1
plants	land plants	Hemerocallidaceae	<i>Tricoryne anceps</i> subsp. <i>anceps</i>			C		3/3
plants	land plants	Hernandiaceae	<i>Gyrocarpus americanus</i> subsp. <i>americanus</i>			C		1/1
plants	land plants	Hydrocharitaceae	<i>Enhalus acoroides</i>			SL		1/1
plants	land plants	Hydrocharitaceae	<i>Halophila decipiens</i>			SL		4/4

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plants	land plants	Hydrocharitaceae	<i>Halophila minor</i>	hydrilla		SL		6/6
plants	land plants	Hydrocharitaceae	<i>Halophila ovalis</i>			SL		7/7
plants	land plants	Hydrocharitaceae	<i>Halophila spinulosa</i>			SL		4/4
plants	land plants	Hydrocharitaceae	<i>Halophila tricostata</i>			SL		3/3
plants	land plants	Hydrocharitaceae	<i>Hydrilla verticillata</i>			SL		2/2
plants	land plants	Hydrocharitaceae	<i>Ottelia alismoides</i>			SL		3/3
plants	land plants	Hydrocharitaceae	<i>Ottelia ovalifolia</i> subsp. <i>ovalifolia</i>			SL		2/2
plants	land plants	Hydrocharitaceae	<i>Thalassia hemprichii</i>			SL		1/1
plants	land plants	Hydrocharitaceae	<i>Vallisneria annua</i>			SL		1/1
plants	land plants	Hydrocharitaceae	<i>Vallisneria nana</i>			SL		2/2
plants	land plants	Hydroleaceae	<i>Hydrolea zeylanica</i>	coastal lolly bush		C		1/1
plants	land plants	Hypericaceae	<i>Hypericum gramineum</i>			C		1/1
plants	land plants	Hypoxidaceae	<i>Curculigo ensifolia</i> var. <i>ensifolia</i>			C		1/1
plants	land plants	Juncaginaceae	<i>Cycnogeton dubius</i>			SL		1/1
plants	land plants	Lamiaceae	<i>Anisomeles moschata</i>			C		4/4
plants	land plants	Lamiaceae	<i>Basilicum polystachyon</i>			C		2/2
plants	land plants	Lamiaceae	<i>Callicarpa candicans</i>			C		3/3
plants	land plants	Lamiaceae	<i>Clerodendrum floribundum</i>			C		7/3
plants	land plants	Lamiaceae	<i>Clerodendrum inerme</i>			C		4/2
plants	land plants	Lamiaceae	<i>Clerodendrum longiflorum</i> var. <i>glabrum</i>			C		3/3
plants	land plants	Lamiaceae	<i>Coleus congestus</i>			C		1/1
plants	land plants	Lamiaceae	<i>Coleus diversus</i>			C		1/1
plants	land plants	Lamiaceae	<i>Glossocarya hemiderma</i>			C		4/4
plants	land plants	Lamiaceae	<i>Holmskioldia sanguinea</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Hyptis capitata</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Lamiaceae</i>					1/1
plants	land plants	Lamiaceae	<i>Leucas decemdentata</i>			C		2/2
plants	land plants	Lamiaceae	<i>Leucas lavandulifolia</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Mesosphaerum suaveolens</i>		Y			14/9
plants	land plants	Lamiaceae	<i>Premna dallachyana</i>			C		1/1
plants	land plants	Lamiaceae	<i>Premna serratifolia</i>			C		3/2
plants	land plants	Lamiaceae	<i>Vitex rotundifolia</i>			C		2/2
plants	land plants	Lamiaceae	<i>Vitex trifolia</i>			C		1
plants	land plants	Lamiaceae	<i>Vitex trifolia</i> var. <i>trifolia</i>			C		1/1
plants	land plants	Lauraceae	<i>Beilschmiedia bancroftii</i>			C		1/1
plants	land plants	Lauraceae	<i>Cassytha</i>					1
plants	land plants	Lauraceae	<i>Cassytha capillaris</i>			C		1/1
plants	land plants	Lauraceae	<i>Cassytha filiformis</i>	dodder laurel		C		3/2
plants	land plants	Lauraceae	<i>Cassytha pubescens</i>	downy devil's twine		C		1/1
plants	land plants	Lauraceae	<i>Cinnamomum oliveri</i>	Oliver's sassafras		C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya angulata</i>	ivory laurel		C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya grandis</i>			C		2/1
plants	land plants	Lauraceae	<i>Cryptocarya hypospodia</i>	north Queensland purple laurel		C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya macdonaldii</i>	McDonald's laurel		C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis</i>			C		1
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>			C		3/3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Lauraceae	<i>Cryptocarya vulgaris</i>			C		2/2
plants	land plants	Lauraceae	<i>Endiandra cowleyana</i>	northern rose walnut		C		1/1
plants	land plants	Lauraceae	<i>Endiandra discolor</i>	domatia tree		C		1/1
plants	land plants	Lauraceae	<i>Endiandra wolfei</i>			C		1/1
plants	land plants	Lauraceae	<i>Litsea fawcettiana</i>			C		3/3
plants	land plants	Lauraceae	<i>Litsea glutinosa</i>			C		4/3
plants	land plants	Lauraceae	<i>Litsea leefeana</i>			C		1/1
plants	land plants	Lauraceae	<i>Neolitsea brassii</i>			C		3/2
plants	land plants	Laxmanniaceae	<i>Lomandra</i>					1
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>			C		3/3
plants	land plants	Laxmanniaceae	<i>Thysanotus tuberosus subsp. tuberosus</i>			C		1/1
plants	land plants	Lecythidaceae	<i>Planchonia careya</i>	cockatoo apple		C		5/1
plants	land plants	Leguminosae	<i>Abrus precatorius</i>	crabs-eye vine		C		2/1
plants	land plants	Leguminosae	<i>Acacia aulacocarpa</i>			C		3/3
plants	land plants	Leguminosae	<i>Acacia auriculiformis</i>	black wattle		C		1/1
plants	land plants	Leguminosae	<i>Acacia crassicarpa</i>			C		8/2
plants	land plants	Leguminosae	<i>Acacia flavescens</i>	toothed wattle		C		2/1
plants	land plants	Leguminosae	<i>Acacia hemsleyi</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia holosericea</i>			C		2/1
plants	land plants	Leguminosae	<i>Acacia jackesiana</i>			C		8/7
plants	land plants	Leguminosae	<i>Acacia julifera subsp. julifera</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia leptocarpa</i>	north coast wattle		C		1
plants	land plants	Leguminosae	<i>Acacia leptostachya</i>	Townsville wattle		C		6/5
plants	land plants	Leguminosae	<i>Acacia mangium</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia mangium x Acacia polystachya</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia multisiliqua</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia nesophila x Acacia polystachya</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia polystachya</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia simsii</i>			C		8/8
plants	land plants	Leguminosae	<i>Acacia spirorbis subsp. solandri</i>			C		4/4
plants	land plants	Leguminosae	<i>Acacia umbellata</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia victoriae</i>			C		1
plants	land plants	Leguminosae	<i>Acacia victoriae subsp. fasciaria</i>			C		1/1
plants	land plants	Leguminosae	<i>Acaciella angustissima</i>	white ball acacia	Y			5/5
plants	land plants	Leguminosae	<i>Aeschynomene americana var. americana</i>		Y			1/1
plants	land plants	Leguminosae	<i>Aeschynomene brevifolia</i>			C		3/3
plants	land plants	Leguminosae	<i>Aeschynomene indica</i>	budda pea		C		5/5
plants	land plants	Leguminosae	<i>Aeschynomene villosa</i>		Y			1/1
plants	land plants	Leguminosae	<i>Albizia</i>					1/1
plants	land plants	Leguminosae	<i>Albizia lebbbeck</i>	Indian siris		C		2/2
plants	land plants	Leguminosae	<i>Albizia procera</i>			C		2/1
plants	land plants	Leguminosae	<i>Alysicarpus vaginalis</i>		Y			3/3
plants	land plants	Leguminosae	<i>Aphyllodium biarticulatum</i>			C		5/5
plants	land plants	Leguminosae	<i>Archidendron grandiflorum</i>	lace flower tree		C		2/2
plants	land plants	Leguminosae	<i>Cajanus cajan</i>	pigeon pea	Y			1/1
plants	land plants	Leguminosae	<i>Cajanus confertiflorus</i>			C		6/6

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plants	land plants	Leguminosae	<i>Cajanus marmoratus</i>			C		3/3
plants	land plants	Leguminosae	<i>Cajanus reticulatus</i> var. <i>reticulatus</i>			C		11/10
plants	land plants	Leguminosae	<i>Cajanus scarabaeoides</i>			C		1/1
plants	land plants	Leguminosae	<i>Cajanus scarabaeoides</i> var. <i>scarabaeoides</i>			C		2/2
plants	land plants	Leguminosae	<i>Canavalia papuana</i>	wild jack bean		C		1/1
plants	land plants	Leguminosae	<i>Canavalia rosea</i>	coastal jack bean		C		3/3
plants	land plants	Leguminosae	<i>Cassia fistula</i>	Indian laburnum	Y			1/1
plants	land plants	Leguminosae	<i>Cassia</i> sp. (Paluma Range G.Sankowsky+ 450)			C		6/5
plants	land plants	Leguminosae	<i>Castanospermum australe</i>	black bean		C		1/1
plants	land plants	Leguminosae	<i>Centrosema</i>					1/1
plants	land plants	Leguminosae	<i>Centrosema molle</i>		Y			1
plants	land plants	Leguminosae	<i>Centrosema pascuorum</i>		Y			1/1
plants	land plants	Leguminosae	<i>Centrosema plumieri</i>		Y			1/1
plants	land plants	Leguminosae	<i>Chamaecrista absus</i> var. <i>absus</i>				C	1/1
plants	land plants	Leguminosae	<i>Chamaecrista longipes</i>				C	1/1
plants	land plants	Leguminosae	<i>Chamaecrista mimosoides</i>	dwarf cassia			C	1/1
plants	land plants	Leguminosae	<i>Chamaecrista rotundifolia</i>		Y			1/1
plants	land plants	Leguminosae	<i>Chamaecrista rotundifolia</i> var. <i>rotundifolia</i>		Y			3/1
plants	land plants	Leguminosae	<i>Clitoria ternatea</i>	butterfly pea	Y			8/7
plants	land plants	Leguminosae	<i>Crotalaria brevis</i>				C	5/5
plants	land plants	Leguminosae	<i>Crotalaria calycina</i>				C	5/5
plants	land plants	Leguminosae	<i>Crotalaria goreensis</i>	gambia pea	Y			5/3
plants	land plants	Leguminosae	<i>Crotalaria juncea</i>	sunhemp	Y			2/2
plants	land plants	Leguminosae	<i>Crotalaria laburnifolia</i>		Y			5/4
plants	land plants	Leguminosae	<i>Crotalaria lanceolata</i> subsp. <i>lanceolata</i>		Y			1/1
plants	land plants	Leguminosae	<i>Crotalaria medicaginea</i>	trefoil rattlepod			C	1
plants	land plants	Leguminosae	<i>Crotalaria medicaginea</i> var. <i>medicaginea</i>				C	2/2
plants	land plants	Leguminosae	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>				C	2/1
plants	land plants	Leguminosae	<i>Crotalaria mitchellii</i> subsp. <i>laevis</i>				C	1/1
plants	land plants	Leguminosae	<i>Crotalaria mitchellii</i> subsp. <i>laevis</i>				C	1/1
			- <i>Crotalaria mitchellii</i> subsp. <i>mitchellii</i>					
plants	land plants	Leguminosae	<i>Crotalaria mitchellii</i> subsp. <i>mitchellii</i>				C	3/3
plants	land plants	Leguminosae	<i>Crotalaria montana</i> var. <i>angustifolia</i>				C	3/3
plants	land plants	Leguminosae	<i>Crotalaria montana</i> var. <i>exserta</i>				C	1/1
plants	land plants	Leguminosae	<i>Crotalaria pallida</i>		Y			2
plants	land plants	Leguminosae	<i>Crotalaria pallida</i> var. <i>obovata</i>		Y			5/4
plants	land plants	Leguminosae	<i>Crotalaria quinquefolia</i>				C	1/1
plants	land plants	Leguminosae	<i>Crotalaria retusa</i> var. <i>retusa</i>		Y			4/4
plants	land plants	Leguminosae	<i>Crotalaria spectabilis</i>	showy rattlepod	Y			1/1
plants	land plants	Leguminosae	<i>Crotalaria verrucosa</i>				C	1/1
plants	land plants	Leguminosae	<i>Cullen leucanthum</i>				C	2/2
plants	land plants	Leguminosae	<i>Delonix regia</i>	poinciana	Y			1/1
plants	land plants	Leguminosae	<i>Derris trifoliata</i>				C	1/1
plants	land plants	Leguminosae	<i>Desmanthus leptophyllus</i>		Y			1/1
plants	land plants	Leguminosae	<i>Desmanthus pernambucanus</i>		Y			4/3
plants	land plants	Leguminosae	<i>Desmodium filiforme</i>				C	3/3

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plants	land plants	Leguminosae	<i>Desmodium gangeticum</i>			C		1/1
plants	land plants	Leguminosae	<i>Desmodium heterocarpon</i> var. <i>strigosum</i>			C		1/1
plants	land plants	Leguminosae	<i>Desmodium muelleri</i>			C		1/1
plants	land plants	Leguminosae	<i>Desmodium pullenii</i>			C		3/3
plants	land plants	Leguminosae	<i>Desmodium scorpiurus</i>		Y			6/6
plants	land plants	Leguminosae	<i>Desmodium tortuosum</i>	Florida beggar-weed	Y			6/6
plants	land plants	Leguminosae	<i>Desmodium trichostachyum</i>			C		1/1
plants	land plants	Leguminosae	<i>Desmodium triflorum</i>		Y			1/1
plants	land plants	Leguminosae	<i>Dichrostachys cinerea</i> subsp. <i>malesiana</i>		Y			1/1
plants	land plants	Leguminosae	<i>Dunbaria punctata</i>			C		3/3
plants	land plants	Leguminosae	<i>Erythrina vespertilio</i>			C		1
plants	land plants	Leguminosae	<i>Erythrina vespertilio</i> subsp. <i>vespertilio</i>			C		1/1
plants	land plants	Leguminosae	<i>Flemingia lineata</i>			C		2/2
plants	land plants	Leguminosae	<i>Flemingia parviflora</i>	flemingia		C		2/2
plants	land plants	Leguminosae	<i>Flemingia trifoliata</i>			C		3/3
plants	land plants	Leguminosae	<i>Galactia</i>					1/1
plants	land plants	Leguminosae	<i>Galactia muelleri</i>			C		1/1
plants	land plants	Leguminosae	<i>Galactia</i> sp. (Laura J.C.Tothill JT53A)			C		2/2
plants	land plants	Leguminosae	<i>Galactia tenuiflora</i> var. <i>lucida</i>			C		4/4
plants	land plants	Leguminosae	<i>Galactia tenuiflora</i> var. <i>villosa</i>			C		5/5
plants	land plants	Leguminosae	<i>Glycine pescadrensis</i>			C		1/1
plants	land plants	Leguminosae	<i>Glycine tabacina</i>	glycine pea		C		1
plants	land plants	Leguminosae	<i>Glycine tomentella</i>	woolly glycine		C		8/7
plants	land plants	Leguminosae	<i>Guilandina bonduc</i>			C		2/1
plants	land plants	Leguminosae	<i>Hovea longipes</i>	brush hovea		C		1/1
plants	land plants	Leguminosae	<i>Indigastrum parviflorum</i>			C		1/1
plants	land plants	Leguminosae	<i>Indigofera</i>					1
plants	land plants	Leguminosae	<i>Indigofera bancroftii</i>			C		1/1
plants	land plants	Leguminosae	<i>Indigofera colutea</i>	sticky indigo		C		1/1
plants	land plants	Leguminosae	<i>Indigofera hirsuta</i>	hairy indigo		C		4/4
plants	land plants	Leguminosae	<i>Indigofera linifolia</i>			C		5/5
plants	land plants	Leguminosae	<i>Indigofera polygaloides</i>			C		3/3
plants	land plants	Leguminosae	<i>Indigofera pratensis</i>			C		5/5
plants	land plants	Leguminosae	<i>Indigofera spicata</i>	creeping indigo	Y			1/1
plants	land plants	Leguminosae	<i>Indigofera suffruticosa</i>		Y			1
plants	land plants	Leguminosae	<i>Indigofera tinctoria</i>		Y			6/6
plants	land plants	Leguminosae	<i>Indigofera tryonii</i>			C		4/4
plants	land plants	Leguminosae	<i>Isotropis filicaulis</i>			C		2/2
plants	land plants	Leguminosae	<i>Labichea nitida</i>			C		2/2
plants	land plants	Leguminosae	<i>Leucaena leucocephala</i>		Y			14
plants	land plants	Leguminosae	<i>Leucaena leucocephala</i> subsp. <i>glabrata</i>		Y			1/1
plants	land plants	Leguminosae	<i>Leucaena leucocephala</i> subsp. <i>leucocephala</i>		Y			3/3
plants	land plants	Leguminosae	<i>Lysiphyllum binatum</i>			C		1/1
plants	land plants	Leguminosae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		5/5
plants	land plants	Leguminosae	<i>Macroptilium</i>					1/1
plants	land plants	Leguminosae	<i>Macroptilium atropurpureum</i>	siratro	Y			2

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plants	land plants	Leguminosae	<i>Macroptilium lathyroides</i>		Y			2/1
plants	land plants	Leguminosae	<i>Macrotyloma uniflorum</i> var. <i>stenocarpum</i>		Y			3/3
plants	land plants	Leguminosae	<i>Millettia pinnata</i>			C		4/3
plants	land plants	Leguminosae	<i>Mimosa pudica</i>		Y			1/1
plants	land plants	Leguminosae	<i>Mucuna gigantea</i>	burny bean		C		1/1
plants	land plants	Leguminosae	<i>Neltuma pallida</i>		Y			3/3
plants	land plants	Leguminosae	<i>Neonotonia wightii</i> var. <i>wightii</i>		Y			1/1
plants	land plants	Leguminosae	<i>Neptunia dimorphantha</i>			C		4/4
plants	land plants	Leguminosae	<i>Neptunia gracilis</i>			C		2/2
plants	land plants	Leguminosae	<i>Neptunia major</i>			C		6/6
plants	land plants	Leguminosae	<i>Neptunia monosperma</i>			C		1/1
plants	land plants	Leguminosae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			13/7
plants	land plants	Leguminosae	<i>Pycnospora lutescens</i>	pycnospora		C		2/2
plants	land plants	Leguminosae	<i>Rhynchosia acuminatissima</i>			C		2/2
plants	land plants	Leguminosae	<i>Rhynchosia minima</i>			C		1/1
plants	land plants	Leguminosae	<i>Rhynchosia minima</i> var. <i>minima</i>			C		1
plants	land plants	Leguminosae	<i>Senna alata</i>		Y			3/3
plants	land plants	Leguminosae	<i>Senna gaudichaudii</i>			C		1/1
plants	land plants	Leguminosae	<i>Senna obtusifolia</i>		Y			1/1
plants	land plants	Leguminosae	<i>Senna pendula</i> var. <i>glabrata</i>	Easter cassia	Y			1/1
plants	land plants	Leguminosae	<i>Sesbania cannabina</i>			C		2
plants	land plants	Leguminosae	<i>Sesbania cannabina</i> var. <i>cannabina</i>			C		2/2
plants	land plants	Leguminosae	<i>Sesbania grandiflora</i>		Y			1/1
plants	land plants	Leguminosae	<i>Stylosanthes hamata</i>		Y			3/3
plants	land plants	Leguminosae	<i>Stylosanthes humilis</i>	Townsville stylo	Y			1
plants	land plants	Leguminosae	<i>Stylosanthes scabra</i>		Y			2/1
plants	land plants	Leguminosae	<i>Stylosanthes viscosa</i>		Y			2/2
plants	land plants	Leguminosae	<i>Tamarindus indica</i>		Y			2/2
plants	land plants	Leguminosae	<i>Tephrosia</i>					6/6
plants	land plants	Leguminosae	<i>Tephrosia astragaloides</i>			C		5/5
plants	land plants	Leguminosae	<i>Tephrosia barbatala</i>			C		6/6
plants	land plants	Leguminosae	<i>Tephrosia brachyodon</i> var. <i>brachyodon</i>			C		7/7
plants	land plants	Leguminosae	<i>Tephrosia filipes</i>			C		1
plants	land plants	Leguminosae	<i>Tephrosia filipes</i> subsp. <i>filipes</i>			C		3/3
plants	land plants	Leguminosae	<i>Tephrosia juncea</i>			C		3/3
plants	land plants	Leguminosae	<i>Tephrosia macrostachya</i>			C		2/2
plants	land plants	Leguminosae	<i>Tephrosia</i> sp. (Copperfield River P.I.Forster PIF14768)			C		3/3
plants	land plants	Leguminosae	<i>Tephrosia</i> sp. (Miriam Vale E.J.Thompson+ MIR33)			C		3/3
plants	land plants	Leguminosae	<i>Uraria lagopodioides</i>			C		3/3
plants	land plants	Leguminosae	<i>Vachellia bidwillii</i>			C		5/4
plants	land plants	Leguminosae	<i>Vachellia farnesiana</i>		Y			3/3
plants	land plants	Leguminosae	<i>Vachellia nilotica</i>	prickly acacia	Y			3/2
plants	land plants	Leguminosae	<i>Vigna</i>					1/1
plants	land plants	Leguminosae	<i>Vigna lanceolata</i> var. <i>lanceolata</i>			C		1/1
plants	land plants	Leguminosae	<i>Vigna radiata</i> var. <i>sublobata</i>			C		2/2

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plants	land plants	Leguminosae	<i>Vigna sp. (Greta Creek R.J.Lawn+ AQ532201)</i>			C		1/1
plants	land plants	Leguminosae	<i>Vigna sp. (Station Creek R.J.Lawn CQ3284)</i>			C		5/5
plants	land plants	Leguminosae	<i>Zornia dyctiocarpa var. filifolia</i>			C		3/3
plants	land plants	Leguminosae	<i>Zornia muelleriana subsp. muelleriana</i>			C		5/5
plants	land plants	Leguminosae	<i>Zornia muriculata subsp. angustata</i>			C		3/3
plants	land plants	Leguminosae	<i>Zornia muriculata subsp. muriculata</i>			C		3/3
plants	land plants	Leguminosae	<i>Zornia stirlingii</i>			C		2/2
plants	land plants	Lentibulariaceae	<i>Utricularia aurea</i>	golden bladderwort		SL		1/1
plants	land plants	Linderniaceae	<i>Artanema fimbriatum</i>			C		2/2
plants	land plants	Linderniaceae	<i>Bonnaya ciliata</i>			C		1/1
plants	land plants	Linderniaceae	<i>Torenia crustacea</i>			C		1/1
plants	land plants	Lindsaeaceae	<i>Lindsaea ensifolia subsp. agatii</i>			C		4/4
plants	land plants	Lindsaeaceae	<i>Lindsaea ensifolia subsp. ensifolia</i>			C		1/1
plants	land plants	Loganiaceae	<i>Mitrasacme multicaulis</i>			C		1/1
plants	land plants	Loganiaceae	<i>Mitrasacme nudicaulis var. nudicaulis</i>			C		3/3
plants	land plants	Loganiaceae	<i>Mitrasacme prolifera</i>			C		1/1
plants	land plants	Loganiaceae	<i>Strychnos psilosperma</i>	strychnine tree		C		4/4
plants	land plants	Loranthaceae	<i>Amyema bifurcata</i>			C		2/1
plants	land plants	Loranthaceae	<i>Amyema congener subsp. congener</i>			C		3/3
plants	land plants	Loranthaceae	<i>Amyema congener subsp. rotundifolia</i>			C		2/2
plants	land plants	Loranthaceae	<i>Amyema conspicua subsp. conspicua</i>			C		2/1
plants	land plants	Loranthaceae	<i>Amyema mackayensis</i>			C		2/2
plants	land plants	Loranthaceae	<i>Amyema sanguinea var. sanguinea</i>			C		1/1
plants	land plants	Loranthaceae	<i>Dendrophthoe homoplastica</i>			C		1/1
plants	land plants	Loranthaceae	<i>Dendrophthoe vitellina</i>	long-flowered mistletoe		C		5/5
plants	land plants	Loranthaceae	<i>Diplatia furcata</i>			C		1/1
plants	land plants	Loranthaceae	<i>Lysiana maritima</i>			C		2
plants	land plants	Loranthaceae	<i>Lysiana subfalcata</i>			C		2/2
plants	land plants	Lygodiaceae	<i>Lygodium reticulatum</i>			C		1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		1/1
plants	land plants	Lythraceae	<i>Rotala mexicana</i>			C		1/1
plants	land plants	Malpighiaceae	<i>Stigmaphyllon australiense</i>			C		3/3
plants	land plants	Malvaceae	<i>Abelmoschus rhodopetalus</i>			C		3/3
plants	land plants	Malvaceae	<i>Abutilon albescens</i>			C		4/4
plants	land plants	Malvaceae	<i>Abutilon guineense</i>		Y			3/3
plants	land plants	Malvaceae	<i>Abutilon oxycarpum var. oxycarpum</i>			C		1/1
plants	land plants	Malvaceae	<i>Helicteres semiglabra</i>			C		3/3
plants	land plants	Malvaceae	<i>Hibiscus divaricatus</i>			C		2/2
plants	land plants	Malvaceae	<i>Hibiscus meraukensis</i>	Merauke hibiscus		C		3/3
plants	land plants	Malvaceae	<i>Hibiscus normanii</i>			C		2/2
plants	land plants	Malvaceae	<i>Hibiscus townsvillensis</i>			C		1/1
plants	land plants	Malvaceae	<i>Hibiscus vitifolius</i>			C		1/1
plants	land plants	Malvaceae	<i>Malvastrum americanum var. americanum</i>		Y			3/3
plants	land plants	Malvaceae	<i>Sida</i>					2/1
plants	land plants	Malvaceae	<i>Sida acuta</i>	spinyhead sida	Y			3/2
plants	land plants	Malvaceae	<i>Sida ciliaris</i>		Y			2/2

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plants	land plants	Malvaceae	<i>Sida cordifolia</i>		Y			6/3
plants	land plants	Malvaceae	<i>Sida hackettiana</i>			C		2/2
plants	land plants	Malvaceae	<i>Sida magnifica</i>			C		3/3
plants	land plants	Malvaceae	<i>Sida spinosa</i>	spiny sida	Y			2/2
plants	land plants	Malvaceae	<i>Thespesia populnea</i>			C		2/2
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			1/1
plants	land plants	Marsileaceae	<i>Marsilea crenata</i>			C		2/2
plants	land plants	Martyniaceae	<i>Martynia annua</i>	small-fruited devil's claw	Y			2/1
plants	land plants	Melastomataceae	<i>Memecylon pauciflorum</i>			C		5/5
plants	land plants	Meliaceae	<i>Aglaia elaeagnoidea</i>			C		2/1
plants	land plants	Meliaceae	<i>Azadirachta indica</i>		Y			1/1
plants	land plants	Meliaceae	<i>Turraea pubescens</i>	native honeysuckle		C		5/4
plants	land plants	Meliaceae	<i>Xylocarpus granatum</i>	cedar mangrove		C		1/1
plants	land plants	Meliaceae	<i>Xylocarpus moluccensis</i>			C		5/4
plants	land plants	Menispermaceae	<i>Hypserpa laurina</i>			C		1/1
plants	land plants	Menispermaceae	<i>Pachygone ovata</i>			C		6/4
plants	land plants	Menispermaceae	<i>Pleogyne australis</i>	wiry grape		C		4/4
plants	land plants	Menispermaceae	<i>Stephania japonica</i>			C		1
plants	land plants	Menispermaceae	<i>Stephania japonica</i> var. <i>timoriensis</i>			C		1/1
plants	land plants	Menispermaceae	<i>Stephania tuberosa</i>			C		1
plants	land plants	Menispermaceae	<i>Tinospora smilacina</i>	snakevine		C		5/5
plants	land plants	Menyanthaceae	<i>Nymphoides crenata</i>	wavy marshwort		SL		1/1
plants	land plants	Menyanthaceae	<i>Nymphoides indica</i>	water snowflake		SL		2/2
plants	land plants	Mniaceae	<i>Pohlia</i>					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		4/4
plants	land plants	Molluginaceae	<i>Mollugo verticillata</i>		Y			6/6
plants	land plants	Monimiaceae	<i>Wilkiea pubescens</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus congesta</i> var. <i>congesta</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus henneana</i>			C		2/1
plants	land plants	Moraceae	<i>Ficus hispida</i> var. <i>hispida</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus microcarpa</i>			C		3/1
plants	land plants	Moraceae	<i>Ficus obliqua</i>			C		2/2
plants	land plants	Moraceae	<i>Ficus opposita</i>			C		9/6
plants	land plants	Moraceae	<i>Ficus rubiginosa</i> forma <i>rubiginosa</i>			C		6/6
plants	land plants	Moraceae	<i>Ficus virens</i>			C		1
plants	land plants	Moraceae	<i>Ficus virens</i> var. <i>virens</i>			C		1/1
plants	land plants	Moraceae	<i>Maclura cochinchinensis</i>	cockspur thorn		C		1/1
plants	land plants	Moringaceae	<i>Moringa oleifera</i>		Y			2/2
plants	land plants	Muntingiaceae	<i>Muntingia calabura</i>		Y			1/1
plants	land plants	Myrsinaceae	<i>Aegiceras corniculatum</i>	river mangrove		C		1/1
plants	land plants	Myrsinaceae	<i>Myrsine variabilis</i>			C		3/2
plants	land plants	Myrsinaceae	<i>Tapeinosperma pseudojambosa</i>	tapeinosperma		C		1/1
plants	land plants	Myrtaceae	<i>Aggreflorum anfractum</i>			C		3/3
plants	land plants	Myrtaceae	<i>Backhousia angustifolia</i>	narrow-leaved backhousia		C		1/1
plants	land plants	Myrtaceae	<i>Backhousia citriodora</i>	lemon ironwood		C		1/1

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plants	land plants	Myrtaceae	<i>Backhousia tetraptera</i>			CR	CE	7/7
plants	land plants	Myrtaceae	<i>Blakella dallachiana</i>			C		6/1
plants	land plants	Myrtaceae	<i>Blakella tessellaris</i>			C		10/1
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		6/2
plants	land plants	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C		4/4
plants	land plants	Myrtaceae	<i>Eucalyptus</i>					1/1
plants	land plants	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark		C		2/1
plants	land plants	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		15/14
plants	land plants	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		6/6
plants	land plants	Myrtaceae	<i>Eucalyptus exserta</i> x <i>Eucalyptus platyphylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C		7/3
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i> x <i>Eucalyptus tereticornis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus portuensis</i>			C		7/7
plants	land plants	Myrtaceae	<i>Eucalyptus resinifera</i>	red mahogany		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		3
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus xanthoclada</i>	yellow-branched ironbark		C		1/1
plants	land plants	Myrtaceae	<i>Eugenia reinwardtiana</i>	beach cherry		C		4/2
plants	land plants	Myrtaceae	<i>Gossia bidwillii</i>			C		6/4
plants	land plants	Myrtaceae	<i>Lophostemon confertus</i>	brush box		C		2/2
plants	land plants	Myrtaceae	<i>Lophostemon confertus</i> x <i>Lophostemon grandiflorus</i>			C		1/1
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus</i>			C		1
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus</i> subsp. <i>riparius</i>			C		1/1
plants	land plants	Myrtaceae	<i>Lophostemon suaveolens</i>	swamp box		C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca dealbata</i>	swamp tea-tree		C		3
plants	land plants	Myrtaceae	<i>Melaleuca hemisticta</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		C		3/1
plants	land plants	Myrtaceae	<i>Melaleuca quinquenervia</i>	swamp paperbark		C		1
plants	land plants	Myrtaceae	<i>Melaleuca recurva</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca viminalis</i>			C		1
plants	land plants	Myrtaceae	<i>Melaleuca viridiflora</i>			C		7
plants	land plants	Myrtaceae	<i>Melaleuca viridiflora</i> var. <i>viridiflora</i>			C		2/2
plants	land plants	Myrtaceae	<i>Osbornia octodonta</i>	myrtle mangrove		C		1
plants	land plants	Myrtaceae	<i>Sannantha papillosa</i>			V		5/5
plants	land plants	Myrtaceae	<i>Syzygium cryptophlebium</i>			C		1/1
plants	land plants	Myrtaceae	<i>Syzygium johnsonii</i>	Johnson's satinash		C		1/1
plants	land plants	Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		SL		1/1
plants	land plants	Nephrolepidaceae	<i>Nephrolepis oblitterata</i>			C		3/3
plants	land plants	Nyctaginaceae	<i>Boerhavia</i>					2/2
plants	land plants	Nyctaginaceae	<i>Boerhavia burbridgeana</i>			C		3/3
plants	land plants	Nyctaginaceae	<i>Boerhavia diffusa</i>		Y			4/4
plants	land plants	Nyctaginaceae	<i>Boerhavia dominii</i>			C		3/3
plants	land plants	Nyctaginaceae	<i>Boerhavia mutabilis</i>			C		5/5
plants	land plants	Nyctaginaceae	<i>Boerhavia pubescens</i>			C		6/6
plants	land plants	Nyctaginaceae	<i>Boerhavia</i> sp. (Bargara L.Pedley 5382)			C		3/3
plants	land plants	Nyctaginaceae	<i>Pisonia aculeata</i>	thorny pisonia		C		1/1

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plants	land plants	Nymphaeaceae	<i>Nymphaea</i>					2/2
plants	land plants	Nymphaeaceae	<i>Nymphaea gigantea</i>			SL		1
plants	land plants	Nymphaeaceae	<i>Nymphaea immutabilis</i>			SL		1
plants	land plants	Nymphaeaceae	<i>Nymphaea jacobsii</i>			SL		2/2
plants	land plants	Nymphaeaceae	<i>Nymphaea pubescens</i>			SL		1/1
plants	land plants	Nymphaeaceae	<i>Nymphaea violacea</i>			SL		2/2
plants	land plants	Oleaceae	<i>Chionanthus ramiflorus</i>	northern olive		C		6/4
plants	land plants	Oleaceae	<i>Jasminum didymum</i>			C		2
plants	land plants	Oleaceae	<i>Jasminum didymum subsp. racemosum</i>			C		7/6
plants	land plants	Oleaceae	<i>Jasminum simplicifolium</i>			C		1
plants	land plants	Oleaceae	<i>Jasminum simplicifolium subsp. australiense</i>			C		1/1
plants	land plants	Oleaceae	<i>Notelaea microcarpa</i>			C		1/1
plants	land plants	Oleaceae	<i>Olea paniculata</i>			C		1/1
plants	land plants	Onagraceae	<i>Ludwigia hyssopifolia</i>		Y			4/4
plants	land plants	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C		3/3
plants	land plants	Onagraceae	<i>Ludwigia perennis</i>			C		1/1
plants	land plants	Orchidaceae	<i>Cestichis nugentiae</i>			SL		1/1
plants	land plants	Orchidaceae	<i>Cymbidium madidum</i>			SL		1/1
plants	land plants	Orchidaceae	<i>Dendrobium canaliculatum</i>			SL		1
plants	land plants	Orchidaceae	<i>Dendrobium discolor</i>			SL		1/1
plants	land plants	Orchidaceae	<i>Dockrillia bowmanii</i>	scrub pencil orchid		SL		2/2
plants	land plants	Orchidaceae	<i>Geodorum densiflorum</i>	pink nodding orchid		SL		3/2
plants	land plants	Orchidaceae	<i>Nervilia holochila</i>			SL		3/3
plants	land plants	Orchidaceae	<i>Sarcochilus hillii</i>			SL		1
plants	land plants	Orchidaceae	<i>Sarcochilus tricallatus</i>			SL		1/1
plants	land plants	Orobanchaceae	<i>Buchnera linearis</i>			C		3/3
plants	land plants	Orobanchaceae	<i>Rhamphicarpa australiensis</i>			C		6/5
plants	land plants	Orobanchaceae	<i>Striga squamigera</i>			C		1/1
plants	land plants	Oxalidaceae	<i>Oxalis</i>					1/1
plants	land plants	Oxalidaceae	<i>Oxalis perennans</i>			C		1/1
plants	land plants	Oxalidaceae	<i>Oxalis rubens</i>			C		1/1
plants	land plants	Oxalidaceae	<i>Oxalis thompsoniae</i>			C		1/1
plants	land plants	Pandanaceae	<i>Pandanus</i>					1
plants	land plants	Pandanaceae	<i>Pandanus brookei</i>			C		1/1
plants	land plants	Pandanaceae	<i>Pandanus cookii</i>			C		6/3
plants	land plants	Pandanaceae	<i>Pandanus spiralis</i>			C		1/1
plants	land plants	Pandanaceae	<i>Pandanus tectorius</i>			C		1/1
plants	land plants	Passifloraceae	<i>Passiflora</i>					1
plants	land plants	Passifloraceae	<i>Passiflora aurantia</i>			C		1
plants	land plants	Passifloraceae	<i>Passiflora aurantia var. aurantia</i>			C		4/3
plants	land plants	Passifloraceae	<i>Passiflora foetida</i>		Y			12/6
plants	land plants	Passifloraceae	<i>Passiflora pallida</i>		Y			1/1
plants	land plants	Passifloraceae	<i>Turnera subulata</i>		Y			1/1
plants	land plants	Passifloraceae	<i>Turnera ulmifolia</i>		Y			6/6
plants	land plants	Pedaliaceae	<i>Josephinia eugeniae</i>	josephinia burr			C	4/4
plants	land plants	Pentapetaceae	<i>Melhania oblongifolia</i>				C	3/3

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plants	land plants	Phyllanthaceae	<i>Antidesma ghaesembilla</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Antidesma parvifolium</i>			C		3/3
plants	land plants	Phyllanthaceae	<i>Cleistanthus dallachyanus</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Cleistanthus xerophilus</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			C		4/4
plants	land plants	Phyllanthaceae	<i>Glochidion disparipes</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Glochidion harveyanum</i> var. <i>harveyanum</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Glochidion lobocarpum</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Phyllanthus</i>					1
plants	land plants	Phyllanthaceae	<i>Phyllanthus amarus</i>		Y			4/4
plants	land plants	Phyllanthaceae	<i>Phyllanthus carpentariae</i>			C		3/3
plants	land plants	Phyllanthaceae	<i>Phyllanthus lamprophyllus</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Phyllanthus novae-hollandiae</i>			C		3/3
plants	land plants	Phyllanthaceae	<i>Phyllanthus simplex</i>			C		4/4
plants	land plants	Phyllanthaceae	<i>Phyllanthus tenellus</i>		Y			1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus urinaria</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus virgatus</i>			C		2/2
plants	land plants	Picrodendraceae	<i>Petalostigma banksii</i>			C		1/1
plants	land plants	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		7/5
plants	land plants	Piperaceae	<i>Peperomia pellucida</i>		Y			1/1
plants	land plants	Piperaceae	<i>Piper hederaceum</i> var. <i>hederaceum</i>			C		1/1
plants	land plants	Piperaceae	<i>Piper sarmentosum</i>		Y			1/1
plants	land plants	Pittosporaceae	<i>Bursaria incana</i>			C		2/2
plants	land plants	Pittosporaceae	<i>Pittosporum revolutum</i>	yellow pittosporum		C		1/1
plants	land plants	Pittosporaceae	<i>Pittosporum spinescens</i>			C		2/2
plants	land plants	Pittosporaceae	<i>Pittosporum tinifolium</i>			C		3/3
plants	land plants	Plantaginaceae	<i>Bacopa floribunda</i>			C		2/2
plants	land plants	Plantaginaceae	<i>Limnophila brownii</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			5/5
plants	land plants	Plumbaginaceae	<i>Aegialitis annulata</i>	club mangrove		C		4/3
plants	land plants	Plumbaginaceae	<i>Limonium solanderi</i>			C		2/2
plants	land plants	Poaceae	<i>Alloteropsis cimicina</i>			C		1/1
plants	land plants	Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass		C		2/2
plants	land plants	Poaceae	<i>Andropogon gyanus</i>	gamba grass	Y			4/4
plants	land plants	Poaceae	<i>Aristida acuta</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida calycina</i> var. <i>calycina</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida gracilipes</i>			C		2/2
plants	land plants	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>			C		8/7
plants	land plants	Poaceae	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida latifolia</i>	feathertop wiregrass		C		1/1
plants	land plants	Poaceae	<i>Aristida perniciosa</i>			C		2/2
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i>			C		3/3
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>queenslandica</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida spuria</i>			C		2/2
plants	land plants	Poaceae	<i>Aristida superpendens</i>			C		1/1

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plants	land plants	Poaceae	<i>Aristida utilis</i> var. <i>utilis</i>			C		1/1
plants	land plants	Poaceae	<i>Arthrargrostis deschampsoides</i>			C		5/5
plants	land plants	Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C		4/4
plants	land plants	Poaceae	<i>Arundinella setosa</i>			C		1/1
plants	land plants	Poaceae	<i>Arundo donax</i>		Y			1/1
plants	land plants	Poaceae	<i>Avena sativa</i>	common oats	Y			1/1
plants	land plants	Poaceae	<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>			C		4/4
plants	land plants	Poaceae	<i>Bothriochloa decipiens</i>			C		1
plants	land plants	Poaceae	<i>Bothriochloa decipiens</i> var. <i>cloncurrensis</i>			C		1/1
plants	land plants	Poaceae	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>			C		1/1
plants	land plants	Poaceae	<i>Bothriochloa ewartiana</i>	desert bluegrass		C		1/1
plants	land plants	Poaceae	<i>Bothriochloa pertusa</i>		Y			2/2
plants	land plants	Poaceae	<i>Brachyachne convergens</i>	common native couch		C		2/2
plants	land plants	Poaceae	<i>Brachyachne tenella</i>			C		1/1
plants	land plants	Poaceae	<i>Cenchrus ciliaris</i>		Y			2/1
plants	land plants	Poaceae	<i>Cenchrus echinatus</i>	Mossman River grass	Y			3/3
plants	land plants	Poaceae	<i>Cenchrus elymoides</i>			C		1/1
plants	land plants	Poaceae	<i>Cenchrus pedicellatus</i> subsp. <i>pedicellatus</i>		Y			1/1
plants	land plants	Poaceae	<i>Cenchrus pedicellatus</i> subsp. <i>unispiculus</i>		Y			2/2
plants	land plants	Poaceae	<i>Cenchrus pennisetiformis</i>		Y			2/2
plants	land plants	Poaceae	<i>Cenchrus setaceus</i>		Y			2/2
plants	land plants	Poaceae	<i>Cenchrus setigerus</i>		Y			3/3
plants	land plants	Poaceae	<i>Chloris gayana</i>	rhodes grass	Y			4/3
plants	land plants	Poaceae	<i>Chloris inflata</i>	purpletop chloris	Y			9/6
plants	land plants	Poaceae	<i>Chloris virgata</i>	feathertop rhodes grass	Y			3/2
plants	land plants	Poaceae	<i>Chrysopogon aciculatus</i>	Mackie's pest	Y			1/1
plants	land plants	Poaceae	<i>Chrysopogon elongatus</i>			C		1/1
plants	land plants	Poaceae	<i>Chrysopogon fallax</i>			C		2
plants	land plants	Poaceae	<i>Chrysopogon filipes</i>			C		1/1
plants	land plants	Poaceae	<i>Cymbopogon ambiguus</i>	lemon grass		C		3/3
plants	land plants	Poaceae	<i>Cymbopogon bombycinus</i>	silky oilgrass		C		4/4
plants	land plants	Poaceae	<i>Cymbopogon obtectus</i>			C		1/1
plants	land plants	Poaceae	<i>Cymbopogon queenslandicus</i>			C		3/3
plants	land plants	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		1
plants	land plants	Poaceae	<i>Cynodon dactylon</i>		Y			1
plants	land plants	Poaceae	<i>Cynodon dactylon</i> var. <i>dactylon</i>		Y			1/1
plants	land plants	Poaceae	<i>Cynodon nlemfuensis</i> var. <i>nlemfuensis</i>		Y			1/1
plants	land plants	Poaceae	<i>Cynodon radiatus</i>		Y			1/1
plants	land plants	Poaceae	<i>Dactyloctenium aegyptium</i>	coast button grass	Y			6/5
plants	land plants	Poaceae	<i>Dactyloctenium buchananensis</i>			C		1/1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		1/1
plants	land plants	Poaceae	<i>Dichanthium</i>					1/1
plants	land plants	Poaceae	<i>Dichanthium annulatum</i>	sheda grass	Y			2/2
plants	land plants	Poaceae	<i>Dichanthium aristatum</i>	angleton grass	Y			2/2
plants	land plants	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass		C		4/3
plants	land plants	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>polystachyum</i>			C		2/2

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plants	land plants	Poaceae	<i>Dichanthium sericeum subsp. sericeum</i>			C		4/4
plants	land plants	Poaceae	<i>Dichanthium tenue</i>	small bluegrass		C		1/1
plants	land plants	Poaceae	<i>Digitaria bicornis</i>			C		2/2
plants	land plants	Poaceae	<i>Digitaria brownii</i>			C		5/5
plants	land plants	Poaceae	<i>Digitaria ciliaris</i>	summer grass	Y			2/2
plants	land plants	Poaceae	<i>Digitaria didactyla</i>	Queensland blue couch	Y			1/1
plants	land plants	Poaceae	<i>Digitaria diffusa</i>			C		4/4
plants	land plants	Poaceae	<i>Digitaria fumida</i>			C		1/1
plants	land plants	Poaceae	<i>Digitaria gibbosa</i>			C		2/2
plants	land plants	Poaceae	<i>Digitaria leucostachya</i>			C		3/3
plants	land plants	Poaceae	<i>Digitaria longiflora</i>			C		1/1
plants	land plants	Poaceae	<i>Digitaria minima</i>			C		1/1
plants	land plants	Poaceae	<i>Digitaria nematostachya</i>			C		2/2
plants	land plants	Poaceae	<i>Digitaria orbata</i>			C		3/3
plants	land plants	Poaceae	<i>Digitaria ramularis</i>			C		1/1
plants	land plants	Poaceae	<i>Digitaria violascens</i>	bastard summergrass	Y			1/1
plants	land plants	Poaceae	<i>Dinebra decipiens var. asthenes</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra decipiens var. decipiens</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra neesii</i>			C		2/2
plants	land plants	Poaceae	<i>Diplachne fusca var. fusca</i>			C		2/2
plants	land plants	Poaceae	<i>Diplachne fusca var. uninervia</i>		Y			1/1
plants	land plants	Poaceae	<i>Echinochloa colona</i>	awnless barnyard grass	Y			1/1
plants	land plants	Poaceae	<i>Echinochloa crus-galli</i>	barnyard grass	Y			2/2
plants	land plants	Poaceae	<i>Eleusine indica</i>	crowsfoot grass	Y			1/1
plants	land plants	Poaceae	<i>Enneapogon lindleyanus</i>			C		1/1
plants	land plants	Poaceae	<i>Enneapogon nigricans</i>	niggerheads		C		1/1
plants	land plants	Poaceae	<i>Enneapogon polyphyllus</i>	leafy nineawn		C		1/1
plants	land plants	Poaceae	<i>Enneapogon robustissimus</i>			C		3/3
plants	land plants	Poaceae	<i>Eragrostis</i>					1
plants	land plants	Poaceae	<i>Eragrostis basedowii</i>			C		2/2
plants	land plants	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass		C		2/1
plants	land plants	Poaceae	<i>Eragrostis cumingii</i>			C		2/2
plants	land plants	Poaceae	<i>Eragrostis curvula</i>		Y			3/3
plants	land plants	Poaceae	<i>Eragrostis dielsii</i>	mallee lovegrass		C		1/1
plants	land plants	Poaceae	<i>Eragrostis elongata</i>			C		2/2
plants	land plants	Poaceae	<i>Eragrostis fallax</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis interrupta</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass		C		1/1
plants	land plants	Poaceae	<i>Eragrostis leptostachya</i>			C		2/2
plants	land plants	Poaceae	<i>Eragrostis mexicana</i>	Mexican lovegrass	Y			3/3
plants	land plants	Poaceae	<i>Eragrostis paniciformis</i>		Y			1/1
plants	land plants	Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass		C		1/1
plants	land plants	Poaceae	<i>Eragrostis pilosa</i>	soft lovegrass	Y			2/2
plants	land plants	Poaceae	<i>Eragrostis schultzei</i>			C		3/3
plants	land plants	Poaceae	<i>Eragrostis spartnoides</i>			C		3/3
plants	land plants	Poaceae	<i>Eragrostis stenostachya</i>			C		2/2

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plants	land plants	Poaceae	<i>Eragrostis tenella</i>		Y			2/2
plants	land plants	Poaceae	<i>Eragrostis tenuifolia</i>	elastic grass	Y			1/1
plants	land plants	Poaceae	<i>Eragrostis unioloides</i>		Y			1/1
plants	land plants	Poaceae	<i>Eremochloa bimaculata</i>	poverty grass		C		1/1
plants	land plants	Poaceae	<i>Eriachne ciliata</i>			C		2/2
plants	land plants	Poaceae	<i>Eriachne humilis</i>			C		1/1
plants	land plants	Poaceae	<i>Eriachne obtusa</i>			C		1/1
plants	land plants	Poaceae	<i>Eriachne rara</i>			C		5/4
plants	land plants	Poaceae	<i>Eriachne triodioides</i>			C		3/3
plants	land plants	Poaceae	<i>Eriochloa crebra</i>	spring grass		C		1/1
plants	land plants	Poaceae	<i>Eriochloa procera</i>	slender cupgrass		C		2/2
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		1/1
plants	land plants	Poaceae	<i>Hackelochloa granularis</i>			C		2/2
plants	land plants	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		12/8
plants	land plants	Poaceae	<i>Heteropogon triticeus</i>	giant speargrass		C		7/3
plants	land plants	Poaceae	<i>Hymenachne amplexicaulis</i> 'Olive'		Y			1/1
plants	land plants	Poaceae	<i>Hyparrhenia rufa</i> subsp. <i>rufa</i>		Y			4/4
plants	land plants	Poaceae	<i>Imperata cylindrica</i>	blady grass		C		2/2
plants	land plants	Poaceae	<i>Ischaemum australe</i> var. <i>arundinaceum</i>			C		2/2
plants	land plants	Poaceae	<i>Ischaemum rugosum</i> var. <i>rugosum</i>			C		1/1
plants	land plants	Poaceae	<i>Ischaemum rugosum</i> var. <i>segetum</i>			C		1/1
plants	land plants	Poaceae	<i>Leersia hexandra</i>	swamp rice grass		C		1/1
plants	land plants	Poaceae	<i>Lepturus repens</i>	stalky grass		C		2/2
plants	land plants	Poaceae	<i>Lolium perenne</i>	perennial ryegrass	Y			1/1
plants	land plants	Poaceae	<i>Megathyrsus maximus</i>		Y			5
plants	land plants	Poaceae	<i>Megathyrsus maximus</i> var. <i>coloratus</i>		Y			2/2
plants	land plants	Poaceae	<i>Megathyrsus maximus</i> var. <i>maximus</i>		Y			2/2
plants	land plants	Poaceae	<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Y			2/2
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			10/4
plants	land plants	Poaceae	<i>Mnesithea formosa</i>			C		2/2
plants	land plants	Poaceae	<i>Mnesithea rottboellioides</i>			C		3/3
plants	land plants	Poaceae	<i>Oryza</i>					1/1
plants	land plants	Poaceae	<i>Oryza australiensis</i>			C		1/1
plants	land plants	Poaceae	<i>Oryza meridionalis</i>			C		4/4
plants	land plants	Poaceae	<i>Ottochloa gracillima</i>	pademelon grass		C		1/1
plants	land plants	Poaceae	<i>Panicum</i>					1
plants	land plants	Poaceae	<i>Panicum decompositum</i> var. <i>decompositum</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum decompositum</i> var. <i>tenuius</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum effusum</i>			C		4/4
plants	land plants	Poaceae	<i>Panicum mindanaense</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum mitchellii</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum paludosum</i>	swamp panic		C		2/2
plants	land plants	Poaceae	<i>Panicum queenslandicum</i> var. <i>queenslandicum</i>			C		2/2
plants	land plants	Poaceae	<i>Panicum seminudum</i> var. <i>cairnsianum</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum trichoides</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalidium constrictum</i>			C		1/1

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plants	land plants	Poaceae	<i>Paspalidium criniforme</i>			C		2/2
plants	land plants	Poaceae	<i>Paspalidium distans</i>	shotgrass		C		5/5
plants	land plants	Poaceae	<i>Paspalidium gracile</i>	slender panic		C		5/5
plants	land plants	Poaceae	<i>Paspalidium rarum</i>			C		3/3
plants	land plants	Poaceae	<i>Paspalidium scabrifolium</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalidium udum</i>			V		3/2
plants	land plants	Poaceae	<i>Paspalum</i>					1
plants	land plants	Poaceae	<i>Paspalum distichum</i>	water couch	Y			1/1
plants	land plants	Poaceae	<i>Paspalum notatum</i>	bahia grass	Y			2/2
plants	land plants	Poaceae	<i>Perotis rara</i>	comet grass		C		1/1
plants	land plants	Poaceae	<i>Phragmites australis</i>	common reed		C		1/1
plants	land plants	Poaceae	<i>Pseudoraphis spinescens</i>	spiny mudgrass		C		2/2
plants	land plants	Poaceae	<i>Sacciolepis indica</i>	Indian cupscale grass		C		1/1
plants	land plants	Poaceae	<i>Sarga plumosum</i>			C		3/2
plants	land plants	Poaceae	<i>Schizachyrium pseudoulalia</i>			C		1/1
plants	land plants	Poaceae	<i>Sehima nervosum</i>			C		3/3
plants	land plants	Poaceae	<i>Setaria</i>					1/1
plants	land plants	Poaceae	<i>Setaria oplismenoides</i>			C		2/2
plants	land plants	Poaceae	<i>Setaria surgens</i>			C		2/2
plants	land plants	Poaceae	<i>Sorghum bicolor</i>	forage sorghum	Y			1/1
plants	land plants	Poaceae	<i>Sorghum halepense</i>	Johnson grass	Y			1/1
plants	land plants	Poaceae	<i>Sorghum nitidum forma aristatum</i>			C		3/3
plants	land plants	Poaceae	<i>Sorghum x almum</i>		Y			2/2
plants	land plants	Poaceae	<i>Spinifex sericeus</i>	beach spinifex		C		1/1
plants	land plants	Poaceae	<i>Sporobolus</i>					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 coromandelianus</i>		Y			3/3
plants	land plants	Poaceae	<i>Sporobolus jacquemontii</i>		Y			4/4
plants	land plants	Poaceae	<i>Sporobolus lenticularis</i>			C		1/1
plants	land plants	Poaceae	<i>Sporobolus natalensis</i>		Y			1/1
plants	land plants	Poaceae	<i>Sporobolus virginicus</i>	sand couch		C		6/2
plants	land plants	Poaceae	<i>Thaumastochloa pubescens</i>			C		1
plants	land plants	Poaceae	<i>Themeda arguens</i>			C		3/3
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			16/3
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		6/4
plants	land plants	Poaceae	<i>Triodia stenostachya</i>			C		3/3
plants	land plants	Poaceae	<i>Urochloa holosericea subsp. holosericea</i>			C		3/3
plants	land plants	Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y			2/2
plants	land plants	Poaceae	<i>Urochloa mutica</i>		Y			2/1
plants	land plants	Poaceae	<i>Urochloa oligotricha</i>		Y			1/1
plants	land plants	Poaceae	<i>Urochloa panicoides var. panicoides</i>		Y			1/1
plants	land plants	Poaceae	<i>Urochloa pubigera</i>			C		1/1
plants	land plants	Poaceae	<i>Urochloa subquadrifera</i>		Y			5/5
plants	land plants	Poaceae	<i>Whiteochloa airoides</i>			C		2/2
plants	land plants	Polygalaceae	<i>Polygala glaucoides</i>			C		1/1

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plants	land plants	Polygalaceae	<i>Polygala paniculata</i>		Y			1/1
plants	land plants	Polygalaceae	<i>Polygala parviloba</i>			C		1/1
plants	land plants	Polygalaceae	<i>Polygala wightiana</i>			C		2/2
plants	land plants	Polygalaceae	<i>Salomonina ciliata</i>			C		1/1
plants	land plants	Polygalaceae	<i>Xanthophyllum octandrum</i>			C		2/2
plants	land plants	Polygonaceae	<i>Antigonon leptopus</i>		Y			2/2
plants	land plants	Polygonaceae	<i>Muehlenbeckia zippelii</i>			C		2/2
plants	land plants	Polygonaceae	<i>Persicaria attenuata</i>			C		2/2
plants	land plants	Polygonaceae	<i>Persicaria orientalis</i>	princes feathers		C		1/1
plants	land plants	Polygonaceae	<i>Polygonum aviculare</i>	wireweed	Y			1/1
plants	land plants	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed		C		1/1
plants	land plants	Polygonaceae	<i>Triplaris americana</i>		Y			1/1
plants	land plants	Polypodiaceae	<i>Drynaria sparsisora</i>			SL		1/1
plants	land plants	Polypodiaceae	<i>Pyrrosia rupestris</i>	rock felt fern		SL		1/1
plants	land plants	Pontederiaceae	<i>Pontederia crassipes</i>		Y			2/2
plants	land plants	Pontederiaceae	<i>Pontederia cyanea</i>			C		3/3
plants	land plants	Pontederiaceae	<i>Pontederia vaginalis</i>			C		1/1
plants	land plants	Portulacaceae	<i>Calandrinia gracilis</i>			C		2/2
plants	land plants	Portulacaceae	<i>Calandrinia halophila</i>			C		1/1
plants	land plants	Portulacaceae	<i>Portulaca australis</i>			C		2/1
plants	land plants	Portulacaceae	<i>Portulaca bicolor</i>			C		3/3
plants	land plants	Portulacaceae	<i>Portulaca filifolia</i>			C		1/1
plants	land plants	Portulacaceae	<i>Portulaca oleracea</i>	pigweed	Y			1/1
plants	land plants	Portulacaceae	<i>Portulaca pilosa</i>		Y			2/2
plants	land plants	Potamogetonaceae	<i>Potamogeton</i>					2/2
plants	land plants	Potamogetonaceae	<i>Potamogeton crispus</i>	curly pondweed		SL		1/1
plants	land plants	Potamogetonaceae	<i>Potamogeton octandrus</i>			SL		1/1
plants	land plants	Proteaceae	<i>Bleasdalea bleasdalei</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea parallela</i>			C		8/5
plants	land plants	Proteaceae	<i>Grevillea stenobotrya</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood		C		3
plants	land plants	Proteaceae	<i>Helicia glabriflora</i>	pale oak		C		1/1
plants	land plants	Proteaceae	<i>Persoonia falcata</i>			C		1
plants	land plants	Proteaceae	<i>Xylomelum scottianum</i>			C		1/1
plants	land plants	Psilotaceae	<i>Tmesipteris truncata</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Adiantum atroviride</i>			SL		3/3
plants	land plants	Pteridaceae	<i>Adiantum hispidulum</i> var. <i>hispidulum</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Adiantum hispidulum</i> var. <i>hypoglaucum</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Ceratopteris thalictroides</i>			SL		2/2
plants	land plants	Pteridaceae	<i>Cheilanthes brownii</i>			C		4/4
plants	land plants	Pteridaceae	<i>Cheilanthes nudiusscula</i>			C		1/1
plants	land plants	Pteridaceae	<i>Doryopteris concolor</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Haplopteris elongata</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Pellaea muelleri</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Pityrogramma calomelanos</i> var. <i>calomelanos</i>		Y			2/2
plants	land plants	Pteridaceae	<i>Pteris tremula</i>			SL		1/1

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plants	land plants	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		4/1
plants	land plants	Pylaiadelphaceae	<i>Trachyphyllum inflexum</i>			C		1/1
plants	land plants	Rhamnaceae	<i>Alphitonia</i>			C		1
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		12/9
plants	land plants	Rhamnaceae	<i>Colubrina asiatica</i>			C		2/2
plants	land plants	Rhamnaceae	<i>Pomaderris argyrophylla</i>			C		1/1
plants	land plants	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y			25/8
plants	land plants	Rhizophoraceae	<i>Bruguiera exaristata</i>			C		4/4
plants	land plants	Rhizophoraceae	<i>Bruguiera gymnorhiza</i>	large-fruited orange mangrove		C		2/2
plants	land plants	Rhizophoraceae	<i>Carallia brachiata</i>	carallia		C		2/2
plants	land plants	Rhizophoraceae	<i>Ceriops tagal</i>	yellow mangrove		C		3/1
plants	land plants	Rhizophoraceae	<i>Rhizophora stylosa</i>	spotted mangrove		C		6/3
plants	land plants	Rosaceae	<i>Rubus moluccanus</i> var. <i>trilobus</i>			C		1/1
plants	land plants	Rousseaceae	<i>Abrophyllum ornans</i>			C		1/1
plants	land plants	Rubiaceae	<i>Aidia racemosa</i>			C		4/3
plants	land plants	Rubiaceae	<i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i>			C		1/1
plants	land plants	Rubiaceae	<i>Coelospermum reticulatum</i>			C		3/2
plants	land plants	Rubiaceae	<i>Cyclophyllum coprosmoides</i> var. <i>coprosmoides</i>			C		2/2
plants	land plants	Rubiaceae	<i>Gynochthodes canthoides</i>			C		3/2
plants	land plants	Rubiaceae	<i>Ixora timorensis</i>			C		2/2
plants	land plants	Rubiaceae	<i>Knoxia sumatrensis</i>			C		1/1
plants	land plants	Rubiaceae	<i>Larsenaikia ochreatea</i>			C		5/4
plants	land plants	Rubiaceae	<i>Mitracarpus hirtus</i>		Y			4/3
plants	land plants	Rubiaceae	<i>Morinda citrifolia</i>			C		2/1
plants	land plants	Rubiaceae	<i>Nauclea orientalis</i>	Leichhardt tree		C		1
plants	land plants	Rubiaceae	<i>Oldenlandia</i>					1
plants	land plants	Rubiaceae	<i>Oldenlandia corymbosa</i> var. <i>corymbosa</i>		Y			7/7
plants	land plants	Rubiaceae	<i>Paranotis mitrasacmoides</i> subsp. <i>trachymenoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Pavetta australiensis</i> var. <i>australiensis</i>			C		1/1
plants	land plants	Rubiaceae	<i>Pavetta australiensis</i> var. <i>australiensis</i>			C		1/1
			- <i>Pavetta granitica</i>					
plants	land plants	Rubiaceae	<i>Pavetta granitica</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psychotria</i>					1/1
plants	land plants	Rubiaceae	<i>Psychotria fitzalanii</i>			C		7/7
plants	land plants	Rubiaceae	<i>Psychotria interstans</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psychotria polioSTEMMA</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax</i>					1
plants	land plants	Rubiaceae	<i>Psydrax lepida</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax odorata</i> forma <i>australiana</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax odorata</i> forma <i>foveolata</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax odorata</i> subsp. <i>australiana</i>			C		5/5
plants	land plants	Rubiaceae	<i>Psydrax saligna</i> forma <i>saligna</i>			C		3/2
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		4/4
plants	land plants	Rubiaceae	<i>Spermacoce brachystema</i>			C		4/3
plants	land plants	Rubiaceae	<i>Spermacoce remota</i>		Y			2/2
plants	land plants	Rubiaceae	<i>Spermacoce verticillata</i>		Y			1/1

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plants	land plants	Rubiaceae	<i>Timonius timon</i> var. <i>timon</i>			C		1/1
plants	land plants	Rubiaceae	<i>Triflorensia ixoroides</i>			C		2/2
plants	land plants	Rutaceae	<i>Acronychia laevis</i>	glossy acronychia		C		2/2
plants	land plants	Rutaceae	<i>Bosistoa medicinalis</i>			C		2/2
plants	land plants	Rutaceae	<i>Clausena brevistyla</i>	clausena		C		3/3
plants	land plants	Rutaceae	<i>Dinosperma erythrococcum</i>			C		3/3
plants	land plants	Rutaceae	<i>Dinosperma melanophloium</i>			C		1/1
plants	land plants	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		12/12
plants	land plants	Rutaceae	<i>Micromelum minutum</i>	clusterberry		C		3/2
plants	land plants	Rutaceae	<i>Murraya lucida</i>			C		3/3
plants	land plants	Salicaceae	<i>Scolopia braunii</i>	flintwood		C		1/1
plants	land plants	Salviniaceae	<i>Salvinia molesta</i>	salvinia	Y			3/3
plants	land plants	Santalaceae	<i>Dendrotrophe varians</i>			C		1/1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		4/2
plants	land plants	Santalaceae	<i>Viscum articulatum</i>	flat mistletoe		C		3/3
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		2/2
plants	land plants	Sapindaceae	<i>Alectryon reticulatus</i>	wild quince		C		8/7
plants	land plants	Sapindaceae	<i>Alectryon tomentosus</i>			C		1/1
plants	land plants	Sapindaceae	<i>Arytera divaricata</i>	coogera		C		2/2
plants	land plants	Sapindaceae	<i>Atalaya hemiglauca</i>			C		1/1
plants	land plants	Sapindaceae	<i>Atalaya multiflora</i>	broad-leaved whitewood		C		3/3
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		2/1
plants	land plants	Sapindaceae	<i>Cupaniopsis wadsworthii</i>			C		2/2
plants	land plants	Sapindaceae	<i>Dodonaea dodecandra</i>			C		1/1
plants	land plants	Sapindaceae	<i>Dodonaea lanceolata</i> var. <i>subsessilifolia</i>			C		3/3
plants	land plants	Sapindaceae	<i>Dodonaea stenophylla</i>			C		1/1
plants	land plants	Sapindaceae	<i>Dodonaea viscosa</i>			C		1
plants	land plants	Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>			C		4/4
plants	land plants	Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>viscosa</i>			C		1/1
plants	land plants	Sapindaceae	<i>Ganophyllum falcatum</i>			C		3/2
plants	land plants	Sapindaceae	<i>Guioa lasioneura</i>			C		1/1
plants	land plants	Sapindaceae	<i>Harpullia hillii</i>			C		1/1
plants	land plants	Sapindaceae	<i>Harpullia pendula</i>			C		2/2
plants	land plants	Sapindaceae	<i>Lepiderema punctulata</i>			C		3/3
plants	land plants	Sapotaceae	<i>Amorphospermum antilogum</i>			C		1/1
plants	land plants	Sapotaceae	<i>Mimusops elengi</i>			C		3/3
plants	land plants	Sapotaceae	<i>Planchonella pohlmaniana</i>			C		3/2
plants	land plants	Sapotaceae	<i>Pleioluma queenslandica</i>			C		2/2
plants	land plants	Sapotaceae	<i>Sersalisia sericea</i>			C		1
plants	land plants	Schizaeaceae	<i>Schizaea bifida</i>	forked comb fern		SL		1/1
plants	land plants	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		1/1
plants	land plants	Simaroubaceae	<i>Brucea javanica</i>			C		1/1
plants	land plants	Smilacaceae	<i>Smilax australis</i>	barbed-wire vine		C		1
plants	land plants	Solanaceae	<i>Capsicum frutescens</i>		Y			1/1
plants	land plants	Solanaceae	<i>Lycianthes shanesii</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Solanaceae	<i>Physalis angulata</i>		Y			3/2
plants	land plants	Solanaceae	<i>Solanum americanum</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		1/1
plants	land plants	Solanaceae	<i>Solanum lycopersicum</i> var. <i>cerasiforme</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum seaforthianum</i>	Brazilian nightshade	Y			1/1
plants	land plants	Solanaceae	<i>Solanum sporadotrichum</i>			NT		8/4
plants	land plants	Solanaceae	<i>Solanum torvum</i>	devil's fig	Y			3/3
plants	land plants	Sparrmanniaceae	<i>Corchorus aestuans</i>			C		7/7
plants	land plants	Sparrmanniaceae	<i>Corchorus hygrophilus</i>			V		4/4
plants	land plants	Sparrmanniaceae	<i>Corchorus olitorius</i>	jute		C		3/3
plants	land plants	Sparrmanniaceae	<i>Corchorus pumilio</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia asiatica</i>		Y			9/7
plants	land plants	Sparrmanniaceae	<i>Grewia australis</i>			C		3/3
plants	land plants	Sparrmanniaceae	<i>Grewia graniticola</i>			C		49/8
plants	land plants	Sparrmanniaceae	<i>Grewia savannicola</i>			C		4/4
plants	land plants	Sparrmanniaceae	<i>Grewia scabrella</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Triumfetta pentandra</i>		Y			1/1
plants	land plants	Sparrmanniaceae	<i>Triumfetta repens</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Triumfetta rhomboidea</i>	chinese burr	Y			3/3
plants	land plants	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree		SL		1/1
plants	land plants	Sterculiaceae	<i>Brachychiton bidwillii</i>	little kurrajong		SL		2/2
plants	land plants	Sterculiaceae	<i>Sterculia quadrifida</i>	peanut tree		C		3/2
plants	land plants	Stylidiaceae	<i>Stylidium</i>					1
plants	land plants	Stylidiaceae	<i>Stylidium uliginosum</i>	swamp triggerplant		SL		1/1
plants	land plants	Taccaceae	<i>Tacca leontopetaloides</i>			C		1/1
plants	land plants	Tamaricaceae	<i>Tamarix aphylla</i>	athel pine	Y			7/7
plants	land plants	Thelypteridaceae	<i>Christella dentata</i>	creek fern		SL		1/1
plants	land plants	Thymelaeaceae	<i>Pimelea latifolia</i>			C		1/1
plants	land plants	Thymelaeaceae	<i>Pimelea sericostachya</i>			C		3/3
plants	land plants	Thymelaeaceae	<i>Wikstroemia indica</i>	tie bush		C		1/1
plants	land plants	Typhaceae	<i>Typha domingensis</i>			C		2/2
plants	land plants	Typhaceae	<i>Typha orientalis</i>	broad-leaved cumbungi		C		1
plants	land plants	Urticaceae	<i>Dendrocnide moroides</i>	Gympie stinger		C		1/1
plants	land plants	Urticaceae	<i>Pipturus argenteus</i>	white nettle		C		2/2
plants	land plants	Verbenaceae	<i>Duranta erecta</i>	duranta	Y			1/1
plants	land plants	Verbenaceae	<i>Lantana camara</i>	lantana	Y			7/5
plants	land plants	Verbenaceae	<i>Phyla canescens</i>		Y			1/1
plants	land plants	Verbenaceae	<i>Stachytarpheta</i>		Y			2
plants	land plants	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			8/4
plants	land plants	Verbenaceae	<i>Stachytarpheta mutabilis</i>	pink snakeweed	Y			2/1
plants	land plants	Violaceae	<i>Pigea enneasperma</i>			C		6/3
plants	land plants	Violaceae	<i>Pigea stellarioides</i>			C		2/2
plants	land plants	Vitaceae	<i>Apocissus oblonga</i>			C		4/3
plants	land plants	Vitaceae	<i>Causonis trifolia</i>			C		4/4
plants	land plants	Vitaceae	<i>Cissus cardiophylla</i>			C		2/2
plants	land plants	Vitaceae	<i>Cissus reniformis</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Vitaceae	<i>Clematicissus opaca</i>			C		7/7
plants	land plants	Vitaceae	<i>Tetrastigma nitens</i>	shining grape		C		1/1
plants	land plants	Vitaceae	<i>Tetrastigma thorsborneorum</i>			C		3/3
plants	land plants	Winteraceae	<i>Tasmannia insipida</i>	brush pepperbush		C		1/1
plants	land plants	Xyridaceae	<i>Xyris complanata</i>	yellow-eye		C		1/1
plants	land plants	Zingiberaceae	<i>Alpinia</i>					1/1
plants	land plants	Zygophyllaceae	<i>Tribulus</i>					1/1
plants	land plants	Zygophyllaceae	<i>Tribulus cistoides</i>	bulls head vine		C		2/2
plants	land plants	Zygophyllaceae	<i>Tribulus terrestris</i>	caltrop		C		2/2

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).

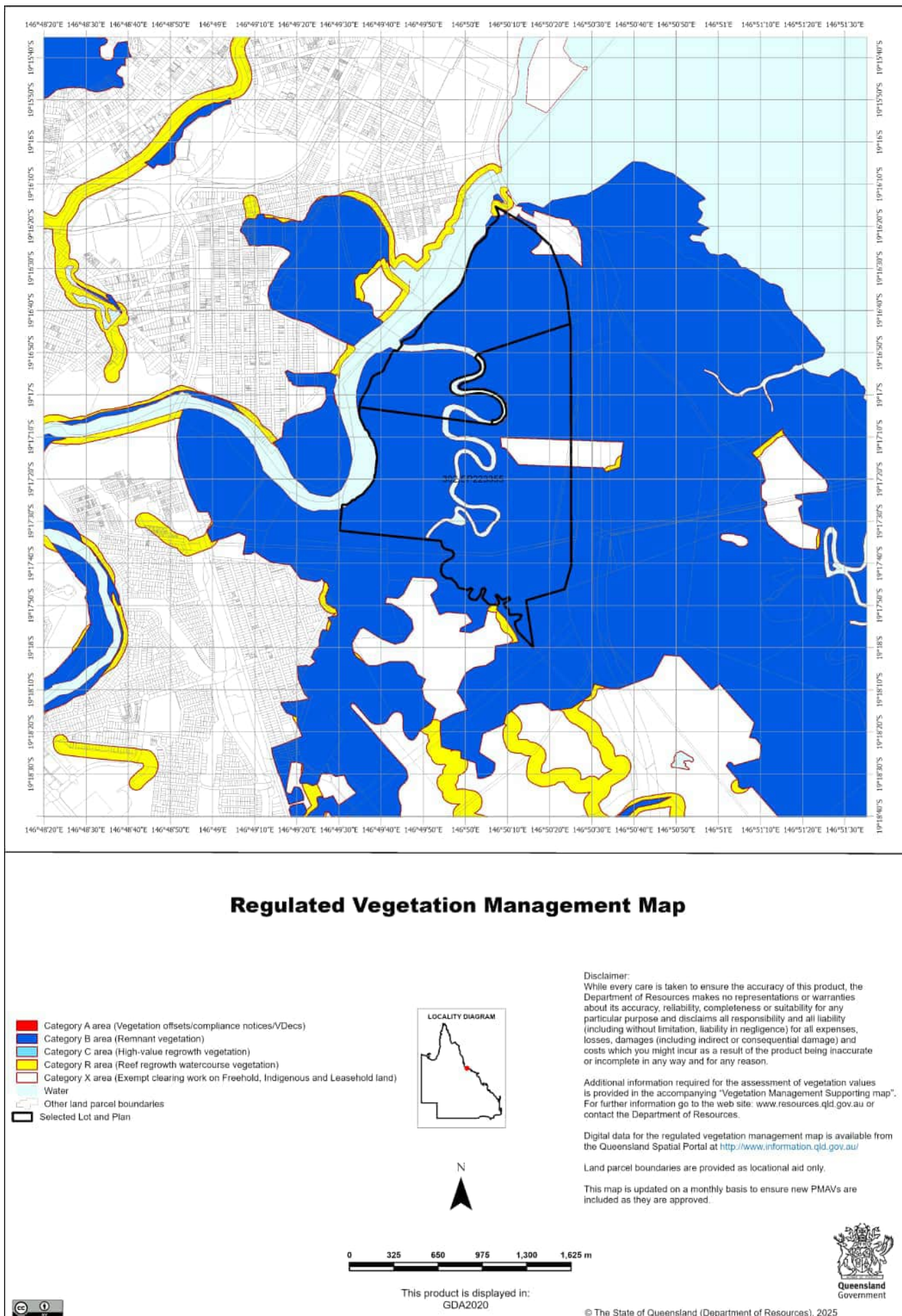
A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

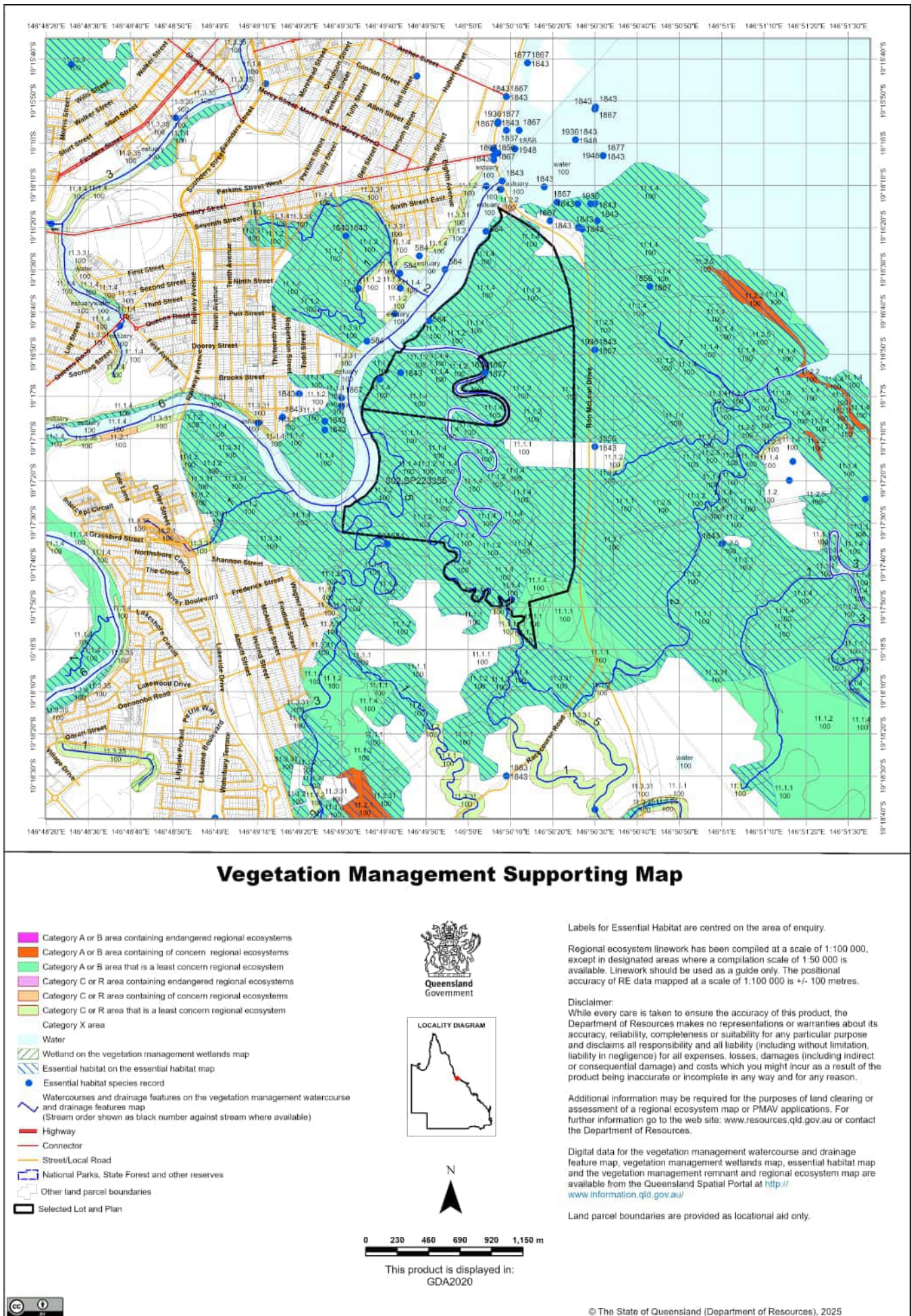
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

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.





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.resources.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.		Near and in waterbodies.
1843	<i>Numenius madagascariensis</i>	eastern curlew	E	Foraging on soft, intertidal mudflat, with a preference for broad flats, often in sheltered areas near mangroves and estuaries/creeks, also on sandflats and occasionally ocean beaches, rock platforms and coral reefs. Roost on saltflat, saltmarsh, mangroves, reef flat, sandy spits and grassland near water.	Sea level to 100m.	Sand, sandy mud and mud substrates.	Associated with coastlines and wetlands.
1856	<i>Calidris tenuirostris</i>	great knot	CE	Foraging on intertidal mudflat/sandflat in sheltered coastal areas, exposed reef, rock platform, mangrove, near coastal swamp/lagoon and salt lake. Roost on sandy beach, mudflat and coastal claypan .	Sea level to 100m.	Mud and sand substrates.	Associated with coastlines and wetlands.
1867	<i>Limosa lapponica baueri</i>	Western Alaskan bar-tailed godwit	V	Foraging on large intertidal mudflat/sandflat, banks in estuaries, inlets, bays and coastal lagoons; also saline wetlands, saltmarsh, sandy beach, rock platform and coral reef-flat. Roost on sandy beach/spit and near saltmarsh.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and wetlands.
1877	<i>Calidris canutus</i>	red knot	E	Foraging on intertidal mudflat/sandflat and sandy beach of sheltered coastal areas, also saline wetlands/saltmarsh. Roost on sandy beach or spit, mudflat and coastal claypan .	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and wetlands.
1878	<i>Calidris ferruginea</i>	curlew sandpiper	CE	Foraging on intertidal mudflat in sheltered estuaries, bays, inlets and lagoons; non-tidal swamps and inland ephemeral and permanent lakes, dams or waterholes. Roost on shingle/sand/shell beaches, saltmarsh, mangrove and close to wetlands.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and coastal and inland wetlands.
1883	<i>Rostratula australis</i>	Australian painted-snipe	E	Shallow ephemeral and permanent swamps, water meadows and damp lake margins with rushes, long grass and herbage (e.g. lignum, chenopods) in good condition, as well as areas of muddy ground; also uses saltmarsh, samphire flats and waterlogged grasslands with trees present (e.g. Eucalyptus camaldulensis, E. brownii). Nest in shallow grass-lined hollow in damp ground under low shrub or grass tussock near shallow water.			Associated with wetlands.
1936	<i>Charadrius mongolus</i>	lesser sand plover	E	Foraging on sandy beach, intertidal mudflat/sandflat and mangrove mudflat of coastal bays and estuaries. Also inland at lakes and soaks. Roost on beach, banks, sand/shell spits, rocky spits and exposed reef.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and coastal and inland wetlands.
1948	<i>Charadrius leschenaultii</i>	greater sand plover	V	Foraging on intertidal mudflats, sandbank, sandy/shelly/muddy beaches, rock platforms, coral reefs and tidal lagoons. Roost on sandspit, beach, lagoons edge, rocky points, coastal saltmarsh and claypan.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and wetlands.

Label	Regional Ecosystem (mandatory unless otherwise specified)
584	All regional ecosystems within the stream/wetland buffer as determined by VMA code.
1843	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 7.1.1, 7.1.2, 7.1.3, 8.1.1, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 11.1.4, 12.1.2, 12.1.3
1856	2.1.1, 2.1.2, 2.1.3, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 7.1.1, 7.1.3, 8.1.2, 11.1.2, 11.1.4, 12.1.3.
1867	2.1.1, 2.1.4, 2.1.5, 3.1.6, 7.1.2, 7.1.3, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 12.1.2, 12.1.3.
1877	2.1.1, 2.1.4, 2.1.5, 3.1.6, 7.1.2, 7.1.3, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 12.1.2, 12.1.3.
1878	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 7.1.1, 7.1.2, 7.1.3, 8.1.1, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 11.1.4, 12.1.2, 12.1.3.
1883	All regional ecosystems within the stream/wetland buffer as determined by VMA code.
1936	2.1.1, 2.1.2, 2.1.3, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 7.1.1, 7.1.3, 8.1.2, 11.1.2, 11.1.4, 12.1.3.
1948	2.1.1, 2.1.4, 2.1.5, 3.1.6, 7.1.2, 7.1.3, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 12.1.2, 12.1.3.



Vegetation management report

For Lot: 302 Plan: SP223355
3/19/2025



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Recent changes

Updated mapping

Updated vegetation mapping was released on 22 November 2023 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, essential habitat, wetland and high-value regrowth mapping.

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

The latest version (v10) of the Protected Plants Flora Survey Trigger Map (trigger map) was released on 6 September 2023.

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, Science and Innovation 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, Science and Innovation 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: 302 Plan: SP223355 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)
B	SP192620	Easement	0
302	SP223355	Reserve	3,010,000
A	SP192616	Easement	7,992
C	SP192619	Easement	5,377
S	RP800683	Easement	3,892
G	SP273484	Easement	19,050
D	RP720391	Easement	0
A	RP719679	Easement	0

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.

Does the property Lot: 302 Plan: SP223355 have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 302 Plan: SP223355, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Townsville City	Ross	Brigalow Belt	Townsville Plains

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

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2023, 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 identified in the Vegetation Management Regional Ecosystem Description Database (VM REDD) as having a grassland structure; 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/management/vegetation/clearing-approvals/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/management/vegetation/clearing-approvals/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://vegetation-apps.dnrm.qld.gov.au>

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/management/vegetation/clearing-approvals/area-management-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/clearing-approvals/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

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

3. Vegetation management framework for Lot: 302 Plan: SP223355

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

Vegetation category	Area (ha)
Category B	279.81
Category R	0.08
Category Water	11.28
Category X	9.88

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
11.1.1	Least concern	B	44.36	Sporobolus virginicus grassland on marine clay plains	Woody grassland
11.1.2	Least concern	B	69.25	Samphire forbland on marine clay plains	Other
11.1.2	Least concern	R	0.01	Samphire forbland on marine clay plains	Other
11.1.4	Least concern	B	147.73	Mangrove low open forest and/or woodland on marine clay plains	Mid-dense
11.1.4	Least concern	R	0.03	Mangrove low open forest and/or woodland on marine clay plains	Mid-dense
11.2.2	Of concern	R	less than 0.01	Complex of Ipomoea pes-caprae subsp. brasiliensis and Spinifex sericeus and Casuarina equisetifolia low woodland and herbland on fore dunes	Sparse
11.2.5	Least concern	B	18.47	Corymbia-Melaleuca woodland complex of beach ridges and swales	Sparse
estuary	None	R	0.03	None	None
non-rem	None	X	9.88	None	None
water	None	Water	11.28	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

There are no vegetation management wetlands present on this property.

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 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.		Near and in waterbodies.
1843	<i>Numenius madagascariensis</i>	eastern curlew	E	Foraging on soft, intertidal mudflat, with a preference for broad flats, often in sheltered areas near mangroves and estuaries/creeks, also on sandflats and occasionally ocean beaches, rock platforms and coral reefs. Roost on saltflat, saltmarsh, mangroves, reef flat, sandy spits and grassland near water.	Sea level to 100m.	Sand, sandy mud and mud substrates.	Associated with coastlines and wetlands.
1856	<i>Calidris tenuirostris</i>	great knot	CE	Foraging on intertidal mudflat/sandflat in sheltered coastal areas, exposed reef, rock platform, mangrove, near coastal swamp/lagoon and salt lake. Roost on sandy beach, mudflat and coastal claypan .	Sea level to 100m.	Mud and sand substrates.	Associated with coastlines and wetlands.
1867	<i>Limosa lapponica baueri</i>	Western Alaskan bar-tailed godwit	V	Foraging on large intertidal mudflat/sandflat, banks in estuaries, inlets, bays and coastal lagoons; also saline wetlands, saltmarsh, sandy beach, rock platform and coral reef-flat. Roost on sandy beach/spit and near saltmarsh.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and wetlands.
1877	<i>Calidris canutus</i>	red knot	E	Foraging on intertidal mudflat/sandflat and sandy beach of sheltered coastal areas, also saline wetlands/saltmarsh. Roost on sandy beach or spit, mudflat and coastal claypan .	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and wetlands.
1878	<i>Calidris ferruginea</i>	curlew sandpiper	CE	Foraging on intertidal mudflat in sheltered estuaries, bays, inlets and lagoons; non-tidal swamps and inland ephemeral and permanent lakes, dams or waterholes. Roost on shingle/sand/shell beaches, saltmarsh, mangrove and close to wetlands.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and coastal and inland wetlands.
1883	<i>Rostratula australis</i>	Australian painted-snipe	E	Shallow ephemeral and permanent swamps, water meadows and damp lake margins with rushes, long grass and herbage (e.g. lignum, chenopods) in good condition, as well as areas of muddy ground; also uses saltmarsh, samphire flats and waterlogged grasslands with trees present (e.g. Eucalyptus camaldulensis, E. brownii). Nest in shallow grass-lined hollow in damp ground under low shrub or grass tussock near shallow water.			Associated with wetlands.
1936	<i>Charadrius mongolus</i>	lesser sand plover	E	Foraging on sandy beach, intertidal mudflat/sandflat and mangrove mudflat of coastal bays and estuaries. Also inland at lakes and soaks. Roost on beach, banks, sand/shell spits, rocky spits and exposed reef.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and coastal and inland wetlands.
1948	<i>Charadrius leschenaultii</i>	greater sand plover	V	Foraging on intertidal mudflats, sandbank, sandy/shelly/muddy beaches, rock platforms, coral reefs and tidal lagoons. Roost on sandspit, beach, lagoons edge, rocky points, coastal saltmarsh and claypan.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and wetlands.

Label	Regional Ecosystem (mandatory unless otherwise specified)
584	All regional ecosystems within the stream/wetland buffer as determined by VMA code.
1843	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 7.1.1, 7.1.2, 7.1.3, 8.1.1, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 11.1.4, 12.1.2, 12.1.3
1856	2.1.1, 2.1.2, 2.1.3, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 7.1.1, 7.1.3, 8.1.2, 11.1.2, 11.1.4, 12.1.3.
1867	2.1.1, 2.1.4, 2.1.5, 3.1.6, 7.1.2, 7.1.3, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 12.1.2, 12.1.3.
1877	2.1.1, 2.1.4, 2.1.5, 3.1.6, 7.1.2, 7.1.3, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 12.1.2, 12.1.3.
1878	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 7.1.1, 7.1.2, 7.1.3, 8.1.1, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 11.1.4, 12.1.2, 12.1.3.
1883	All regional ecosystems within the stream/wetland buffer as determined by VMA code.
1936	2.1.1, 2.1.2, 2.1.3, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 7.1.1, 7.1.3, 8.1.2, 11.1.2, 11.1.4, 12.1.3.
1948	2.1.1, 2.1.4, 2.1.5, 3.1.6, 7.1.2, 7.1.3, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 12.1.2, 12.1.3.

3.6 Area Management Plan(s)

Nil

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

*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?

No Class A

No Class B

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: 302 Plan: SP223355.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:
<https://www.resources.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.

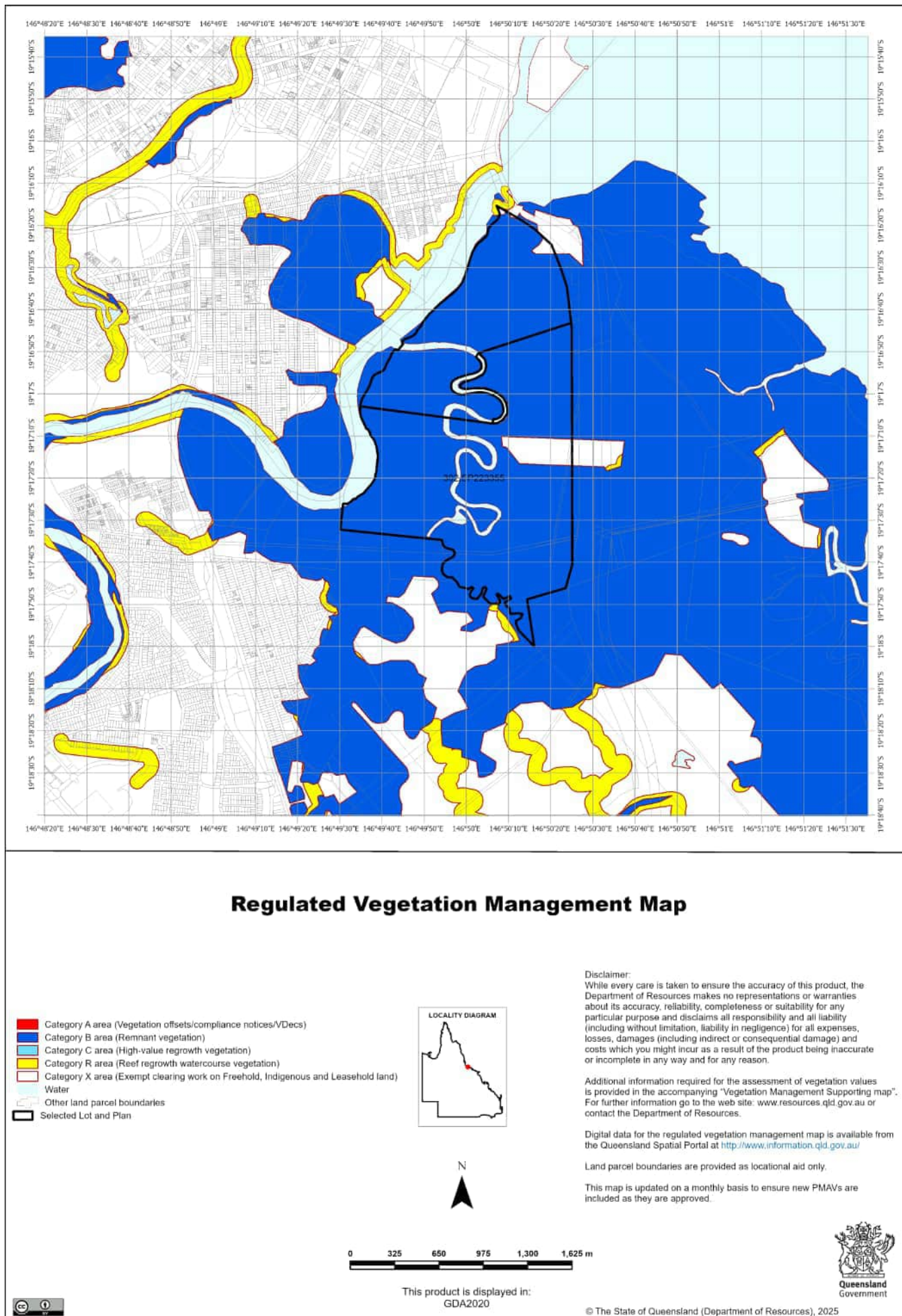
Coastal/non-coastal map

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).

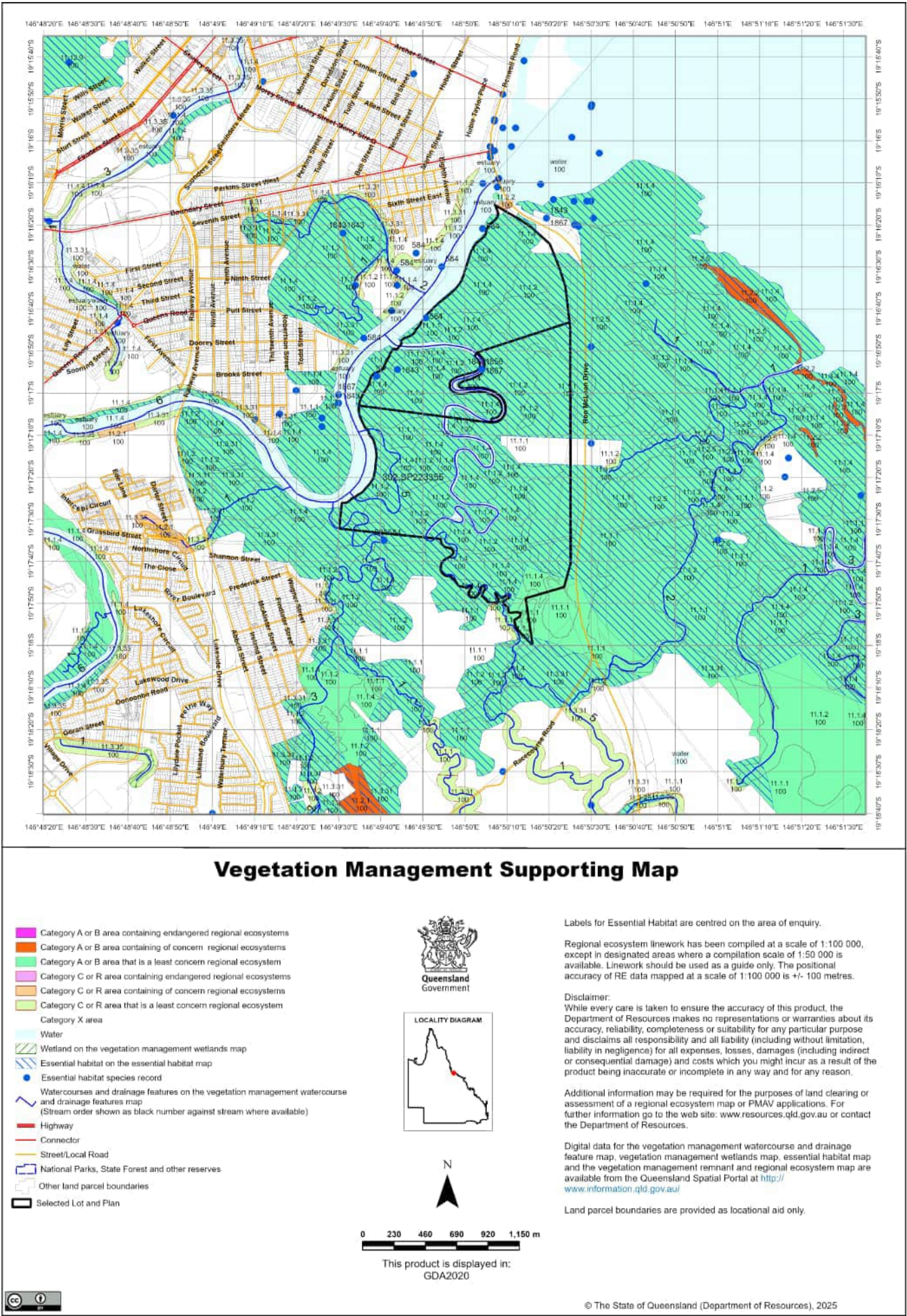
Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

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.

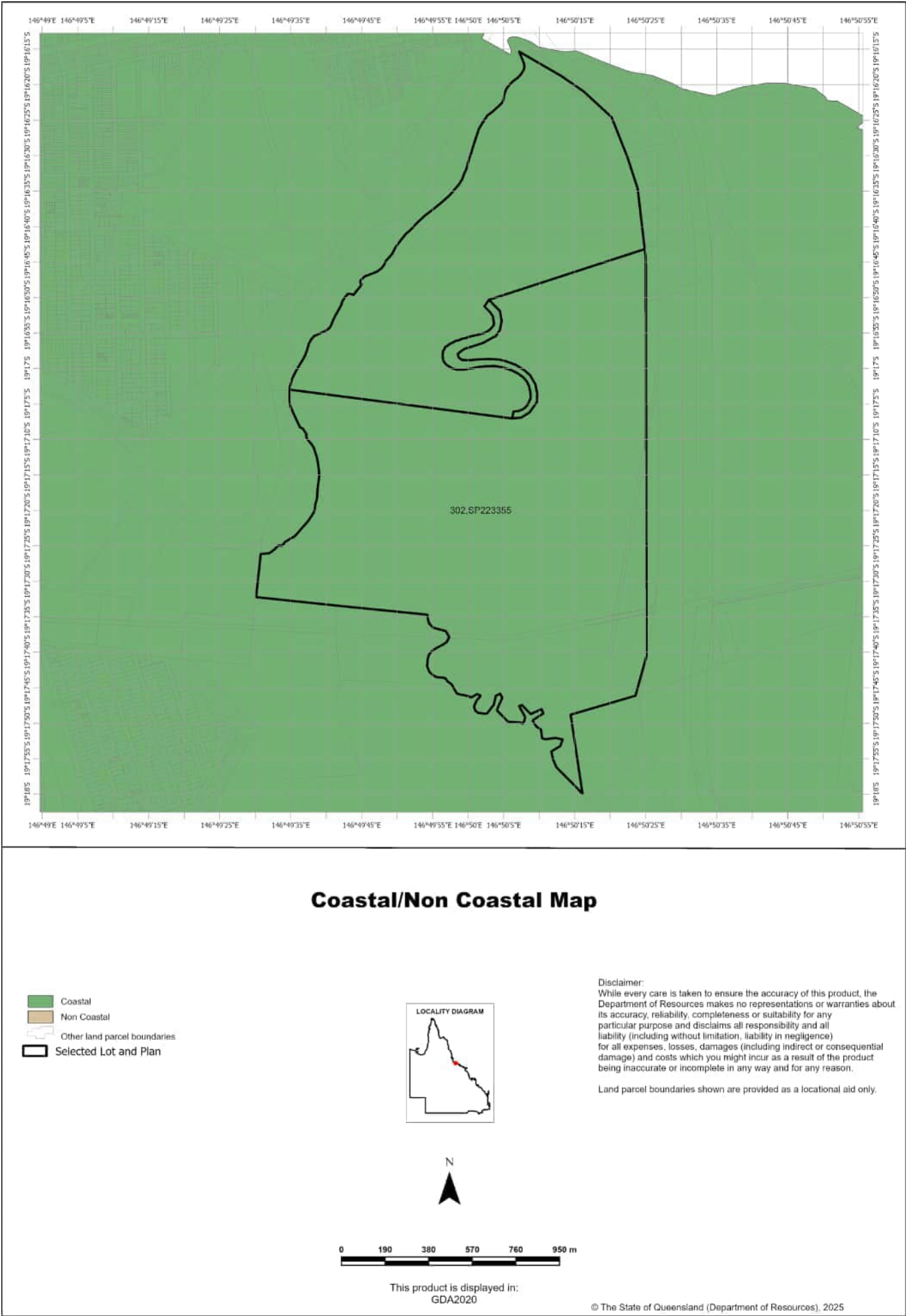
4.1 Regulated vegetation management map



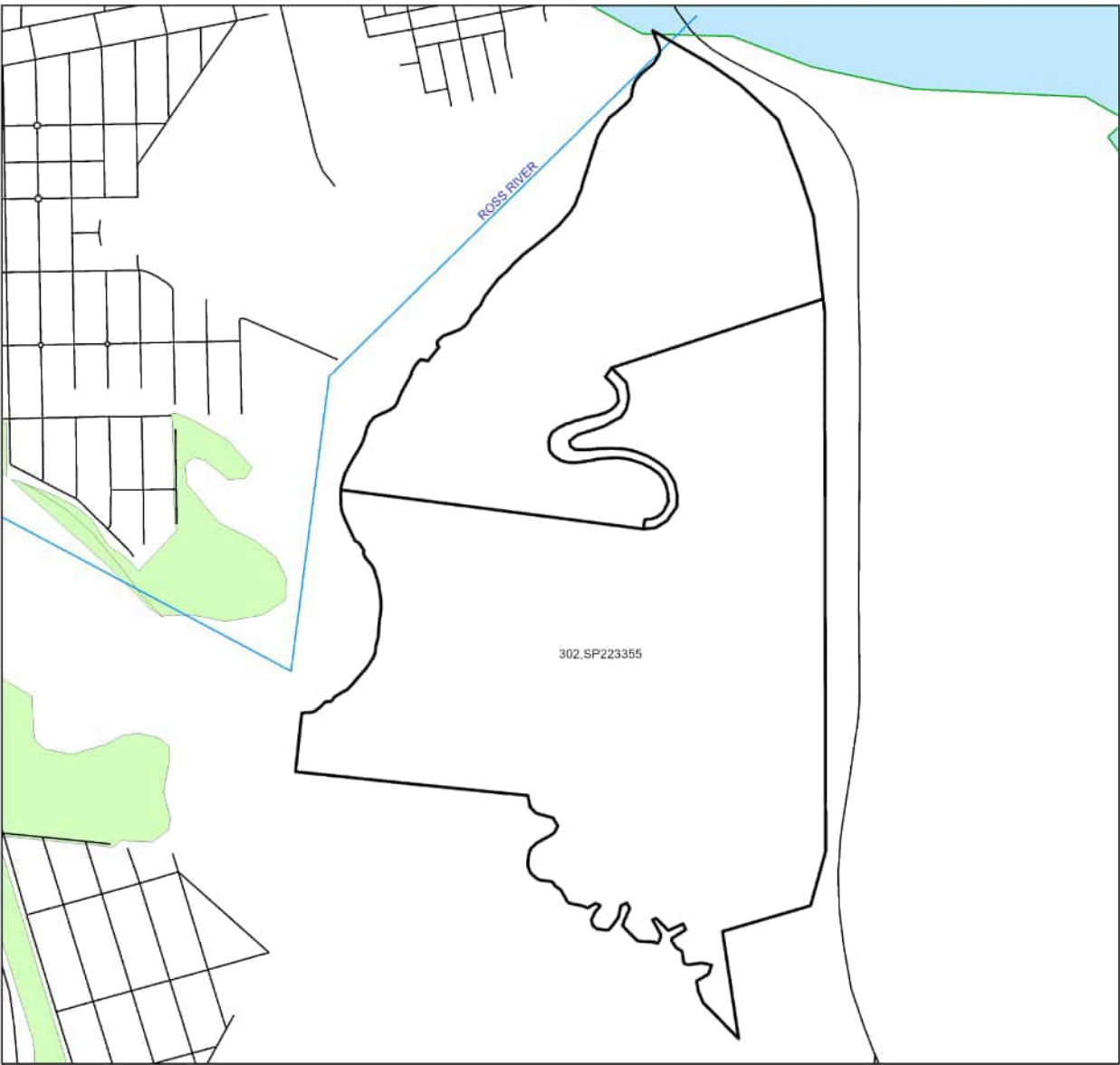
4.2 Vegetation management supporting map



4.3 Coastal/non-coastal map



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

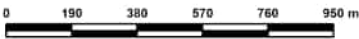


**Agricultural Land Class A or B
as per State Planning Policy: State Interest for Agriculture**

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



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5. Protected plants framework (administered by the Department of Environment, Science and Innovation (DESI))

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 threatened and near threatened plants. These are areas where threatened or near threatened 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 threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened 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, Science and Innovation, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened 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 threatened or near threatened 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 DESI

For further information on the protected plants framework:

Phone 1300 130 372 (and select option four)

Email 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.

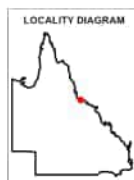
Species information

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, Science and Innovation 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, Science and Innovation webpage on the [clearing of protected plants](#) for more information.



Protected Plants Flora Survey Trigger Map

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



0 130 260 390 520 650 m

This product is displayed in:
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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 the Environment, Tourism, Science and Innovation at 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.

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6. Koala protection framework (administered by the Department of Environment, Science and Innovation (DESI))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered 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 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 DESI

For further information on the koala protection framework:

Phone 13 QGOV (13 74 68)

Email koala.assessment@des.qld.gov.au

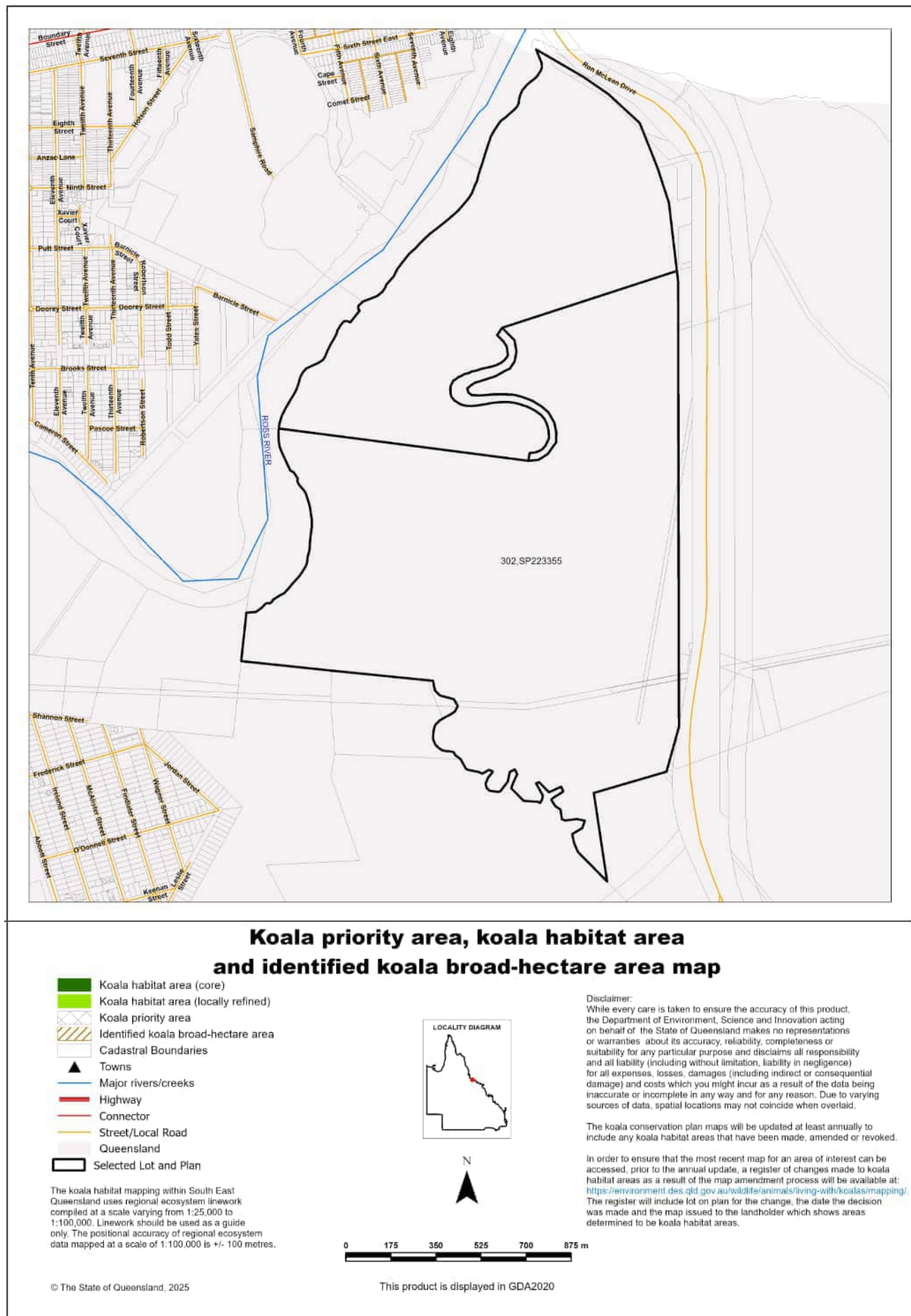
Visit <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>

7. Koala protection framework details for Lot: 302 Plan: SP223355

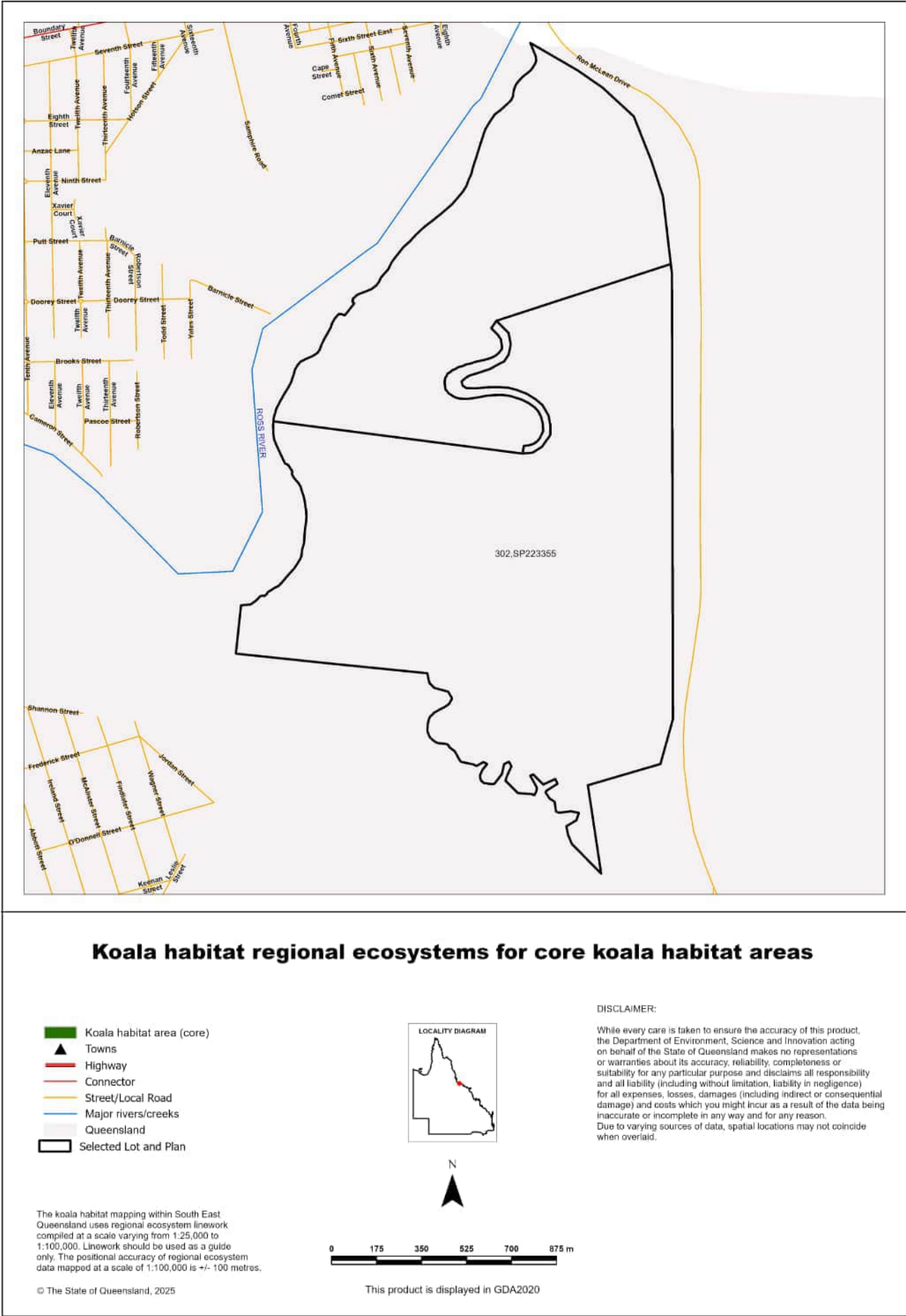
7.1 Koala districts

Koala District C

7.2 Koala priority area, koala habitat area and identified koala broad-hectare map



7.3 Koala habitat regional ecosystems for core koala habitat areas



8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
Interference with overland flow	<i>Water Act 2000</i>	Queensland Department of Regional Development, Manufacturing and Water	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au
Earthworks, significant disturbance	<i>Soil Conservation Act 1986</i>	Queensland Department of Resources	Ph: 13 QGOV (13 74 68) www.resources.qld.gov.au
Fire Permits	<i>Fire and Emergency Services Act 1990</i>	Queensland Fire Department	Ph: 13 QGOV (13 74 68) www.fire.qld.gov.au
Indigenous Cultural Heritage	<i>Aboriginal Cultural Heritage Act 2003</i> <i>Torres Strait Islander Cultural Heritage Act 2003</i>	Queensland Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts	Ph: 13 QGOV (13 74 68) www.dsdsatsip.qld.gov.au
Mining and environmentally relevant activities Infrastructure development (coastal) Heritage issues	<i>Environmental Protection Act 1994</i> <i>Coastal Protection and Management Act 1995</i> <i>Queensland Heritage Act 1992</i>	Queensland Department of Environment, Science and Innovation	Ph: 13 QGOV (13 74 68) www.desi.qld.gov.au
Protected plants and protected areas	<i>Nature Conservation Act 1992</i> <i>Planning Act 2016</i>	Queensland Department of Environment, Science and Innovation	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.desi.qld.gov.au
Koala mapping and regulations	<i>Nature Conservation Act 1992</i>	Queensland Department of Environment, Science and Innovation	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
Interference with fish passage in a watercourse, mangroves Forestry activities	<i>Fisheries Act 1994</i> <i>Forestry Act 1959</i>	Queensland Department of Agriculture and Fisheries	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
Matters of National Environmental Significance including listed threatened species and ecological communities	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Department of Climate Change, Energy, the Environment and Water (Australian Government)	Ph: 1800 803 772 www.dcceew.gov.au
Development and planning processes	<i>Planning Act 2016</i> <i>State Development and Public Works Organisation Act 1971</i>	Queensland Department of Housing, Local Government, Planning and Public Works	Ph: 13 QGOV (13 74 68) www.planning.qld.gov.au
Coordinated projects	<i>Planning Act 2016</i> <i>State Development and Public Works Organisation Act 1971</i>	Office of the Coordinator-General	Ph: 13 QGOV (13 74 68) www.statedevelopment.qld.gov.au/coordinator-general
Wet Tropics World Heritage Area	<i>Wet Tropics World Heritage Protection and Management Act 1993</i>	Queensland Wet Tropics Management Authority	Ph: (07) 4241 0500 www.wettropics.gov.au
Requirements on State controlled road	<i>Transport Infrastructure Act 1994</i>	Queensland Department of Transport and Main Roads	Ph: 13 QGOV (13 74 68) https://www.tmr.qld.gov.au
Local government requirements	<i>Local Government Act 2009</i> <i>Planning Act 2016</i>	Your relevant local government office	

Appendix C

Flora and Fauna Species List

Appendix C-1 Flora and Fauna Species List

Fauna Species List

Family	Scientific name	Common name	EPBC Act status ²	NC Act status ¹
Amphibians				
Hylidae	<i>Litoria gracilentia</i>	Graceful treefrog	-	LC
Birds				
Acanthizidae	<i>Gerygone levigaster</i>	Mangrove gerygone	-	LC
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle	-	LC
Accipitridae	<i>Milvus migrans</i>	Black kite	-	LC
Accipitridae	<i>Pandion cristatus</i>	Eastern osprey	Mi	SLC
Alaudidae	<i>Mirafrja javanica</i>	Horsfield's bushlark	-	LC
Anatidae	<i>Anas superciliosa</i>	Pacific black duck	-	LC
Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	-	LC
Anatidae	<i>Dendrocygna arcuata</i>	Wandering whistling-duck	-	LC
Ardeidae	<i>Ardea alba modesta</i> (syn. <i>A. modesta</i>)	Eastern great egret	-	LC
Ardeidae	<i>Butorides striata</i>	Striated heron	-	LC
Ardeidae	<i>Egretta garzetta</i>	Little egret	-	LC
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced heron	-	LC
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted woodswallow	-	LC
Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie	-	LC
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced cuckoo-shrike	-	LC
Campephagidae	<i>Coracina papuensis</i>	White-bellied cuckoo-shrike	-	LC
Campephagidae	<i>Lalage leucomela</i>	Varied triller	-	LC
Charadriidae	<i>Charadrius ruficapillus</i>	Red-capped plover	-	LC
Charadriidae	<i>Vanellus miles</i>	Masked lapwing	-	LC
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed cisticola	-	LC
Columbidae	<i>Columba livia</i> *	Rock dove	-	-
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered dove	-	LC
Columbidae	<i>Geopelia placida</i>	Peaceful dove	-	LC
Corvidae	<i>Corvus coronoides</i>	Australian raven	-	LC
Cuculidae	<i>Cacomantis variolosus</i>	Brush cuckoo	-	LC
Cuculidae	<i>Centropus phasianinus</i>	Pheasant coucal	-	LC
Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo	-	LC

Family	Scientific name	Common name	EPBC Act status ²	NC Act status ¹
Cuculidae	<i>Chalcites lucidus</i>	Shining bronze-cuckoo	-	LC
Cuculidae	<i>Chalcites minutillus</i>	Little bronze-cuckoo	-	LC
Dicruridae	<i>Dicrurus bracteatus</i>	Spangled drongo	-	LC
Estrildidae	<i>Lonchura castaneothorax</i>	Chestnut-breasted mannikin	-	LC
Estrildidae	<i>Lonchura punctulata</i> *	Nutmeg mannikin	-	-
Estrildidae	<i>Taeniopygia bichenovii</i>	Double-barred finch	-	LC
Gruidae	<i>Antigone rubicunda</i>	Brolga	-	LC
Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty oystercatcher	-	LC
Haematopodidae	<i>Haematopus longirostris</i>	Australian pied oystercatcher	-	LC
Halcyonidae	<i>Todiramphus sanctus</i>	Sacred kingfisher	-	LC
Hirundinidae	<i>Hirundo neoxena</i>	Welcome swallow	-	LC
Laridae	<i>Chroicocephalus novaehollandiae</i>	Silver gull	-	LC
Laridae	<i>Hydroprogne caspia</i>	Caspian tern	Mi	SLC
Laridae	<i>Thalasseus bergii</i>	Greater crested tern	Mi	SLC
Maluridae	<i>Malurus melanocephalus</i>	Red-backed fairy-wren	-	LC
Meliphagidae	<i>Gavicalis fasciogularis</i>	Mangrove honeyeater	-	LC
Meliphagidae	<i>Lichmera indistincta</i>	Brown honeyeater	-	LC
Meliphagidae	<i>Philemon buceroides</i>	Helmeted friarbird	-	LC
Meliphagidae	<i>Ramsayornis fasciatus</i>	Bar-breasted honeyeater	-	LC
Meliphagidae	<i>Stomiopera flava</i>	Yellow honeyeater	-	LC
Meropidae	<i>Merops ornatus</i>	Rainbow bee-eater	-	LC
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	-	LC
Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit	-	LC
Nectariniidae	<i>Cinnyris jugularis</i>	Olive-backed sunbird	-	LC
Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird	-	LC
Otididae	<i>Ardeotis australis</i>	Australian bustard	-	LC
Pachycephalidae	<i>Colluricincla megarrhyncha</i>	Little shrike-thrush	-	LC
Passeridae	<i>Passer domesticus</i> *	House sparrow	-	-
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican	-	LC
Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little black cormorant	-	LC
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied cormorant	-	LC
Phasianidae	<i>Synoicus ypsilophorus</i>	Brown quail	-	LC
Psittacidae	<i>Trichoglossus moluccanus</i>	Rainbow lorikeet	-	LC

Family	Scientific name	Common name	EPBC Act status ²	NC Act status ¹
Ptilonorhynchidae	<i>Chlamydera nuchalis</i>	Great bowerbird	-	LC
Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V, Mi	V
Scolopacidae	<i>Limosa lapponica baueri</i>	Western alaskan bar-tailed godwit	E, Mi	E
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern curlew	CE, Mi	CR
Scolopacidae	<i>Numenius phaeopus</i>	Whimbrel	Mi	SLC
Sturnidae	<i>Acridotheres tristis</i> *	Common myna	-	-
Threskiornithidae	<i>Platalea regia</i>	Royal spoonbill	-	LC
Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis	-	LC
Mammals				
Canidae	<i>Canis familiaris</i> *	Dog	-	-
Suidae	<i>Sus scrofa</i> *	Pig	-	-
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked echidna	-	SLC
Phalangeridae	<i>Trichosurus vulpecula</i>	Common brushtail possum	-	LC
Muridae	<i>Rattus norvegicus</i> *	Brown rat	-	-

Flora Species List

Family	Scientific Name	Common Name	EPBC Act status ¹	NC Act Status ²
Acanthaceae	<i>Avicennia marina</i>	Grey mangrove	-	LC
Aizoaceae	<i>Sesuvium portulacastrum</i>	Sea purslane	-	LC
Apocynaceae	<i>Cryptostegia grandiflora</i> *	Rubber vine	-	-
Chenopodiaceae	<i>Dissocarpus biflorus</i>	Twin flower saltbush	-	LC
Chenopodiaceae	<i>Suaeda australis</i>	Austral seablight	-	LC
Chenopodiaceae	<i>Tecticornia halocnemoides</i>	Shrubby samphire	-	LC
Chenopodiaceae	<i>Tecticornia indica</i>	-	-	LC
Chenopodiaceae	<i>Tecticornia pergranulata</i>	-	-	LC
Combretaceae	<i>Lumnitzera racemosa</i>	-	-	LC
Combretaceae	<i>Terminalia muelleri</i>	-	-	LC
Convolvulaceae	<i>Ipomoea sp.</i> *	-	-	LC
Cyperaceae	<i>Cyperus subulatus</i>	-	-	LC
Cyperaceae	<i>Eleocharis spiralis</i>	-	-	LC
Cyperaceae	<i>Fimbristylis dichotoma</i>	Common fringe-rush	-	LC
Cyperaceae	<i>Fimbristylis ferruginea</i>	-	-	LC
Cyperaceae	<i>Fimbristylis polytrichoides</i>	-	-	LC
Euphorbiaceae	<i>Excoecaria agallocha</i>	Milky mangrove	-	LC
Lamiaceae	<i>Clerodendrum floribundum</i>	-	-	LC
Leguminosae	<i>Acacia crassicarpa</i>	-	-	LC
Leguminosae	<i>Aeschynomene indica</i>	Budda pea	-	LC
Leguminosae	<i>Canavalia rosea</i>	Coastal jack bean	-	LC
Leguminosae	<i>Clitoria ternatea</i> *	Butterfly pea	-	-
Leguminosae	<i>Crotalaria medicaginea</i>	Trefoil rattlepod	-	LC
Leguminosae	<i>Crotalaria montana</i>	-	-	LC
Leguminosae	<i>Leucaena leucocephala</i> *	Leucaena	-	-
Leguminosae	<i>Neptunia gracilis</i>	-	-	LC
Leguminosae	<i>Tamarindus indica</i> *	-	-	-
Malvaceae	<i>Sida cordifolia</i> *	-	-	-
Malvaceae	<i>Sida hackettiana</i>	-	-	LC
Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash	-	LC
Myrtaceae	<i>Melaleuca viridiflora</i>	Broad-leaved paperbark	-	LC
Oleaceae	<i>Jasminum didymum</i>	-	-	LC
Pandanaceae	<i>Pandanus cookii</i>	Screw pine	-	LC

Family	Scientific Name	Common Name	EPBC Act status ¹	NC Act Status ²
Poaceae	<i>Bothriochloa pertusa</i> *	-	-	-
Poaceae	<i>Chloris gayana</i> *	Rhodes grass	-	-
Poaceae	<i>Diplachne fusca</i>	-	-	LC
Poaceae	<i>Eragrostis interrupta</i>	-	-	LC
Poaceae	<i>Eriochloa crebra</i>	Spring grass	-	LC
Poaceae	<i>Heteropogon contortus</i>	Black speargrass	-	LC
Poaceae	<i>Leersia hexandra</i>	Swamp rice grass	-	LC
Poaceae	<i>Megathyrsus maximus</i> *	-	-	-
Poaceae	<i>Melinis repens</i> *	Red natal grass	-	-
Poaceae	<i>Panicum decompositum</i>	-	-	LC
Poaceae	<i>Setaria sphacelata</i> *	-	-	-
Poaceae	<i>Sporobolus pyramidalis</i> *	-	-	-
Poaceae	<i>Sporobolus virginicus</i>	Sand couch	-	LC
Poaceae	<i>Themeda triandra</i>	Kangaroo grass	-	LC
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap tree	-	LC
Rhamnaceae	<i>Ziziphus mauritiana</i> *	Chinee apple	-	-
Rhizophoraceae	<i>Ceriops australis</i>	-	-	LC
Rhizophoraceae	<i>Rhizophora apiculata</i>	-	-	LC
Rhizophoraceae	<i>Rhizophora stylosa</i>	Spotted mangrove	-	LC

¹ E = Endangered; V = Vulnerable; Mi = Migratory² E = Endangered; V = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern.

Appendix C-2 Migratory Shorebird Counts

Status/Site		EPBC Act ¹	NC Act ²	Claypan 8/02/2023	Claypan 9/02/2023	Claypan 10/02/2023	Sandspit 10/02/2023
Species	Common name						
Migratory shorebirds							
<i>Limosa lapponica baueri</i>	Bar-tailed godwit (western alaskan)	Mi, V	V				8
<i>Numenius phaeopus</i>	Whimbrel	Mi	S	40	35	5	2
<i>Numenius madagascariensis</i>	Far eastern curlew	Mi, CE	E	19	11	10	6
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Mi	S	10			
Total migratory shorebirds				69	46	15	8
Resident shorebirds							
<i>Haematopus longirostris</i>	Australian pied oystercatcher		LC		2		2
<i>Haematopus fuliginosus</i>	Sooty oystercatcher		LC				2
<i>Vanellus miles</i>	Masked lapwing		LC		2		
<i>Charadrius ruficapillus</i>	Red-capped plover		LC	9	7	8	
Total resident shorebirds				9	11	8	4
Other waterbirds							
<i>Chenonetta jubata</i>	Australian wood duck		LC				
<i>Pelecanus conspicillatus</i>	Australian pelican		LC				
<i>Phalacrocorax sulcirostris</i>	Little black cormorant		LC				
<i>Phalacrocorax varius</i>	Pied cormorant		LC				
<i>Threskiornis molucca</i>	Australian white ibis		LC				
<i>Platalea regia</i>	Royal spoonbill		LC				
<i>Butorides striatus</i>	Striated heron		LC				

Status/Site		EPBC Act ¹	NC Act ²	Claypan 8/02/2023	Claypan 9/02/2023	Claypan 10/02/2023	Sandspit 10/02/2023
Species	Common name						
<i>Ardea modesta</i>	Eastern great egret		LC				
<i>Egretta novaehollandiae</i>	White-faced heron		LC	1			
<i>Egretta garzetta</i>	Little egret		LC	1			
<i>Chroicocephalus novaehollandiae</i>	Silver gull		LC	8			10
<i>Hydroprogne caspia</i>	Caspian tern	Mi	S				
<i>Thalasseus bergii</i>	Greater crested tern	Mi	S				
Total other waterbirds				10	0	0	10
Potential disturbance factors present	People (on foot/swimming)						
	Dogs (leashed)						
	Dogs (off leash)						
	Vehicles on intertidal						

¹ E = Endangered; V = Vulnerable; Mi = Migratory

² E = Endangered; V = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern.

Appendix D

Likelihood of Occurrence Assessment

Appendix D Likelihood of Occurrence Assessment

Table 17 Likelihood of occurrence assessment

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
Birds							
<i>Arenaria interpres</i>	Ruddy turnstone	V, Mi	V	In Australasia, the ruddy turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats. In north Australia it is known to occur in a wide variety of habitats, and may prefer wide mudflats. The ruddy turnstone mainly forages between lower supralittoral and lower littoral zones of foreshores, from strand-line to wave-zone. They often forage among banks of stranded seaweed or other tide-wrack. They are also known to forage on exposed rocky platforms, coral reefs and mudflats. The ruddy turnstone is widespread within Australia during its non-breeding period of the year, including from Tasmania in the south to Darwin in the north and many coastal areas in between. It is found in most coastal regions, with occasional records of inland populations. It strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats and sandy beaches.	Yes Species records are located along the coastline and sporadically inland of mainland Australia. The nearest species record is located within 1 km of the alignment to the north (2012).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Botaurus poiciloptilus</i>	Australasian bittern	E	E	The Australasian bittern inhabits shallow (less than 30cm deep), permanent freshwater and brackish swamps or lagoons that are densely vegetated (e.g. tall reeds, sedges, lignum). They also inhabit bore drains with tussocky vegetation and occasionally saltmarsh. They use temporary pools when population densities are high and deep swamps when breeding (Department of Climate Change, Energy, the Environment and Water, 2023c). The species is found throughout New South Wales, Victoria and Tasmania to southern Queensland and eastern South Australia, also the south-west corner of Western Australia. It also occurs in New Zealand and New Caledonia. Population contains about 2500 mature individuals.	Potential Suitable habitat types are present within the study area in the form of saltmarsh and temporary pools.	Yes Species records are predominately located along the southern coast of mainland Australia between Brisbane and Perth, with records also located north of Townsville. The nearest species record is located 30 km to the north west of the alignment (2018).	Unlikely While suitable habitat for the species is present, recent records are far away.
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V, Mi	V	In Australasia, the sharp-tailed sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. In Queensland, the sharp-tailed sandpiper is recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in the centre and south-west (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats and sedgeland.	Yes Species records are located along the coastline and inland of mainland Australia. The nearest species record is located within 1 km of the alignment to the north (2018).	Known Suitable habitat for the species is present with recent records nearby. The species was identified during field surveys in February 2023.
<i>Calidris canutus</i>	Red knot	V, Mi	V	In Australasia the red knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps. The red knot usually forage in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide. At high tide they may feed at nearby lakes, sewage ponds and floodwaters. They have also been recorded foraging on beds of eelgrass on tidal sandflats, on a thick algal mat in shallow water and in shallow pools on crest of coral reef (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are present along the entire coast of mainland Australia. The nearest species record is located within 1 km of the alignment (2020) with multiple other records located nearby.	Likely Suitable habitat for the species is present with recent records nearby.

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				The red knot is common in all the main suitable habitats around the coast of Australia and is occasionally recorded inland. In Queensland, they migrate along the coast north of 19 °S, sometimes in large numbers. It is widespread along the coast south of Townsville. This species does not breed in Australia.			
<i>Calidris ferruginea</i>	Curlew sandpiper	CE, Mi	CR	Curlew sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. In Australia, curlew sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one year old birds remain in Australia rather than migrating north. In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed in Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are present along the entire coast and inland areas of mainland Australia. The nearest species record is located within 1 km of the alignment (2014) with multiple other records located nearby.	Likely Suitable habitat for the species is present with recent records nearby.
<i>Calidris tenuirostris</i>	Great knot	V, Mi	V	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps. The great knot has been recorded around the entirety of the Australian coast, with a few scattered records inland. It is now absent from some sites along the south coast where it used to be a regular visitor. The greatest numbers are found in northern Australia; where the species is common on the coasts of the Pilbara and Kimberley, from the Dampier Archipelago to the Northern Territory border, and in the Northern Territory from Darwin and Melville Island, through Arnhem Land to the south-east Gulf of Carpentaria. Other important sites include the Broad Sound-Shoalwater Bay area, the Mackay region and Moreton Bay in Queensland (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed in Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are present along the entire coast of mainland Australia. The nearest species record is located within 1 km of the alignment (2007) with multiple other records located nearby.	Likely Suitable habitat for the species is present with recent records nearby.
<i>Charadrius leschenaultii</i>	Greater sand plover	V, Mi	V	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs. They are occasionally recorded on near-coastal saltworks and saltlakes, including marginal saltmarsh, and on brackish swamps. They seldom occur at shallow freshwater wetlands. Once, during a severe drought, the species was recorded in a poorly grassed paddock with large bare areas, more than 1 km from the nearest water (Department of Climate Change, Energy, the Environment and Water, 2023c). In Australia, the greater sand plover occurs in coastal areas in all states, though the greatest numbers occur in northern Australia, especially the north-west. In northern Australia, the species is especially widespread between North West Cape and Roebuck Bay in Western Australia, there are sparsely scattered records from the largely inaccessible area between Roebuck Bay and Darwin, but it often occurs in the Top End of the Northern Territory, including on Groote Eylandt. It is also abundant in south-eastern parts of the Gulf of Carpentaria in Queensland, and is widespread from the Torres Strait, along the eastern coast, into the Northern Rivers region of northern NSW, with occasional records south to about Shoalhaven Heads. This species does not breed in Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located around the coastline of mainland Australia. The nearest species record is located 1.1 km to the east of the alignment (2019).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Charadrius mongolus</i>	Lesser sand plover	E, Mi	E	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries,	Yes	Yes	Likely

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				and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. The species also inhabits saltworks and near-coastal saltpans, brackish swamps and sandy or silt islands in river beds (Department of Climate Change, Energy, the Environment and Water, 2023c). Within Australia, the lesser sand-plover is widespread in coastal regions, and has been recorded in all states. It mainly occurs in northern and eastern Australia, in south-eastern parts of the Gulf of Carpentaria, western Cape York Peninsula and islands in Torres Strait, and along the entire east coast, though it occasionally also occurs inland. It is most numerous in Queensland. This species does not breed in Australia.	Suitable habitat types are present within the study area in the form of mudflats.	Species records are present along the entire coast of mainland Australia. The nearest species record is located within 1 km of the alignment (2022) with multiple other records located nearby.	Suitable habitat for the species is present with recent records nearby.
<i>Chloebia gouldiae</i>	Gouldian finch	E	E	The species is found in northern Australia from Cape York Peninsula through north-west Queensland and the north of the Northern Territory to the Kimberley Region of Western Australia. When breeding they use small patches of open woodland, usually on ridges dominated by cavity bearing trees such as white northern gum (<i>Eucalyptus brevifolia</i>) in the west and Territory salmon gum (<i>E. tintinnans</i>) <i>Erythrura gouldiae</i> (Gouldian finch) in the east, with an understory of grasses such as sorghum (<i>Sarga</i> spp.), <i>Schizachyrium</i> spp. and spinifex (<i>Trodia</i> spp.), and usually within 2-4 km of perennial waterholes or springs (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area.	Yes Species records are predominately located along the coast and inland of northern Mainland Australia. The nearest record is located 15 km to the west of the alignment (2020).	Unlikely While species records are located within 20 km, however no suitable habitat is present.
<i>Cyclopsitta diophthalma macleayana</i>	Macleay's fig-parrot	-	V	The species utilises habitat from Townsville to Cooktown. In northern Queensland, gig parrots frequent rainforest, gallery forest and adjacent open forest up to about 750 m.	Unlikely Suitable habitat in the form of rainforest is not present in the study area.	No Species records are located along the coastline of mainland Australia between Cooktown and Townsville. The nearest record is located 180 km to the north of the alignment.	Unlikely Suitable habitat is not present within the study area and species records are far away.
<i>Erythrotriorchis radiatus</i>	Red goshawk	E	E	The red goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins 1993). Riverine forests are also used frequently. Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the goshawk requires for prey. The red goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water. The red goshawk is endemic to Australia. It is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia, from western Kimberley Division (north of 19°S) to northeastern NSW (north of 33°), and occasionally on continental islands (Aumann & Baker-Gabb 1991; Marchant & Higgins 1993). It has probably always occurred in central Australia, where three widely-spaced, recent confirmed sightings corroborate earlier, previously doubted records. However, no breeding has been recorded in central Australia and these records are thought to be of dispersive individuals (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	No Species records are located along the northern and eastern coastline of mainland Australia, between Sydney and Derby, Western Australia. The nearest record is located 265 km to the south of the alignment near Glenden.	Unlikely While suitable habitat is present within the study area and species records are far away.
<i>Esacus magnirostris</i>	Beach stone-curlew	-	V	The beach stone-curlew is found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, at the back of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves. In Australia, the beach stone-curlew occupies coastlines from about Point Cloates in Western Australia, across northern and north-eastern Australia south to north-eastern NSW, with occasional vagrants to south-eastern NSW and Victoria (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline of mainland Australia between Adelaide and Carnarvon, Western Australia. The nearest record is located within 1 km of the alignment (2020-2024).	Likely Suitable habitat for the species is present with recent records nearby.

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<i>Falco hypoleucos</i>	Grey falcon	V	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. It also occurs near wetlands where surface water attracts prey. The grey falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500 mm rainfall in NSW (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Woodland and watercourses are present adjacent to the study area.	No Species records are located sporadically throughout mainland Australia. The nearest record is located 195 km to the north west of the alignment near the Girringun National Park.	Unlikely While potential habitat is present, species records are located far away.
<i>Fregetta grallaria grallaria</i>	White-bellied storm petrel	V	-	The species breeds on offshore islets and rocks in the Lord Howe Island group, Australia, and on Macauley Island and Curtis Island, in the Kermadec Islands group, New Zealand. Its pelagic distribution is poorly understood, but it has been recorded north and east of its breeding islands to the tropics, in the Tasman Sea, Coral Sea, and north of New Zealand, and it is thought that some birds reach the central Pacific Ocean. It has also been recorded over near-shore waters off the coasts of mainland Australia (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area as the species utilises island habitats.	Yes Two records are present at Cape Cleveland over 20 km to the northeast of the study area.	Unlikely Suitable habitat is not present within the study area.
<i>Gallinago hardwickii</i>	Latham's snipe	V, Mi	V	In Australia, Latham's snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) (Department of Climate Change, Energy, the Environment and Water, 2023c). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Latham's snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Queensland, the range extends inland over the eastern tablelands in south-eastern Queensland.	Yes Suitable habitat types are present within the study area in the form of flooded grasslands and low dense vegetation.	Yes Species records are located along the coastline of eastern mainland Australia from Cape York to Adelaide. The nearest species record is located within 8.5 km of the alignment to the north (2021).	Potential Suitable habitat for the species is present with recent records nearby.
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern subspecies)	V	V	Squatter pigeon (southern) habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated in the overstorey by <i>Eucalyptus Corymbia</i> , <i>Acacia</i> or <i>Callitris</i> species; remnant, regrowth or partly modified vegetation communities and within 3 km of water bodies or courses. The known distribution of the squatter pigeon (southern) extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland. Overall, the subspecies' known distribution is estimated to occur within the latitudes, 17° to 30° S, and the longitudes, 141° to 153° 30' E (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat in the form of open forests are not present within the study area.	No Species records are located between Townsville and the Gold Coast. The nearest record is located 21 km to the south west of the alignment (2020).	Unlikely Suitable habitat is not present within the study area and species records are far away.
<i>Hirundapus caudacutus</i>	White-throated needletail	V, Mi	V	In Australia, the white-throated needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Due to their aerial nature, it has been stated that conventional habitat descriptions are inapplicable (Cramp 1985), but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (Department of Climate Change, Energy, the Environment and Water, 2023c). This species is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and New South Wales, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (Department of the Environment, 2015a). This species does not breed in Australia.	Yes – Flyover Only Suitable habitat is present within the study area above mudflats and mangroves.	Yes Species records are predominately located along the coast and inland of eastern Mainland Australia and Tasmania. The nearest recent records are located 6 km to the northwest of the alignment in Town Common (2022-2024).	Likely – Flyover Only Suitable habitat is present within the study area and records are present nearby.
<i>Limnodromus semipalmatus</i>	Asian dowitcher	V, Mi	V	The Asian dowitcher occurs in sheltered coastal environments, such as embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats. In Australia the Port Hedland Saltworks provides crucial habitat for the species. The species is commonly	Yes Suitable habitat types are present within the study	No Species records are located sporadically throughout coastal areas of	Unlikely While suitable habitat is present, species records

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				found in the round ponds and channels of saltworks and sewage farms. It is also found at near-coastal swamps and lakes. In Queensland they have been recorded at Cairns, Yeppoon, Lytton, Thorneside, Morton Bay and Clontarf (Department of Climate Change, Energy, the Environment and Water, 2023c).	area as it is adjacent to an estuary.	mainland Australia from Broome to Melbourne. The nearest recent record is located within 300 km of the alignment to the north-west (2015).	are located over 300 km away.
<i>Limosa lapponica baueri</i>	Western Alaskan bar-tailed godwit	E, Mi	E	The bar-tailed godwit occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Department of Climate Change, Energy, the Environment and Water, 2023c). The bar-tailed godwit has been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria, including the offshore islands. It is found south from Cooktown to Port Phillip Bay, but is less common west of the Bellarine Peninsula. The species is a non-breeding migrant to Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the eastern coast of Australia between Cape York and Brisbane and from Sydney to Melbourne. The nearest record is located 1 km to north of the alignment (2011).	Known Suitable habitat for the species is present with recent records nearby. The species was identified during surveys in February 2023.
<i>Limosa limosa</i>	Black-tailed godwit	E, Mi	E	In Australia the black-tailed godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. The use of habitat often depends on the stage of the tide. It is also found in shallow and sparsely vegetated, near-coastal, wetlands; such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains. There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms and saltworks. The black-tailed godwit is found in all states and territories of Australia, however, it prefers coastal regions and the largest populations are found on the north coast between Darwin and Weipa (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline and sporadically inland of mainland Australia. The nearest species record is located within 1 km of the alignment to the north (2014), with other recent records present in the Townsville region	Likely Suitable habitat for the species is present with recent records nearby.
<i>Macronectes giganteus</i>	Southern giant-petrel	E	E	This species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory. It breeds on six subantarctic and Antarctic islands in Australian territory; Macquarie Island, Heard Island and McDonald Island in the Southern Ocean, and Giganteus Island, Hawker Island, and Frazier Island in the Australian Antarctic Territories (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area.	Yes Species records are located around the coastline of Australia from Rockhampton to Carnarvon, Perth. Sparse records re also located around Cairns and Townsville. The nearest record is located 10 km to the north west of the alignment (2005) on Cape Pallarenda.	Unlikely No recent records are present within 20 km and suitable habitat is not present within the study area.
<i>Neochmia ruficauda ruficauda</i>	Star finch (eastern subspecies)	E	E	The star finch (eastern) occurs mainly in grasslands and grassy woodlands that are located close to bodies of fresh water. It also occurs in cleared or suburban areas such as along roadsides and in towns. The distribution of the star finch (eastern) is very poorly known. The star finch (eastern) occurs only in central Queensland. Based on the small number of accepted records, the distribution of the star finch (eastern) is believed to extend north to Bowen, west to beyond Winton and, based on recent records, south to near Wowan. It is possible that the distribution extends farther north to Mount Surprise and the Cloncurry-Mount Isa region, but records from these locations could relate to the subspecies <i>N. r. subclarescens</i> (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area.	No Species records are rare and sporadic around Queensland. The nearest record is located 154 km to the north of the alignment (1904).	Unlikely No recent records are present within 20 km and suitable habitat is not present within the study area.
<i>Numenius madagascariensis</i>	Eastern curlew	CE, Mi	CR	The species generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky	Yes Suitable habitat types are present within the study	Yes Species records are present along the entire	Known

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				islets. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed (Department of Climate Change, Energy, the Environment and Water, 2023c). Within Australia, the eastern curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. Eastern curlews are rarely recorded inland. This species does not breed in Australia.	area in the form of mudflats.	coast of mainland Australia. The nearest species record is located within 1 km of the alignment (2018) with multiple other records located nearby.	Species were identified during field surveys in February 2023.
<i>Pluvialis squatarola</i>	Grey plover	V, Mi	V	In non-breeding grounds in Australia, grey plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes. Grey plovers usually forage on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons. Grey plovers breed in tundra, often at higher elevations (up to the tree-line), and generally in dry positions, such as on low ridges or bluffs, in areas vegetated with sedges, moss, lichen and stunted trees, and interspersed with large wetlands and patches of snow and unmelted ice. In Australia, the grey plover has been recorded in all states, where it is found along the coasts, and it especially abundant on the western and southern coastlines, mainly between The Coorong and western beaches of the Eyre Peninsula in South Australia, and the coast of Western Australia between Albany and the northern Kimberley coast (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats and beaches.	Yes Species records are located along the coastline of eastern mainland Australia. The nearest species records are located within 1 km of the alignment to the north (2022).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Poephila cincta cincta</i>	Black-throated finch (southern)	E	E	The black-throated finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by <i>Eucalyptus</i>, <i>Corymbia</i> and <i>Melaleuca</i>, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. Almost all recent records of the finch from south of the tropics have been in riparian habitat. The subspecies is thought to require a mosaic of different habitats in which it can find seed during the wet season. The black-throated finch (southern) occurs at two general locations: in the Townsville region, where it is considered to be locally common at a few sites around Townsville and Charters Towers and at scattered sites in central-eastern Queensland (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat in the form of open woodlands and forest is not present within the study area. Additionally there is no permanent freshwater sources within the proposed corridor.	Yes Species records are predominately located along the eastern coast of mainland Australia between the Gold Coast and Cooktown and Adelaide, with records also located sporadically to the north west of mainland Australia. The nearest species record is located 12 km to the south of the alignment (2019).	Unlikely While recent records within 20 km, suitable habitat is not present within the study area.
<i>Rostratula australis</i>	Australian painted-snipe	E	E	Preferred habitat includes shallow inland wetlands, brackish or freshwater, that are permanently or temporarily inundated. Breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby (Department of Climate Change, Energy, the Environment and Water, 2023c). The Australian painted snipe has been recorded from wetlands in all Australian states, however is most common in eastern Australia, especially the Murray-Darling Basin. Individuals are nomadic, and there is some evidence of partial migration from south-eastern wetlands to coastal central and northern Queensland in autumn and winter.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are predominately located along the eastern coast of mainland Australia between Cairns and Adelaide, with records also located sporadically to the north west of mainland Australia. The nearest species record is located 2 km to the south of the alignment (2008).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Sternula albifrons</i>	Little tern	V, Mi	SLC	In Australia, little terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. Little terns are widespread on islands off the Northern Territory coast but	Yes Suitable habitat types are present within the study	Yes Species records are located along the coastline	Likely

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				appear to be less often on offshore continental islands or coral cays off Queensland. In the Northern Territory, little terns are commonly seen in sandy coastal habitats and in mangrove-mudflat habitats along the coast or in bays and estuaries, but not recorded on wetlands more than 1 km from the coast. The Australian breeding population can be divided into two major subpopulations: a northern subpopulation that breeds across northern Australia, from about Broome in north-western Western Australia (where first recorded only in December 1995), through coastal Northern Territory (mainly from just west of Darwin to the Queensland border) to the Gulf of Carpentaria and eastern Cape York Peninsula (with an extended breeding season covering most of the year); and an eastern subpopulation that breeds on the eastern and south-eastern coast of the mainland and northern and eastern Tasmania, occasionally extending as far west as western Victoria and south-eastern South Australia (and breeding in the austral spring-summer).	area in the form of estuaries with exposed sand banks.	of mainland Australia from Adelaide to Perth. The nearest species record is located within 6 km of the alignment to the north (2020-2023).	Suitable habitat for the species is present with recent records nearby.
<i>Tringa nebularia</i>	Common greenshank	E, Mi	E	The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms (Department of Climate Change, Energy, the Environment and Water, 2023c). In Queensland, this species is widespread in the Gulf country and eastern Gulf of Carpentaria. It has been recorded in most coastal regions, possibly with a gap between north Cape York Peninsula and Cooktown. Inland, there have been a few records south of a line from near Dalby to Mount Guide, and sparsely scattered records elsewhere. This species does not breed in Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coast and sporadically inland of mainland Australia. The nearest record is located within 1 km to the north of the alignment (2020).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Tyto novaehollandiae kimberli</i>	Masked owl (northern subspecies)	V	V	In northern Australia, the masked owl 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. The distribution of the masked owl (northern) is very poorly known, and three subpopulations have been suggested: Kimberley, Northern Territory (NT) and Cape York (Department of Climate Change, Energy, the Environment and Water, 2023c). In Queensland, there are historical records from the Normanton region, and from Pascoe, Archer, Chester and Watson Rivers on Cape York Peninsula. It occurs along the southern rim of the Gulf of Carpentaria, Cape York Peninsula and south to Atherton Tablelands and the Einasleigh-Burdekin divide. There is some confusion about where the Queensland southern limit of the subspecies is, with authorities suggesting Mackay or Coomooboolaroo Station (west of Rockhampton).	Yes Riparian habitat is present adjacent to the study area.	No Species records are located on the northern coastline of Australia from Townsville to Derby in western Australia. The nearest species record is located 20 km to the south west, however this record and all other records within the Townsville region are old (pre-2000).	Unlikely While potential habitat is present, species records are located far away.
<i>Xenus cinereus</i>	Terek sandpiper	V, Mi	V	It mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (<i>Halosarcia</i> spp.). Mangroves are preferred for roosting. In Australia, this species has a primarily coastal distribution and is more widespread and common in northern and eastern Australia than southern Australia. There are twelve sites of international significance in Australia, four of which are in Queensland including south-east Gulf of Carpentaria, Shoalwater Bay and Broad Sound, the Great Sandy Strait and Moreton Bay. This species does not breed in Australia (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline and sporadically inland of mainland Australia from Perth to Adelaide. The nearest species record is located within 1 km of the alignment to the north (2020).	Likely Suitable habitat for the species is present with recent records nearby.
Migratory birds							
<i>Acrocephalus orientalis</i>	Oriental reed-warbler	Mi	SLC	The Australian reed-warbler prefers dense vegetation alongside water, especially thick reed beds, as well as tall crops, bamboo thickets and lantana.	No Suitable habitat is not present within the study area.	No Species records are located sporadically throughout mainland Australia. The nearest	Unlikely Suitable habitat is not present within the study area and species records nearby are old.

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				The Australian reed-warbler is found throughout Australia where there is suitable habitat and is also found from New Guinea to south-eastern Africa (Department of Climate Change, Energy, the Environment and Water, 2023c).		species record is old (pre-2000), located within 5.5 km of the alignment to the west (1989).	
<i>Actitis hypoleucos</i>	Common sandpiper	Mi	SLC	The common sandpiper is known to occur in a range of wetland environments, both coastal and inland, with varying levels of salinity. Their primary habitat is rocky shorelines and narrow muddy margins of billabongs, lakes, estuaries and mangroves. The species has also been recorded on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties (Department of Climate Change, Energy, the Environment and Water, 2023c). Found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline and inland of mainland Australia. The nearest species record is located 200 m of the alignment to the east along Cleveland Bay Treatment Plant Access Road (2024).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Anous stolidus</i>	Common noddy	Mi	SLC	During the breeding season, the common noddy usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. When not at the nest, individuals will remain close to the nest, foraging in the surrounding waters. Birds may nest in bushes, saltbush, or other low vegetation. They may also nest on the ground in pigface (<i>Carpobrotus</i> spp.) or grass, on bare rock, on top of rocks protruding above vegetation, on shingle beaches, among coral rubble or in sand close to grassy areas. The species has also been recorded nesting in the forks of tall trees, at the top of coconut palms (<i>Cocos nucifera</i>*), in holes in dead timber and on tree-stumps. On Lord Howe, Kermadec and Christmas Islands, many nests are built on cliff ledges. Although the species is obviously quite flexible in regards to nesting locations, pairs appear to select nesting habitat based on a hierarchy of preference (Department of Climate Change, Energy, the Environment and Water, 2023c). In Australia, the common noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast. The species is also rarely encountered off the coast of the Northern Territory, where only one breeding location with about 100-130 birds is known. The species also occurs on Norfolk, Lord Howe, Christmas and Cocos-Keeling Islands.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline of mainland Australia from Melbourne to Perth. The nearest species record is located within 6 km of the alignment to the north west (2000). The next recent record (2023) is located 12 km to the north on Magnetic Island.	Potential Suitable habitat for the species is present with recent records nearby.
<i>Apus pacificus</i>	Fork-tailed swift	Mi	SLC	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. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. They forage aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water. They often occur in areas of updraughts, especially around cliffs. They are said to search along edges of low-pressure systems, which assist flight. Low-flying Swifts are said to be precursors of unsettled weather, possibly because insect prey fly at a lower altitude when the air is humid and when the air density is low. They sometimes feed aerially among tree-tops in open forest. They probably roost aerially, but are occasionally observed to land. They were once recorded roosting in trees, using a bare exposed branch emergent above the foliage. Sometimes they loaf in the air, by allowing strong winds to support them. There have been rare records of loafing elsewhere including Swifts briefly resting on ground and alighting on wire netting of a tennis court. Once, one was seen attempting to land on the wall of a lighthouse. There are scattered records of the Fork-tailed Swift in the Gulf Country, and a few records on Cape York Peninsula. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. They are also widespread but scattered in coastal areas from 20° S, south to Brisbane and in much of the south south-eastern region. They are more widespread west of the Great Divide, and are commonly found west of the line joining Chinchilla and Hughenden. They are found to the west between Richmond and Winton, Longreach, Gowan Range, Maraila National Park and Dirranbandi. They are rarely found further west to Windorah and Thargomindah.	Yes Suitable habitat types are present within the study area.	Yes Species records are located along the coastline of mainland Australia. The nearest species record is located within 2 km of the alignment to the north (2021).	Likely Suitable habitat for the species is present with recent records nearby.

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<i>Ardenna pacifica</i>	Wedge-tailed shearwater	Mi	V	The wedge-tailed shearwater is a pelagic, marine bird known from tropical and subtropical waters. The species tolerates a range of surface-temperatures and salinities but is most abundant where temperatures are greater than 21 °C and salinity is greater than 34.6%. In tropical zones the species may feed over cool nutrient-rich waters. The species breeds throughout its known range, mainly on vegetated islands, atolls and cays, but one colony is also known on the Australian mainland (Department of Climate Change, Energy, the Environment and Water, 2023c). The largest breeding colony is known from the Capricorn-Bunker group of islands.	No Suitable habitat is not present within the study area.	No Species records are located along the eastern and western coast of mainland Australia. The nearest recent record (post-2000) is located 80 km to the north of the alignment, near Palm Island.	Unlikely Suitable habitat is not present within the study area and species records are far away.
<i>Ardenna tenuirostris</i>	Short-tailed shearwater	Mi	SLC	The short-tailed shearwater is found in coastal waters, and is Australia's most abundant seabird. As per the species distribution map on SPRAT, on mainland Australia the short-tailed shearwater occurs at scattered coastal locations in southern Australia including Western Australia, South Australia, Victoria, Tasmania and New South Wales (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as it is adjacent to the coastline.	No Species records are located sporadically throughout the coastline of mainland Australia from Cape York to Perth. The nearest species record is old (pre-2000), with newer records located within 20 km of the alignment to the northwest at Bushland Beach (2021).	Unlikely Suitable habitat for the species is present but records are located around 35 km away.
<i>Calidris alba</i>	Sanderling	Mi	SLC	In Australia, the species is almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. Sanderlings also occur on beaches that may contain wave-washed rocky outcrops. Less often the species occurs on more sheltered sandy shorelines of estuaries, inlets and harbours. Rarely, they are recorded in near-coastal wetlands, such as lagoons, hypersaline lakes, saltponds and samphire flats. There are rare inland records from sandy shores of ephemeral brackish lakes and brackish river-pools. The sanderling occurs in coastal areas around Australia. Inland records have occurred in most states of singles or small groups, birds probably on migration. They are occasional in the Gulf of Carpentaria and Torres Strait. Scattered records occur in mid-east and south-east Queensland from Townsville and Alva Beach, south to Fraser Island, and around Moreton Bay and Point Danger, including on offshore islands (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of sandy beaches.	Yes Species records are located along the coastline of mainland Australia. The nearest species record is located within 2 km of the alignment to the west (2010).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Calidris falcinellus</i> (syn. <i>Limicola falcinellus</i>)	Broad-billed sandpiper	Mi	SLC	The broad-billed sandpiper occurs in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons, saltworks and sewage farms, and in areas with large soft intertidal mudflats, which may have shell or sandbanks nearby. Occasionally they occur on reefs or rocky platforms. They have also been recorded in creeks, swamps and lakes near the coast, particularly those with bare mudflats or sand exposed by receding water. They often favour mud among, or fringed by, mangroves, particularly on the seaward side and sometimes occur in estuaries edged by saltmarsh. They are rarely recorded inland. Foraging occurs on exposed flats of soft mud or wet sand at edges of coastal and near-coastal wetlands, often around channels on mudflats or in accumulated mud in swales between shell banks. In northern Australia, they forage in soft mud near mangroves, but may remain on same muddy section, even though fresher substrate may be exposed by the receding tide. They also forage in shallow water on muddy edges of ponds. They roost on the banks of sheltered sandy, shelly or shingly beaches. They nest on the ground, frequently in the top of a tussock (Department of Climate Change, Energy, the Environment and Water, 2023c). In Australia, the broad-billed sandpiper is most common on the north and north-west coasts and occur regularly at scattered localities in southern Australia, where they are usually seen singly. In Queensland, there are scattered coastal records, including at the south and south-east Gulf of Carpentaria. They have	Yes Suitable habitat types are present within the study area as it is adjacent to extensive muddy margins and mangroves along the banks of an estuary are present.	Yes Species records are located throughout coastal areas of mainland Australia from Perth to Adelaide. The nearest recent record is located within 12 km of the alignment to the north-west (2014).	Likely Suitable habitat for the species is present with recent records nearby.

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				been seen at Coen River, Eagle Island, Cairns, Innisfail, Townsville and Jerona. In the states north they have been seen at Mackay, Emu Park and Gladstone.			
<i>Calidris melanotos</i>	Pectoral sandpiper	Mi	SLC	In Australasia, the pectoral sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. This species is usually found in coastal or near coastal habitat but very occasionally found further inland. In Queensland, most records for the pectoral sandpiper occur around Cairns. There are scattered records elsewhere, mainly from east of the Great Divide between Townsville and Yeppoon. Records also exist in the south-east of the state as well as a few inland records at Mount Isa, Longreach and Oakley (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of estuaries.	Yes Species records are located sporadically throughout mainland Australia. The nearest species record is located within 9 km of the alignment to the north west (2017).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Calidris pugnax</i>	Ruff	Mi	SLC	In Australia the ruff is found on generally fresh, brackish or saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks. They are sometimes found on wetlands surrounded by dense vegetation including grass, sedges, saltmarsh and reeds. They have been observed on sand spits and other sandy habitats including shingles. The ruff forages on exposed mudflats, in shallow water and occasionally on dry mud. They have been observed foraging in dry waterside plants and in swampy areas next to aeration tanks in sewage farms. They prefer to roost amongst shorter vegetation. In Queensland the ruff is widely scattered at several localities. It has been recorded at Edward River, Hasties Swamp, Atherton Tableland, Townsville and Alva (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as it is adjacent to extensive muddy margins and mangroves along the banks of an estuary are present.	No Species records are located sporadically throughout coastal areas of mainland Australia from Perth to Adelaide. The nearest recent record is located within 265 km of the alignment to the north-west (2015).	Unlikely While suitable habitat is present, species records are located over 250 km away.
<i>Calidris ruficollis</i>	Red-necked stint	Mi	SLC	In Australasia, the red-necked stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation. It is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. The Red-necked Stint has been recorded in all coastal regions, and found inland in all states when conditions are suitable (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline and inland of mainland Australia. The nearest species record is located within 1 km of the alignment to the north (2017).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Charadrius bicinctus</i>	Double-banded plover	Mi	SLC	The double-banded plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. The species is sometimes associated with coastal lagoons, inland saltlakes and saltworks. It is also found on seagrass beds, especially <i>Zostera</i>, which, when exposed at low tide, remain heavily saturated or have numerous water-filled depressions. This species sometimes utilises kelp beds (Department of Climate Change, Energy, the Environment and Water, 2023c). The double-banded plover can be found in both coastal and inland areas. During the non-breeding season, it is common in eastern and southern Australia, mainly between the Tropic of Capricorn and western Eyre Peninsula, with occasional records in northern Queensland and Western Australia. The greatest numbers are found in Tasmania and Victoria, but numbers diminish to the north and west of these regions (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline of mainland Australia from Cape York to Perth. The nearest species record is located within 20 km of the alignment to the north west (2020).	Potential Suitable habitat for the species is present with recent records nearby.
<i>Charadrius dubius</i>	Little ringed plover	Mi	SLC	The species breeds on stony substrates around lakes, gravel pits, and along rivers; migrants occur in wide variety of fresh and brackish wetland habitats, but rarely out on open tidal areas.	No Suitable habitat is not present within the study area.	No Species records are sparsely located along the coastline of mainland	Unlikely Suitable habitat is not present within the study

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						Australia. The nearest species record is located within 100 km of the alignment to the south east (2020).	area and recent records are located far away.
<i>Charadrius veredus</i>	Oriental plover	Mi	SLC	Immediately after arriving in non-breeding grounds in northern Australia, Oriental plovers spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland. Thereafter they usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps, or open areas that have been recently burnt. At the onset of the Wet Season, some may move into lightly wooded grasslands. Some remain in estuarine and littoral environments, and a few are occasionally recorded around terrestrial wetlands or flooded paddocks. Vagrants in southern Australia have been recorded in saltmarsh. The Oriental plover is a non-breeding visitor to Australia, where the species occurs in both coastal and inland areas, mostly in northern Australia. Most records are along the north-western coast, between Exmouth Gulf and Derby in Western Australia, and there are records at a few scattered sites elsewhere, mainly along the northern coast, such as in the Top End, the Gulf of Carpentaria and on Cape York Peninsula. The species also often occurs further inland on the 'blacksoil' plains of northern Western Australia, the Northern Territory and north-western Queensland ('the Gulf Country'). It is seldom recorded in southern Australia. The species has also been recorded as a vagrant on Lord Howe Island and Christmas Island (Indian Ocean) (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of estuarine mudflats and sandy beaches.	Yes Species records are located sporadically throughout mainland Australia. The nearest species record is located within 11 km of the alignment to the north-west on Cape Pallarenda (2019).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Chlidonias leucopterus</i>	White-winged black tern	Mi	SLC	In Australia, and elsewhere in their non-breeding range, the species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands. White-winged black terns frequent tidal wetlands, such as harbours, bays, estuaries and lagoons, and their associated tidal sandflats and mudflats. Terrestrial wetlands, including swamps, lakes, billabongs, rivers, floodplains, reservoirs, saltworks, sewage ponds and outfalls are also inhabited. Wetlands may be open, or with floating emergent or marginal vegetation. Most breeding is on vegetated, freshwater inland wetlands. In the Northern Territory, the species is often recorded on wetlands of varying sizes and along rivers, and also commonly recorded on the coast, on islands and foraging at sea. The species is a non-breeding migrant to Australia, where it is widespread and common along south-western, northern and central-eastern coasts, with only scattered records of small numbers along the coasts elsewhere in southern Australia (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as it is adjacent to extensive bare areas, short grassland and floodplain.	Yes Species records are located throughout mainland Australia. Several older records are located around Townsville (pre-2000). The nearest recent record is located within 9 km of the alignment to the north-west (2008).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Cuculus optatus</i>	Oriental cuckoo	Mi	SLC	It mainly inhabits forests, occurring in coniferous, deciduous and mixed forest. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as well as on the ground. It is usually secretive and hard to see. The oriental cuckoo is a regular migrant to Australia, where it spends the non-breeding season (Sept-May) in coastal regions across northern and eastern Australia as well as offshore islands. They are more widespread in the Top End and coastal Queensland with the odd vagrant records south to the Pilbara (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of forests.	Yes Species records are located along the coastline and inland of north eastern mainland Australia from Broome to Sydney. The nearest species record is located within 2 km of the alignment to the west (2020).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Fregata ariel</i>	Lesser frigatebird	Mi	SLC	This species is found in tropical and subtropical seas, coasts and islands, nesting in low trees, shrubs and grasses (Department of Agriculture Water and the Environment, 2021b). It is common in tropical seas, breeding on remote islands, including Christmas Island in the Indian Ocean in recent years.	Potential Suitable habitat type for the species is typically associated with islands off the coast however marginal	Yes Species records are located along the coastline of eastern mainland Australia from Perth to	Potential Suitable habitat for the species is present with recent records nearby.

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					habitat is mapped in the study area.	Melbourne. The nearest species record is located within 1 km of the alignment to the north (2010). Records as recent as 2024 are common within 10 km of the alignment.	
<i>Fregata minor</i>	Great frigatebird	Mi	SLC	Great frigatebirds are found over open, tropical ocean waters and near offshore, oceanic nesting islands. Males and females may occupy different ranges outside of the breeding season, which may be influenced by their different wing loading characteristics and the nature of winds over different areas of the ocean. When not breeding, great frigatebirds wander widely to feed on fish and squid in areas with high concentrations of prey, such as at ocean upwellings, divergences, and convergences. Great frigatebirds breed on islands without predators. They nest in trees and shrubs, such as beach naupaka (<i>Scaevola sericea</i>), beach heliotrope (<i>Tournefortia argentea</i>), pisonia (<i>Pisonia grandis</i>), and mangroves (<i>Bruguiera</i> and <i>Rhizophora</i> species). Nests are usually above 0.5 m and may be several kilometers inland on larger islands. Great frigatebirds are superb soaring birds and do not need to come to land frequently to roost. They can soar for long period of time, including overnight (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat type for the species is typically associated with islands off the coast. The species typically utilises ocean marine habitat, which is not within the study area.	Yes Species records are located along the coastline of eastern mainland Australia from Broome to Melbourne. The nearest species record is located within 5.5 km of the alignment to the north west (2017). Records as recent as 2024 are common within 10 km of the alignment.	Potential Suitable habitat for the species is not present however recent records are located nearby.
<i>Gallinago megala</i>	Swinhoe's snipe	Mi	SLC	During the non-breeding season Swinhoe's snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens. Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes. Few definite records exist for Swinhoe's snipe in Australia. The species has been recorded in the north between the Kimberley Divide and Cape York Peninsula. In Western Australia the species has been recorded in Pilbara, the Kimberley region, Mount Goldsworthy, Mount Blaize and in the north-west regions around the Mitchell Plateau. In the Northern Territory the species is believed to be common and widespread in the Top End. Definite records exist from Darwin, Melville Island, Cannon Hill, Red Lily Lagoon and Mount Brockman. In Queensland specimens have been taken at Normanton. The species has also been sighted at Mount Isa (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats and claypan.	No Species records are located along the northern coastline of mainland Australia from Ingham to Port Hedland. The nearest species record is located within 93 km of the alignment to the north-west (2019).	Unlikely While suitable habitat is present, species records are located far away.
<i>Gallinago stenura</i>	Pin-tailed snipe	Mi	SLC	During non-breeding period the pin-tailed snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not normally in saline or inter-tidal wetlands. The species distribution within Australia is not well understood. There are confirmed records from NSW, south-west Western Australia, Pilbara and the Top End (Department of Climate Change, Energy, the Environment and Water, 2025b). The species does not breed in Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats and claypan.	No Species records are located along the northwestern and western coastline of mainland Australia from the Top End to Perth. The only record in Queensland is located within 100 km of the alignment to the north-west (older than 1990).	Unlikely While suitable habitat is present, species records are located far away and are outdated.
<i>Gelochelidon nilotica</i>	Gull-billed tern	Mi	SLC	This species inhabits freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean. The species occurs on all continents except Antarctica (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as it is adjacent to extensive mudflats and grassland.	Yes Species records are located throughout mainland Australia. The nearest recent record is located within 1 km of the alignment to the north-west (2006).	Likely Suitable habitat for the species is present with recent records nearby.

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
<i>Glareola maldivarum</i>	Oriental pratincole	Mi	SLC	Within Australia the Oriental pratincole is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in Western Australia, the Top End of the Northern Territory, and parts of the Gulf of Carpentaria. It is also widespread but scattered inland. In non-breeding grounds in Australia, the Oriental pratincole usually inhabits open plains, floodplains or short grassland (including farmland or airstrips), often with extensive bare areas (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as it is adjacent to extensive bare areas, short grassland and floodplain.	Yes Species records are located throughout mainland Australia. The nearest record is located within 9.5 km of the alignment to the west (2014).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Hirundo rustica</i>	Barn swallow	Mi	SLC	In Australia, the barn swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Birds are often sighted perched on overhead wires, and also in or over freshwater wetlands, paperbark <i>Melaleuca</i> woodland, mesophyll shrub thickets and tussock grassland. The barn swallow usually occurs in northern Australia, on Cocos-Keeling Island, Christmas Island, Ashmore Reef and patchily along the north coast of the mainland from the Pilbara region (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as paperbark <i>Melaleuca</i> woodland is present.	No Species records are located throughout mainland Australia. Several older records are located around Townsville (pre-2000). The nearest recent record is located within 95 km of the alignment to the north-west (2021).	Unlikely While suitable habitat is present, records are located approximately 95 km away.
<i>Hydroprogne caspia</i>	Caspian tern	Mi	SLC	The Caspian tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks. In offshore areas the species prefers sheltered situations, particularly near islands, and is rarely seen beyond reefs. In Queensland, Caspian tern are widespread in coastal regions from the southern Gulf of Carpentaria to the Torres Strait, and along the eastern coast (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as it is adjacent to extensive muddy margins along the banks of an estuary is present.	Yes Species records are located throughout mainland Australia. The nearest recent record is located within 1 km of the alignment to the north-west (2023).	Known Suitable habitat for the species is present with recent records nearby. The species was identified in field surveys in February 2023.
<i>Motacilla cinerea</i>	Grey wagtail	Mi	SLC	The species has a strong association with water. In their normal breeding range, grey wagtails are found across a variety of wetlands, especially watercourses, but also on the banks of lakes and marshes, as well as artificial wetlands such as sewage farms, reservoirs and fishponds. This association with water extends into non-breeding habitats with all confirmed Australian records being associated with water; especially creeks, rivers and waterfalls. The grey wagtail is a rare non-breeding visitor to northern Australia, generally arriving during the last 10 days of October and departing around March (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area as it is adjacent to a waterway.	No Species records are located sporadically throughout coastal areas of mainland Australia. The nearest recent record is located within 250 km of the alignment to the north-west (2011).	Unlikely While suitable habitat is present, species records are located over 250 km away
<i>Motacilla flava</i>	Yellow wagtail	Mi	SLC	The yellow wagtail is considered one of five 'extremely uncommon migrants' to Australia. When in Australia it is a regular wet season visitor to northern Australia. In Queensland this species has been recorded from Mossman south to Townsville. Habitat requirements for the yellow wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves. The yellow wagtail is a regular wet season visitor to northern Australia. In Queensland this species is a regular visitor from Mossman south to Townsville. The species is a vagrant further south and on Heron Island (Department of Climate Change, Energy, the Environment and Water, 2023b). The species does not breed in Australia.	Yes Suitable habitat types are present within the study area as grasslands, mudflats, tidal mudflats and mangroves are present.	Yes Species records are located sporadically throughout coastal areas of mainland Australia. The nearest recent records are located within 10 km to the northwest of the alignment (2018-2020).	Potential Suitable habitat for the species is present and recent records are located nearby.
<i>Numenius minutus</i>	Little curlew	Mi	SLC	When resting during the heat of day, the little curlew congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. The species prefers pools with bare dry mud (including mudbanks in shallow water) and they do not use pools if they are totally dry, flooded or heavily vegetated. The little curlew is most often found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline throughout mainland Australia, with sporadic	Likely Suitable habitat for the species is present with recent records nearby.

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
				inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used. Little curlews generally spend the non-breeding season in northern Australia from Port Hedland in Western Australia to the Queensland coast. There are records of the species from inland Australia, and widespread but scattered records on the east coast. The species has also been recorded on Lord Howe Island, Cocos-Keeling Island and Christmas Island. The species is recorded in Australia between September and April and there are few winter records (Department of Climate Change, Energy, the Environment and Water, 2023c).		records inland. The nearest species record is located within 3 km of the alignment to the north-west (2014).	
<i>Numenius phaeopus</i>	Whimbrel	Mi	SLC	Whimbrels are found mainly on the coast, on tidal and estuarine mudflats, especially near mangroves. They are sometimes found on beaches and rocky shores. Whimbrels are common across northern Australia and uncommon to rare further south. They breed in central Siberia to Iceland. The subspecies variegatus is the one mainly found in Australia and also the Bay of Bengal through to Melanesia, Micronesia and to New Zealand in small numbers (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline throughout mainland Australia. The nearest species record is located within 1 km of the alignment to the north (2020).	Known. Species were identified on site during field surveys (February 2023).
<i>Onychoprion anaethetus</i>	Bridled tern	Mi	SLC	Bridled terns occupy tropical and subtropical seas, breeding on islands, including vegetated coral cays, rocky continental islands and rock stacks. Bridled terns are only rarely found in inshore continental waters and along mainland coastlines, though the species is reported to breed on the mainland of far southern Western Australia (Department of Climate Change, Energy, the Environment and Water, 2023c). In Australia, bridled terns are widespread, breeding on offshore islands in western, northern and north-eastern Australia. This species does not breed on mainland Queensland.	No Suitable habitat is not present within the study area as the species utilises island habitats.	Yes Species records are located throughout coastal areas of mainland Australia. The nearest recent record is located within 3 km of the alignment to the north-west (2013).	Unlikely While there are recent records nearby, the species is unlikely to utilise the habitat.
<i>Pandion haliaetus</i> syn. <i>Pandion cristatus</i>	Osprey	Mi	SLC	Eastern ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. The breeding range of the osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia and clockwise around the Australian coast to Lake Macquarie in New South Wales; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats and estuary.	Yes Multiple recent species records are present within and immediately adjacent the study area.	Known Suitable habitat for the species is present with recent records nearby. The species was identified during surveys in February 2023.
<i>Phaethon lepturus</i>	White-tailed tropicbird	Mi	SLC	At the species level, the white-tailed tropicbird occupies marine habitats in tropical waters with sea-surface temperatures of more than 22°C. The tropicbird breeds on islands and atolls, where it nests in a variety of habitats including on bare sandy ground, in closed-canopy rainforest, on rocky cliffs and in quarries. In Australia, the white-tailed tropicbird (Indian Ocean) breeds in the Cocos-Keeling Islands (on North Keeling Island and, formerly, on West Island [Pulu Panjang] in the main atoll, where breeding was last recorded in 1941), and at Ashmore Reef (on West, Middle and East Islands) and Rowley Shoals off the northern coast of Western Australia. Over the past few years, birds have been sighted with increased frequency on West Island and Home Island (also in the main atoll) in the Cocos-Keeling Islands. However, there have been no recent breeding records. The white-tailed tropicbird (Indian Ocean) ranges widely over the oceans surrounding its breeding locations (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed on mainland Australia	Yes Suitable habitat types are present within the study area in the form of bare sandy ground.	No Species records are located along the coastline and inland of eastern mainland Australia from Cape York to Melbourne. The nearest species record is located within 290 km of the alignment to the north (2016).	Unlikely While habitat is present within the study area, species records are located far away.

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
<i>Plegadis falcinellus</i>	Glossy ibis	Mi	SLC	The glossy ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons. Within Australia, the glossy ibis is generally located east of the Kimberley in Western Australia and Eyre Peninsula in South Australia. The species moves in response to good rainfalls, expanding its range, however the core breeding areas used are within the Murray-Darling Basin region of NSW and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. The glossy ibis often moves north in autumn, then return south to the main breeding areas in spring and summer (Department of Climate Change, Energy, the Environment and Water, 2023c).	Potential Suitable habitat types occasionally used by the species are present within the study area as it is adjacent to the estuaries and flood plains.	Yes Species records are located throughout mainland Australia. The nearest record is located within 1 km of the alignment to the north (2014).	Potential Suitable habitat occasionally used by the species is present with recent records nearby.
<i>Pluvialis fulva</i>	Pacific golden plover	Mi	SLC	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific golden plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as Sarcocornia, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. In addition, Pacific golden plovers occasionally forage among vegetation, such as saltmarsh, mangroves or in pasture or crops (Department of Climate Change, Energy, the Environment and Water, 2023c). Within Australia, the Pacific golden plover is widespread in coastal regions, though there are also a number of inland records (in all states), sometimes far inland and usually along major river systems, especially the Murray and Darling Rivers and their tributaries. Most Pacific golden plovers occur along the east coast, and are especially widespread along the Queensland and NSW coastlines.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coast and sporadically inland of mainland Australia. The nearest record is located within 1 km to the north of the alignment (2024).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Spatula querquedula</i>	Garganey	Mi	SLC	Occurs in wetlands with reedy and other fringing vegetation. Migrants can be found over open water or tidal mudflats. Breeds widely across Eurasia; winters in Africa and southern Asia. Migrants can be on more open water, even tidal mudflats. This species does not breed in Australia (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat types are present within the study area in the form of mudflats.	No Species records are located sporadically throughout mainland Australia. The nearest species record is old (pre-2000), located within 8.5 km of the alignment to the west (1992).	Unlikely Suitable habitat for the species is present with recent records nearby but these are old.
<i>Stercorarius parasiticus</i>	Arctic jaeger	Mi	SLC	After leaving the Arctic, parasitic jaegers migrate to the Southern Hemisphere. They arrive in October and November and leave again in February or March. Parasitic jaegers spend their time in the southern oceans and are common in eastern Australia. During migration, they can sometimes be blown off course and found in places they don't normally occur, such as Borneo (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area as the species utilises island habitats and is rarely seen in tidal creeks.	No Species records are located sporadically throughout coastal areas of mainland Australia. The nearest recent record is located within 300 km of the alignment to the north-west (2013).	Unlikely Suitable habitat is not present, species records are located over 300 km away
<i>Sterna dougallii</i>	Roseate tern	Mi	SLC	The roseate tern occurs in coastal and marine areas in subtropical and tropical seas. The species inhabits rocky and sandy beaches, coral reefs, sand cays and offshore islands. Birds rarely occur in inshore waters or near the mainland, usually venturing into these areas only accidentally, when nesting islands are nearby. In Queensland, scattered records occur in the south-east Gulf of Carpentaria and west Cape York Peninsula, but birds are possibly more widespread, with large numbers nesting on south-east Bountiful Island. Birds are widespread along the east coast of Australia, south to about Hervey Bay (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area as the species utilises island habitats.	Yes Species records are located throughout coastal areas of mainland Australia from Perth to Sydney. The nearest recent record is located within 10 km of the alignment to the north-west in Town Common (2016).	Unlikely Suitable habitat is not present within the study area.

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
<i>Sterna hirundo</i>	Common tern	Mi	SLC	Common terns are marine, pelagic and coastal. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores. Occasionally they are recorded in coastal and near-coastal wetlands, either saline or freshwater, including lagoons, rivers, lakes, swamps and saltworks. Sometimes they occur in mangroves or saltmarsh and, in bad weather, in coastal sand-dunes or coastal embayments. The species is a non-breeding migrant to Australia, where it is widespread and common on the eastern coast south to eastern Victoria, and common on parts of the northern coast, mainly east of Darwin. The subspecies occurring in Australia is predominantly <i>Sterna hirundo longipennis</i> (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed in Australia.	Yes Suitable habitat types are present within the study area as it is adjacent to extensive muddy margins and mangroves along the banks of an estuary are present.	Yes Species records are located throughout coastal areas of mainland Australia from Perth to Adelaide. The nearest recent record is located within 1 km of the alignment to the north-west (2017).	Likely Suitable habitat for the species is present with recent records nearby.
<i>Sterna sumatrana</i>	Black-naped tern	Mi	SLC	In northern and north-eastern Australia, black-naped terns breed and roost on islands, which are very occasionally close to or attached to the mainland at low tides, and forage in seas surrounding colonies. Black-naped terns are mainly associated with small, offshore sand and coral cays, coral reefs and lagoons, and sandy and rocky islands and islets, and in the surrounding seas. The species is only occasionally recorded in inshore waters away from their breeding colonies or coastal mainland Australia, such as harbours or bays, with their occurrence inshore probably being influenced by climatic conditions. In Australia, black-naped terns are found mainly in the central north and north-east of the country, in central and eastern Northern Territory, the Gulf of Carpentaria and Torres Strait and through the islands and waters of the Great Barrier Reef and Coral Sea. The species is rarely found in inshore waters except when breeding (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed on mainland Australia.	No Suitable habitat is not present within the study area as the species utilises island habitats.	Yes Species records are located throughout coastal areas of mainland Australia from Broome to the Gold Coast. The nearest recent record is located within 9 km of the alignment to the north-west (2000).	Unlikely Suitable habitat is not present within the study area with recent records nearby..
<i>Sula dactylatra</i>	Masked booby	Mi	SLC	Nesting on islands; the species is very rarely seen from the mainland. Often found with feeding groups of other seabirds such as terns, other boobies, and shearwaters (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area as the species utilises island habitats.	No Species records are located sporadically throughout the coastline of mainland Australia from Cape York to Canberra. The nearest species record is old (pre-2000), with newer records located within 25 km of the alignment to the northwest (2017).	Unlikely Suitable habitat is not present within the study area and records are located far way.
<i>Sula leucogaster</i>	Brown booby	Mi	SLC	The brown booby uses both marine and terrestrial habitat. The species occurs in, but is not restricted to, tropical waters of all major oceans, often staying close to breeding islands. The species is known to approach mainland coastlines more than other boobies and has been recorded in coastal waters, harbours and estuaries and near offshore islands but seldom flying over land. Off north-west Western Australia, Brown Boobies are most abundant 18–36 km from land, but also occur inside and outside these limits. The species is often concentrated where wavelets are about 2 m high, the Brown Booby flies low, seldom higher than 30 m above the sea surface. In Australia, the brown booby is found from Bedout Island in Western Australia, around the coast of the Northern Territory to the Bunker Group of islands in Queensland with occasional reports further south in New South Wales (NSW) and Victoria (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed on mainland Queensland.	Yes Suitable habitat types are present adjacent to the Study area as it is near to the coastline.	Yes Species records are located throughout the coastline of mainland Australia from Karratha to Melbourne. The nearest record is located within 1 km of the alignment to the north (2018). Recent records are common within 5 km of the alignment.	Potential Suitable habitat for the species is present with recent records nearby.
<i>Sula sula</i>	Red-footed booby	Mi	SLC	Nesting on islands; the species is very rarely seen from the mainland. Often found with feeding groups of other seabirds such as terns, other boobies, and shearwaters (eBird Australia, 2021).	No	Yes	Unlikely

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
					Suitable habitat is not present within the study area as the species utilises island habitats.	Species records are located throughout the coastline of mainland Australia from Cape York to Sydney. The nearest record is located within 9 km of the alignment to the north (2018).	Suitable habitat is not present within the study area with recent records nearby..
<i>Thalasseus bergii</i>	Crested tern	Mi	SLC	The nests are located on low-lying sandy, rocky, or coral islands, sometimes amongst stunted shrubs, often without any shelter at all. When not breeding, the greater crested tern will roost or rest on open shores, less often on boats, pilings, harbour buildings and raised salt mounds in lagoons. It is rarely seen on tidal creeks or inland waters (Department of Climate Change, Energy, the Environment and Water, 2023c). The greater crested tern occurs in tropical and warm temperate coastal parts of the Old World from South Africa around the Indian Ocean to the Pacific and Australia.	No Marginal habitat is present within the study area as the species utilises island habitats and is rarely seen in tidal creeks.	Yes Species records are located throughout coastal areas of mainland Australia. Multiple recent records occur within 1 km of the alignment to the north-east and north-west (2021-2023). The nearest is located within Ross River 100 m to the west of the Southern Port Road.	Known. Marginal habitat for the species is present with recent records nearby. The species was identified during field surveys in February 2023.
<i>Tringa brevipes</i>	Grey-tailed tattler	Mi	SLC	The grey-tailed tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. The grey-tailed tattler usually forages in shallow water, on hard intertidal substrates, such as reefs and rock platforms, in rock pools and among rocks and coral rubble, over which water may surge. The grey-tailed tattler usually roosts in the branches of mangroves or, rarely, in dense stands of other shrubs, or on snags or driftwood. Where mangroves are not present, it roosts on rocks that are sometimes partly submerged. It is also known to roost on beaches and reefs; however, it is rarely reported roosting on bare sandy beaches or sandbanks. The grey-tailed tattler is found along the entire coast, with small numbers located in the Gulf of Carpentaria. It is widespread along the east coast and the Torres Strait. There is a continuous population along the entire east coast of Cape York Peninsula. Inland records include Burdekin Weir, Charters Towers and Mount Isa; however these are rare, with the species preferring coastal locations. This species does not breed in Australia (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Suitable habitat is not present within the study area.	Yes Species records are located throughout mainland Australia. The nearest species record is located within 1 km of the alignment to the north (2017).	Potential Suitable habitat for the species is not present however recent records are located nearby.
<i>Tringa glareola</i>	Wood sandpiper	Mi	SLC	The wood sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains (Department of Climate Change, Energy, the Environment and Water, 2023c). In Queensland, there are sparsely scattered records, generally south of 17° S, but also around Cairns. This species does not breed in Australia.	Yes Suitable habitat types are present within the study area in the form of grasslands and short herbage.	Yes Species records are located throughout Australia. The nearest recent record is located within 10 km of the alignment to the north east uin Town Common (2020)	Potential Suitable habitat for the species is present with recent records nearby.
<i>Tringa incana</i>	Wandering tattler	Mi	SLC	The wandering tattler is generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. It is occasionally seen on coral reefs or beaches, and tends to avoid mudflats. Foraging habitat is among rocks or shingle, or in shallow pools at edges of reefs or beaches, mainly along the tideline. Wandering tattlers have been recorded roosting or perching on top of boulders surrounded by or close to water. The wandering tattler is a vagrant in the East Asian-Australasian Flyway and is uncommon in Australia, although it may sometimes be overlooked. There are a few records from around Darwin and as a passage	Potential Marginal habitat types are present within the study area in the form of beaches.	Yes Species records are located along the coastline and inland of eastern mainland Australia from Cape York to Sydney. The nearest species record is located within 1 km of the	Potential Marginal habitat is present within the study area with species located nearby.

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
				migrant in Torres Strait, and along the east coast, often on offshore or nearshore islands and reefs, south as far as Moruya. The wandering tattler is also recorded on Lord Howe and Norfolk Islands. The distribution and status of this species in Asia and Australia is poorly known, partly because of confusion with the grey-tailed tattler (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed in Australia.		alignment to the north (2013).	
<i>Tringa stagnatilis</i>	Marsh sandpiper	Mi	SLC	The marsh sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. In north Australia they prefer intertidal mudflats, although surveys in Kakadu National Park recorded more birds around shallow freshwater lakes than in areas influenced by tide. The marsh sandpiper usually forages in shallow water at the edge of wetlands. The marsh sandpiper has been recorded roosting or loafing on tidal mudflats, near low saltmarsh, and around inland swamps. The marsh sandpiper is found on coastal and inland wetlands throughout Australia. The species is widespread in coastal Queensland, but few records exist north of Cooktown. It is recorded in all regions of NSW but especially the central and south coasts and (inland) on the western slopes of Great Divide and western plains (Department of Climate Change, Energy, the Environment and Water, 2023c). This species does not breed in Australia.	Yes Suitable habitat types are present within the study area in the form of mudflats.	Yes Species records are located along the coastline of mainland Australia between Wyndham and Adelaide. The nearest record is located 1 km to the north of the alignment (2011).	Likely Suitable habitat for the species is present with recent records nearby.
Mammals							
<i>Dasyurus hallucatus</i>	Northern quoll	E	LC	The northern quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern quoll are also known to occupy non rocky lowland habitats such as beachscrub communities in central Queensland. Northern quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. In Queensland, the northern quoll is known to occur as far south as Gracemere and Mount Morgan, south of Rockhampton, as far north as Weipa in Queensland and extends as far west into central Queensland to the vicinity of Carnarvon Range National Park (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Some habitat features are present within the study area, however the location is not close to boulders or high relief areas used for denning.	Yes Species records are located sporadically throughout coastal and inland areas of mainland Australia from Brisbane to Port Hedland. The nearest recent record is located within 11 km of the alignment to the south-east off Bruce Highway near Alligator Creek (2024).	Unlikely While species records are located within 11 km, the study area does not support denning or refuge habitat. Furthermore, the study area is isolated in the landscape by features such as the Port Access Road and Bruce Highway.
<i>Hipposideros semoni</i>	Semon's leaf-nosed bat	V	E	Semon's leaf-nosed bat occurs mainly in north-eastern Australia (along eastern Cape York Peninsula to Townsville), with the majority of records around Iron Range, Kulla, Oyala Thumotang and Cape Melville National Parks, and near Cooktown. It is found in tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland (Department of Climate Change, Energy, the Environment and Water, 2023c). It is known to roost in houses, abandoned buildings, caves and trees.	No Breeding habitat is unlikely to be present within the study area as it is a flat plain.	No Species records are located sporadically throughout coastal areas of Far North Queensland from Cooktown to Cape York. The nearest recent record is located within 430 km of the alignment near Cairns (2014).	Unlikely The Project is unlikely to support breeding habitat for the species and recent records are located far away.
<i>Macroderma gigas</i>	Ghost bat	V	E	Regional populations of ghost bat are centred on permanent maternity roosts that are genetically isolated from each other. Roost sites are deep natural caves or disused mines with a specific microclimate, which is a relatively stable temperature (23°C to 28°C) with moderate to high (50-90 %) relative humidity, and the ceiling at least 2 m above the floor. Individuals aggregate in these maternity roosts during spring and summer (Department of Climate Change, Energy, the Environment and Water, 2023c). Ghost bat is endemic to Australia. In Queensland this species is currently distributed in only 4-5 highly disjunct populations along the coast and inland from the McIlwraith Range in Cape York to Rockhampton. The major colony of <i>M. gigas</i> occurs at Mount Etna. <i>Macroderma gigas</i> also occurs in the northern Pilbara and Kimberley in Western Australia, and the top end of the Northern Territory.	No Breeding habitat is unlikely to be present within the study area as it is a flat plain.	No Species records are located sporadically throughout coastal and inland areas of mainland Australia. The nearest recent record is located within 40 km of the alignment to the west (2016).	Unlikely The Project is unlikely to support breeding habitat for the species and recent records are located far away.

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<i>Ornithorhynchus anatinus</i>	Platypus	-	SLC	Platypus make their home in and near freshwater creeks, slow-moving rivers, lakes joined by rivers, and built water storages such as farm dams. They build a simple burrow in a river bank, just above water level and often among a tangle of tree roots. Platypus are found in eastern Australia from the steamy tropics of far north Queensland to the freezing snows of Tasmania. In Queensland, platypus live in rivers east of the Great Dividing Range, and are also found in some western-flowing streams. In north Queensland, the range of the platypus is close to the coast. The animals aren't found in Cape York Peninsula (Department of Environment and Science, 2021).	No Freshwater habitats are not present within the study area as it is tidally inundated.	No Species records are located throughout coastal and inland areas of mainland Australia from Cooktown to Adelaide. The nearest recent record is located within 57 km of the alignment to the north west (2022).	Unlikely Freshwater habitat is not present within the study area.
<i>Petauroides minor</i>	Northern greater glider	V	V	The greater glider (northern) is found in highest abundance in open woodland to open forests with relatively old trees and abundant hollows. The main tree species for the Greater Glider (northern) for feeding are white mahogany, narrow -leaved ironbark, forest fed gum, pink bloodwood, grey box, lemon-scented gum, and for denning are white mahogany, lemon-scented gum and forest red gum. The greater glider (northern) occurs in the wet-dry tropical region of north eastern Australia, with a distribution from slightly south of Townsville northwards to the Windsor Tableland. This distribution is very patchy, with some isolated subpopulations, for example in the Gregory Range/Gilbert Plateau west of Townsville, and Blackbraes National Park (Department of Climate Change, Energy, the Environment and Water, 2023c).	No While Corymbia species are located within the study area, these did not have the adequate amount of hollows or size required to house a population.	No Species records are located sporadically throughout coastal and inland areas of Far North Queensland from north of Townsville to the Daintree. The nearest recent record is located within 65 km of the alignment to the north-west (2016).	Unlikely Species records are not located nearby. Furthermore, the patch of vegetation that would not support this species is isolated within the landscape.
<i>Petauroides volans</i>	Greater glider (southern and central)	E	E	During the day, this species spends most of its time denning in hollowed trees, with each animal inhabiting up to twenty different dens within its home range. It is primarily folivorous, with a diet mostly comprising the leaves and flowers of Myrtaceae (e.g. eucalypt) trees. The greater glider is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria, with an elevational range from sea level to 1200 m above sea level. An isolated inland subpopulation occurs in the Gregory Range west of Townsville, and another in the Einasleigh (Department of Climate Change, Energy, the Environment and Water, 2023c).	No While Corymbia species are located within the study area, these did not have the adequate amount of hollows or size required to house a population.	No Species records are located sporadically throughout coastal and inland areas of mainland Australia from Cairns to Melbourne. The nearest recent record is located within 40 km of the alignment to the north-west (2000).	Unlikely Species records are not located nearby. Furthermore, the patch of vegetation that would not support this species is isolated within the landscape.
<i>Petrogale sharmani</i>	Sharman's rock wallaby	V	V	The species occurs in a variety of rocky habitats (including rocky outcrops, boulder piles, gorges, cliff lines and rocky slopes) within open forests or grassy woodlands. It shelters during the day in rocky refuges or dense vegetation, emerging at dusk to feed. The range of Sharman's rock-wallaby is limited. It is known from only about 20 colonies scattered within a 2000 km² area of the Seaview and Coane Ranges, west of Ingham in north-eastern Queensland. Around 80 percent of known colonies are located in the Australian Wildlife Conservancy's Mount Zero – Taravale wildlife sanctuary (Department of Climate Change, Energy, the Environment and Water, 2025b).	No Suitable habitat does not occur within the study area as there is no rocky habitat.	No Species records are concentrated in a small area of northeast Australia inland of Ingham. The nearest recent record is located 75 km to the west near Taravale (2014).	Unlikely Species records are not nearby and there is no suitable habitat.
<i>Phascolarctos cinereus</i>	Koala	E	E	Koalas inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities. Koalas eat a variety of eucalypt leaves and a few other related tree species, including <i>Lophostemon</i>, <i>Melaleuca</i> and <i>Corymbia</i> species. Koalas are found in higher densities where food trees are growing on more fertile soils and along watercourses. They do, however, remain in areas where their habitat has been partially cleared and in urban areas. In Queensland, the koala's distribution extends inland from the east coast: from the Wet Tropics bioregion, into the Einasleigh Uplands bioregion in the north of the state; from the Central Mackay Coast bioregion, through the Brigalow Belt North bioregion to the Desert Uplands and Mitchell Grass Downs bioregions, and from the Southeast Queensland bioregion, through the Brigalow Belt to the Mulga Lands and Channel Country bioregions in the southwest of the state (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Suitable habitat is present for the species in the form of Melaleuca and Corymbia species.	No Species records are located throughout coastal and inland areas of mainland Australia from Cairns to Adelaide. The nearest recent record is located within 12 km of the alignment to the north of the alignment associated with Magnetic Island where Koalas have been reintroduced (2023).	Unlikely While species records are located nearby, these are associated with the introduced population of koalas at Magnetic Island. Furthermore, the patch of vegetation that would support this species is isolated within the landscape.

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<i>Pteropus conspicillatus</i>	Spectacled flying-fox	E	E	The Spectacled Flying-fox roosts within 6.5 km of rainforest, although a roost 16 km from rainforest has also been observed. The species was long assumed to feed primarily on rainforest species but individuals regularly feed on a wide variety of non-rainforest species, including eucalypts (<i>Eucalyptus</i> spp., <i>Corymbia</i> spp.) in tall open forests adjoining rainforest communities and in tropical woodland and savanna ecosystems. The Mabi Forest (Complex Notophyll Vine Forest 5b) is considered a key habitat for the Spectacled Flying-fox. The Spectacled Flying-fox occurs in north-eastern Queensland, north of Cardwell with past records from Brisbane and Chillagoe. It is restricted to tropical rainforest areas, most specifically, the species occurs between Ingham and Cooktown, and between the McIlwraith and Iron Ranges of Cape York. The species also occurs on Torres Strait islands. The largest population in Australia is known from the Wet Tropics of Queensland World Heritage Area between Townsville and Cooktown (Department of Climate Change Energy the Environment and Water, 2023b).	Suitable habitat types (rainforest, forest, tropical woodland) do not occur within the study area.	Species records are restricted to the east coasts of Queensland in Cape York, the Wet Tropics. Records do not occur within 40 km of the Project area.	Unlikely Suitable habitat is not present in the Project area and recent records are located more than 40 km from the Project area.
<i>Rhinolophus robertsi</i>	Greater large-eared horseshoe bat	V	V	The greater large-eared horseshoe bat is found in lowland rainforest, along gallery forest-lined creeks within open eucalypt forest, <i>Melaleuca</i> forest with rainforest understorey, open savannah woodland and tall riparian woodland of <i>Melaleuca</i>, forest red gum (<i>E. tereticornis</i>) and Moreton bay ash (<i>E. tessellaris</i>) The greater large-eared horseshoe bat occurs only in northern Queensland, from the Iron Range southwards to Townsville and west to the karst regions of Chillagoe and Mitchell-Palmer. The southern limit of its range has not been clarified, and it might be present south of Townsville at Mt Elliott and Cape Cleveland (Department of Climate Change, Energy, the Environment and Water, 2025b).	Possible Melaleuca and Corymbia species are present in the study area which may have suitable structure for this species.	No Species records are located along the northeastern coast of Australia, north of Tully in Queensland. The nearest recent record is located 240 km to the northwest of the alignment (2019).	Unlikely While suitable habitat may occur within the study area, species records are located far away.
<i>Saccolaimus saccolaimus nudicluniatus</i>	Bare-rumped sheathtail bat	V	E	The bare-rumped sheathtail bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments. The type locality for the bare-rumped sheathtail bat is Babinda Creek near Cardwell, North Queensland, with syntypes collected from Gowrie Creek near Cardwell. Occasional individuals have been collected from a narrow coastal region (less than 40 km inland) between Ayr and Cooktown, North Queensland, with one isolated specimen from north of Coen on Cape York Peninsula (20 specimens held in the Queensland Museum). Other observations include a road-killed individual on Magnetic Island off Townsville; a sighting of up to 15 individuals flushed from a roost tree in the Iron Range area, Cape York, Queensland; and likely acoustic detection in an area to the west of Townsville (Department of Climate Change, Energy, the Environment and Water, 2023c).	Possible The species may utilise the lowland woodland forest within the study area for foraging.	No Species records are located sporadically throughout coastal areas of Far North Queensland from Townsville to Cape York. The nearest recent record is located within 30 km of the alignment near Magnetic Island (2000).	Potential – marginal foraging The Project is unlikely to support breeding habitat for the species based of the quality of woodland habitat, however it may support foraging habitat.
<i>Tachyglossus aculeatus</i>	Short-beaked echidna	-	SLC	The short-beaked echidna lives in forests and woodlands, heath, grasslands and arid environments. This species can live anywhere with a good supply of food, and regularly feast on ants and termites. The short-beaked echidna is found throughout Australia, including Tasmania (WetlandInfo, 2018).	Known The species was identified during field surveys (February 2023). The species is considered likely to utilise all habitat within the study area.	Known Species records are located throughout mainland Australia. The species was identified on site during field surveys (2023).	Known The species was identified during field surveys (February 2023)
<i>Xeromys myoides</i>	Water mouse	V	V	The water mouse has been recorded in coastal saltmarsh, mangrove and adjacent freshwater wetland habitats in the Northern Territory, Queensland and New Guinea. Until recently In Queensland, the species was known from the Proserpine area south to near the Queensland/ New South Wales border. However, in 2017, a population was identified in Cairns. Habitat for this species includes mangroves and the associated saltmarsh, sedgeland, claypans, heathlands and freshwater wetlands, and in central Queensland, they have only been captured in the high inter-tidal zone in tall, closed fringing mangrove forest containing only <i>Ceriops tagal</i> and/or <i>Bruguiera</i> species and in saline grassland adjacent to closed forest of <i>Ceriops tagal</i> and/or <i>Bruguiera</i> species and <i>Avicennia marina</i> (Department of Climate Change, Energy, the Environment and Water, 2023c).	Possible Mangrove habitat is present within the study area, however the species was not identified using trapping surveys of the area.	No Species records are located sporadically throughout coastal and inland areas of north eastern mainland Australia from the Gold Coast to Darwin. The nearest recent record is located within 290 km of the alignment near Cairns (2017).	Potential While suitable habitat is present, the species has not been identified by targeted ecology surveys which have occurred within the area since 2004 (BAAM, 2004).
Reptiles							

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<i>Acanthophis antarcticus</i>	Common death adder	-	V	This species is found in a wide variety of well-drained habitats, including rainforests and wet sclerophyll forests, woodland, shrublands, grasslands and coastal heathlands, preferring sites with deep fixed leaf litter. The importance of these habitats to this species is not known (Department of Climate Change, Energy, the Environment and Water, 2023c). This species occurs from central Queensland through New South Wales to the southern parts of South Australia and Western Australia.	No The study area is unlikely to support the species as it does not contain well drained areas.	No Species records are located throughout coastal and mainland Australia. The nearest recent record is located within 15 km of the alignment to the north at Magnetic Island (2023).	Unlikely The habitat within the study area is unlikely to support the species and records are restricted to Magnetic Island.
<i>Crocodylus porosus</i>	Estuarine crocodile	Mi	V	Estuarine crocodiles mostly occur in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast. Preferred nesting habitat includes elevated, isolated freshwater swamps that do not experience the influence of tidal movements. Floating rafts of vegetation also provide important nesting habitat. In Queensland the saltwater crocodile inhabits reef, coastal and inland waterways from Gladstone on the east coast, throughout the Cape York Peninsula and west to the Queensland - Northern Territory border (Department of Climate Change, Energy, the Environment and Water, 2023c).	Yes Estuarine habitat is present within the study area.	Yes Species records are located sporadically throughout Northern Australia. The nearest recent record is located within 1.5 km of the alignment to the west (2024).	Likely The habitat is likely to support the species and records are nearby.
<i>Egernia rugosa</i>	Yakka skink	V	V	Habitat requirements are poorly known; however, this species is known from rocky outcrops, sand plain areas and dense ground vegetation, in association with open dry sclerophyll forest (ironbark) or woodland, brigalow forest and open shrubland. In the Brigalow Belt bioregion, core habitat includes: poplar box (<i>Eucalyptus populnea</i>) woodland, mulga (<i>Acacia aneura</i>) woodland, white cypress pine (<i>Callitris glaucophylla</i>); usually in association with eucalypt species such as <i>E. populnea</i>, <i>E. melanophloia</i> or <i>Corymbia tessellaris</i>, ironbark (typically <i>E. melanophloia</i>) woodland, and disturbed, treated and cleared areas of suitable habitat, grazed or ungrazed, where suitable microhabitat features still remain. Colonies have been found in large hollow logs, cavities or burrows under large fallen trees, tree stumps, logs, stick-raked piles, large rocks and rock piles, dense ground-covering vegetation, and deeply eroded gullies, tunnels and sinkholes (Department of Climate Change, Energy, the Environment and Water, 2023c). The known distribution of the yakka skink extends from the coast to the hinterland of sub-humid to semi-arid eastern Queensland. This vast area covers portions of the Brigalow Belt, Mulga Lands, South-east Queensland, Einasleigh Uplands, Wet Tropics and Cape York Peninsula Biogeographical Regions.	No Dry sclerophyll forest is not present within the study area.	Yes Species records are located sporadically throughout Queensland. The nearest recent record is located within 285 km of the alignment to the north west (2003).	Unlikely The habitat within the study area is unlikely to support the species and records are far away.
<i>Lampropholis mirabilis</i>	Saxicoline sunskink	-	NT	This species restricted to the Townsville region, inhabiting rocky creek beds in rainforest with a strong association with rocky outcrops and/or boulders, usually in association with vine thicket, but have been observed in open woodland vegetation near the summit of Mt Stuart (RPS, 2015).	No The study area is unlikely to support the species as it does not contain rocky outcrops or vine thicket.	Yes Species records are located around Townsville. The nearest recent record is located within 3 km of the alignment to the northwest on Castle Hill (2019). Other recent records in Townsville >8 km to the southwest occur on Mt Stuart (2023-2024)	Unlikely The habitat within the study area is unlikely to support the species as the habitat is not present within the study area and species records are located in a mountainous area away from the study area.
<i>Phyllurus amnicola</i>	Mount Elliot broad-tailed gecko	-	V	<i>Phyllurus amnicola</i> have a very limited natural range and are considered microendemic. They are only found along the streams and creeks of Mt. Elliot in Queensland between 400-1000m elevation. Almost all records have been identified on rocks or boulders just above the water line with their head towards the water. Foraging occurs near turbulent or flowing water (iNaturalist, 2023).	No The study area is below 400 m elevation.	No Species records are located south of Townsville near Mount Elliot nearest recent record is located within 30 km of the alignment to the west (2009).	Unlikely The habitat within the study area is unlikely to support the species and records are far away and isolated to Mount Elliot.

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<i>Varanus mertensi</i>	Mertens' water monitor	E	E	Mertens' water monitor is a highly aquatic lizard that seldom ventures more than 5–10 m from the edge of the water except when transitting among core aquatic activity areas (Mayes 2006). This species is recorded from: - Perennial and semi-permanent pools in upper catchment areas, including springs, seeps, swamps, creeks and gorges, - The margins of permanent streams, rivers and lakes in lower catchment areas, - Floodplain billabongs, lagoons, swamps and soaks, - Perennial waterholes in woodlands, and - Man-made irrigation channels and the margins of dams. Mertens' water monitor occurs patchily across tropical northern Australia, from the west Kimberley in Western Australia (WA), across the Top End of the Northern Territory (NT), to the wet tropics in far north Queensland (Qld).	No The species occupies freshwater habitat while the study area contains saltwater and is tidally influenced.	No Species records are located in northern Australia, and in Queensland occur north of Undara. The nearest recent record occur 260 km to the northwest of the alignment at Undara Volcanic National Park (2019).	Unlikely The habitat within the study area is unlikely to support the species and records are far away.
Plants							
<i>Backhousia tetraptera</i>	-	CE	CR	<i>Backhousia tetraptera</i> occurs in dry rainforest along a granite gully. This vegetation type is semi-evergreen vine thicket/microphyll vine forest on granite, dominated by <i>Acacia fasciculifera</i>, <i>Archidendropsis thozetiana</i> and <i>Pleiogynium timorense</i>. <i>Backhousia tetraptera</i> habitat can be considered an 'insular ecosystem' or 'ecological island' within a larger different environment. The vine thicket gully is surrounded by drier eucalypt woodland, although there are other quite large areas of vine thicket in close proximity. <i>Backhousia tetraptera</i> is restricted to the gully floor area where moisture is concentrated. It is not known if <i>B. tetraptera</i> is a 'refuge-endemic'. <i>Backhousia tetraptera</i> is known from a very restricted distribution in the Mt Stuart area near Townsville, within the Brigalow Belt North bioregion. However, it is possible the species is more widespread in the vicinity of the known population, as similar geomorphology and associated vegetation are widespread over Mt Stuart. The area remains poorly botanised, especially away from the known road and track systems that lead to the communication towers on top of Mt Stuart (Department of Climate Change, Energy, the Environment and Water, 2025b).	No Suitable habitat does not occur as there is no dry rainforest on granite in the study area.	Yes The species is endemic to Mt Stuart and similar habitat in the Townsville region of northeastern Australia. The nearest recent records of the species occur on Mt Stuart 8 km to the southwest (2013).	Unlikely The habitat within the study area is unlikely to support the species and records and isolated to specific habitat on Mt Stuart and in Paluma.
<i>Corchorus hygrophilus</i>	-	-	V	<i>Corchorus hygrophilus</i> occurs on vine forest margins or in sclerophyll forest adjacent to vine forest. It grows among boulders and on soils derived from granite or limestone. <i>Corchorus hygrophilus</i> is endemic to Australia. It is found sporadically in coastal and sub-coastal areas of eastern Queensland, from Townsville, south to Eidsvold (Halford, 2009).	No Suitable vine forest habitat does not occur within the study area.	No Species records are located sporadically on the central east coast of Queensland. The nearest recent records are located 15 km to the north of the alignment on Magnetic Island (2024).	Unlikely Suitable habitat does not occur and records in the Townsville region are located at higher altitudes.
<i>Croton magneticus</i>	-	-	E	<i>Croton magneticus</i> grows in deciduous vine thickets (dry rainforest) on soils derived from sandstone, granite or acid agglomerate substrates, often in association with <i>Croton arnhemicus</i> and <i>C. phebalioides</i>. <i>Croton magneticus</i> is restricted to an area between Greenvale to near Collinsville in north-eastern Queensland. <i>C. magneticus</i> is noted to be rare to occasional on Gloucester island and Mt Stuart (near Townsville) and frequent to common on Magnetic Island, Mt Abbott and Mt Blackjack (Lynise Wearne, 2012a).	No Suitable vine thicket habitat does not occur within the study area.	Yes Species records are located in a small area of central-north Queensland between Mackay and Greenvale. The nearest recent records occur 8 km too the southwest on Mt Stuart. Other records in the Townsville region occur on Magnetic Island.	Unlikely While records occur within 10 km, suitable habitat is absent. Records in the Townsville region are located at higher altitudes.
<i>Dichanthium setosum</i>	-	V	LC	This species is associated with heavy basaltic black soils and stony red-brown hard setting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture.	No Suitable soil type does not occur within the study area.	No Species records are located primarily in inland northern NSW and sparsely	Unlikely The habitat within the study area is unlikely to support

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				In Queensland, <i>Dichanthium setosum</i> has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions. This species occurs in the Mistake Range, in Main Range National Park, and possibly in Glen Rock Regional Park, adjacent to the Main Range National Park (Department of Climate Change, Energy, the Environment and Water, 2025b).		distributed through inland Queensland. The nearest recent record is located 230 km to the west of the alignment (2006).	the species and records are located far away.
<i>Eucalyptus paedoglauca</i>	Mt. Stuart ironbark	V	V	<i>Eucalyptus paedoglauca</i> occurs on ridges or hill slopes on shallow sandy-loam soil. <i>Eucalyptus paedoglauca</i> occurs only in the Townsville area of north-east Queensland. The extent of occurrence is about 400 km ² . The area of occupancy and total population size are unknown, but there are estimated to be thousands of trees. This species occurs within the Burdekin (Queensland) Natural Resource Management Region (Department of Climate Change, Energy, the Environment and Water, 2023c).	No Ridges and hill slopes were not present within the study area.	Yes Species records are sparsely located near Townsville. The nearest recent record is located within 8 km of the alignment to the south on Mt Stuart (2024).	Unlikely The habitat within the study area is unlikely to support the species.
<i>Leichhardtia araujacea</i> syn. <i>Marsdenia araujacea</i>	-	CE	CR	Habitat is lowland <i>Blepharocarya involucrigera</i> F. Muell. gallery rainforest invariably associated with permanent water, often by tapping underground springs or aquifers. <i>Blepharocarya</i> dominated communities are widespread and strongly associated with water. They may be located immediately around a water source or are linear following water courses. The 2016 specimen was noted as occurring on conglomerate soil. <i>Marsdenia araujacea</i> is endemic to the northeast Queensland Wet Tropics, occurring between approximately Hope Vale and Townsville.	No Suitable gallery rainforest is not present within the study area.	No Species records are located between Ingham and Hope Vale in northeastern Queensland. The nearest record occur 100 km to the northwest and is outdated (1866).	Unlikely The habitat within the study area is unlikely to support the species and records are far away.
<i>Leichhardtia brevifolia</i> syn. <i>Marsdenia brevifolia</i>	-	V	V	<i>M. brevifolia</i> grows on serpentine rock outcrops or crumbly black soils derived from serpentine in eucalypt woodland, often with broad-leaved ironbark (<i>Eucalyptus fibrosa</i>) and <i>Corymbia xanthope</i> . At Hidden Valley near Paluma, plants grow in woodland on granite soils dominated by granite ironbark (<i>E. granitica</i>), rustyjacket (<i>C. leichhardtii</i>) and white mahogany (<i>E. acmenoides</i>). On Magnetic Island the species occurs in open forest on dark acid agglomerate soils dominated by narrow-leafed ironbark (<i>E. drepanophylla</i>). In the Springsure area <i>M. brevifolia</i> grows in eucalypt woodland (BRI collection records n.d.). <i>Marsdenia brevifolia</i> occurs in north and central Queensland where it is known from near Townsville, Springsure and north of Rockhampton. A single population also occurs at West Point on Magnetic Island (Department of Climate Change, Energy, the Environment and Water, 2023c).	No The study area is flat without rocky outcrops and unlikely to support species.	No Species records are sparsely located in three locations at Townsville, Rockhampton and Springsure. The nearest recent record is located within 80 km of the alignment to the north west (2012).	Unlikely The habitat within the study area is unlikely to support the species and records are far away.
<i>Myrmecodia beccarii</i>	Ant plant	V	V	This species occurs in open woodland dominated by <i>Melaleuca viridiflora</i> or mangroves. <i>Myrmecodia beccarii</i> occurs in coastal woodland and mangrove between Cooktown and Ingham in Queensland (Department of Climate Change, Energy, the Environment and Water, 2023c).	Potential Melaleuca woodland and mangroves were present during the field survey however the species was not identified.	No Species records are sparsely located from Ingham to Cape York. The nearest recent record is located within 110 km of the alignment to the north (2010).	Unlikely While the habitat within the study area is may support the species, records are far away and the species was not identified during field surveys.
<i>Omphalea celata</i>	-	V	V	<i>Omphalea celata</i> occurs in fragmented semi evergreen vine thicket or araucarian microphyll vine forest. Recorded along watercourses in steep sided gorges and gullies on weathered metamorphic or granitic soils (Department of Climate Change, Energy, the Environment and Water, 2023c). Associated species include <i>Eucalyptus raveretiana</i> , <i>E. tereticornis</i> , <i>Lysiphyllum hookeri</i> and <i>Ficus opposita</i> .	No Semi evergreen vine thicket was not present during the field surveys.	No Species records are sparsely located near Mackay. The nearest recent record is located within 190 km of the alignment to the south east (1989).	Unlikely The habitat within the study area is unlikely to support the species and records are far away.
<i>Paspalidium udum</i>	-	-	V	<i>Paspalidium udum</i> is the dominant grass in water-filled sink-holes in rugged basalt, sometimes co-dominant with Phragmites and associated with <i>Cyperus alopecuroides</i> and <i>Diplachne parviflora</i> , found in shallow water. In the Townsville Common, the species is described as occurring in seasonal wetland with <i>Urochloa mutica</i> and <i>Eleocharis dulcis</i> .	Possible. Suitable habitat is likely to occur in the study area with tidally-influenced wetlands. The same vegetation	Yes Records are sparsely located in the Top End and near central-northern coastal Queensland. The	Potential Habitat within the study area may support the species and records occur within 10 km, however the

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
				In Queensland <i>Paspalidium udum</i> is restricted to two populations near Townsville. The species also occurs in a few wetlands in the Northern Territory, including in the Daly River area (L. Weame, 2012).	communities where the species has been detected in the Town Common occur within the Study Area.	nearest recent records (2005) occur 10 km to the northwest at Town Common.	species was not identified during field surveys.
<i>Phlegmariurus tetrastichoides</i>	Square tassel fern	V	V	The square tassel-fern occurs in upland notophyll vineforest. It is an epiphyte on rainforest trees, occurring in north-eastern Queensland, from the Daintree, south to Hinchinbrook Island, and west of Mackay, from sea level to 1100 m altitude. The square tassel-fern is endemic to north-east Queensland and occurs from Mount Finnigan south to the Clarke Range, west of Mackay. It is most prevalent on the Evelyn, Atherton and Mount Carbine Tablelands but extends to lower altitudes along the North Johnstone River and Mossman Gorge (Department of Climate Change, Energy, the Environment and Water, 2025b).	No Suitable notophyll vine forest habitat was not present during the field surveys.	No Species records are located in the northeast coast of Australia from Cape Tribulation to Mackay. The nearest record (1989) is located 70 km othe northwest of the alignment in Paluma.	Unlikely The habitat within the study area is unlikely to support the species and records are far away.
<i>Sannantha papillosa</i>	-	-	V	<i>Sannantha papillosa</i> is confined to shrubland on outcrops of granite-like rocks, on skeletal soil, and is associated with shrubs such as <i>Leptospermum brachyandrum</i>, <i>Leptospermum petersonii</i> subsp. <i>lanceolatum</i>, <i>Corymbia trachyphloia</i> and <i>Melaleuca pearsonii</i>. <i>Sannantha papillosa</i> occurs in three locations: on Frederick Peak and in Bowling Green Bay National Park south of Townsville, and from Sydney Heads, Homevale National Park, west of Mackay.	No Rocky outcrops were not found within the study area during field surveys.	No Species records are mostly scattered around Townsville with one record close to Mackay. The nearest recent record (2009) is located 5 km to the west and has high spatial uncertainty. Other records in the Townsville region are outdated and located at Mt Stuart and Cape Cleveland at higher altitudes.	Unlikely The habitat within the study area is unlikely to support the species and records nearby are unreliable, outdated or on habitat types not found in the study area.
<i>Solanum graniticum</i>	Granite nightshade	E	E	<i>Solanum graniticum</i> grows in open eucalypt woodland on hillsides with shallow soil derived from granite or granodiorite. Associated species include <i>Eucalyptus drepanophylla</i> and <i>Corymbia erythrophloia</i> (Threatened Species Scientific Committee, 2021).	No The study area is flat and unlikely to support species.	No Species records are sparsely located between Townsville and Mackay. The nearest recent record is located within 95 km of the alignment to the west (2012).	Unlikely The habitat within the study area is unlikely to support the species and records are far away.
<i>Solanum sporadotrichum</i>	-	-	NT	<i>Solanum sporadotrichum</i> grows in association with semi-evergreen vine thicket, notophyll rainforest or littoral rainforest with <i>Brachychiton australis</i>, <i>Gyrocarpus americanus</i>, <i>Flindersia collina</i>, <i>Araucaria cunninghamii</i>, <i>Acacia fasciculifera</i> and <i>Drypetes deplanchei</i>, or in eucalypt open forest or woodland. Soils are moderately to very fertile. <i>Solanum sporadotrichum</i> is endemic to Queensland. In subcoastal areas the species extends from Magnetic Island (near Townsville) to Calder Island (50 km North East of Mackay). The species occurs west of Townsville from Fanning River Station, 25 km North east of Mingela to Mount Wickham. <i>S. sporadotrichum</i> occurs within Magnetic Island National Park, Gloucester island National Park, Dryander State Forest and Conway National Park (Lynise Weame, 2012b)	No Semi evergreen vine thicket was not present during the field surveys.	No Species records are located primarily along the east coast in central-north Queensland between Sarina and Townsville, with sparse records in southwest QLD/northern NSW. The nearest recent record (2024) occur on Magnetic Island 25 km to the north of the alignment, with no records on the Townsville mainland within 60 km.	Unlikely The habitat within the study area is unlikely to support the species and records do not occur within 60 km of the alignment on the mainland.
<i>Tephrosia leveillei</i>	-	V	-	<i>Tephrosia leveillei</i> has been recorded growing on alluvial plains in <i>Eucalyptus cullenii</i> woodland with <i>Corymbia erythrophloia</i> , <i>Erythrophleum chlorostachys</i> and <i>Grevillea glauca</i> , and in tall open forest of	No	No	Unlikely

Scientific Name	Common Name	EPBC Act Status ¹	NC Act Status ²	Habitat Types	Potential Habitat Utilisation in the study area	Species Records in the study area	Likelihood of occurrence
				<i>Eucalyptus</i> and <i>Corymbia</i> species over dense <i>Heteropogon contortus</i> on red sand. At the Ravenswood site it is recorded growing along the railway track. The species is currently known from the area between Chillagoe and Forty Mile Scrub (five collections) with one collection further south, near Ravenswood (Department of Climate Change, Energy, the Environment and Water, 2025b).	Alluvial plains with suitable soil type does not occur in the study area.	Species records are rare, with only two ALA records present inland between Townsville and Cairns. The nearest species record is located 260 km to the northwest of the study area.	The habitat within the study area is unlikely to support the species and records are far away.
Threatened ecological communities							
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	E	-		Semi-evergreen vine thicket (SEVT) is considered an extreme form of dry seasonal subtropical rainforest. It occurs in areas with a subtropical, seasonally dry climate on soils of high to medium fertility and is generally characterised by the prominence of trees with microphyll sized leaves (2.5–7.5cm long) and the frequent presence of swollen-stemmed “bottle trees” (<i>Brachychiton australis</i>, <i>B. rupestris</i>) as emergents from the vegetation. In the northern SEVT TEC, although a large number of plant species occur within the community, only a few species are always present. These include the trees broad-leaved bottle tree <i>Brachychiton australis</i>, yellow tulip <i>Drypetes deplanchei</i>, small-leaved ebony <i>Diospyros humilis</i>, helicopter tree <i>Gyrocarpus americanus</i>, brush wilga <i>Geijera salicifolia</i>, yellow lemon <i>Pouteria cotinifolia</i> and strychnine <i>Strychnos psilosperma</i> and the vines <i>Cissus reniformis</i> and <i>Jasminum didymum</i>. Common emergent trees range from those that are fully deciduous (e.g. <i>Brachychiton australis</i>, <i>Gyrocarpus americanus</i>) to those that are semi-evergreen (e.g. ribbonwood <i>Euroschinus falcata</i>, Burdekin plum <i>Pleiogynium timorense</i>). Lower canopy species also show a great range in their deciduousness. In Queensland, the following 10 REs comprise this TEC: REs 11.2.3, 11.3.11, 11.4.1, 11.5.15, 11.8.3, 11.8.6, 11.8.13, 11.9.4, 11.9.8, 11.11.18.	No Semi evergreen vine thicket was not present during the field surveys.	-	Unlikely Analogous REs do not occur within the study area, and associated species for this TEC were not found during the field surveys.

¹ Conservation status under the EPBC Act where CE=Critically Endangered, E=Endangered, V=Vulnerable, Mi = Migratory.² Conservation status under the NC Act where CE=Critically Endangered, E=Endangered, V=Vulnerable, SLC=Special Least Concern, LC=Least Concern.

Appendix E

MNES Significant Impact Assessment

Appendix E MNES Significant Impact Assessment

Initial Screening Assessment

As detailed in Section 7.1.1.2, Matter of National Environmental Significance (MNES) values within the Project area may be directly or indirectly impacted by the development of the Project. However, the overall risk to MNES values associated with these potential Project impacts will differ, based on a combination of factors including the community or species' ecological characteristics and the likely consequence of such impacts. As such, an initial screening assessment was undertaken in accordance with the developed risk framework (Table 18, Table 19, Table 20) and the approach detailed in Section 3.5.1, to identify MNES that are at low risk to potential Project impacts and MNES that are at potential risk and require further assessment. Where species have been identified that have similar habitat values, they have been assessed together.

Findings of the screening assessment determined all species as low risk, however six MNES species were assessed further against the significant impact assessment criteria based on species listing status, possibility of meeting migratory shorebird flyway populations, cryptic nature or potential presence within the Project area. Species assessed were:

- Eastern curlew (*Numenius madagascariensis*)
- Great knot (*Calidris tenuirostris*)
- Whimbrel (*Numenius phaeopus*)
- Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*)
- Water mouse (*Xeromys myoides*)
- Sharp-tailed sandpiper (*Calidris acuminata*)

Two additional SIAs were undertaken for 'migratory shorebird species' (grouped as detailed in **Table 40**) and 'migratory terrestrial bird species' (as detailed in **Table 45**) to further assess risks.

Table 18 Screening framework: consequence criteria

Consequences	Criteria	
	Threatened species and communities	Migratory species
	1	
	No impacts to threatened species populations, ecological communities, habitat extent and habitat quality; and No increase in threatening processes to threatened species and ecological communities; and Threatened species and ecological communities recovery or persistence is unaffected.	No impacts to migratory species habitat extent and habitat quality; and No increase in threatening processes to migratory species; and Area of habitat within the Project area is not nationally or internationally significant and Migratory species recovery or persistence is unaffected.
2	Impacts to threatened species, ecological communities and associated habitats are of a low magnitude or are short-term; and Increased threatening processes to threatened species and ecological communities can effectively be mitigated by well characterised management measures; and In a regional context, reduction in available habitat is inconsequential; and Species specific referral guidance (if available) indicates a low risk.	Impact area is below species-specific clearing thresholds (if available); and No impacts to areas supporting an ecologically significant proportion of a population; and Impacts to migratory species important habitat are of a low magnitude or are short-term; and Increased threatening processes to migratory species can effectively be mitigated by well characterised management measures; and In a regional context, reduction in available habitat is inconsequential.
3	Species has been confirmed within the Project area or in adjacent properties; however uncertainty on population density, population dynamics and or habitat utilisation occurs; or Population numbers and habitat utilisation within the Project area may vary temporally and spatially due to dependence on climatic conditions i.e. rainfall events recharging wetlands. Therefore, full extent of potential impacts on threatened species is uncertain; or Impacts to threatened species, ecological communities and associated habitats are of a moderate or high magnitude or are longer-term; or Increased threatening processes to threatened species and ecological communities require more intensive, longer term management or intervening measures to mitigate impacts; or Receiving environment is more sensitive to impacts or the consequence of the impact is uncertain; or In a regional context, reduction in available habitat is notable; or Species specific referral guidance (if available) indicates a moderate or high risk.	Multiple individuals were recorded using habitat within the Project area; Close to or above species-specific clearing thresholds (if available); or Impacts to areas supporting or close to supporting an ecologically significant proportion of a population; or Impacts to migratory species important habitat are of a moderate or high magnitude or are longer-term; or Increased threatening processes to migratory species require more intensive, longer term management or intervening measures to mitigate impacts; or Receiving environment is more sensitive to impacts or the consequence of the impact is uncertain; or In a regional context, reduction in available habitat is notable.

Table 19 Screening framework: likelihood criteria

Likelihood level	Descriptor
Highly unlikely	- May only occur in exceptional circumstances - No previous incidence of occurring
Unlikely	- Very low chance of occurring - One rare previous incidence of occurring
Possible	- Might occur in some circumstances - Few previous incidences of occurring

Table 20 Screening framework: outcome matrix

Likelihood	Severity		
	1	2	3
Highly unlikely	Low risk – no further assessment recommended	Low risk – no further assessment recommended	Low risk – no further assessment recommended
Unlikely	Low risk – no further assessment recommended	Low risk – no further assessment recommended	Low risk – no further assessment recommended
Possible	Low risk – no further assessment recommended	Low risk – no further assessment recommended	Potential risk – further assessment recommended

Significant impact assessments are discussed in Section 2.

Table 21 Screening assessment for potential impacts to MNES

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
Fork-tailed Swift (<i>Apus pacificus</i>)	Mi	The fork-tailed swift is almost exclusively aerial, recorded generally east of the Great Dividing Range from Cooktown to the New South Wales border, but extends further west in southern Queensland (Department of Climate Change, Energy, the Environment and Water, 2023c). This species mostly occurs over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. The <i>Referral guideline for 14 birds listed as migratory species under the EPBC Act</i> (Department of the Environment, 2015b), defines important habitat for the species as “Non-breeding habitat only: Found across a range of habitats, from inland open plains to wooded areas, where it is exclusively aerial.”	This species may potentially occur in the airspace above the study area due to the presence of suitable habitat. This species was not recorded during field surveys, however scattered recent records occur within 10-20 km of the Project area. A total of 138.9 ha of suitable foraging and dispersal habitat occurs within the study area. All potential habitat is considered important habitat as it meets the definition specified in the <i>Referral guideline for 14 birds listed as migratory species under the EPBC Act</i>. Direct impacts will occur to 5.47 ha of foraging and dispersal habitat via vegetation clearing. Given this species is predominately aerial and is widespread within Australia, impacts are unlikely to affect the persistence of the species. The Project will not create a barrier to movement. Moreover, clearing for the Project is narrow and linear, and as such is unlikely to cause significant changes to insect loads in the aerial space above the habitat. Most of the cleared areas will be reinstated after construction, except for the access tracks which will remain permanently. The Southern Port Road is located immediately adjacent and presents an existing barrier to dispersal which is unlikely to be greatly exacerbated by permanent access tracks. All other key threats to this species are unlikely to be increased beyond current levels with the implementation of mitigation measures detailed in Section 8.0	2	Unlikely	Low risk – no further assessment recommended
Great knot (<i>Calidris tenuirostris</i>)	V, Mi	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. The great knot rarely occurs on inland lakes and swamps <i>Calidris tenuirostris</i>. This species does not breed in Australia. The species is known to occur in areas adjacent to the study area and is typically recorded on the spit to the north of the study area which is a known low tide roosting and foraging site. This area recorded species abundance above the national significance thresholds of 425 individuals (NRA, 2020). At a regional level they have been recorded in high numbers in Bowling Green Bay Ramsar site to the south of the Project area.	The species is considered likely to occur in areas of saltpan and mudflats within the study area. A total of 68.3 ha of potential habitat for the species was identified within the study area. Of this, the mudflats associated with RE 11.1.1 consist of the most suitable habitat for the species to utilise. Within the Project area impacts are anticipated to be reduced to the clearing of 3.38 ha of marginal foraging and roosting habitat associated with <i>Sporobolus virginicus</i> grassland that may be occasionally utilised by the species. The Project area is not considered nationally important migratory shorebird habitat as it did not meet 0.1 % of the flyway population (19 individuals recorded during field surveys), support 2000 migratory shorebirds or support 15 migratory shorebird species. The areas of known roosting and foraging habitat associated with mudflat and claypan are intersected at the very edge of the highest astronomical tide. This area may be used by the species during this event. To reduce impacts to the species, under boring is proposed as a construction methodology. This will retain habitat and reduce direct impacts to the species in this area. In a regional context, the habitat impacted by the Project is marginal, with more optimal habitat associated with the sand spit and mud flats to the north and the Bowling Green Bay	2	Possible	Low risk – however further assessment is recommended based on potential presence of species within the Project area and presence of adjacent known important habitat.

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
			Ramsar nationally important wetland area to the south. The sand spit immediately adjacent to the Project area supports a nationally important population for the species. Furthermore, the impacts to the species are anticipated to be short term, as the pipeline will be buried. While the access track will remain permanently, it is expected to be utilised only during the construction and maintenance phases and is unlikely to exacerbate impacts caused by the existing Southern Port Road situated immediately adjacent. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project.			
Saltwater crocodile (<i>Crocodylus porosus</i>)	Mi	The saltwater crocodile is found in Australian coastal waters, estuaries, lakes, inland swamps and marshes. Despite the species' common name, the saltwater crocodile can persist in freshwater bodies. In Queensland, the species is usually restricted to coastal waterways and floodplain wetlands. Populations may also be found hundreds of kilometres upstream, such as in the Fitzroy River and the waterways of the southern Gulf of Carpentaria. The species' distribution ranges from Rockhampton in Queensland throughout coastal Northern Territory to King Sound (near Broome) in Western Australia. In Australia, threats to the saltwater crocodile include mortality due to fishing nets and the effects of habitat destruction. In Arnhem Land, Northern Territory, feral animals such as the buffalo (<i>Bubalus bubalis</i>) destroy wetland habitat by increasing drainage and reducing vegetation (Department of Climate Change, Energy, the Environment and Water, 2023c).	The saltwater crocodile is likely to occur within the study area due to the presence of suitable habitat and nearby species records, and the ability for the species to traverse across land. A total of 38.3 ha of suitable foraging and dispersal habitat occurs within the study area, with nesting habitat likely to be present further upstream. This species is known to inhabit coastal waterways and is known to travel inland via creeks and rivers. As such, potential habitat within the study area is likely to be utilised during travel upstream and occasional foraging and dispersal. Clearing of vegetation for the Project of suitable habitat for this species will be avoided. No substantial or permanent impacts on the hydrology of watercourses that intersect the study area will occur and therefore the continuation of current habitat quality and extent is anticipated. The Project will not create a barrier that may hinder access to potential habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed as per Section 8.0.	2	Unlikely	Low risk – no further assessment recommended
Oriental cuckoo (<i>Cuculus optatus</i>)	Mi	The oriental cuckoo is a non-breeding migrant that occurs in coastal regions across northern and eastern Australia from September to May. While in Australia, the species inhabits a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types (Department of the Environment, 2015b). The <i>Referral guideline for 14 birds listed as migratory species under the EPBC Act</i>, defines important habitat for the species as "monsoonal rainforest, vine thickets, wet sclerophyll forest or open <i>Casuarina</i>, <i>Acacia</i> or <i>Eucalyptus</i> woodlands. Frequently at edges or ecotones between habitat types". Based on estimates of population sizes within Europe, the global population may be greater than 20 million. An ecologically significant proportion of the population is 1000 individuals (0.1% threshold). The lower area threshold for impacts on important habitat is 25,000 ha. There is no information regarding known threats to this species while in Australia.	This species is considered potential to occur within the study area based on the presence of suitable habitat and scattered records nearby the study area. This species was not recorded during the field survey program. A total of 16.9 ha of potential habitat occurs within the study area. All potential habitat is suitable for foraging and dispersal only as this species does not breed in Australia. The species is a generalist and has broad habitat associations, however, habitat available in the study area is disconnected and lacks the complexity that the species prefers. Potential habitat does not meet the definition of important habitat for the species, nor does it meet the area requirements to be considered Nationally or Internationally significant habitat and is unlikely to support an ecologically significant proportion of the population as defined under the <i>Referral guideline for 14 birds listed as migratory species under the EPBC Act</i>. A total of 2.1 ha of potential habitat will be directly impacted via vegetation clearing for the Project. This area is well below the clearing threshold for significant impacts as defined by the referral guidelines (250,000 ha). This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project, nonetheless these will be managed as detailed in Section 8.0.	2	Unlikely	Low risk – no further assessment recommended

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
Latham's snipe (<i>Gallinago hardwickii</i>)	V, Mi	In Australia, Latham's snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level (Department of Climate Change, Energy, the Environment and Water, 2023c). They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Latham's snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Queensland, the range extends inland over the eastern tablelands in south-eastern Queensland. Threshold criteria are still considered the best way to identify important sites in the absence of data sufficient for more rigorous methods. For the purposes of this plan, important habitat for Latham's snipe is described as areas that have previously been identified as internationally important for the species, or areas that support at least 18 individuals of the species.	This species is considered a potential occurrence within the study area due to the presence of suitable foraging and dispersal habitat and scattered records nearby the Project area. Although freshwater wetlands do not occur within the study area, there are brackish and saline areas associated with tidal inundation. A total of 68.3 ha of potential habitat occurs within the study area. Habitat is considered marginal due lack of preferred habitat features that provide protection and foraging resources. The potential habitat is considered suitable for foraging and dispersal only, as this species does not breed in Australia. Based on each species large distribution and migration patterns, only a small number of individuals are expected to utilise potential habitat of the study area at any time Within the Project area a total of 3.38 ha of potential habitat will be cleared for the Project. This habitat is not considered important habitat as per the <i>EPBC Act policy statement 3.21</i>. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project. No areas of potential habitat are considered to comprise habitat critical to the survival of the species (wetlands providing potential breeding or foraging and roosting habitat) due to the degraded nature of the habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed as per Section 8.0. Other indirect impacts such increased dust, light, noise and vibration will be temporary and localised.	2	Unlikely	Low risk – no further assessment recommended
White-throated needletail (<i>Hirundapus caudacutus</i>)	V, Mi	The white-throated needletail breeds in the northern hemisphere and migrates in the austral summer months to Australia. While in Australia, this species is widespread and predominately aerial. There is no current accurate population estimate, however the global population is estimated at greater than 10,000 birds (Higgins, 1999). Important populations are not defined, however important habitat includes large tracts of native vegetation, particularly forest. The species usually roosts in tall trees on cliffs or steep slopes that have vantage points, amongst dense foliage in the canopy or in hollows. In Australia, white-throated needletails almost always forage aerially, at heights up to 'cloud level', though usually much lower. They often forage in areas of updraughts, such as ridges, cliffs or sand-dunes, or in the smoke of bushfires or occasionally in whirlwinds. Identified threats to this species whilst in Australia include habitat loss and fragmentation, mortality due to collision with wind turbines and overhead wires, poisoning and pesticides. However it is stated that as this affects only a few individuals, it is not a threat to the species overall.	This species is considered likely to occur in the airspace above the study area and multiple records occur within 20 km. A total of 138.9 ha of suitable foraging and dispersal habitat occurs within the study area. No habitat within the study area is considered to comprise important habitat (large tracts of vegetation suitable for roosting and foraging). This species has a very large distribution across Australia and is constantly moving, therefore only small numbers are expected to utilise the study area at one time. Vegetation clearing required for the construction of the Project will result in direct impacts to 5.47 ha of foraging and dispersal habitat. As this species is predominately aerial, is widespread within Australia and has broad habitat requirements, impacts are unlikely to affect the persistence of the species. In addition, it is likely vast areas of important habitat occur within the wider local area. Moreover, clearing for the Project is narrow and linear, and as such is unlikely to cause significant changes to insect loads in the aerial space above the habitat. The pipeline trench will be reinstated after construction, and a small strip 4 m wide associated with the access track will remain permanently. However given the presence of the Southern Port Road located immediately adjacent, key threats to this species are unlikely to be increased beyond current levels with the implementation of mitigation measures detailed in Section 8.0.	2	Unlikely	Low risk – no further assessment recommended
Western Alaskan bar-tailed godwit (<i>Limosa lapponica baueri</i>)	E, Mi	The Bar-tailed godwit occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts,	This species is considered known to occur within the study area based on the presence of suitable habitat and scattered records nearby the study area. The species was identified during field surveys to the north of the study area on the sand spit, a	2	Unlikely	Low risk – however further assessment is recommended

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
		sandy ocean beaches, rock platforms, and coral reef-flats (Department of Climate Change, Energy, the Environment and Water, 2023c). An important population for the species is considered to be 325 individuals based off the 0.1% flyway population. The species is known to occur in areas adjacent to the study area on the spit to the north of the study area which is a nationally important population for the species (NRA, 2020). The species was also recorded in this area during field surveys. At a regional level the species has been recorded in high numbers in Bowling Green Bay Ramsar site to the south of the Project area.	nationally important area for the species. A total of 68.3 ha of potential habitat for the species was identified within the study area. Of this, the mudflats and sand areas associated with RE 11.1.1 and 11.2.2 are considered the most likely habitat for these species to utilise. All potential habitat is suitable for foraging and dispersal only as this species does not breed in Australia. Within the Project area, the species is likely to utilise 3.38 ha of foraging and dispersal habitat. Potential habitat is considered marginal as it is only inundated during king tides. The species was not identified in the Project area during field surveys. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project. Furthermore, based on the presence of more abundant and frequently used habitat outside of the Project area, this species is unlikely to be impacted by the clearing of marginal foraging and dispersal habitat, nonetheless impacts will be managed as detailed in Section 8.0.			based on potential presence of species within the Project area and presence of adjacent known important habitat.
Yellow wagtail (<i>Motacilla flava</i>)	Mi	The yellow wagtail is considered one of five 'extremely uncommon migrants' to Australia. When in Australia it is a regular wet season visitor to northern Australia. In Queensland this species has been recorded from Mossman south to Townsville. Habitat requirements for the yellow wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves (Department of the Environment, 2015a). The yellow wagtail is a regular wet season visitor to northern Australia. In Queensland this species is a regular visitor from Mossman south to Townsville. The species is a vagrant further south and on Heron Island. The species does not breed in Australia. An ecologically significant proportion of this species population is 1000 individuals (0.1%).	The species is considered to potentially occur in areas of grasslands, claypans and tidal mudflats and mangroves within the study area. A total of 102.8 ha of potential habitat for the species was identified within the study area. This habitat is only considered potential foraging and roosting habitat as the species does not breed in Australia and is considered an extremely uncommon migrant to the country. The species was not recorded during extensive field surveys within the study area, and therefore it is considered that an ecologically significant proportion of this species population (i.e. 0.1% of the population) is unlikely to occur in the Project area. A total of 3.38 ha of potential habitat occurs within the Project area which may be suitable foraging habitat for the species. The impact area is linear in nature, and this is considered to be a highly mobile species. A majority of suitable habitat for this species will be avoided for direct impacts due to the Project, as the mangroves and most of the claypans will be under-bored. Furthermore, any direct impacts to the species habitat are anticipated to be short term, as the pipeline will be buried. While the 4 m-wide access track will remain permanently, it is situated immediately adjacent to the Southern Port Road and the Project is not expected to exacerbate impacts beyond that presented by the existing high-speed road corridor.	2	Unlikely	Low risk – no further assessment recommended
Eastern curlew (<i>Numenius madagascariensis</i>)	CE, Mi	This species generally occupies coastal lakes, inlets, bays and estuarine habitats, and is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Within Australia, the eastern curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. eastern curlews are rarely recorded inland.	The species is considered known to occur in areas of saltpan and mudflats within the study area. A total of 68.3 ha of potential habitat for the species was identified within the study area. Of this, the mudflats associated with RE 11.1.1 consist of the most suitable habitat for the species to utilise. The areas of known roosting and foraging habitat associated with mudflat and claypan are intersected at the very edge of the highest astronomical tide (RE 11.1.1). This area may be used by the species during this event. To reduce impacts to the species,	2	Possible	Low risk – however further assessment is recommended based on potential presence of species within the Project area, number of

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
		An important population for the species is considered to be 32 individuals based off the 0.1% flyway population. The species is known to occur in areas adjacent to the study area and has been recorded on the spit to the north of the study area this area is a known low tide roosting and foraging site. The species was also recorded next to the Ross River on the saltpan / mudflat section of the study area. At a regional level they have been recorded in high numbers in Bowling Green Bay Ramsar site to the south of the Project area	under-boring beneath the claypan and estuary is being utilised as a construction methodology. This will retain habitat and reduce direct impacts to the species in this area. Within the Project area, impacts have been reduced to the clearing of 3.38 ha of marginal foraging and roosting habitat associated with <i>Sporobolus virginicus</i> grassland that may be occasionally utilised by the species. The Project will avoid regrowth marginal foraging habitat. This area has been historically cleared and is used regularly by fishermen, evidence of which was present during field surveys. No shorebird species were identified utilising this habitat during the field survey. The impact area is linear in nature. Furthermore, the impacts to as the species are anticipated to be short term, as the pipeline will be buried. The permanent access tracks will remain after construction however impacts are expected to be minor given the presence of the Southern Port Road immediately adjacent and mitigation measures proposed to minimise impacts are presented in Section 8.0. In a regional context, the habitat impacted by the Project is marginal, with more optimal habitat associated with the sand spit and mud flats to the north and the Bowling Green Bay Ramsar nationally important wetland area to the south. Based on the field data and past surveys, the Project area is not considered nationally important migratory shorebird habitat as it does not meet 0.1 % of the flyway population (19 individuals recorded during field surveys), support 2000 migratory shorebirds or support 15 migratory shorebird species.			individuals recorded during field surveys being close to 0.1% of flyway population and presence of adjacent known important habitat.
Whimbrel (<i>Numenius phaeopus</i>)	Mi	The whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used salt flats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms and salt fields. There are a small number of inland records from saline lakes and cane grass swamps. It has also been recorded in coastal dunes and on a football field. A nationally important population is considered to be 65 individuals (0.1% flyway population).	This species is considered known to occur within the study area following identification during field surveys. These species are likely to utilise mudflats, mangrove and beaches throughout the study area. A total of 102.6 ha of potential habitat occurs within the study area. There is potential for a nationally important population to utilise the study area, with 40 individuals recorded during surveys, even though field surveys identified less than 0.1% of the flyway population, there is a nationally important population on the sand spit to the north and these numbers may fluctuate. Habitat within the Project area is considered marginal due to the distance of the alignment from the estuary, with the majority of the habitat only inundated during king tides and lack of suitable habitat features that provide protection and foraging resources. The potential habitat is considered suitable for foraging and dispersal, as it is marginal habitat that occurs outside of known breeding areas of all five species. Up to 3.38 ha of marginal foraging and dispersal habitat may be cleared for the Project. No substantial impacts on the vegetation is anticipated as the Project will be under boring beneath the area of claypan and using a trenching method in all other	2	Possible	Low risk – however further assessment is recommended based on potential presence of species within the Project area, number of individuals recorded during field surveys being close to 0.1% of flyway population and presence of adjacent known important habitat.

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
			pipeline areas which will be subsequently re-filled. While permanent impacts are anticipated due to the new access track proposed alongside the alignment, this track is only 0.84 ha of narrow and linear impact which runs immediately adjacent to the existing Southern Port Road, and impacts due to the Project are not anticipated to be greatly increased beyond existing levels. Indirect impacts such as increased erosion, sedimentation and contamination will be managed as per Section 8.0. Other indirect impacts such increased dust, light and noise will be temporary and localised.			
Osprey (<i>Pandion haliaetus</i> syn. <i>Pandion cristatus</i>)	Mi	Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. The breeding range of the osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in New South Wales; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island (Department of Climate Change, Energy, the Environment and Water, 2023c).	This species is considered known to occur within the study area, with additional records nearby. Suitable habitat is marginally available for the osprey within the study area, associated with disturbed non-remnant wetlands and flooding during wet season. Preferred habitat is not present within the study area, such as large bodies of water, or tall trees along waterways for nesting. A total of 138.9 ha of potential habitat occurs within the study area. Potential habitat is considered suitable for foraging and dispersal only. A total of 5.47 ha of potential habitat will be directly impacted via vegetation clearing for the Project. There is little guidance on the significance of impacts for the osprey and white-bellied sea-eagle, however the species is a generalist that occurs across most of the Australian coastline, with preferred habitat locally abundant, and thus impacts are anticipated to be unlikely to impact an important population or habitat. The Project is unlikely to present an additional barrier that may hinder access to habitat beyond existing levels posed by the Southern Port Road. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project, nonetheless these will be managed as detailed in Section 8.0.	2	Unlikely	Low risk – no further assessment recommended
Glossy ibis (<i>Plegadis falcinellus</i>)	Mi	Within Australia, this species is widely distributed generally occurring east of the Kimberley in Western Australia and Eyra Peninsula in South Australia. It moves in response to good rainfalls, expanding its range, however the core breeding areas used are within the Murray-Darling Basin region of New South Wales and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. The glossy Ibis often moves north in autumn, then return south to the main breeding areas in spring and summer. Regular migration to locations outside of Australia is also suspected but has not been confirmed. Preferred habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is also occasionally found in coastal locations. Wetland destruction or degradation is the major threat to the species. Clearing, grazing, burning, increased salinity, groundwater extraction and invasion by exotic plants and fish species are also threats to the species through habitat modification (Department of Climate Change, Energy, the Environment and Water, 2023c).	This species is considered potential to occur within the study area. The estuarine environment may be occasional habitat for the species. A total of 68.1 ha of potential habitat occurs within the study area. Potential habitat is considered marginal for foraging only due to the northerly location of the study area outside of known breeding areas. Based on the species large distribution and migration patterns, only a small number of individuals are expected to utilise potential habitat of the study area at any time. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project. Up to 3.38 ha of marginal foraging and dispersal habitat may be directly impacted via vegetation clearing required for the Project. The Project is unlikely to present an additional barrier that may hinder access to habitat beyond existing levels posed by the Southern Port Road. Indirect impacts such as increased erosion, sedimentation and contamination will be managed as per Section 8.0. Other indirect impacts such increased dust, light and noise will be temporary and localised.	2	Unlikely	Low risk – no further assessment recommended

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
Australian painted-snipe (<i>Rostratula australis</i>)	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum <i>Muehlenbeckia</i> or canegrass or sometimes tea-tree (<i>Melaleuca</i>). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (Department of Climate Change, Energy, the Environment and Water, 2023c). Australian painted snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover. The Australian painted snipe loafs on the ground under clumps of lignum, tea-tree and similar dense bushes. This species has been recorded foraging under clumps of tea-trees but most records are from daytime roost sites and the foraging habitat requirements of this species are not well understood and may be quite specific. This species requires suitable wetland areas even in drought conditions. The species can move to suitable habitat if necessary.	This species is considered a potential occurrence within the study area due to the presence of suitable foraging and dispersal habitat and scattered records nearby the Project area. A total of 68.3 ha of potential habitat occurs within the study area. Habitat is considered marginal due lack of preferred habitat features that provide protection and foraging resources. Additionally, the species prefers freshwater wetlands while the habitat in the study area is brackish and saline associated with tidal inundation. The potential habitat is considered suitable for foraging and dispersal only, as this species has very specific breeding habitat requirements that were not recorded within the study area during surveys. Within the Project area a total of 3.38 ha of potential habitat will be cleared for the Project. The species requires suitable wetland areas even in drought conditions, which only occurs in the Project area during king tide. Only a small number of individuals are expected to utilise potential habitat of the study area at any time. This habitat is not considered important habitat as per the <i>EPBC Act policy statement 3.21</i>. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project. No areas of potential habitat are considered to comprise habitat critical to the survival of the species (wetlands providing potential breeding or foraging and roosting habitat) due to the degraded nature of the habitat. Moreover, trenched areas of the Project will be reinstated after the construction phase, therefore direct impacts are predominantly considered as temporary. Permanent impacts associated with access tracks are also considered minor given the presence of the existing Southern Port Road immediately adjacent. The species is considered highly mobile and is known to move to suitable habitat where necessary, which is abundant in the surrounding areas on either side of the Southern Port Road and to the west of the Project area. Indirect impacts such as increased erosion, sedimentation and contamination will be managed as per Section 8.0. Other indirect impacts such increased dust, light and noise will be temporary and localised.	2	Unlikely	Low risk – no further assessment recommended
Bare-rumped sheathtail bat (<i>Saccolaimus saccolaimus nudicluniatatus</i>)	V	The Bare-rumped Sheathtail Bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments (Department of Climate Change, Energy, the Environment and Water, 2023c). The type locality for the Bare-rumped Sheathtail Bat is Babinda Creek near Cardwell, North Queensland, with syntypes collected from Gowrie Creek near Cardwell. Occasional individuals have been collected from a narrow coastal region (less than 40 km inland) between Ayr and Cooktown, North Queensland, with one isolated specimen from north of Coen on Cape York Peninsula (20 specimens held in the Queensland Museum). Other observations include a road-killed individual on Magnetic Island off Townsville; a sighting of up to 15 individuals flushed from a roost tree in the Iron Range area, Cape York, Queensland; and likely acoustic detection in an area to the west of Townsville (Department of Climate Change, Energy, the Environment and Water, 2023c).	The species is considered to potentially utilise the open forests and low open forests within the Project area. Based off habitat assessments during the field survey, the area is anticipated to provide only marginal foraging habitat for the species due to the weedy understorey and lack of forest clearings and availability of better habitat nearby. Hollows were rare during the field survey, as such the species is considered unlikely to breed within the Project area, utilising the area for foraging only.	2	Unlikely	Low risk – no further assessment recommended
Water mouse (<i>Xeromys myoides</i>)	V	The water mouse has been recorded in coastal saltmarsh, mangrove and adjacent freshwater wetland habitats in the Northern Territory, Queensland and New Guinea. Until recently In	Water mouse is considered potential to occur within the Project area within mangroves adjacent to the study area.	2	Unlikely	Low risk – however further

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
		Queensland, the species was known from the Proserpine area south to near the Queensland/New South Wales border. However, in 2017, a population was identified in Cairns. Habitat for this species includes mangroves and the associated saltmarsh, sedgeland, claypans, heathlands and freshwater wetlands, and in central Queensland, they have only been captured in the high inter-tidal zone in tall, closed fringing mangrove forest containing only <i>Ceriops tagal</i> and/or <i>Bruguiera</i> species and in saline grassland adjacent to closed forest of <i>Ceriops tagal</i> and/or <i>Bruguiera</i> species and <i>Avicennia marina</i> (Department of Climate Change, Energy, the Environment and Water, 2023c).	The Project design has been updated to completely avoid direct impacts to the area of remnant mangrove habitat in the study area adjacent to the Townsville Port Access Road (Southern Port Road) that may be used by the species for breeding, foraging and dispersal. Significant survey effort has been undertaken to locate the species in the past including surveys by BAAM in 2004 (290 trap nights) and AECOM in 2019 (240 trap nights). White flash cameras were deployed as part of the survey effort in recent surveys (28 trap nights). None of the above surveys recorded the species, however this does not eliminate potential species presence as the surrounding habitat may support small populations of the species. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project. At a regional level, the mangroves that will be avoided by the Project have been historically impacted by the Southern Port Road. This feature acts as a barrier of movement between the two adjacent areas of mangroves. The Project is unlikely to exacerbate this barrier as the Project will completely avoid any clearing of mangroves which is considered core habitat for the species, moreover regrowth is likely to occur following the installation of the pipeline which will manage any indirect impacts to fringing mudflat and claypan habitat.			assessment is recommended based on the cryptic nature of the species.
Red knot (<i>Calidris canutus</i>)	V, Mi	The Red knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours, sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs (Department of Climate Change, Energy, the Environment and Water, 2023c). They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. This species does not breed in Australia. The species was not recorded during surveys at the Port of Townsville to the north of the Project area (NRA, 2020). However, ALA records are present to the north of the site, predominantly nearby the sand spit. The species has been recorded at the Bowling Green Bay Ramsar Site in low numbers (4 records in March 2012) (Driscoll, Milton and Harding, 2012).	Curlew sandpiper, lesser sand plover and red knot are considered likely to occur in areas of saltpan and mudflats within the study area based off their habitat requirements and previous records in the area. A total of 68.3 ha of potential habitat for the species was identified within the study area. Of this, the mudflats associated with RE 11.1.1 are considered the most likely habitat for these species to utilise. Within the Project area, impacts are anticipated to be reduced to the clearing of 3.38 ha of marginal foraging and roosting habitat associated with <i>Sporobolus virginicus</i> grassland and beach dunes that may be occasionally utilised by these species. These species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project.	2	Unlikely	Low risk – no further assessment recommended
Curlew sandpiper (<i>Calidris ferruginea</i>)	CE, Mi	This species mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They occur in both fresh and brackish waters (Department of Climate Change, Energy, the Environment and Water, 2023c). In Australia, curlew sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. The species was recorded during high tide surveys at the Port of Townsville to the north of the Project area in 2020 (NRA, 2020). Only 2 counts of the species were recorded during this survey. Higher abundance of species has been noted at the Bowling Green Bay Ramsar Site (76 counts in November 2011 surveys) (Driscoll, Milton and Harding, 2012).	The areas of known roosting and foraging habitat associated with mudflat and claypan are intersected at the very edge of the highest astronomical tide. This area may be used by species during this event. To reduce impacts to the species, under boring is proposed as a construction methodology. This will retain habitat and reduce direct impacts to the species in this area. In a regional context, the habitat impacted by the Project is marginal, with more optimal habitat associated with the sand spit and mud flats to the north and the Bowling Green Bay Ramsar nationally important wetland area to the south. The sand spit immediately adjacent to the Project area does not support a nationally important population for any of these species.	2	Low	Low risk – no further assessment recommended
Lesser sand plover (<i>Charadrius mongolus</i>)	E, Mi	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among		2	Low	Low risk – no further assessment recommended

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
		mangroves. The species also inhabits saltworks and near-coastal salt pans, brackish swamps and sandy or silt islands in river beds (Department of Climate Change, Energy, the Environment and Water, 2023c). The species was recorded during high tide surveys at the Port of Townsville to the north of the Project area in 2020. 60 counts of the species were recorded during this survey which does not meet the criteria for a nationally important population (NRA, 2020). Higher abundance of species has been at the Bowling Green Bay Ramsar Site which was found to support internationally significant populations of the species (Driscoll, Milton and Harding, 2012).	Furthermore, impacts to species are predominantly anticipated to be temporary, as the infrastructure will be buried, plus a narrow permanent access track. However the access track is located immediately adjacent to the Southern Port Road and impacts associated are unlikely to be exacerbated beyond existing levels presented by the current road corridor.			
Grouped migratory birds <u>Endangered:</u> Black-tailed godwit <i>(Limosa limosa)</i>	E, Mi	These species generally occupy near shore environments including coastal lakes, beaches, inlets, bays and estuarine habitats, and is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, these species occur on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed	The species are considered likely to occur in areas of salt pan and mudflats within the study area. A total of 68.3 ha of potential habitat for these species was identified within the study area. Of this, the mudflats associated with RE 11.1.1 are considered the most likely habitat for these species to utilise.	2	Unlikely	Low risk – no further assessment recommended
<u>Vulnerable:</u> Ruddy turnstone <i>(Arenaria interpres)</i> Greater sand plover <i>(Charadrius leschenaultii)</i> Grey plover <i>(Pluvialis squatarola)</i> Little tern <i>(Sternula albigularis)</i>	V, Mi	The species are considered known to occur in areas adjacent to the study area and have been recorded on the spit to the north of the study area which is a known low tide roosting and foraging site. At a regional level these species have been recorded in high numbers in Bowling Green Bay Ramsar site to the south of the Project area.	Habitat within the Project area is considered marginal due to the distance of the alignment from the estuary, with the majority of the habitat only inundated during king tides and lack of suitable habitat features that provide protection and foraging resources. The potential habitat is considered suitable for foraging and dispersal, as it is marginal habitat that occurs outside of known breeding areas of all species. Up to 3.38 ha of marginal foraging and dispersal habitat may be cleared for the Project. No substantial impacts on the vegetation is anticipated as the Project will be under boring beneath the areas of claypan and mangroves, and using a trenching method in all other areas which will be subsequently re-filled. These species are highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project. Indirect impacts such as increased erosion, sedimentation and contamination will be managed as per Section 8.0. Other indirect impacts such as increased dust, light, noise and vibration will be temporary and localised. The areas of known roosting and foraging habitat associated with mudflat and claypan are intersected at the very edge of the highest astronomical tide. This area may be used by species during this event. To reduce impacts to the species, under boring is proposed as a construction methodology. This will retain habitat and reduce direct impacts to species in this area. Based on the areas impacted, the presence of more suitable habitat elsewhere (the sand spit to the north and Bowling Green Bay Ramsar area to the south) and the design measures proposed to avoid potential habitat the Project is not anticipated to substantially modify, destroy or isolate an area of important habitat for a migratory species, result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species or seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.			
<u>Migratory only:</u> Sanderling <i>(Calidris alba)</i> Broad-billed sandpiper <i>(Calidris falcinellus)</i> Pectoral sandpiper <i>(Calidris melanotos)</i> Red-necked stint <i>(Calidris ruficollis)</i> Double-banded plover <i>(Charadrius bicinctus)</i> Oriental plover <i>(Charadrius veredus)</i> White-winged black tern <i>(Chlidonias leucopterus)</i> Gull-billed tern <i>(Gelochelidon nilotica)</i> Oriental pratincole <i>(Glareola maldivarum)</i>	Mi					

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
Caspian tern (<i>Hydroprogne caspia</i>) Little curlew (<i>Numenius minutus</i>) Pacific golden plover (<i>Pluvialis fulva</i>) Common tern (<i>Sterna hirundo</i>) Crested tern (<i>Thalasseus bergii</i>) Marsh sandpiper (<i>Tringa stagnatilis</i>)						
Common sandpiper (<i>Actitis hypoleucos</i>)	Mi	The common sandpiper is known to occur in a range of wetland environments, both coastal and inland, with varying levels of salinity. Their primary habitat is rocky shorelines and narrow muddy margins of billabongs, lakes, estuaries and mangroves. The species has also been recorded on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties (Department of Climate Change, Energy, the Environment and Water, 2023c). Found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia. In Queensland, this species is widespread but scattered in the east, being recorded on passage on a few islands in the western Torres Strait. Satin flycatchers are also found extensively along the Great Dividing Range (Department of Climate Change, Energy, the Environment and Water, 2023c). A nationally important population is considered to be 160 individuals (0.1% flyway population).	The common sandpiper, common greenshank, sharp-tailed sandpiper, terek sandpiper, grey-tailed tattler, wood sandpiper and the wandering tattler are considered potential occurrences within the study area due to the presence of suitable habitat and records in the wider area, particularly adjacent to the Project area. These species are likely to utilise mudflats, mangrove and beaches throughout the study area. A total of 102.6 ha of potential habitat occurs within the study area. Habitat within the Project area is considered marginal due to the distance of the alignment from the estuary, with the majority of the habitat only inundated during king tides and lack of suitable habitat features that provide protection and foraging resources. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project.	2	Unlikely	Low risk – no further assessment recommended
Sharp-tailed sandpiper (<i>Calidris acuminata</i>)	V, Mi	In Australasia, the sharp-tailed sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, claypans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. In Queensland, the sharp-tailed sandpiper is recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in the centre and south-west (Department of Climate Change, Energy, the Environment and Water, 2023c). A nationally important population is considered to be 160 individuals (0.1% flyway population).	The potential habitat is considered suitable for foraging and dispersal only, as it is marginal habitat that occurs outside of known breeding areas of all five species. Up to 3.38 ha of marginal foraging and dispersal habitat may be cleared for the Project. No substantial impacts on the vegetation is anticipated as the Project will be under boring beneath the area of claypan and using a trenching method in all other areas which will be subsequently re-filled. While permanent impacts are anticipated due to the new access track proposed alongside the alignment, this track is only 0.84 ha of narrow and linear impact (4 m width) which runs immediately adjacent to the existing Southern Port Road, and impacts due to the Project are not anticipated to be greatly increased beyond existing levels.	2	Unlikely	Low risk – however further assessment is recommended based on potential presence of species within the Project area and presence of adjacent known important habitat.
Grey-tailed tattler (<i>Tringa brevipes</i>)	E, Mi	The grey-tailed tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. The grey-tailed tattler usually forages in shallow water, on hard intertidal substrates, such as reefs and rock platforms, in rock pools and among rocks and coral rubble, over which water may surge. The grey-tailed tattler usually roosts in the branches of mangroves or, rarely, in dense stands of other shrubs, or on snags or driftwood. Where mangroves are not present, it roosts on rocks that are sometimes partly submerged. It is also known to roost on beaches and reefs; however, it is rarely reported roosting on bare sandy beaches or sandbanks.	Indirect impacts such as increased erosion, sedimentation and contamination will be managed as per Section 8.0. Other indirect impacts such increased dust, light and noise will be temporary and localised.	2	Unlikely	Low risk – no further assessment recommended

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
		A nationally important population is considered to be 50 individuals (0.1% flyway population).				
Wood sandpiper (<i>Tringa glareola</i>)	Mi	The wood sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially <i>Melaleuca</i> and river red gums <i>Eucalyptus camaldulensis</i> and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying. They are rarely found using brackish wetlands, or dry stunted saltmarsh. Typically, they do not use coastal flats, but are occasionally recorded in stony wetlands. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains. In Western Australia, within wetlands, birds often occur within a few metres of one another and are concentrated at a few sites in a wetland. The wood sandpiper forages on moist or dry mud at the edges of wetlands, either along shores, among open scattered aquatic vegetation, or in clear shallow water. The wood sandpiper has been recorded loafing on a low, grassy hillock in a flooded meadow. It has also been recorded perched low in trees and on fences. A nationally important population is considered to be 130 individuals (0.1% flyway population).		2	Unlikely	Low risk – no further assessment recommended
Wandering tattler (<i>Tringa incana</i>)	Mi	The wandering tattler is generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. It is occasionally seen on coral reefs or beaches, and tends to avoid mudflats. Foraging habitat is among rocks or shingle, or in shallow pools at edges of reefs or beaches, mainly along the tideline. Wandering tattlers have been recorded roosting or perching on top of boulders surrounded by or close to water. The wandering tattler is a vagrant in the East Asian-Australasian Flyway and is uncommon in Australia, although it may sometimes be overlooked. There are a few records from around Darwin and as a passage migrant in Torres Strait, and along the east coast, often on offshore or nearshore islands and reefs, south as far as Moruya. The wandering tattler is also recorded on Lord Howe and Norfolk Islands. The distribution and status of this species in Asia and Australia is poorly known, partly because of confusion with the grey-tailed tattler. A nationally important population is considered to be 10-25 individuals (0.1% flyway population).		2	Unlikely	Low risk – no further assessment recommended
Common greenshank (<i>Tringa nebularia</i>)	E, Mi	The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. In Queensland, this species is widespread in the Gulf country and eastern Gulf of Carpentaria. It has been recorded in most coastal regions, possibly with a gap between north Cape York Peninsula and Cooktown. Inland, there have been a few records south of a line from near Dalby to Mount Guide, and sparsely scattered records elsewhere (Department of Climate Change, Energy, the Environment and Water, 2023c). A nationally important population is considered to be 110 individuals (0.1% flyway population).		2	Unlikely	Low risk – no further assessment recommended
Terek sandpiper (<i>Xenus cinereus</i>)	V, Mi	It mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (<i>Halosarcia</i> spp.). Mangroves are preferred for roosting (Department of Agriculture Water and the Environment, 2021). A nationally important population is considered to be 50 individuals (0.1% flyway population).		2	Unlikely	Low risk – no further assessment recommended

Species	EPBC Act status ¹	Habitat, threats and regional context	Nature and extent of potential impacts	Consequence	Likelihood	Risk
Brown noddy (<i>Anous stolidus</i>)	Mi	In Australia, the common noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast. The species is also rarely encountered off the coast of the Northern Territory, where only one breeding location with about 100-130 birds is known (Department of Climate Change, Energy, the Environment and Water, 2023c).	These species are considered potential to occur in the estuary waters within the study area. A total of 0 ha of suitable foraging and dispersal habitat occurs within the study area, as direct impacts to habitat for these species will be completely avoided. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project. The Project is designed to bore beneath the estuary of the Ross River as well as mangroves and claypans in the study area, as such, impacts to these marine species is considered unlikely.	2	Unlikely	Low risk – no further assessment recommended
Lesser frigatebird (<i>Fregata ariel</i>)	Mi	This species is found in tropical and subtropical seas, coasts and islands, nesting in low trees, shrubs and grasses (Department of Agriculture Water and the Environment, 2021b).		2	Unlikely	Low risk – no further assessment recommended
Great frigatebird (<i>Fregata minor</i>)	Mi	Great frigatebirds are found over open, tropical ocean waters and near offshore, oceanic nesting islands. Great frigatebirds breed on islands without predators. They nest in trees and shrubs, such as beach naupaka (<i>Scaevola sericea</i>), beach heliotrope (<i>Tournefortia argentea</i>), pisonia (<i>Pisonia grandis</i>), and mangroves (<i>Bruguiera</i> and <i>Rhizophora</i> species). Nests are usually above 0.5 m and may be several kilometers inland on larger islands. Great frigatebirds are superb soaring birds and do not need to come to land frequently to roost. They can soar for long period of time, including overnight (Department of Climate Change, Energy, the Environment and Water, 2023c).		2	Unlikely	Low risk – no further assessment recommended
Brown booby (<i>Sula leucogaster</i>)	Mi	The brown booby uses both marine and terrestrial habitat. The species occurs in, but is not restricted to, tropical waters of all major oceans, often staying close to breeding islands. The species is known to approach mainland coastlines more than other boobies and has been recorded in coastal waters, harbours and estuaries and near offshore islands but seldom flying over land.		2	Unlikely	Low risk – no further assessment recommended

¹ Conservation status under the EPBC Act, where CE=Critically Endangered, E=Endangered, V=Vulnerable and Mi=Migratory

Significant Impact Assessments

Critically endangered and endangered species

Eastern Curlew (Numenius madagascariensis)

Description and Status under the EPBC Act.

The species is listed as critically endangered, marine and migratory under the EPBC Act. The species' critically endangered status has been in effect under the EPBC Act from 26-May-2015. The eastern curlew is migratory. After breeding in the Northern Hemisphere, they move south during the Northern Hemisphere winter. The birds migrate by day and night at varying altitudes

The eastern curlew is the largest migratory shorebird in the world, with a long neck, long legs, and a very long downcurved bill. The wingspan is 110 cm and the birds weigh approximately 900 g. The head and neck are dark brown and streaked with darker brown. The chin and throat are whitish and there is a prominent white eye-ring; the iris is dark brown (Department of Climate Change, Energy, the Environment and Water, 2023a).

Distribution

Within Australia, the species has a coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. The species is rarely recorded inland. The distribution of the eastern curlew is continuous from Barrow Island and the Dampier Archipelago in Western Australia, through the Kimberley Division and along the Northern Territory, Queensland, the islands of the Torres Strait and New South Wales coasts. They occur patchily elsewhere. Far eastern curlews are endemic to the East Asian – Australasian Flyway. (Department of Climate Change, Energy, the Environment and Water, 2023a).

Habitat requirements

During the non-breeding season in Australia, the species is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (*Zosteraceae*). The species occurs occasionally on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. Individuals are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal saltworks and sewage farms.

The species roosts during high tide on sandy spits, sandbars and islets, on beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. They occasionally roost on reef-flats, in the shallow water of lagoons and coastal wetlands. Eastern curlews have occasionally been recorded roosting in trees (Department of Climate Change, Energy, the Environment and Water, 2023a).

The eastern curlew does not breed in Australia.

Threats

Threats in Australia, especially eastern and southern Australia, include ongoing human disturbance, habitat loss and degradation from pollution, changes to the water regime and invasive plants. A key threat is continued disturbance resulting in interruptions to feeding and roosting. This may have impacts on the ability of the species to migrate (Department of Climate Change, Energy, the Environment and Water, 2023a).

Survey Effort

Table 22 Survey Effort for Migratory Shorebirds

Survey techniques	Survey Effort	Requirements
The EPBC Act industry guidelines delineate survey effort in tidal and non-tidal locations. The study area is predominantly tidal. The survey guidelines recommend the following methods and survey effort for migratory shorebirds:	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023. - Literature review of migratory bird surveys	Requirements partially met Potential habitat for these species is limited within the Project area to areas of mudflats and shoreline. These areas were visited each day. Furthermore, several studies for the Port of

Survey techniques	Survey Effort	Requirements
Bird surveys in suitable habitat: 1 x survey in December 2 x surveys in January 1 x survey in February Surveys should be conducted during the day and consist of area searches or line transects in suitable habitat (i.e. wetland or other waterbodies and their surrounding vegetation (Department of Climate Change Energy the Environment and Water, 2022)). Seasonal considerations Surveys should be conducted between August and April when the species' generally arrive and depart in Australia.	within and adjacent to the study area. General habitat assessments were conducted throughout the study area.	Townsville have identified the species in the area. The field survey did not meet the temporal survey effort of the survey guidelines as surveys across three months were not completed. Due to the linear and disturbed nature of the Project area and the assumption that these species are present, survey effort is considered sufficient.

Species Presence and Utilisation of the Study Area

During field surveys in February 2023, eastern curlew individuals were identified within the study area, located outside the Project area. Previous studies by AECOM (AECOM, 2020) and NRA (NRA, 2021) have identified the species utilising the area adjacent to the study area at the sand spit to the north. The species was seen occupying the area of mudflat adjacent to the Ross River at low and high tide.

Three areas are considered potential foraging and roosting habitat within the study area. These were associated with the sandy foredunes to the north of the study area, adjacent to the bridge, the mudflat and claypan area as well as the grassland area adjacent to the claypan. The species is considered most likely to utilise the mudflat and claypan areas, with occasional foraging and dispersal throughout the grassland and sandy foredunes.

Habitat mapping was undertaken to estimate the extent of the potential habitat in the study area and Project area and is presented in Figure 5 in Appendix A.

Potential Impacts and Mitigation Measures

Potential impacts on this species include the loss of marginal, degraded foraging and roosting habitat which is potentially suitable only during a king tide. The extent of habitat loss is displayed in Table 23. The samphire forland on marine clay plains habitat, which is more suitable foraging and roosting habitat, has been avoided entirely in the Project design through the adoption of directional drilling.

Table 23 Impacts to the Eastern Curlew

Habitat Utilisation	Area (ha) within the Project area	Habitat Type
Foraging and roosting	0	Samphire forland on marine clay plains. This area is tidally inundated. The Project area would only be inundated during highest astronomical tides. This section of habitat will be under-bored and impacts will be avoided entirely.
Marginal foraging and roosting	3.4	<i>Sporobolus virginicus</i> grassland on marine clay plains and complex of <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> and <i>Spinifex sericeus</i> and <i>Casuarina equisetifolia</i> low woodland and herbland on fore dunes. These areas are considered marginal as they are either degraded (in the form of historically cleared habitat adjacent to the road corridor) or not typically utilised by the species (<i>Sporobolus virginicus</i> grassland). <i>Sporobolus virginicus</i> grassland within the Project area is typically only inundated during the highest astronomical tide.

Habitat Utilisation	Area (ha) within the Project area	Habitat Type
Total habitat within the Project area	3.4	Habitat within the Project area is considered marginal foraging and roosting only during king tides.

Mitigation measures are outlined in Section 8.0 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas.
- Weed wash down requirements for all vehicles coming into and exiting the study area. This will be strictly implemented as part of the Project Environmental Management Plan (Construction) CEMP to avoid the spread of weed species in and around the study area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire study area and will have stringent focus around waterways and tidally inundated areas.
- A “soft” ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides.
- If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.

Significant Impact Guidelines

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 24. Based on the assessment it is unlikely that the Project will have a significant impact on the eastern curlew.

Table 24 Significant Impact Assessment for the Eastern Curlew

Criterion - is there a real chance or possibility that the Project will...	Assessment
Lead to a long-term decrease in the size of a population?	Unlikely Project impacts to the species are anticipated to be short term in nature. Project works will require clearing of 3.38 ha of marginal foraging and roosting habitat in a linear area. This habitat would likely only be utilised during periods of highest astronomical tides, and the species is likely to prefer nearby habitat including the sand spit at the mouth of the Ross River. The proposed construction methodology within the direct impact area is trenching, which will be refilled following construction. Based on the groundcover species present, it is anticipated that the impacts to the groundcover will be predominantly temporary with a small area (0.84 ha) of permanent impacts to species' habitat associated with access tracks. Based on the small area and duration of impacts, predominantly temporary impacts, location of the Project outside the nationally important habitat for the species, the presence of higher value habitat located in surrounding areas, the Project is considered unlikely to lead

Criterion - is there a real chance or possibility that the Project will...	Assessment
	to a long-term decrease in the size of an important population of the species.
Reduce the area of occupancy of the species?	Unlikely The Project is adjacent to better habitat for the species, including the sand spit to the north, which has been identified as a nationally important population for the species. The Project is not anticipated to have direct impacts on this habitat containing a nationally important population as it is outside the Project area, and indirect impacts are managed through measures provided in Section 8.0. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be temporary in nature due to the species' mobility, likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. It is likely that these species will return to the study area during high tide events following the noise fading. As such a reduction to the area of occupancy of the species is unlikely.
Fragment an existing population into two or more populations?	Unlikely The species is migratory and highly mobile. As the species moves frequently and a small, linear area of marginal habitat will be impacted, it is unlikely for the Project to result in fragmentation of the species. Furthermore, the Project area is adjacent to an arterial road with existing noise impacts, which is unlikely to be favoured habitat by this species. The Project is collocated with existing disturbance, and is unlikely to materially change the landscape within which the birds already exist.
Adversely affect habitat critical to the survival of a species.	Unlikely The Project is not considered a national or internationally important area for migratory bird species, and is subject to existing disturbances. Mitigations will be in place to manage noise and other indirect impacts. As such, impacts to habitat critical for survival are not anticipated.
Disrupt the breeding cycle of a population?	Unlikely Impacts to the species may occur during construction in the form of noise and disturbance. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be temporary in nature due to the species' mobility, likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	Unlikely The Project is anticipated to impact 3.38 ha of marginal foraging and roosting habitat for the species. This will be refilled following construction, therefore impacts are predominantly temporary, with a small area of permanent access tracks. The area impacted is marginal, disturbance is expected to be short term and there is more abundant habitat nearby to the Project. As

Criterion - is there a real chance or possibility that the Project will...	Assessment
	such, minor modifications to the habitat within the Project area are unlikely to result in species decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	No Invasive species are not a key threat listed for the species in their SPRAT database. Nonetheless, weeds and pests will be managed by the Project CEMP. Following construction, the pipeline will be re-filled. Mitigation measures are proposed in Section 8.0 to reduce the likelihood of weed spread associated with the permanent access tracks. Moreover, the existing Southern Port Road adjacent to the Project already presents a risk of weed spread. As such, impacts from weeds and pests post construction are not anticipated to increase beyond existing levels.
Introduce disease that may cause the species to decline?	No Invasive species are not a key threat listed for the species in the Species Profile Risks and Threats (SPRAT) database. The CEMP will detail any necessary measures to prevent disease.
Interfere with the recovery of the species?	Unlikely The area of habitat impacted by the Project is marginal for foraging and roosting. It is anticipated that any impact to the species would be in the form of short disturbance impacts during and immediately post construction, and/or during brief periods of maintenance during the operational period of the pipeline. Temporary disturbance to the species would likely result in individuals moving to utilise more abundant habitat nearby. As such, interference with the recovery of the species is considered unlikely.

Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*)

Description and status under the EPBC Act

The Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*) is listed as Endangered under the EPBC Act. The subspecies was firstly listed as Vulnerable in 2016 before it was reassessed and uplisted to Endangered status effective from 5-January-2024. The Western Alaskan bar-tailed godwit is additionally classified as a Migratory species under the EPBC Act and afforded international protection through its inclusion under the Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) and the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) (Department of Climate Change, Energy, the Environment and Water, 2024).

The Western Alaskan bar-tailed godwit is 37 – 39 cm long, has a wingspan of 62 – 75 cm and weighs 250 – 450 g. Female Western Alaskan bar-tailed godwits tend to be larger than males, with a longer bill and duller breeding plumage. The non-breeding plumage of adults is narrowly streaked black and white, appearing variegated above. The crown upperparts and inner wing-coverts are pale brownish-grey. The neck and sides of the head are slightly paler than the rest of the upperparts and are finely streaked darker. They have a dark eye-stripe and bold white supercilium. The underbody is white with a pale brownish-grey wash. Fine dark streaks run across the breast (Department of Climate Change, Energy, the Environment and Water, 2024).

Distribution

Within Australia, the subspecies mainly occurs along the north and east coasts. The subspecies is widespread in the Torres Strait and along the east and south-east coasts of Queensland, New South Wales, and Victoria. Smaller populations have been recorded in Tasmania, where the subspecies is mainly found along the south-east coast. In South Australia it has mostly been recorded around coasts from Lake Alexandrina to Denial Bay. Populations have also been recorded in northern Australia, from Darwin east to the Gulf of Carpentaria (Department of Climate Change, Energy, the Environment and Water, 2024).

Habitat requirements

The subspecies does not breed in Australia therefore, habitat requirements are limited to foraging and roosting. The bar-tailed godwit usually forages near the edge, or in shallow water within tidal estuaries and harbours. They prefer exposed sandy or soft, muddy substrates on intertidal flats and beaches. They wade through shallow water or exposed mudflats, probing the substrate with their long bills for marine invertebrates and plant material. Foraging generally occurs during the day but sometimes at moonlight with feeding parties including up to 30 individuals (Department of Climate Change, Energy, the Environment and Water, 2024).

Threats

Within Australia, the Western Alaskan bar-tailed godwit is threatened by habitat loss and disturbance within roosting and feeding sites. Tourist activities such as fishing, power boating, jet skiing, four-wheel driving, walking with dogs, and night lighting can potentially disturb birds. The presence of off-leash dogs has been found to be particularly problematic. Sustained disturbances can prevent the birds from using parts of their habitat. Constant disturbance prior to migration can affect the ability of the birds to build up the energy stores required to complete long-distance migrations (Department of Climate Change, Energy, the Environment and Water, 2024).

Roosting tends to occur on large intertidal sandflats, spits, and banks. Less frequently, roosting occurs within mudflats, estuaries, coastal lagoons, and bays. These sites are often near beds of seagrass and sometimes near saltmarshes. Few reports have identified the bird roosting in areas of sandy ocean beach, rock platforms and coral reef flats. Where natural habitat is limited in availability, the subspecies may occur within anthropogenic wetlands such as aquaculture ponds, saltworks, and port, power and wastewater sites (Department of Climate Change, Energy, the Environment and Water, 2024).

Survey effort

Table 25 Survey effort

Survey techniques	Survey effort	Requirements
The <i>Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species</i> (Department of the Environment and Energy, 2017) delineate survey effort between tidal and non-tidal locations. With the Study area being predominantly tidal, the following methods for migratory shorebirds apply: Bird surveys in suitable habitat: 4 surveys for roosting habitat during periods most migratory species are present - Replicate surveys to measure variability 4 surveys conducted at low and high tide 1 survey during northern hemisphere breeding season to capture birds that remain in Australia. Surveys should be conducted during: - The months most shorebirds are present in the area (August – April) - Both tidal extremes. Local knowledge should be acquired to determine optimal survey time. Seasonal considerations Surveys should be conducted between August and April when the subspecies generally arrive and depart in Australia.	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023. - General habitat assessments were conducted throughout the Study area.	Requirements partially met Potential habitat for this subspecies within the Project area is restricted to intertidal mudflats and shoreline environments. These habitats were subject to daily survey effort over the course of the assessment. Additionally, multiple ecological studies conducted in association with the Port of Townsville have previously recorded the subspecies within the broader locality, confirming its presence in the region. The field survey did not meet the temporal survey effort of the survey guidelines as surveys across three months were not completed. However, given the linear and disturbed nature of the Project area and the assumed presence of the subspecies, survey effort is considered sufficient.

Occurrence and potential habitat within the Study area

Multiple individuals of the species were observed at the Sandspit adjacent to the Study area on the spit during field surveys in February 2023. The sand spit is part of Cleveland bay which is recognised a nationally important habitat for the species (NRA, 2020). At a regional level the species has been recorded in high numbers in Bowling Green Bay Ramsar site to the south of the Project area. A total of 68.3 ha of potential habitat for the species was identified within the study area. Of this, the mudflats and sand areas associated with RE 11.1.1 and 11.2.2 are considered the most likely habitat for these species to utilise. Within the Project area, the species is likely to utilise 3.38 ha of foraging and dispersal habitat.

Habitat mapping was undertaken to estimate the extent of the potential habitat in the Study area and Project area and is presented in Figure 5 in Appendix A.

Habitat critical to the survival of the species

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary (Department of Climate Change Energy the Environment and Water, 2023):

- 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 Western Alaskan bar-tailed godwit such as macrobenthos)
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species or ecological community.

Habitat critical to the survival of bar-tailed godwits includes a mosaic of feeding and roosting habitat. The species is likely highly selective about foraging environments due to its specialised feeding techniques. Feeding habitat includes exposed sandy or soft mud substrates on intertidal flats and beaches. In general, feeding takes place over the whole tidal range; however, like most migratory shorebird species, upper tidal flats are likely especially important. Feeding activities within these areas likely account for more than 70 percent of the species' cumulative foraging time. Large and robust networks of feeding sites are required for the species to cope natural and human-driven environmental changes (Xu et al. 2019). Roosting habitat consists primarily of large intertidal sandflats, spits, and banks. Less frequently, roosting occurs within mudflats, estuaries, coastal lagoons, and bays. These sites are often near beds of seagrass and sometimes near saltmarshes. A few reports have identified the bird roosting in areas of sandy ocean beach, rock platforms and coral reef flats (Department of Climate Change Energy the Environment and Water, 2023).

Potential impacts and mitigation measures

The extent of habitat loss is displayed in Table 26. The samphire forbland on marine clay plains habitat, which is more suitable foraging and roosting habitat, has been avoided entirely in the Project design through the adoption of directional drilling.

Table 26 Potential impacts to the Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*)

Habitat Utilisation	Area (ha) within the Project area	Habitat Type
Remnant foraging and dispersal	3.4	<i>Sporobolus virginicus</i> grassland on marine clay plains and complex of <i>Ipomoea pes-caprae</i> subsp. <i>Brasiliensis</i> , <i>Spinifex sericeus</i> and <i>Casuarina equisetifolia</i> low woodland and herbland on fore dunes. These areas are considered marginal as they are either degraded (in the form of historically cleared habitat adjacent to the road corridor) or not typically utilised by the species (<i>Sporobolus virginicus</i> grassland). <i>Sporobolus virginicus</i> grassland within the Project area is typically inundated during the highest astronomical tide.
Remnant (marginal) foraging and roosting,	0	Samphire forbland on marine clay plains. This area is tidally inundated. The Project area would only be inundated during highest astronomical tides. This section of habitat will be under-bored and impacts will be avoided entirely.

Habitat Utilisation	Area (ha) within the Project area	Habitat Type
Regrowth (marginal) foraging		
Total habitat within the Project area	3.4	Habitat within the Project area is considered remnant foraging and roosting only during very high or king tides.

Mitigation measures are outlined in Section 8.2.7 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas.
- Weed wash down requirements for all vehicles coming into and exiting the Study area. This will be strictly implemented as part of the Project Environmental Management Plan (Construction) CEMP to avoid the spread of weed species in and around the Study area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire Study area and will have stringent focus around waterways and tidally inundated areas.
- A 'soft' ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides.
- If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.

Significant Impact Assessment

An assessment of the significance of impacts to this species under the *EPBC Act Policy Statement 1.1 – Significant Impact Guidelines* (Department of the Environment, 2013) is provided in **Table 27**. The outcome of this assessment is that the Project is **unlikely** to result in a significant impact on the Western Alaskan bar-tailed godwit.

Table 27 Significant impact assessment – Western Alaskan bar-tailed godwit (*Limosa lapponica baueri*)

Criterion – is there a real chance or possibility that the Project will:	Assessment
Lead to a long-term decrease in the size of a population?	Unlikely Project impacts to the species are anticipated to be short-term in nature. Project works anticipate direct impacts to 3.38 ha of marginal foraging and roosting habitat in a linear corridor. Cleared habitat would likely only be utilised during periods of highest astronomical tides and be the less preferred option compared to nearby habitat at the sand spit and Ross River mouth. The National Directory of Important Migratory Shorebird Habitat (Weller <i>et al.</i>, 2020) identifies all known feeding and roosting sites of Bar-tailed godwits in Australia, which are considered as important habitat for the species. The Project is located adjacent to Cleveland Bay which contains a nationally important population of the species. The species was observed during field surveys at Cleveland Bay outside of the Project area.

Criterion – is there a real chance or possibility that the Project will:	Assessment
	The proposed construction methodology within the direct impact area is trenching, which will be refilled following construction. Based on the groundcover species present, it is anticipated that the impacts will be predominantly temporary, with a small area (0.84 ha) of permanent impacts to marginal habitat associated with access tracks. Based on the small area and duration of impacts, predominantly temporary impacts, the presence of higher value habitat located in surrounding areas including Cleveland Bay, the Project is considered unlikely to lead to a long-term decrease in the size of a population of the species.
Reduce the area of occupancy of the species?	Unlikely The Project is adjacent to more suitable habitat for the species, including the sand spit to the north as part of Cleveland Bay, which has been identified as a nationally important population for the species. The Project is not anticipated to have direct impacts on this habitat as it is located outside the Project area, and indirect impacts will be managed through measures provided in Section 8. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be temporary in nature, likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. The possibility remains that these species will return to the Study area during high tide events following the noise fading. As such a reduction to the area of occupancy of the species is unlikely.
Fragment an existing population into two or more populations?	Unlikely The species is migratory and highly mobile. As the species moves frequently and only a small, linear area of marginal habitat will be impacted, it is unlikely for the Project to result in fragmentation of the species. Furthermore, the Project area is adjacent to an existing arterial road causing noise impacts and reducing habitat suitability for the species. The Project is collocated with existing disturbance and is unlikely to materially change the landscape in which the birds already exist.
Adversely affect habitat critical to the survival of a species?	Unlikely The habitat within the Project area is not identified as nationally or internationally important for the Western Alaskan bar-tailed godwit (<i>Limosa lapponica baueri</i>) and does not meet the criteria for habitat critical to the species' survival under the EPBC Act. The area supports only marginal foraging and roosting habitat, which is typically utilised, if at all, during highest astronomical tides. In contrast, adjacent areas, including Cleveland Bay and the Bowling Green Bay Ramsar site, support known internationally and nationally significant populations and remain unaffected by the proposed action. The Project area is already subject to existing anthropogenic disturbance, including proximity to the Southern Port Road, and lacks the ecological characteristics that define critical habitat for this

Criterion – is there a real chance or possibility that the Project will:	Assessment
	subspecies, such as extensive intertidal flats or consistent high use roosting sites. Furthermore, direct impacts are restricted to a narrow, linear corridor and will predominantly be temporary in nature due to trenching activities followed by site rehabilitation. Directional drilling has been employed to avoid higher-quality habitats, including tidal claypans and samphire forblands. Mitigation measures will be implemented to manage potential indirect impacts, including noise attenuation, seasonal timing of works, and sediment control. Given the limited ecological value of the impacted habitat, the highly mobile nature of the species, and the availability of suitable habitat nearby, the Project is considered unlikely to adversely affect habitat critical to the survival of the Western Alaskan bar-tailed godwit.
Disrupt the breeding cycle of a population?	Unlikely Impacts to the species are likely to be highest during construction in the form of noise and disturbance. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. Only a small area of marginal foraging habitat (3.38 ha) will be impacted. With vast areas of adjacent foraging habitat, it is expected that the species will meet their energy requirements to support migration to breeding sites. An important population of Western Alaskan bar-tailed godwit is not considered to occur within the Project area as the habitat is of lower quality and no individuals were observed within the Project area during field surveys, including targeted migratory bird surveys. Therefore, the Project is considered unlikely to disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	Unlikely The Project is anticipated to impact 3.38 ha of marginal foraging and roosting habitat for the species. This will be refilled following construction and therefore impacts are predominantly temporary, with a small area of permanently cleared for access tracks (0.84 ha). The area impacted is marginal habitat, disturbance is expected to be short term and there is more abundant higher quality adjacent to the Project. As such, minor modifications to the habitat within the Project area are unlikely to result in species decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	Unlikely Invasive species are not a key threat listed for the species in the (Department of Climate Change Energy the Environment and Water, 2023). Nonetheless, weeds and pests will be managed by the Project CEMP. Following construction, the pipeline will be refilled. Mitigation measures are proposed in Section 8.0 to reduce the likelihood of weed spread associated with the Project area. Moreover, the existing

Criterion – is there a real chance or possibility that the Project will:	Assessment
	Southern Port Road adjacent to the Project already presents a risk of weed spread. As such, impacts from weeds and pests post construction are not anticipated to increase.
Introduce disease that may cause the species to decline?	Unlikely Invasive species are not a key threat listed for the species (Department of Climate Change Energy the Environment and Water, 2023). The CEMP will detail any necessary measures to prevent disease.
Interfere with the recovery of the species?	Unlikely The area of habitat impacted by the Project is marginal for foraging and roosting. It is anticipated that any impact to the species would be in the form of short disturbance during and immediately post construction, and/or during brief periods of maintenance during the operational period of the pipeline. Temporary disturbance to the species would likely result in individuals moving to utilise nearby, abundant habitat. As such, interference with the recovery of the species is considered unlikely.

Vulnerable Species

Great Knot (Calidris tenuirostris)

Description and Status under the EPBC Act.

The species is listed as vulnerable, marine and migratory under the EPBC Act. The conservation listing is effective 05 Jan 2024. The great knot is migratory. The species breeds in the northern hemisphere and undertakes biannual migrations along the East Asian-Australasian Flyway, wintering in Australia. The species does not breed in Australia.

The great knot is the largest of the calidrid shorebirds. It is a medium-sized shorebird and grows to a length of 26–28 cm with a wingspan of approximately 58 cm. In Australia, they are usually seen in non-breeding plumage which is grey upperparts with pale scalloping, and white underparts with heavy streaking on the neck, grading to spots on the breast (Department of Climate Change, Energy, the Environment and Water, 2024).

Distribution

The great knot has been recorded around the entirety of the Australian coast, with a few scattered records inland. The species is now absent from some sites along the south coast where it used to be a regular visitor. The greatest numbers of individuals are found in northern Australia; where the species is common on the coasts of the Pilbara and Kimberley, and in the Northern Territory from Darwin to the south-east Gulf of Carpentaria. Other important sites include the Broad Sound-Shoalwater Bay area, the Mackay region, and Moreton Bay in Queensland. The species is much less common in south-west Australia, South Australia, Victoria, and Tasmania (Department of Climate Change, Energy, the Environment and Water, 2024).

Habitat requirements

Great knots utilise sheltered coastal habitats with large intertidal mudflats or sandflats including inlets, bays, harbours, estuaries and lagoons. They are sometimes found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. The species rarely occurs on inland lakes and swamps.

Along sheltered coasts with areas of intertidal mudflats, they often congregate with other small species of shorebirds and can form large flocks comprising hundreds or thousands of birds. The species typically roosts in large groups often at the waters edge (Department of Climate Change, Energy, the Environment and Water, 2024).

Threats

Threats to the global population of the great knot across its range include: habitat loss and habitat degradation. Disturbance is also a potential issue for the species as they are sensitive to certain activities which may impact their high energy demands, these can include birds of prey, humans and vehicles (Department of Climate Change, Energy, the Environment and Water, 2024).

Survey Effort

Table 28 Survey Effort for Migratory Shorebirds

Survey techniques	Survey Effort	Requirements
The EPBC Act industry guidelines delineate survey effort in tidal and non-tidal locations. The study area is predominantly tidal. The survey guidelines recommend the following methods and survey effort for migratory shorebirds: Bird surveys in suitable habitat: 1 x survey in December 2 x surveys in January 1 x survey in February	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023. - Literature review of migratory bird surveys within and adjacent to the study area. - General habitat assessments were	Requirements partially met Potential habitat for these species is limited within the Project area to areas of mudflats and shoreline. These areas were visited each day. Furthermore, several studies for the Port of Townsville have identified the species in the area. The field survey did not meet the temporal survey effort of the survey

Survey techniques	Survey Effort	Requirements
Surveys should be conducted during the day and consist of area searches or line transects in suitable habitat (i.e. wetland or other waterbodies and their surrounding vegetation (Department of Climate Change Energy the Environment and Water, 2022)). Seasonal considerations Surveys should be conducted between August and April when the species' generally arrive and depart in Australia.	conducted throughout the study area.	guidelines as surveys across three months were not completed. Due to the linear and disturbed nature of the Project area and the assumption that these species are present, survey effort is considered sufficient.

Species presence and Utilisation of the Study area

Great knot was not identified in surveys however the sand spit adjacent to the Project area has been found to support nationally important populations (above 0.1% flyway population) during previous surveys.

Three areas are considered potential foraging and roosting habitat within the study area. These were associated with the sandy foredunes to the north of the study area, adjacent to the bridge, the mudflat and claypan area as well as the grassland area adjacent to the claypan. The species is considered most likely to utilise the mudflat and claypan areas, with occasional foraging and dispersal throughout the grassland and sandy foredunes.

The habitat within the study area is in seemingly good condition due to high diversity of ground layer and lower presence of weed species, particularly away from the Southern Port Road.

Habitat mapping was undertaken to estimate the extent of the potential habitat in the study area and Project area and is presented in Figure 5 in Appendix A.

Potential Impacts and Mitigation Measures

Potential impacts on this species include the loss of marginal, degraded foraging and roosting habitat which is potentially suitable only during a king tide. The extent of habitat loss is displayed in Table 29. The samphire forbland on marine clay plains habitat, which is more suitable foraging and roosting habitat, has been avoided entirely in the Project design through the adoption of directional drilling.

Table 29 Impacts to the great knot

Habitat Type	Area (ha) within the Project area	Habitat Type
Foraging and roosting	0	Samphire forbland on marine clay plains. This area is tidally inundated. The Project area would only be inundated during highest astronomical tides. This area will be under-bored and impacts will be avoided entirely.
Marginal foraging and roosting	3.4	<i>Sporobolus virginicus</i> grassland on marine clay plains and complex of <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> and <i>Spinifex sericeus</i> and <i>Casuarina equisetifolia</i> low woodland and herbland on fore dunes. These areas are considered marginal as they are either degraded (in the form of historically cleared habitat adjacent to the road corridor) or not typically utilised by the species (<i>Sporobolus virginicus</i> grassland). <i>Sporobolus virginicus</i> grassland within the Project area is typically inundated during the highest astronomical tide.
Total habitat within the Project area	3.4	Habitat within the Project area is considered marginal foraging and roosting only during king tides.

Mitigation measures are outlined in Section 8.0 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas.

- Weed wash down requirements for all vehicles coming into and exiting the study area. This will be strictly implemented as part of the Project Environmental Management Plan (Construction) CEMP to avoid the spread of weed species in and around the study area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire study area and will have stringent focus around waterways and tidally inundated areas.
- A “soft” ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides.
- If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.

Significant Impact Guidelines

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 30. Based on the assessment it is unlikely that the Project will have significant impact on the great knot.

Table 30 Significant Impact Assessment for the Great Knot

Criterion - is there a real chance or possibility that the Project will...	Assessment
Lead to a long-term decrease in the size of an important population of a species?	Unlikely Project impacts to the species are anticipated to be short term in nature. Project works will require clearing of 3.38 ha of marginal foraging and roosting habitat in a linear area. This habitat would likely only be utilised during periods of highest astronomical tides, and the species is likely to prefer nearby habitat including the sand spit at the mouth of the Ross River. The National Directory of Important Migratory Shorebird Habitat (Weller <i>et al.</i>, 2020) identifies all known feeding and roosting sites of great knot in Australia, which are considered as important habitat for the species. The Project is located adjacent to Cleveland Bay which contains a nationally important population of the species. However, the Project is located outside this area. The species was not detected within the study area during field surveys which included targeted migratory shorebird survey effort. The proposed construction methodology within the direct impact area is trenching, which will be refilled following construction. Based on the groundcover species present, it is anticipated that the impacts to the groundcover will be predominantly temporary with a small area (0.84 ha) of permanent impacts to species' habitat associated with access tracks. Based on the small area and duration of impacts, predominantly temporary impacts, location of the Project outside the nationally important habitat for the species, the presence of higher value habitat located in surrounding areas including to the east along Cleveland Bay, the Project is considered unlikely to lead to a long-term decrease in the size of an important population of the species.

Criterion - is there a real chance or possibility that the Project will...	Assessment
Reduce the area of occupancy of an important population?	Unlikely The Project is adjacent to better habitat for the species, including the sand spit to the north, which has been identified as a nationally important population for the species. The Project is not anticipated to have direct impacts on this habitat containing a nationally important population as it is outside the Project area, and indirect impacts are managed through measures provided in Section 8.0. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be temporary in nature due to the species' mobility, likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. It is likely that these species will return to the study area during high tide events following the noise fading. As such a reduction to the area of occupancy of the species is unlikely.
Fragment an existing important population into two or more populations?	Unlikely The species is migratory and highly mobile. As the species moves frequently and a small, linear area of marginal habitat will be impacted, it is unlikely for the Project to result in fragmentation of the species. Furthermore, the Project area is adjacent to an arterial road with existing noise impacts, which is unlikely to be favoured habitat by this species. The Project is collocated with existing disturbance, and is unlikely to materially change the landscape within which the birds already exist.
Adversely affect habitat critical to the survival of a species.	Unlikely The Project is not considered a national or internationally important area for migratory bird species, and is subject to existing disturbances. Mitigations will be in place to manage noise and other indirect impacts. As such, impacts to habitat critical for survival are not anticipated.
Disrupt the breeding cycle of an important population?	Unlikely Impacts to the species are likely to be highest during construction in the form of noise and disturbance. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be temporary in nature due to the species' mobility, likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. An important population of great knot is not considered to occur within the Project area as the habitat is of lower quality and no individuals were noted during field surveys including targeted migratory bird surveys. Therefore, the Project is not considered to disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	Unlikely The Project is anticipated to impact 3.38 ha of marginal foraging and roosting habitat for the species. This will be refilled following construction, therefore impacts are predominantly temporary, with a small area of permanent access tracks (0.84 ha).

Criterion - is there a real chance or possibility that the Project will...	Assessment
	The area impacted is marginal, disturbance is expected to be short term and there is more abundant, higher quality habitat nearby to the Project. As such, minor modifications to the habitat within the Project area are unlikely to result in species decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	No Invasive species are not a key threat listed for the species in the SPRAT database. Nonetheless, weeds and pests will be managed by the Project CEMP. Following construction, the pipeline will be refilled. Mitigation measures are proposed in Section 8.0 to reduce the likelihood of weed spread associated with the Project area. Moreover, the existing Southern Port Road adjacent to the Project already presents a risk of weed spread. As such, impacts from weeds and pests post construction are not anticipated to increase.
Introduce disease that may cause the species to decline?	No Invasive species are not a key threat listed for the species in their Species Profile Risks and Threats (SPRAT) database. The CEMP will detail any necessary measures to prevent disease.
Interfere substantially with the recovery of the species?	Unlikely The area of habitat impacted by the Project is marginal for foraging and roosting. It is anticipated that any impact to the species would be in the form of short disturbance impacts during and immediately post construction, and/or during brief periods of maintenance during the operational period of the pipeline. Temporary disturbance to the species would likely result in individuals moving to utilise more abundant habitat nearby. As such, interference with the recovery of the species is considered unlikely.

Sharp-tailed sandpiper (*Calidris acuminata*)

Description and Status under the EPBC Act.

The Sharp-tailed sandpiper (*Calidris acuminata*) is listed as Vulnerable, Marine and Migratory under the EPBC Act effective since 05-Jan-2024. This migratory species breeds in the northern hemisphere and undertakes biannual migrations along the East Asian-Australasian Flyway, wintering in Australia. The species does not breed in Australia.

Sharp-tail sandpipers are approximately 17 - 22 cm long, have a wingspan of 36 - 43 cm, and weigh around 65 g. They are a small to medium sized sandpiper, with a pot-belly and rather drawn-out rear end. They have a small, flat head on top of a short neck. Both sexes appear similar but show marked seasonal variation in plumage. Juveniles are distinct from adults. Non-breeding plumage as seen in Australia features head and neck with a pale grey-brown colour, covered with fine dark streaks and a distinct rufous cap. The bird's upperparts are strongly patterned and appear mottled. The mantle, back, and scapulars are grey-brown with ill-defined black centres or streaks (DCCEEW, 2024)

Distribution

During the non-breeding season, approximately 91 percent of the East Asian - Australasian population occurs in Australia and New Zealand. Sharp-tailed sandpipers occur within all states of Australia, found mostly in the south-east and are widespread in both inland and coastal locations. The species also occurs in both freshwater and saline habitats. In Queensland, the species is widespread along the coast and is sparsely scattered inland (DCCEEW, 2024).

Habitat requirements

The Sharp-tailed sandpiper breeds in the northern hemisphere therefore, only foraging and roosting habitat is found in Australia.

The species utilises a range of aquatic and marine habitat types from fresh to hypersaline. The Sharp-tailed sandpiper feeds along the edge of water on mudflats, coastal and inland wetlands, and sewage ponds. After rainfall events, the species may also feed on agricultural areas. Sharp-tailed sandpipers are omnivorous, their diet comprising mostly seeds, worms, molluscs, crustaceans, and insects, which they prey on by probing muddy substrate. The species roosts on rocky and sandy beaches, freshwater habitats, and inland saltwater habitats (DCCEEW, 2024).

Threats

In Australia, the dominant threat to sharp-tailed sandpipers is the increasing frequency and severity of drought. Elsewhere, the main threats are changes to coastal stopover locations, particularly along the coast of the Yellow Sea. The Yellow Sea is heavily affected by rapid development, invasive weeds, pollution, hunting, and incidental drowning in fishing nets and traps. The habitat area is also shrinking through a combination of restricted inflow of sediments from increasingly dammed rivers. A reduction in the extent or quality of habitat in one part of the Flyway can have impacts for the species, despite other habitats remaining in good condition, affecting the species throughout different stages of migration. Therefore, population changes experienced in Australia may be driven by processes occurring thousands of kilometres away (DCCEEW, 2024).

Survey effort

Table 31 Survey effort for Sharp-tailed sandpiper (*Calidris acuminata*)

Survey techniques	Survey Effort	Requirements
The <i>Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species</i> (Department of the Environment and Energy, 2017) delineate survey effort between tidal and non-tidal locations. With the Study area being predominantly tidal, the following methods for migratory shorebirds apply: Bird surveys in suitable habitat: 4 surveys for roosting habitat during periods most migratory species are present - Replicate surveys to measure variability 4 surveys conducted at low- and high tide 1 survey during northern hemisphere breeding season to capture birds remaining in Australia Surveys should be conducted during: - The months most shorebirds are present in the area (August – April) - Both tidal extremes. Local knowledge should be acquired to determine optimal survey time. Seasonal considerations Surveys should be conducted between August and February when the species' generally arrive and depart in Australia.	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023. - General habitat assessments were conducted throughout the Study area.	Requirements partially met Potential habitat for these species is limited within the Project area to areas of mudflats and shoreline. These areas were visited each day. Furthermore, several studies for the Port of Townsville have identified the species in the area. The field survey did not meet the temporal survey effort of the survey guidelines as surveys across three months were not completed. Due to the linear and disturbed nature of the Project area and the assumption that these species are present, survey effort is considered sufficient.

Occurrence and potential habitat within the Study area

Multiple individuals of the species were observed at the Clay pan within the Study area during field surveys in February 2023. Records are scattered throughout the study area and adjacent habitat at Cleveland Bay hosts a Sharp-tailed sandpiper population of international significance (Weller *et al.*, 2020). The species is likely to utilise mudflats, mangrove and beaches throughout the study area.

Habitat within the Project area is considered marginal due to the distance of the alignment from the estuary, with the majority of the habitat only inundated during the highest tides and lack of suitable habitat features that provide protection and foraging resources.

Habitat mapping was undertaken to estimate the extent of the potential habitat in the Study area and Project area and is presented in Figure 5 in Appendix A.

Important population

Important populations are defined as:

- 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 study area abuts Cleveland bay which has been recognised as habitat for an international significant population of the Sharp-tailed sandpiper. Therefore, this area can be considered as a key source population for dispersal of the species. It is possible that individuals from this population utilise marginal foraging and dispersal habitat within the Project area during the highest tides.

Internationally important populations have one of the following attributes:

- 1 percent of the individuals in a population of one species or subspecies of waterbird or;
- a total abundance of at least 20,000 waterbirds.

Habitat critical to the survival of the species

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary (Department of the Environment, 2013):

- 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 Sharp-tailed sandpiper, such as macrobenthos); .
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species.

Sharp-tailed sandpipers are more flexible in their habitat choice than most shorebird species during the non-breeding season. The species occurs both along coasts and within inland wetlands - from fresh to hypersaline. Sharp-tailed sandpipers are also more tolerant of grassy vegetation than most shorebirds. The highest density of the species can be found around grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches (DCCEW, 2024).

Potential impacts and mitigation measures

Potential impacts on this species include the loss of marginal, degraded foraging and roosting habitat which is potentially suitable only during the highest tides. The extent of habitat loss is displayed in **Table 32**. The samphire forbland on marine clay plains habitat, which is more suitable foraging and roosting habitat for the species, has been avoided entirely in the Project design through the adoption of directional drilling methods.

Table 32 Potential impacts to the Sharp-tailed sandpiper (*Calidris acuminata*)

Habitat Type	Area (ha) within the Project area	Habitat Type
Remnant foraging and roosting	3.4	<i>Sporobolus virginicus</i> grassland on marine clay plains and complex of <i>Ipomoea pes-caprae</i> subsp. <i>Brasiliensis</i> , <i>Spinifex sericeus</i> and <i>Casuarina equisetifolia</i> low woodland and herbland on fore dunes. These areas are considered marginal as they are either degraded (in the form of historically cleared habitat adjacent to the road corridor) or not typically utilised by the species (<i>Sporobolus virginicus</i> grassland). <i>Sporobolus virginicus</i> grassland within the Project area is typically inundated during the highest astronomical tide.

Habitat Type	Area (ha) within the Project area	Habitat Type
Remnant (marginal) foraging and roosting, Regrowth (marginal) foraging	0	Samphire forland on marine clay plains. This area is tidally inundated. The Project area would only be inundated during highest astronomical tides. This section of habitat will be under-bored and impacts will be avoided entirely.
Total habitat within the Project area	3.4	Habitat within the Project area is considered remnant foraging and roosting only during very high or king tides.

Mitigation measures are outlined in Section 8.2.7 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas.
- Weed wash down requirements for all vehicles coming into and exiting the Study area. This will be strictly implemented as part of the Project Environmental Management Plan (Construction) CEMP to avoid the spread of weed species in and around the Study area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire Study area and will have stringent focus around waterways and tidally inundated areas.
- A 'soft' ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides.
- If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.

Significant Impact Assessment

An assessment of the significance of impacts to this species under the *EPBC Act Policy Statement 1.1 – Significant Impact Guidelines* (Department of the Environment, 2013) is provided in **Table 33**. The outcome of this assessment is that the Project is **unlikely** to result in a significant impact on the Sharp-tailed sandpiper.

Table 33 Significant impact assessment – Sharp-tailed sandpiper (*Calidris acuminata*)

Criterion – is there a real chance or possibility that the Project will:	Assessment
Lead to a long-term decrease in the size of an important population of a species?	Unlikely Project impacts to the species are anticipated to be short term. Up to 3.38 ha of marginal foraging and dispersal habitat may be cleared for the Project. No substantial impacts on the vegetation is anticipated as the Project will be under boring beneath the area of claypan and using a trenching method in all other areas which will be subsequently re-filled. While permanent impacts are anticipated due to the new access track proposed alongside the alignment, this track is only 0.84 ha of narrow and linear impact (4 m width) which runs immediately adjacent to the existing Southern Port Road, and impacts due to the Project are not anticipated to be greatly increased beyond existing levels.

Criterion – is there a real chance or possibility that the Project will:	Assessment
	The National Directory of Important Migratory Shorebird Habitat (Weller <i>et al.</i>, 2020) identifies all known feeding and roosting sites of Sharp-tailed sandpiper in Australia, which are considered as important habitat for the species. The Project is located adjacent to Cleveland Bay which contains an internationally important population of the species. The species was observed during field surveys at Cleveland Bay outside of to the Project footprint. The proposed construction methodology within the direct impact area is trenching, which will be refilled following construction. Based on the groundcover species present, it is anticipated that the impacts to vegetation will be predominantly temporary with a small area (0.84 ha) of permanent impacts to marginal habitat associated with access tracks. Based on the small area and duration of impacts, predominantly temporary impacts and the presence of higher value habitat located in surrounding areas at Cleveland Bay, the Project is considered unlikely to lead to a long-term decrease in the size of an important population of the species.
Reduce the area of occupancy of an important population?	Unlikely The Project is adjacent to more suitable habitat for the species, including the sand spit to the north as part of Cleveland Bay, which has been identified as habitat for an internationally important population for the species. The Project is not anticipated to have direct impacts on this habitat as it is located outside the Project area, and indirect impacts are managed through measures provided in Section 8. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be temporary, likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. The possibility remains that these species will return to the Study area during high tide events following the noise fading. As such a reduction to the area of occupancy of the species is unlikely.
Fragment an existing important population into two or more populations?	Unlikely The species is migratory and highly mobile. As the species moves frequently and only a small, linear area of marginal habitat will be impacted, it is unlikely for the Project to result in fragmentation of the species. Furthermore, the Project area is adjacent to an existing arterial road inflicting noise impacts and reducing habitat suitability for the species. The Project is collocated with existing disturbance and is unlikely to materially change the landscape in which the birds already exist.
Adversely affect habitat critical to the survival of a species?	Unlikely The Project area is not considered as nationally or internationally important habitat for the Sharp-tailed sandpiper and is subject to existing disturbances. Mitigations will be in place to manage noise and other indirect impacts. As such, impacts to habitat critical for survival of the species are unlikely.

Criterion – is there a real chance or possibility that the Project will:	Assessment
Disrupt the breeding cycle of an important population?	Unlikely Impacts to the species are likely to be highest during construction in the form of noise and disturbance. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. Only a small area of marginal foraging habitat (3.38 ha) will be impacted. With vast areas of adjacent foraging habitat, it is expected that the species will meet their energy requirements to support migration to breeding sites. An important population of Sharp-tailed sandpiper is not considered to occur within the Project area as the habitat is marginal and no individuals were observed within its extent during field surveys, including targeted migratory bird surveys. Therefore, the Project is considered unlikely to disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	Unlikely The Project is anticipated to impact 3.38 ha of marginal foraging and roosting habitat for the species. This will be refilled following construction and therefore impacts are predominantly temporary, with a small area of permanent access tracks (0.84 ha). The area impacted is marginal habitat, disturbance is expected to be short term and there is more abundant, higher quality habitat adjacent to the Project area. As such, minor modifications to the habitat within the Project area are unlikely to result in species decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	No Invasive species possess a potential threat to the species. Invasion of mudflats and coastal saltmarshes by mangroves and cord grass (<i>Spartina alterniflora</i>) can impact the species' habitat (DCCEEW, 2024). Weeds and pests will be managed by the Project CEMP, mitigating potential impacts through invasive species. Following construction, the pipeline will be refilled. Mitigation measures are proposed in Section 8.0 to reduce the likelihood of weed spread associated with the Project area. Moreover, the existing Southern Port Road adjacent to the Project already presents a risk of weed spread. As such, impacts from weeds and pests post construction are not anticipated to increase.
Introduce disease that may cause the species to decline?	No The introduction of weeds, pests and disease as a result of Project activities will be actively managed and mitigated through actions outlined in the CEMP. Mitigation measures managing the spread of weeds, pest and disease as part of the CEMP are listed in section 8.2.4.
Interfere substantially with the recovery of the species?	Unlikely The area of habitat impacted by the Project is marginal for foraging and roosting. It is anticipated that any impact to the species would be temporary during and immediately post construction, and/or during

Criterion – is there a real chance or possibility that the Project will:	Assessment
	brief periods of maintenance during the operational period of the pipeline. Temporary disturbance to the species would likely result in individuals moving to utilise nearby, abundant habitat. As such, interference with the recovery of the species is considered unlikely.

Water Mouse (*Xeromys myoides*)

Description and Status under the EPBC Act

The water mouse is listed as vulnerable under the EPBC Act. The species is a small rodent, with a maximum head to body length of 126 mm and a maximum weight of 64 g. The species has a silky pelt that is water- and mud-resistant, with a characteristic white underbelly and steel grey upperparts.

The water mouse can be distinguished from other species that may be encountered in similar habitat by its long and flattened head shape, slender, thinly haired and very finely ringed tail, and the presence of only two molars in each of the upper and lower rows of teeth (Department of the Environment, 2015c).

Distribution

The water mouse occurs across an extensive although almost linear range in coastal and near-coastal Queensland and the Northern Territory. However, the regions in which it occurs are widely separated. In Townsville the species is mapped as having habitat that may occur, the nearest species record is mapped 290 km away (Atlas of Living Australia, 2023).

Habitat requirements

The habitat of the Water Mouse is aquatic environments, including coastal saltmarsh, samphire shrublands, saline reed-beds and saline grasslands, mangroves, and coastal freshwater wetlands, and wet heathlands as demonstrated through occupancy by the species continuously, periodically or occasionally in the past or present. The attributes of water mouse habitat providing for the species for various life cycle include but are not limited to:

- intact hydrology
- prey resources
- a defined supralittoral bank
- structures (tidal pools, channels, crab holes, pneumatophores, crevices in bark) (Department of the Environment, 2015c).

Threats

The primary threat to water mouse is habitat degradation due to urban development, saltwater intrusion, spread of exotic pasture grasses and impacts of feral animals and livestock (Department of the Environment, 2015c).

Survey Effort

Table 34 Survey Effort for Water Mouse

Survey techniques	Survey Effort	Requirements
Survey Techniques • Daytime searches 1-2 hours per hectare of intertidal habitat • Elliott trapping 100 trap nights per hectare of suitable water mouse habitat • Camera trapping	Daytime searches • 6 hours of daytime searches in intertidal habitat Camera Traps • Camera traps were deployed throughout the study area, particularly along creek lines, totalling 42 camera trap nights following the Queensland Government terrestrial vertebrate fauna guidelines Previous survey effort • A 2019 survey by AECOM included a total survey effort of 240 trap nights, failed to detect the species. • 2004 surveys conducted at the mouth of the Ross River and involving a total survey effort of 290 trap nights and active	Requirements partially met Camera traps and daytime searches were used to supplement previous survey effort within the study area. Due to the linear and disturbed nature of the Project within the same area surveyed during previous studies, survey effort is considered sufficient.

Survey techniques	Survey Effort	Requirements
	searches, also failed to detect the water mouse (BAAM, 2004).	

Species presence and Utilisation of the Study area

Evidence of the species was not found during field surveys in February 2023, nor has it been identified in previous field surveys despite significant survey effort. One area was considered potential breeding, foraging and dispersal habitat for the species, being the mangrove area to north of the Project.

This area contained a variety of mangrove species, intact hydrology only marginally impacted by the presence of the Southern Port Road, prey resources in the form of crustaceans and other mangrove dwelling species, a define supralittoral bank in some areas of this habitat type and an abundance of tidal pools, crab holes and crevices in bark that may potentially be used as nesting habitat.

The habitat within the study area is in seemingly good condition due to high diversity of ground layer and lower presence of weed species, particularly away from the Southern Port Road.

Habitat mapping was undertaken to estimate the extent of the potential habitat in the study area and Project area and presented in Figure 6 in Appendix A.

Potential Impacts and Mitigation Measures

Potential impacts on this species are indirect in nature only, with all direct impacts avoided entirely in the Project design through the adoption of directional drilling. The extent of habitat loss is displayed in Table 35.

Table 35 Impacts to the Water Mouse

Habitat Type	Area (ha) within the Project area	Habitat Type
Breeding, foraging and dispersal	0.00	Closed forests and low closed forests dominated by mangroves
Total habitat within the Project area	0.00	Suitable habitat is not subject to direct impacts by the Project.

Mitigation measures are outlined in Section 8.0 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas
- Weed wash down requirements for all vehicles coming into and exiting the study area. This will be strictly implemented as part of the Projects CEMP to avoid the spread of weed species in and around the study area.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire study area and will have stringent focus around waterways and tidally inundated areas.

Significant Impact Guidelines

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in Table 36. Based on the assessment it is unlikely that the Project will have a significant impact on the water mouse.

Table 36 Significant Impact Assessment for the Water Mouse

Criterion - is there a real chance or possibility that the Project will...	Assessment
Lead to a long-term decrease in the size of an important population of the species?	Unlikely Project impacts to the species are anticipated to be short term in nature. Project works will avoid all suitable breeding foraging and dispersal habitat within the study area. Based off previous survey effort, it is considered that if water mouse is present within the study area, it is at a low population density. Given the lack of habitat impacted, low density of species if present, and presence of habitat immediately adjacent to the Project, it is unlikely that a long term decrease in the size of a population would occur.
Reduce the area of occupancy of an important population?	No The Project is unlikely to reduce the area of occupancy of the species as direct impacts to water mouse habitat (mangroves) within the study area will be completely avoided through under-boring. Moreover, (based on previous survey effort), if they are present, they are at sufficiently low density that indirect and temporary impacts such as dust, noise, light and vibration is unlikely cause a significant reduction in the area of occupancy.
Fragment an existing important population into two or more populations?	No Potential water mouse habitat within the Project area is already fragmented by the Southern Port Road, and vegetation clearing in this habitat will be completely avoided through under-boring in this section. The Project runs adjacent to this and is unlikely to further exacerbate this.
Adversely affect habitat critical to the survival of a species?	Unlikely It is not considered practicable to describe habitat within the study area as habitat critical to the survival of the water mouse. Areas with potential to be habitat for this species are extensive and unsurveyed and newly identified threats to the species are ongoing and intensifying.
Disrupt the breeding cycle of an important population?	No Impacts to the species are likely to be highest during construction, and will only be indirect impacts as the species' habitat will be completely avoided through under-boring of the pipeline in this section. Based off previous field effort, it is considered a low chance for the species to be present within the Project area. The area impacted will also be assessed by a spotter catcher in a preclearance survey, with further mitigation measures applied should animal breeding places be identified as required by the Queensland <i>Nature Conservation Act 1992</i>.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	No The Project will not impact any breeding, foraging or dispersal habitat for the species as complete avoidance of direct impacts to the mangroves is proposed for the Project through under-boring in this section. Works are to occur adjacent to previous clearing for the Southern Port Road and trenches will be refilled post construction. The linear nature of the corridor is unlikely to cause a decrease of habitat extent to a level that would result in species decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	No Invasive species are not a key threat listed for the species in their SPRAT database. Nonetheless, weeds and pests will be managed by the Project CEMP.

Criterion - is there a real chance or possibility that the Project will...	Assessment
	The mangrove area will be completely under-bored and no clearing for the pipeline, access tracks or any ancillary works will be required for this species' habitat. As such, impacts from weeds and pests are post construction are not anticipated to increase.
Introduce disease that may cause the species to decline?	No Invasive species are not a key threat listed for the species in their SPRAT database. The CEMP will detail any necessary measures to prevent disease.
Interfere with the recovery of the species?	No The Project will completely avoid any vegetation clearing for the species' habitat (mangrove area) as this section will be completely under-bored. Any impacts to this area are expected to be minor, indirect and temporary, restricted to the construction phase only. Moreover, the pipeline trench will be refilled and allowed to regenerate and will likely result in a short-term disturbance before habitat values are returned to a previous level. Therefore the Project is not expected to interfere with the recovery of the water mouse.

Migratory species

Whimbrel (Numenius phaeopus)

Description and Status under the EPBC Act

The whimbrel is listed as migratory and marine under the EPBC Act. Medium sized curlew, with a length of around 40–45 cm, weight of approximately 350 g and wingspan of 76–89 cm. The Whimbrel is dark brown on the upper half of its body, varyingly spotted with pale fringes. The underside is predominately white with dark coarse brown streaks. Its legs are dull bluish-grey in colour, sometimes with a tinge of green. Adult whimbrels have a strongly patterned head with a dark brown crown and eye-strip (Department of Climate Change, Energy, the Environment and Water, 2023c).

Distribution

The Whimbrel is a regular migrant to Australia and New Zealand, with a primarily coastal distribution. There are scattered inland records of Whimbrels in all regions. It is found in all states but is more common in the north. It is found along almost the entire coast of Queensland and NSW and regularly at some places in Victoria, Tasmania, and South Australia (Department of Climate Change, Energy, the Environment and Water, 2023c).

Habitat requirements

The Whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used saltflats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms. The Whimbrel is one of a small group of shorebird species that regularly roost in mangroves and other structures flooded at high tide (Department of Climate Change, Energy, the Environment and Water, 2023c).

Threats

Threats to the global population of the whimbrel across its range include habitat loss and habitat degradation. Disturbance is also a potential issue for the species as they are sensitive to certain activities which may impact their high energy demands, these can include birds of prey, humans and vehicles (Department of Climate Change, Energy, the Environment and Water, 2023c).

Survey Effort

Table 37 Survey Effort for Whimbrel

Survey techniques	Survey Effort	Requirements
The EPBC Act industry guidelines delineate survey effort in tidal and non-tidal locations. The study area is predominantly tidal. The survey guidelines recommend the following methods and survey effort for migratory shorebirds: Bird surveys in suitable habitat: 1 x survey in December 2 x surveys in January 1 x survey in February Surveys should be conducted during the day and consist of area searches or line transects in suitable habitat (i.e. wetland or other waterbodies and their surrounding vegetation (Department of Climate Change Energy the Environment and Water, 2022). Seasonal considerations	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023. - Literature review of migratory bird surveys within and adjacent to the study area. - General habitat assessments were conducted throughout the study area.	Requirements partially met Potential habitat for this species is limited within the Project area to areas of mudflats and shoreline. These areas were visited each day. Furthermore, several studies for the Port of Townsville have identified the species in the area. Due to the linear and disturbed nature of the Project area and the assumption that these species are present, survey effort is considered sufficient.

Survey techniques	Survey Effort	Requirements
Surveys should be conducted between August and April when the species' generally arrive and depart in Australia.		

Species presence and Utilisation of the Study area

During field surveys in February 2023, whimbrel individuals were identified within the study area. Furthermore, previous studies by AECOM (AECOM, 2020) and NRA (NRA, 2021) have identified the species utilising the area adjacent to the study area at the sand spit to the north. The species was identified utilising the area of mudflat adjacent to the Ross River at low and high tide. While the field survey did not identify enough individuals to meet the criteria for nationally important populations, the requirements of the survey guidelines were only partially met. Assessment of studies adjacent to the Project found that the sand spit to the north of the Project supports nationally important populations of the species. As individuals were found in high numbers (40 individuals) during the field survey.

Three habitat types within the Project area are considered potential foraging and roosting habitat within the study area. These were associated with the sandy foredunes to the north of the study area, adjacent to the bridge, the mangroves, mudflat and claypan area as well as the grassland area adjacent to the claypan. The species is considered most likely to utilise the mudflat and claypan areas, with occasional foraging and dispersal throughout the grassland and sandy foredunes.

The habitat within the study area is in seemingly good condition due to high diversity of ground layer and lower presence of weed species, particularly away from the Southern Port Road.

Habitat mapping was undertaken to estimate the extent of the potential habitat in the study area and Project area. The final map is presented in Figure 7 in Appendix A.

Potential Impacts and Mitigation Measures

Potential impacts on this species include the loss of marginal, degraded foraging and roosting habitat which is potentially suitable only during a king tide. The extent of habitat loss is displayed in **Table 43** and Figure 7 in Appendix A. The samphire forland on marine clay plains habitat and mangrove habitat, which is more suitable foraging and roosting habitat for the species, has been avoided entirely in the Project design through the adoption of directional drilling.

Table 38 Impacts to the whimbrel

Habitat Type	Area (ha) within the Project area	Habitat Type
Foraging and roosting	0	Samphire forland on marine clay plains. This area is tidally inundated. The Project area would only be inundated during highest astronomical tides. This area will be under-bored and impacts will be avoided entirely.
Roosting	0	Closed forests and low closed forests dominated by mangroves, utilised for roosting habitat. This area will be under-bored and impacts will be avoided entirely.
Marginal foraging and roosting	3.4	<i>Sporobolus virginicus</i> grassland on marine clay plains and complex of <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> and <i>Spinifex sericeus</i> and <i>Casuarina equisetifolia</i> low woodland and herbland on fore dunes. These areas are considered marginal as they are either degraded (in the form of historically cleared habitat adjacent to the road corridor) or not typically utilised by the species (<i>Sporobolus virginicus</i> grassland). <i>Sporobolus virginicus</i> grassland within the Project area is typically inundated during the highest astronomical tide.
Total habitat within the Project area	3.4	Habitat within the study area is considered marginal foraging and dispersal only during king tides.

Mitigation measures are outlined in Section 8.0 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas.
- Weed wash down requirements for all vehicles coming into and exiting the study area. This will be strictly implemented as part of the Project CEMP to avoid the spread of weed species in and around the study area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire study area and will have stringent focus around waterways and tidally inundated areas.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- A 'soft' ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species.
- If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides.
- If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.

Significant Impact Guidelines

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for this species is provided in **Table 44**. Based on the assessment it is unlikely that the Project will have significant impact on the whimbrel.

Table 39 Significant Impact Assessment for the Whimbrel

Criterion - is there a real chance or possibility that the Project will...	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Unlikely The Project is anticipated to impact 3.38 ha of marginal foraging and roosting habitat for the species. This will be refilled following construction, therefore impacts are predominantly temporary, with a small area of permanent access tracks (0.84 ha). The area impacted is marginal, disturbance is expected to be short term and there is more abundant, higher quality habitat nearby to the Project. While an area of important habitat is potentially present within the study area, the Project area does not intersect this as the proposed construction methodology is to under bore beneath the mud flats which is more suitable habitat for the species. Furthermore, direct impacts to areas of mangroves potentially used for roosting have been avoided through directional drilling.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	No Invasive species are not a key threat listed for the species in their SPRAT database. Nonetheless, weeds and pests will be managed by the Projects CEMP. Following construction, the pipeline will be refilled and allowed to regenerate. Mitigation measures are proposed in Section 8.0 to reduce the likelihood of weed spread associated with the permanent access tracks. Moreover, the existing Southern Port Road adjacent to the Project already presents a risk of weed

Criterion - is there a real chance or possibility that the Project will...	Assessment
	spread. As such, impacts from weeds and pests are post construction are not anticipated to increase.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	No The Project is not anticipated to seriously disrupt the lifecycle of a significant proportion of the population as it is predominately impacting marginal foraging and roosting habitat. The areas impacted are small and linear in nature, with larger areas of more abundant habitat located nearby. As such, species disturbed by Project works are likely to utilise these areas instead. Impacts to the species are likely to be highest during construction in the form of noise and disturbance. The Project will minimise construction during the migratory bird season, which means the species is unlikely to be present within the region during construction. If construction must occur during the migratory bird visitation, it is anticipated that any disturbance through noise and presence of machinery will be temporary in nature due to the species' mobility, likely resulting in the movement of the species to the sand spit or other areas of better habitat such as the Bowling Green Bay Ramsar site. Further, the areas impacted by the Project will be refilled and allowed to regenerate. As such, impacts as a result of construction activities are anticipated to be predominately temporary in nature, in addition to small and narrow areas of permanent access tracks adjacent to the pipeline.

Migratory shorebird species

An assessment of the significance of impacts to migratory shorebird species (listed in **Table 40**) under the *EPBC Act Policy Statement 1.1 – Significant Impact Guidelines* (Department of the Environment, 2013) is provided below. The outcome of this assessment is that the Project is **unlikely** to result in a significant impact on migratory shorebird species.

Table 40 Likelihood of migratory shorebird species presence

Species	Status		Habitat type	
	EPBC Act ¹	NC Act ²	Likelihood	Habitat type
Migratory birds				
Black-tailed godwit (<i>Limosa limosa</i>)	E / Mi	E	Likely	1 (foraging and roosting), 3 (marginal foraging)
Broad-billed sandpiper (<i>Calidris falcinellus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Caspian tern (<i>Hydroprogne caspia</i>)	Mi	SLC	Known	1 (foraging and roosting), 3 (marginal foraging)
Common greenshank (<i>Tringa nebularia</i>)	E / Mi	E	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)

Species	Status		Habitat type	
	EPBC Act ¹	NC Act ²	Likelihood	Habitat type
Common sandpiper (<i>Actitis hypoleucos</i>)	Mi	SLC	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Common tern (<i>Sterna hirundo</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Crested tern (<i>Thalasseus bergii</i>)	Mi	SLC	Known	1 (foraging and roosting), 3 (marginal foraging)
Curlew sandpiper (<i>Calidris ferruginea</i>)	CR / Mi	CE	Likely	1 (foraging and roosting), 3 (marginal foraging)
Double-banded plover (<i>Charadrius bicinctus</i>)	Mi	SLC	Potential	1 (foraging and roosting), 3 (marginal foraging)
Glossy ibis (<i>Plegadis falcinellus</i>)	Mi	SLC	Potential	1 (foraging and roosting),
Greater sand plover (<i>Charadrius leschenaultii</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Grey plover (<i>Pluvialis squatarola</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Grey-tailed tattler (<i>Tringa brevipes</i>)	Mi	SLC	Potential	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Gull-billed tern (<i>Gelochelidon nilotica</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Latham's snipe (<i>Gallinago hardwickii</i>)	V / Mi	V	Potential	1 (marginal foraging and roosting)
Lesser sand plover (<i>Charadrius mongolus</i>)	E / Mi	E	Likely	1 (foraging and roosting), 3 (marginal foraging)
Little curlew (<i>Numenius minutus</i>)	Mi	SLC	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)
Little tern (<i>Sternula albifrons</i>)	V / Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Marsh sandpiper (<i>Tringa stagnatilis</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Oriental plover (<i>Charadrius veredus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Oriental pratincole (<i>Glareola maldivarum</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Pacific golden plover (<i>Pluvialis fulva</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Pectoral sandpiper (<i>Calidris melanotos</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)
Red knot (<i>Calidris canutus</i>)	V / Mi	V	Likely	1 (foraging and roosting), 3 (marginal foraging)
Red-necked stint (<i>Calidris ruficollis</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging)

Species	Status		Habitat type	
	EPBC Act ¹	NC Act ²	Likelihood	Habitat type
Ruddy turnstone (<i>Arenaria interpres</i>)	V / Mi	V	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)
Sanderling (<i>Calidris alba</i>)	Mi	SLC	Likely	1 (marginal foraging and roosting), 3 (marginal foraging)
Terek sandpiper (<i>Xenus cinereus</i>)	V / Mi	V	Likely	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
Wandering tattler (<i>Tringa incana</i>)	Mi	SLC	Potential	3 (marginal foraging)
Whimbrel (<i>Numenius phaeopus</i>)	Mi	SLC	Known	1 (foraging and roosting), 2 (marginal foraging and roosting) 3 (marginal foraging)
White-winged black tern (<i>Chlidonias leucopterus</i>)	Mi	SLC	Likely	1 (foraging and roosting), 3 (marginal foraging) 5 (foraging and dispersal)
Wood sandpiper (<i>Tringa glareola</i>)	Mi	SLC	Potential	1 (foraging and roosting), 3 (marginal foraging)
Yellow wagtail (<i>Motacilla flava</i>)	Mi	SLC	Potential	1 (foraging and roosting), 2 (marginal foraging) 3 (marginal foraging)

¹ E = Endangered; V = Vulnerable; Mi = Migratory

² E = Endangered; V = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern.

Description and Status under the EPBC Act

Migratory species are those species which migrate to, or pass through or over, Australian territory on their annual migrations. Migratory species listed under international agreements to which Australia is a party are protected under the *EPBC Act*. These international agreements include Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) and the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Habitat requirements

Important habitats in Australia for migratory shorebirds include a variety of habitats. After arrival in Australia (from August) the species disperse throughout the continent to a variety of habitats including:

- Coastal wetlands, estuaries, mudflats, mangroves, reefs and sandy beaches
- Inland wetlands, floodplains and grasslands with ephemeral water sources.

These important habitats in Australia allow adult birds to build up the energy reserves necessary to support northward migration and subsequent breeding. Under the *EPBC Act*, 'important habitat' is habitat recognised as nationally or internationally important which is related to abundance and proportion of individuals present at the habitat compared to the species' population. Cleveland Bay and the Bowling Green Bay Ramsar site adjacent to the Project area are considered internationally and nationally important habitat for numerous migratory shore bird species (Table 41) (Department of the Environment and Energy, 2017).

Table 41 Internationally and nationally important habitat for migratory shorebirds

Redland Bay		Bowling Green Bay	
Internationally Important habitat	Nationally Important habitat	Internationally Important habitat	Nationally Important habitat
Great knot	Lesser sand plover	Red-necked stint	Great knot
Red knot	Red-necked stint	Sharp-tailed sandpiper	Black-tailed godwit
Sharp-tailed sandpiper	Greater sand plover		Greater sand plover
	Bar-tailed godwit		Bar-tailed godwit
	Eastern curlew		Lesser sand plover
	Whimbrel		Curlew sandpiper
	Grey-tailed tattler		Pacific golden plover
			Red knot
			Eastern curlew
			Grey-tailed tattler
			Whimbrel

Threats

Migratory shorebirds in Australia face a range of threats that have led to population declines. Key dangers include the destruction and degradation of tidal and coastal habitats due to urban development, land reclamation, and infrastructure Projects. Climate change exacerbates these issues by altering coastal ecosystems and affecting food availability and migration patterns. Human disturbance such as recreational activities on beaches or domestic dogs can disrupt feeding and nesting, (Department of the Environment and Energy, 2017).

Survey effort

Table 42 Survey effort

Survey techniques	Survey effort	Requirements
The <i>Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species</i> (Department of the Environment and Energy, 2017) delineate survey effort between tidal and non-tidal locations. With the Study area being predominantly tidal, the following methods for migratory shorebirds apply: Bird surveys in suitable habitat: 4 surveys for roosting habitat during periods most migratory species are present - Replicate surveys to measure variability 4 surveys conducted at low- and high tide 1 survey during northern hemisphere breeding season to capture birds remaining in Australia Surveys should be conducted during: - The months most shorebirds are present in the area (August – April) - Seek local knowledge to determine optimal survey time	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023. - Literature review of migratory bird surveys within and adjacent to the Study area. - General habitat assessments were conducted throughout the study area.	Requirements partially met Potential habitat for migratory shorebirds is limited within the Project area to areas of mudflats and shoreline. These areas were visited each day. Furthermore, several studies for the Port of Townsville have identified the species in the area. Due to the linear and disturbed nature of the Project area and the assumption that these species are present, survey effort is considered sufficient.

Survey techniques	Survey effort	Requirements
Both tidal extremes Seasonal considerations Surveys should be conducted between August and April when migratory species generally arrive and depart in Australia.		

Occurrence and potential habitat within the Study area

During field surveys, a small number of migratory shorebird species were observed within the Study area. These include the Whimbrel (*Numenius phaeopus*), Caspian tern (*Hydroprogne caspia*) and Crested tern (*Thalasseus bergii*). Cleveland Bay, considered as internationally and nationally important habitat for many shore bird migrants, is adjacent to the Project site suggesting the presence of an array of migratory shorebirds, although not observed during field surveys. No migratory shorebird species have been observed within the Project area

Three habitat types within the Study area are considered potential foraging and roosting habitat. These were associated with the sandy foredunes to the north of the Study area, adjacent to the bridge, the mangroves, mudflat and claypan area as well as its adjacent grassland. The majority of species is most likely to utilise the mudflat and claypan areas, with occasional foraging and dispersal throughout the grassland and sandy foredunes.

The habitat within the Study area is in seemingly good condition due to high diversity of vegetative ground cover with a lower presence of weed species, particularly away from the Southern Port Road. Habitat mapping was undertaken to estimate the extent of the potential habitat throughout the Study area and within the Project area of which is presented in Figure 7 in Appendix A.

Important habitat within the Study area

According to the *EPBC Act Policy Statement 1.1 – Significant Impact Guidelines* (Department of the Environment, 2013), 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
- Habitat that is of critical importance to the species at particular life-cycle stages
- Habitat utilised by a migratory species which is at the limit of the species range
- Habitat within an area where the species is declining

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies within the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates). Cleveland Bay and Bowling Green Bay are recognised habitat for a range of migratory shorebird species however, the Project area is not part of these habitats.

Potential impacts and mitigation measures

Potential impacts on migratory shorebirds include the loss of marginal, remnant foraging and roosting habitat which is potentially suitable only during the highest tides. The extent of habitat loss is displayed in **Table 43** and Figure 7 in Appendix A. The samphire forbland on marine clay plains habitat and mangrove habitat, which is more suitable foraging and roosting habitat for the species, has been avoided entirely in the Project design through the adoption of directional drilling.

Table 43 Potential impacts to migratory shorebird species

Habitat type	Area (ha) within the Project area	Habitat type
Foraging and roosting	0	Samphire forland on marine clay plains. This area is tidally inundated. The Project area would only be inundated during highest astronomical tides. This area will be under-bored and impacts will be avoided entirely.
Roosting	0	Closed forests and low closed forests dominated by mangroves, utilised for roosting habitat. This area will be under-bored and impacts will be avoided entirely.
Marginal remnant foraging and roosting	3.4	<i>Sporobolus virginicus</i> grassland on marine clay plains and complex of <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> and <i>Spinifex sericeus</i> and <i>Casuarina equisetifolia</i> low woodland and hermland on fore dunes. These remnant areas are considered marginal as they are either degraded (in the form of historically cleared habitat adjacent to the road corridor) or not typically utilised by the species (<i>Sporobolus virginicus</i> grassland). <i>Sporobolus virginicus</i> grassland within the Project area is typically inundated during the highest astronomical tide.
Total habitat within the Project area	3.4	Habitat within the Project area is considered both remnant and marginal foraging and roosting only during high or king tides.

Mitigation measures are outlined in Section 8 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas.
- Weed wash down requirements for all vehicles coming into and exiting the Study area. This will be strictly implemented as part of the Project CEMP to avoid the spread of weed species in and around the Study area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire Study area and will have stringent focus around waterways and tidally inundated areas.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forlands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- A 'soft' ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species.
- If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides.
- If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.

Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for migratory species is provided in **Table 44**. Based on the assessment it is unlikely that the Project will have significant impact on migratory shorebirds.

Table 44 Significant impact assessment – migratory shorebird species

Criterion – is there a real chance or possibility that the Project will:	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Unlikely The Project will result in direct impacts to approximately 3.38 ha of marginal foraging and roosting habitat for migratory shorebirds. These areas, comprising

Criterion – is there a real chance or possibility that the Project will:	Assessment
	degraded <i>Sporobolus virginicus</i> grassland and coastal dune vegetation, are situated adjacent to existing infrastructure and are not considered important habitat as defined under the EPBC Act <i>Significant Impact Guidelines 1.1</i>. The affected habitat is likely to be utilised infrequently, primarily during king tide events. Construction impacts will be predominantly temporary, with trenching reinstated following installation. Only a minor portion (0.84 ha) will be subject to permanent clearing for access tracks. Importantly, areas of higher-value habitat, including tidal mudflats and mangrove communities with greater likelihood of consistent migratory shorebird use, have been completely avoided through Project design phases and the application of trenchless construction methods (e.g. directional drilling). The Project footprint does not intersect with areas mapped as nationally or internationally important habitat for migratory shorebirds, such as Cleveland Bay or the Bowling Green Bay Ramsar site, both of which are located nearby and remain undisturbed. Given the marginal quality and limited extent of habitat within the Project area, the temporary nature of disturbance, and the avoidance of known high-use areas, the Project is unlikely to result in the fragmentation, destruction or isolation of important habitat. Moreover, it is considered unlikely to alter ecological processes such as fire, nutrient, or hydrological cycles to a degree that would substantially modify habitat quality for migratory shorebird species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	Unlikely Invasive species, including weeds and pest animals, are recognised threats to migratory shorebirds due to their potential to degrade habitat quality and disrupt ecological function (Department of the Environment and Energy, 2017). However, the Project is not expected to result in the introduction or establishment of invasive species within areas of important habitat. The Project footprint intersects only marginal habitat and avoids direct disturbance to high-value or mapped important habitat areas, including tidal flats and mangrove systems. Existing disturbance from the adjacent Southern Port Road corridor already contributes to the local weed burden, and the Project is not anticipated to exacerbate this baseline condition. Mitigation measures to manage the risk of weed and pest spread are outlined in the Project's CEMP. These include strict vehicle and equipment hygiene protocols, sediment and erosion controls, and post-construction site rehabilitation. The pipeline corridor will be reinstated following construction, further reducing the

Criterion – is there a real chance or possibility that the Project will:	Assessment
	potential for long-term establishment of invasive species. Accordingly, the Project is considered unlikely to result in the establishment of invasive species that would be harmful to migratory shorebirds within an area of important habitat.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	Unlikely The Project is not anticipated to seriously disrupt the lifecycle of an ecologically significant proportion of any migratory shorebird population. Impacts are confined to a small, linear corridor comprising 3.38 ha of marginal foraging and roosting habitat. This habitat is degraded, infrequently used, and likely only utilised during highest astronomical tides. More extensive and higher-quality habitat, such as Cleveland Bay and the Bowling Green Bay Ramsar site – occurs nearby and remains unaffected. Construction-phase impacts, particularly noise and human activity, may cause temporary disturbance to individuals if present. However, the Project will aim to minimise construction during the migratory season to reduce the likelihood of shorebird presence. Should migratory shorebirds be present during works, any displacement is expected to be short-term, with birds likely relocating to adjacent, undisturbed areas of suitable habitat. Following construction, the disturbed areas will be reinstated in accordance with the Project's rehabilitation strategy, and permanent impacts will be limited to a narrow 0.84 ha footprint for access tracks. Given the temporary and spatially limited nature of the disturbance, combined with the availability of extensive nearby habitat, the Project is considered unlikely to interfere with breeding, feeding, migratory or resting behaviours to an extent that would affect an ecologically significant proportion of any migratory shorebird population.

Migratory terrestrial bird species

An assessment of the significance of impacts to migratory terrestrial bird species listed as migratory under the EPBC Act is provided in **Table 48**. Migratory species assessed via individual SIAs have been excluded. The relevant species are presented in **Table 45** below:

Table 45 Migratory terrestrial bird species and associated habitat

Species	Status		Habitat types	
	EPBC Act ¹	NC Act ²	Potential	Habitat type (Table 8)
Birds				
Oriental cuckoo (<i>Cuculus optatus</i>)	Mi	SLC	Likely	4 (marginal breeding, foraging and dispersal)
Osprey (<i>Pandion haliaetus</i> syn. <i>Pandion cristatus</i>)	Mi	SLC	Known	1,2,3,4,5 (marginal breeding, foraging and dispersal)

¹ E = Endangered; V = Vulnerable; Mi = Migratory

² E = Endangered; V = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern.

Description and Status under the EPBC Act

Migratory species are those species which migrate to, or pass through or over, Australian territory on their annual migrations. Migratory species listed under international agreements to which Australia is a party are protected under the *EPBC Act*.

Habitat requirements

Important habitats in Australia for migratory species that are not shorebirds are species specific. Referring to the *Draft Referral guideline for 14 birds listed as migratory species under the EPBC Act* (Department of the Environment, 2015), habitat for the Osprey are bays, estuaries, along tidal stretches of large coastal rivers, mangrove swamps, coral and rock reefs, terrestrial wetlands and coastal lands of tropical and temperate Australia and offshore islands. They feed primarily in the sea or nearby estuarine waters and nest in trees, rocky coastlines and on artificial structures.

Breeding outside of Australia, the Oriental cuckoo forages and roosts in a variety of vegetation communities including monsoonal rainforest, vine thickets, wet sclerophyll forest or open *Casuarina*, *Acacia* or *Eucalypt* woodlands. It frequently forages at edges or ecotones between different habitat types.

Threats

Threats to migratory bird species listed in the *Draft Referral guideline for 14 birds listed as migratory species under the EPBC Act* (Department of the Environment, 2015) include, habitat loss and alteration as well as harmful invasive species. Migratory terrestrial birds in Australia are increasingly threatened by a combination of habitat loss, climate change, and invasive species. Land clearing for agriculture, urban expansion, and mining has significantly reduced the availability of native vegetation and critical stopover habitats these birds rely on during migration. Invasive predators such as feral cats and foxes pose a major threat, especially to ground-nesting species. Additionally, risk of avian diseases like H5N1 bird flu adds a new threat.

Survey effort

Table 46 Survey effort

Survey techniques	Survey effort	Requirements
The Draft Referral guideline for 14 birds listed as migratory species under the EPBC Act and Survey guidelines for Australia's threatened birds (Department of the Environment,	6 hours of active birding and 52 hours of incidental birding over 3 days	Requirements partially met Potential habitat for migratory terrestrial

Survey techniques	Survey effort	Requirements
Water, Heritage and the Arts, 2017) outline species specific survey effort: Oriental Cuckoo: - Standardised timed periods - Diurnal area searches or transect-point surveys in areas of favoured habitat - Early morning broadcast surveys Osprey - Observations from vantage points to detect birds in flight over suitable habitat - Area searches on foot to detect birds or signs of occupancy in suitable habitat - Transect surveys from vehicles to detect birds or nests in large survey areas - Transect surveys from boats along suitable coastal or riparian habitat - Aerial surveys to detect birds or nests in large survey areas Seasonal considerations Oriental cuckoo: November – May Osprey: All year	during February 2023. - Literature review of migratory bird surveys within and adjacent to the Study area. - General habitat assessments were conducted throughout the Study area.	species is predominantly limited within the Project area to areas of open forest and woodland. These areas were visited each day.

Occurrence and potential habitat within the Study area

During field surveys, the Osprey was observed within the Study area but outside of the Project area.

All 5 habitat types within the Project area are considered potential foraging or roosting habitat for the Osprey, but only the Open forests and low open forests in seasonally inundated swamps habitat type is suitable for the Oriental cuckoo. The Osprey is most likely to utilise the estuary for foraging whilst open forest would be most suitable as roosting habitat.

Habitat mapping was undertaken to estimate the extent of the potential habitat in the Study area and Project area. The final map is presented in Figure 7 in Appendix A.

Important habitat within the Study area

According to the *EPBC Act Policy Statement 1.1 – Significant Impact Guidelines* (Department of the Environment, 2013), 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
- Habitat that is of critical importance to the species at particular life-cycle stages
- Habitat utilised by a migratory species which is at the limit of the species range
- Habitat within an area where the species is declining

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies within the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates). Due to the minute size and low habitat suitability, it is not expected that important habitat for migratory terrestrial birds occurs within the Project area.

Potential impacts and mitigation measures

Potential impacts on this species include the loss of marginal, degraded foraging and roosting habitat which is potentially suitable only during a king tide. The extent of habitat loss is displayed in **Table 47** and Figure 7 in Appendix A. The samphire forbland on marine clay plains habitat and mangrove habitat, which is more suitable foraging and roosting habitat for the species, has been avoided entirely in the Project design through the adoption of directional drilling.

Table 47 Potential impacts to migratory terrestrial bird species

Habitat type	Area (ha) within the Project area	Habitat type
Osprey (<i>Pandion haliaetus</i> syn. <i>Pandion cristatus</i>) Marginal breeding, foraging and dispersal.	5.5	All existing habitat types are considered marginal habitat for Osprey either breeding, roosting or foraging.
Oriental cuckoo (<i>Cuculus optatus</i>) Remnant (marginal) foraging and dispersal.	2.1	Open forests and low open forests in seasonally inundated swamps (RE 11.2.5) are considered roosting and foraging habitat for Oriental cuckoo.
Total habitat within the Project area	7.6	Habitat within the Project area is considered for both remnant and marginal foraging and dispersal utilisation only during king tides.

Mitigation measures are outlined in Section 8 and include:

- Pre-clearance surveys by a spotter catcher will be undertaken in mapped habitat areas.
- Weed wash down requirements for all vehicles coming into and exiting the Study area. This will be strictly implemented as part of the Project CEMP to avoid the spread of weed species in and around the Study area.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for activities on site. These will be required for the entire Study area and will have stringent focus around waterways and tidally inundated areas.
- Undertake rehabilitation works to reinstate the topsoil over the pipeline to pre-existing levels to allow for the natural regeneration of native grasslands and forblands. Natural regeneration will be monitored, and additional management measures will be considered if natural regeneration is unsuccessful.
- A 'soft' ramp up of any mechanical / loud activities required for construction for works within 500 m of habitat mapped for the species.
- If practicable, works should be avoided nearby habitat areas for the species during highest astronomical tides.
- If practicable, construction adjacent to the claypan area should occur between April and August to reduce potential impacts to the species.

Significant Impact Assessment

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for migratory species is provided in **Table 48**. Based on the assessment it is unlikely that the Project will have significant impact on migratory terrestrial bird species.

Table 48 Significant impact assessment for migratory terrestrial bird species

Criterion – is there a real chance or possibility that the Project will:	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering	Unlikely

Criterion – is there a real chance or possibility that the Project will:	Assessment
hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Project is anticipated to result in direct impacts to approximately 5.47 ha of marginal breeding, foraging and dispersal habitat for Osprey (<i>Pandion haliaetus</i>) and 2.1 ha of remnant open forest habitat considered suitable for roosting and foraging by Oriental cuckoo (<i>Cuculus optatus</i>). These areas represent low-value, fragmented habitat within a disturbed landscape and are not identified as important habitat under the EPBC Act <i>Significant Impact Guidelines 1.1</i>. The vegetation is of marginal quality, highly modified from historical land use and situated adjacent to existing infrastructure, including the Southern Port Road. Project design has minimised impacts to these areas, with construction limited to a linear corridor and permanent clearing restricted to a small portion (0.84 ha) associated with access tracks. The majority of habitat will be temporarily disturbed, with trenching refilled and surface rehabilitation implemented in accordance with the CEMP. Importantly, no areas of habitat identified as nationally or internationally important under migratory bird conservation frameworks (e.g. JAMBA, CAMBA, ROKAMBA) will be directly impacted. Higher-quality habitat, including estuarine and riparian zones adjacent to the Project area, remains intact and available to support migratory species displaced by temporary disturbance. Furthermore, the action is not expected to result in fragmentation of habitat, nor materially alter fire regimes, nutrient cycling, or hydrological processes within the broader landscape. As such, the Project is considered unlikely to substantially modify, destroy, or isolate an area of important habitat for migratory terrestrial bird species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	Unlikely Invasive species, including weeds and pest animals, have the potential to degrade habitat quality and displace native species, representing a general threat to migratory terrestrial birds. However, the Project is not expected to result in the introduction or spread of invasive species within areas of important habitat for migratory species. The Project footprint intersects marginal habitat only, with no direct impacts to recognised important habitat areas. Existing weed and pest species are already present within the Project area and the adjacent Southern Port Road corridor, which constitutes a long-standing disturbance feature. The Project is therefore not introducing a new vector for weed spread, nor materially increasing risk beyond current baseline conditions.

Criterion – is there a real chance or possibility that the Project will:	Assessment
	Weed and pest management measures are clearly outlined in the CEMP including vehicle and equipment hygiene protocols, sediment and erosion control, and site rehabilitation practices. These controls will remain in effect throughout construction and reinstatement, reducing the likelihood of further spread or establishment of invasive species. As such, the Project is considered unlikely to result in an invasive species becoming established in an area of important habitat for migratory terrestrial bird species, nor exacerbate existing invasive pressures within the local landscape.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	Unlikely The Project is not anticipated to seriously disrupt the lifecycle of a significant proportion of migratory terrestrial bird populations as it is predominately impacting a small area of marginal foraging and roosting habitat. The areas impacted are small and linear in nature, with larger areas of more suitable habitat located nearby. As such, species disturbed by Project works are likely to disperse to these areas instead. Impacts to migratory terrestrial birds are likely to be highest during construction in the form of noise disturbance. The Project will minimise construction during the migratory bird season, reducing potential impacts to the Oriental cuckoo. If construction occurs whilst individuals are present, it is anticipated that any disturbance through noise and use of machinery will be temporary in nature, likely resulting in the movement of individuals to other areas within adjacent areas of suitable habitat. Further, the areas impacted by the Project will be refilled and allowed to regenerate. As such, impacts as a result of construction activities are anticipated to be predominately temporary in nature with only small and narrow areas of permanent access tracks adjacent to the pipeline remaining. Therefore, the Project is considered unlikely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

World Heritage properties and National Heritage places

Great Barrier Reef

The Great Barrier Reef World Heritage Area and National Heritage Area is present in the estuary section of the study area. This location will be under bored, therefore potential Project impacts to the estuary are considered unlikely and will be managed as part of the CEMP.

Significant Impact Guidelines

An assessment against the EPBC Act *Significant Impact Guideline 1.1* for the Great Barrier Reef as a World Heritage property and National Heritage place is provided in Table 49. An action is considered likely to have a significant impact on the World Heritage values of a declared World Heritage property if there is a real chance or possibility that it will cause:

- one or more of the World Heritage values to be lost
- one or more of the World Heritage values to be degraded or damaged, or
- one or more of the World Heritage values to be notably altered, modified, obscured or diminished.

An action is likely to have a significant impact on the National Heritage values of a National Heritage place if there is a real chance or possibility that it will cause:

- one or more of the National Heritage values to be lost
- one or more of the National Heritage values to be degraded or damaged, or
- one or more of the National Heritage values to be notably altered, modified, obscured or diminished.

Based on the assessment it is unlikely that the Project will have a significant impact on the Great Barrier Reef World Heritage Area or Great Barrier Reef National Heritage Area.

Table 49 Significant Impact Guidelines for the Great Barrier Reef World Heritage Area and National Heritage Place

Criterion - is there a real chance or possibility that the Project will...	Assessment
World Heritage Properties or National Heritage Places with natural heritage values	
Values associated with geology or landscape: • damage, modify, alter or obscure important geological formations in a World Heritage property or National Heritage place • damage, modify, alter or obscure landforms or landscape features, for example, by excavation or infilling of the land surface in a World Heritage property or National Heritage place • modify, alter or inhibit landscape processes, for example, by accelerating or increasing susceptibility to erosion, or stabilising mobile landforms, such as sand dunes, in a World Heritage property or National Heritage place • divert, impound or channelise a river, wetland or other water body in a World Heritage property or National Heritage place, and • substantially increase concentrations of suspended sediment, nutrients, heavy metals, hydrocarbons, or other pollutants or substances in a river, wetland or water body in a World Heritage property or National Heritage place.	Unlikely The Project has avoided significant features including under boring the clay plains and estuary of Ross River. Indirect impacts related to hydrology and soils, including erosion and sedimentation, will be managed within the CEMP. The Project has been collocated with existing infrastructure to avoid cumulative impacts on geology and landforms. Sensitive features such as the clay plains will not be directly impacted.
Biological and ecological values:	Unlikely

Criterion - is there a real chance or possibility that the Project will...	Assessment
• reduce the diversity or modify the composition of plant and animal species in all or part of a World Heritage property or National Heritage place • fragment, isolate or substantially damage habitat important for the conservation of biological diversity in a World Heritage property or National Heritage place • cause a long-term reduction in rare, endemic or unique plant or animal populations or species in a World Heritage property or National Heritage place, and • fragment, isolate or substantially damage habitat for rare, endemic or unique animal populations or species in a World Heritage property or National Heritage place.	The Project has avoided and minimised impacts to sensitive features containing high biodiversity, such as clay plains, mangroves and Ross River, through under boring. The Project has been collocated with existing infrastructure to avoid fragmentation or cumulative impacts on ecological values. Habitat within the Project area is marginal compared to the adjacent habitat located outside the Project area. Indirect impacts related to weed and pest management, erosion and sedimentation, will be managed within the CEMP.
Wilderness, natural beauty or rare or unique environment values: • involve construction of buildings, roads, or other structures, vegetation clearance, or other actions with substantial, long-term or permanent impacts on relevant values, and • introduce noise, odours, pollutants or other intrusive elements with substantial, long-term or permanent impacts on relevant values.	Unlikely Unique environmental values that are rare or have natural beauty are subjectively absent from the Project area, due to the existing disturbance from infrastructure such as pipelines, powerlines, an arterial road and unlawful 4WD activity. Regardless, the Project does not involve construction or clearing that will substantially impede on the natural beauty and wilderness of this location. Habitat within the Project area is marginal compared to the adjacent habitat located outside the Project area. Indirect impacts will be managed within the CEMP, including noise, odours, pollutants or other intrusive indirect impacts.

Appendix F

MSES Significant Residual Impact Assessment

Appendix F MSES Significant Residual Impact Assessment

Background

An environmental offset condition may be imposed where development or an authority is triggered under various State assessment frameworks (such as the *Planning Act 2016* and *Environmental Protection Act 1994*) for an activity prescribed under the *Environmental Offsets Act 2014*, if the activity will, or is likely to have a significant residual impact on a prescribed environmental matter that is a Matters of State Environmental Significance (MSES).

Environmental offsets are not an assessment trigger, and are only considered where:

- An application for an authority is first required; and
- The assessment requires consideration of an environmental offset as a suitable outcome.

MSES are defined as:

- regulated vegetation (Category B, Category C, Category R, essential habitat, regulated vegetation within the defined distance of a watercourse, and vegetation within 100 m of a wetland)
- connectivity areas (in non-urban areas)
- wetlands and watercourses (declared high-value waters, high ecological significance wetlands, and wetland protected areas)
- designated precincts in Strategic Environmental Areas
- protected wildlife habitat
- protected areas (national parks, regional parks, and nature refuges)
- declared Fish Habitat Areas and highly protected zones of State Marine Parks
- waterways providing for fish passage
- marine plants
- legally secured offsets areas.

As per Section 8 of the EO Act, a significant residual impact is generally an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a prescribed environmental matter that:

- a. Remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site avoidance and mitigation measures for the prescribed activity; and
- b. Is, or will or is likely to be, significant.

MSES within the Project area

As discussed in Section 6.0, the following MSES are found within the Project area:

- regulated vegetation: essential habitat
- connectivity
- protected wildlife habitat
- waterways providing for fish passage
- marine plants.

After all reasonable avoidance and on-site mitigation measures for the Project have been or will be undertaken (Section 8.0), the Project may impact on MSES. A significant residual impact (SRI) assessment has been undertaken for the Project in accordance with the criteria provided in the Significant Residual Impact Guidelines (Department of State Development, Infrastructure and Planning, 2014) given the Project is triggering assessable development under the *Planning Act 2016* for operational works (removal of marine plants) (the Project does not require assessment under the NC

Act, EP Act or *Marine Parks Act 2004*). For the purpose of the impact assessments, it has been assumed that the Project area is the maximum direct impact required for the Project.

It is important to note that the below assessments are not to be used to determine if the Project requires assessment for potential impacts on Matters of National Environmental Significance (MNES) protected by the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or if an offset would be required under this Act.

The Queensland Environmental Offsets Policy states that the State government can only impose an offset condition in relation to a prescribed activity, if the same, or substantially the same impact and the same, or substantially the same matter has not been subject to assessment under one of the following Commonwealth Acts:

- The EPBC Act, to the extent the assessment relates to an activity that has been declared a 'controlled action' by the Commonwealth Minister;
- The Great Barrier Reef Marine Park 1975; or
- Another Commonwealth Act prescribed by regulation.

This includes if the Commonwealth could have imposed an offset condition but did not do so.

It is noted an EPBC referral is being submitted for the Project and this matter may apply where offsets are required in accordance with the EPBC Act.

To avoid duplication of offset conditions between jurisdictions, State and local governments can only impose an offset condition in relation to a prescribed activity if the same or substantially the same impact and the same or substantially the same matter has not been subject to assessment under the EPBC Act. As such, the MSES values presented in this section are those that have not already been assessed under the EPBC Act policy statement '*Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*' (Department of the Environment, 2013). Therefore, any values that are both MNES and MSES will not be considered in this significant residual impact assessment, however this may change if the EPBC Act referral process is followed.

Regulated vegetation – essential habitat

The Project area contains 6.8 ha of mapped essential habitat for the estuarine crocodile, eastern curlew, Western Alaskan bar-tailed godwit and great knot. This is broken into 0.83 ha of permanent impacts and 5.99 ha of temporary impacts. Clearing limits per regional ecosystem (RE) structure category is determined using the table below (Table 50).

Table 50 Clearing limits – width and area thresholds

RE Structure Category ¹	Width (metres)	Area (hectares)
Dense and mid-dense	10	0.5
Sparse and very sparse	20	2
Grassland	25	5

¹ Refer to the structure category within the REDD

A significant residual impact assessment has been completed for essential habitat against Section 3.1 of the Significant Residual Impact Guideline (Department of State Development, Infrastructure and Planning, 2014) (

Table 51). The Project is unlikely to have a significant residual impact on essential habitat as the Project will not result in a greater than 10% permanent reduction in the extent of essential habitat mapped on site.

Table 51 Significant residual impact assessment for essential habitat

Impact Criteria	Assessment
An action is LIKELY to have a SRI on essential habitat if the action will result in:	
Clearing of essential habitat exceeding the thresholds specified in Table 50 AND resulting in a greater than 10% permanent reduction in the extent of essential habitat mapped on site.	No. <u>Clearing thresholds</u> The Project will involve a clearing corridor of up to 30m of RE 11.1.1, RE 11.1.2 and RE 11.2.5, which have structure categories of woody grassland, other and sparse, respectively. Therefore, the Project will exceed the clearing width threshold. <u>Essential habitat extent</u> The Project Site for essential habitat consists of Lot 302 on SP223355, Lot 1 on SP313085 and Ron McLean Drive. The site area for Lot 302 and Lot 1 equates to 315.2 ha. The Project is considered to permanently impact 0.83 ha associated with access tracks, which totals less than 10% of essential habitat for the mapped essential habitat within the Project Site. The remaining Project area, associated with the pipeline, will predominantly be refilled and allowed to regenerate following trenching. In summary, as the proportion of permanent impacts compared to the Project Site is less than 10%, it is not likely that the Project will have a significant residual impact on areas of essential habitat for estuarine crocodile, eastern curlew, Western Alaskan bar-tailed godwit and great knot.

Connectivity areas

The Department of Environment, Tourism, Science and Innovation (DETSI) has developed a Landscape Fragmentation and Connectivity (LFC) tool to assist in identifying and quantifying any significant impact on connectivity for an individual impact area. The measure of impact significance is based on how the prescribed activity will change the size and configuration of remnant vegetation areas (Category B regulated vegetation) and the level of fragmentation that will result at the local scale (5 km radius) given regard to the regional scale (20 km radius).

The LFC tool determined that Project related impact on connectivity areas is not significant (Table 52).

Table 52 LFC tool results for connectivity (state-mapped remnant vegetation)

Impact Criteria	Assessment result														
Significance test one	The regional total area is 137805.61 The regional extent of core remnant is 51912.38 The regional extent of core remnant is 37.67 percent This level of regional fragmentation sets a local impact threshold of: 10.0 percent The table below lists the local impact thresholds for categories of regional core remnant extent: <table> <tr> <th>REGIONAL CORE CATEGORY</th><th>LOCAL IMPACT THRESHOLD</th></tr> <tr> <td>< 10</td><td>2.0</td></tr> <tr> <td>10 - 30</td><td>5.0</td></tr> <tr> <td>30 - 50</td><td>10.0</td></tr> <tr> <td>50 - 70</td><td>20.0</td></tr> <tr> <td>70 - 90</td><td>30.0</td></tr> <tr> <td>>90</td><td>50.0</td></tr> </table> Area of core at the local scale (pre impact): 2252.42 Area of core at the local scale (post impact): 2226.19 Percent change of core at the local scale (post impact): 1.16 percent	REGIONAL CORE CATEGORY	LOCAL IMPACT THRESHOLD	< 10	2.0	10 - 30	5.0	30 - 50	10.0	50 - 70	20.0	70 - 90	30.0	>90	50.0
REGIONAL CORE CATEGORY	LOCAL IMPACT THRESHOLD														
< 10	2.0														
10 - 30	5.0														
30 - 50	10.0														
50 - 70	20.0														
70 - 90	30.0														
>90	50.0														
Significance test two	The number of core remnant areas occurring on the site: 1 The number of core remnant areas remaining on the site post impact: 1														
Result	This analysis has determined any impact on connectivity areas is NOT significant.														

Protected wildlife habitat

Protected wildlife habitat is defined as an area of habitat (e.g. foraging, roosting, nesting or breeding habitat) for an animal or plant that is Endangered or Vulnerable, or a Special Least Concern (non-migratory) animal under the NC Act. As of 9 May 2018, under the *Vegetation Management and Other Legislation Amendment Bill 2018*, the definition of protected wildlife has been extended to include Near Threatened wildlife.

Offsets may be required for the following protected wildlife habitat:

- an area that contains plants that are 'endangered' or 'vulnerable' wildlife;
- a habitat for an animal that is 'endangered' or 'vulnerable' wildlife or a special least concern animal, including areas or features used by an animal for foraging, roosting, nesting or breeding;
- koala habitat that is classified as essential habitat on the essential habitat map; and
- an area shown as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the map called 'Map of Assessable Development Area Koala Habitat Values' that applies under the South East Queensland Koala Conservation State Planning Regulatory Provisions (Koala SPRP) (now repealed).

Significant residual impact assessments for the species considered potential, likely or known to occur within the Project area are detailed below. As the Screening Assessment for the EPBC Listed species for the Project found a low risk of impact to all species identified, only species that have been identified as potentially occurring and are listed only under the NC Act have been assessed for SRIs.

Short-beaked echidna (*Tachyglossus aculeatus*)

The short-beaked echidna is listed as Special Least Concern under the NC Act.

The short-beaked echidna is found throughout Australia, including Tasmania. It is Australia's most widespread native animal (The Australian Museum, 2018). No systematic study of the ecology of the short-beaked echidna has been published, but studies of several aspects of their behaviour have been conducted. Individuals are solitary wanderers: they have large, overlapping home ranges (up to 50 ha) and only maintain a fixed shelter or nest site when rearing their young in a burrow (Augee, Gooden and Musser, 2006). They avoid extremes in temperature by sheltering in hollow logs, rock crevices and vegetation. Limited only by an insufficient supply of ants or termites, short-beaked echidnas live in a range of climates and habitats.

This species is not threatened with extinction, but human activities, such as hunting, vehicles, habitat destruction, and the introduction of foreign predatory species and parasites, have reduced its distribution in Australia (The Australian Museum, 2018). This species can live anywhere with a good supply of food, and regularly forages on ants and termites, and are most common in forested areas with abundant, termite-filled, fallen logs.

The solitary short-beaked echidna looks for a mate between May and September; the precise timing of the mating season varies with geographic location. The short-beaked echidna is an egg-laying mammal (monotreme) and lays one egg at a time. The eggs hatch after about 10 days and the young, emerge blind and hairless. Clinging to hairs inside the mother's pouch, the young echidna suckles for two or three months. Once it develops spines and becomes too prickly, the mother removes it from her pouch and builds a burrow for it. It continues to suckle for the next six months (The Australian Museum, 2018).

Occurrence and Potential Habitat

This species is considered known to occur within the Project area. This is a generalist species that may utilise all remnant and high-value regrowth vegetation habitat within the Project area.

The extent of potential habitat for the species includes 5.47 ha. An assessment against the Significant Residual Impact Guideline for this species is provided in Table 53.

Outcome

The Project is unlikely to have a significant residual impact on the short-beaked echidna (Table 53).

Table 53 Significant residual impact assessment for short-beaked echidna

Impact Criteria	Assessment
An action is LIKELY to have a significant residual impact on habitat for an animal that is 'Special Least Concern' wildlife if the action will:	
Lead to a long-term decrease in the size of a local population?	No. This species is known to occur within the Project area and potentially utilises 5.47 ha for breeding, foraging and dispersal which may be directly impacted by the Project (worst-case scenario). This species is common throughout its distribution. This loss of habitat is considered minimal compared to the extensive areas of potential habitat in the local area. To mitigate the death of any short-beaked echidnas during construction, open trenches will be checked for trapped fauna in the morning and at the end of the day by a spotter catcher. The Project is considered unlikely to lead to a significant reduction in the foraging or breeding success of a local population or a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species?	No. This species occurs across Australia and is considered common. The Project area is highly modified, surrounded by urbanisation and disturbance. Given this species is relatively mobile, and is considered a generalist, it is unlikely the Project will reduce the extent of occurrence of the species.
Fragment an existing population?	No. Discrete sub-populations of short-beaked echidna are not known, and available population information indicates that this species is stable throughout its range. Any individuals present within the Project area are likely to only constitute a very small portion of the total population. A small area of potential habitat will be impacted by the Project. However, as this species is relatively mobile and the Project is unlikely to create a barrier to movement that doesn't already exist in the highly modified area, the Project is considered unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation?	No. This species is widely distributed and common. It has broad habitat requirements and as such impacts to potential habitat within the Project area is unlikely to have population-level impacts. The current levels of habitat connectivity are low within the Project area due to existing infrastructure and therefore are unlikely to be significantly reduced by the Project. Infrastructure is co-located with existing infrastructure (highway). During construction, open trenches may trap dispersing individuals however these will be checked in the morning and at the end of the day by a spotter catcher. This species is relatively mobile and the Project is unlikely to create a new barrier to movement between the Project area and adjacent available habitat. Therefore, the Project is unlikely to result in a genetically distinct population forming as a result of habitat isolation.

Impact Criteria	Assessment
An action is LIKELY to have a significant residual impact on habitat for an animal that is 'Special Least Concern' wildlife if the action will:	
Cause disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species?	No. Potential habitat suitable for breeding, foraging and dispersal occurs within the Project area, however there is no information to suggest this habitat is ecologically significant. A total of 5.47 ha of potential habitat will be directly impacted via vegetation clearing. Given the relatively small direct loss of potential habitat, the highly modified nature of the Project area, and the species' mobility and common occurrence, the Project is considered unlikely to cause disruption to ecologically significant locations of the species.

Waterways providing for fish passage

An environmental offset may be required for any part of a waterway that provides for passage of fish (other than that part of a waterway within an urban area) if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.

Barriers to fish passage can restrict and / or isolate fish communities, preventing access to, and benefits of fish habitats otherwise available to them. Poorly designed structures can injure or kill fish moving over or around them, or fish may become stranded and subjected to inappropriate water quality, lack of food, increased predation, crowding or other conditions that impact on their health, wellbeing and productivity.

A significant residual impact assessment has been completed for the waterways against Section 10 of the Significant Residual Impact Guideline (Department of State Development, Infrastructure and Planning, 2014) (Table 54).

This assessment determined that the Project is unlikely to have a significant residual impact on waterways providing for fish passage.

Table 54 Significant residual impact assessment for waterways providing for fish passage

Impact Criteria	Assessment
An action is LIKELY to have a SRI on a waterway providing for fish passage if the action will result in:	
A permanent modification to the volume, depth, timing, duration or flow frequency of the waterway;	No. Works are proposed to occur outside the bed and banks of the Ross River. The works will involve trenching within highest astronomical tide, however the trenching will be filled in and allowed to regenerate, as such the impacts will predominantly be temporary, with the exception of a small area (0.84 ha) of permanent access tracks located adjacent to the Southern Port Road.
Permanent modification or fragmentation of fish habitat including but not limited to in stream vegetation, snags and woody debris, substrate, bank or riffle formation necessary for breeding and/or survival of native fish species;	No. Works are proposed to occur outside the bed and banks of the Ross River. The works will involve trenching within highest astronomical tide, however the teaching will be filled in and allowed to regenerate, as such the impacts will predominantly be temporary, with the exception of a small area (0.84 ha) of permanent access tracks located adjacent to the Southern Port Road.
The mortality or injury of fish species; OR	No. Works are proposed to occur outside the bed and banks of the Ross River. Mitigation measures will be included to ensure that fish are not trapped within trenches during construction.
Works that permanently reduce the level of fish passage provided in a tidal waterway or a waterway identified as a major high-risk waterway for waterway barrier works, to a level that would increase stress on fish populations.	No. Works are proposed to occur outside the bed and banks of the Ross River. The works will involve trenching within highest astronomical tide, however the teaching will be filled in and allowed to regenerate, as such the impacts will predominantly be temporary, with the exception of a small area (0.84 ha) of permanent access tracks located adjacent to the Southern Port Road.

Marine plants

Marine plants are part of the mosaic of fish habitats and are an integral and usually highly visible feature of the coastline. Queensland has a very high diversity of marine plant species, including mangroves, seagrass, salt couch, algae, samphire (succulent) vegetation and adjacent plants. Effective management and protection of all marine plants and adjacent coastal areas is important in ensuring sustainable fish habitats and fisheries production.

A marine plant under the *Fisheries Act 1994*, is defined as:

- (a) a plant (a *tidal plant*) that usually grows on, or adjacent to, tidal land, whether it is living or dead, standing or fallen;
- (b) material of a tidal plant, or other plant material on tidal land;
- (c) a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.

This definition excludes prohibited matter or restricted matter under *the Biosecurity Act 2014*.

Tidal land, as defined in the Schedule Dictionary of the Fisheries Act includes 'reefs, shoals and other land permanently or periodically submerged by waters subject to tidal influence.' For the purpose of this assessment the Highest Astronomical Tide (HAT) has been utilised to define the area of tidal influence.

A significant residual impact assessment has been completed for marine plants against Section 11 of the Significant Residual Impact Guideline (Department of State Development, Infrastructure and Planning, 2014) (Table 55).

This assessment determined that based off the proposed Project area known at the concept design phase, the Project is considered likely to have a significant residual impact on marine plants.

Detailed impacts and mitigation measures proposed for marine plants associated with this Project are addressed in a separate marine plants report.

A development permit for operational works (removal of marine plants) will be sought for the Project.

Table 55 Significant residual impact assessment for marine plants

Impact Criteria	Assessment
An action is LIKELY to have a SRI on marine plants if the action will result in:	
More than 50 m ² of marine plants above tidal limits will be permanently removed as a result of the Project; AND	Yes The Project will impact on greater than 50 m ² of marine plants above tidal limits. Further assessment is proposed to calculate the precise area of marine plants impacted above HAT as the design progresses.
Onsite rehabilitation or restoration will not result in an equal or larger area of marine plants, providing equal or better fisheries values, within 5 years of clearing.	Yes. Clearing of mangrove species is not required for the Project and will be avoided by under-boring of the pipeline. Remaining impacted marine plants include forbs and grasses. Trenches will be refilled; therefore these areas may regenerate and provide an equal area of marine plants within 5 years. However, a small and linear area of permanent impacts to marine plants will occur associated with proposed access tracks alongside the pipeline alignment.

Appendix G

MNES Survey Effort

Appendix G MNES Survey Effort

Table 56 Survey guideline requirements and survey effort

Species	Survey guideline documents	Survey guideline requirement	Survey effort undertaken	Assessment of survey effort achieved
Birds				
White-throated needletail (<i>Hirundapus caudacutus</i>)	No specific guideline, information sourced from literature – SPRAT (Department of Climate Change, Energy, the Environment and Water, 2023c)	Survey techniques Area survey and timed area counts (survey effort not specified). Seasonal considerations Surveys must be conducted between October and April in northern and eastern Australia.	- A total of 56 person hours over 3 days of area searches - General habitat assessments were conducted throughout the study area.	Requirements met Survey techniques and seasonal requirements have been met. This species was not detected, though presence is possible.
Migratory birds				
Oriental cuckoo and migrant flycatchers during breeding season and migration (fork-tailed swift, oriental cuckoo, white throated needletail satin flycatcher, rufous fantail, black-faced monarch)	Referral guideline for 14 birds listed as migratory species under the EPBC Act (Department of the Environment, 2015b)	Survey techniques The EPBC Act referral guideline for 14 birds listed as migratory under the EPBC Act prescribes the following survey methods and effort for migratory species: - Area survey and timed area counts (survey effort not specified). Seasonal considerations Surveys should be conducted during the appropriate survey period: - Oriental cuckoo: September to May. - Fork-tailed swift: October to April. - Satin flycatcher: spring or autumn. - Rufous fantail: spring or autumn.	- A total of 56 person hours over 3 days of land based area searches including - General habitat assessments were conducted throughout the study area.	Requirements met Survey techniques and seasonal requirements have been met These species were not detected, though presence is assumed.

Species	Survey guideline documents	Survey guideline requirement	Survey effort undertaken	Assessment of survey effort achieved
		Black-faced monarch: spring, summer or autumn.		
Migratory shorebirds: Great knot, curlew sandpiper, lesser sand plover, red knot, Australian painted-snipe, greater sand plover, rufous fantail, marsh sandpiper, common greenshank, common greenshank, brown noddy, sanderling, fork-tailed swift, little tern, oriental plover, little curlew, ruddy turnstone, black-tailed godwit, terek sandpiper, common sandpiper, satin flycatcher, lesser frigatebird, great frigatebird, grey plover, red-necked stint, pectoral sandpiper, grey-tailed tattler, short-tailed shearwater, brown booby, glossy ibis, oriental pratincole, white-winged black tern, gull-billed tern, common tern, white-bellied sea-eagle, broad-billed sandpiper.	Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Department of the Environment and Energy, 2017).	Survey techniques The EPBC Act industry guidelines delineate survey effort in tidal and non-tidal locations. The study area is predominantly tidal. The survey guidelines recommend the following methods and survey effort for migratory shorebirds: - Bird surveys in suitable habitat: 1 x survey in December 2 x surveys in January 1 x survey in February Surveys should be conducted during the day and consist of area searches or line transects in suitable habitat (i.e. wetland or other waterbodies and their surrounding vegetation (Department of Climate Change Energy the Environment and Water, 2022). Seasonal considerations - Surveys should be conducted between August and April when the species' generally arrive and depart in Australia.	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023. - Literature review of migratory bird surveys within and adjacent to the study area. - General habitat assessments were conducted throughout the study area.	Requirements partially met Potential habitat for these species is limited within the Project area to areas of mudflats and shoreline. These areas were visited each day. Furthermore, several studies for the Port of Townsville have identified the species in the area. Due to the linear and disturbed nature of the Project area and the assumption that these species are present, survey effort is considered sufficient.
Latham's snipe (<i>Gallinago hardwickii</i>)	Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species:	Survey techniques The survey guidelines recommend the following methods and survey effort for the Latham's snipe:	6 hours of active birding and 52 hours of incidental birding over 3 days during February 2023.	Requirements partially met Potential habitat for these species is limited within the Project area to areas of mudflats and shoreline. These

Species	Survey guideline documents	Survey guideline requirement	Survey effort undertaken	Assessment of survey effort achieved
	Latham's snipe (Department of the Environment and Energy, 2017).	- Bird surveys in suitable habitat: 1 x survey in December 2 x surveys in January 1 x survey in February Surveys should be conducted during the day and consist of area searches or line transects in suitable habitat (i.e. wetland or other waterbodies and their surrounding vegetation (Department of Climate Change Energy the Environment and Water, 2022). Seasonal considerations Surveys should be conducted for Latham's snipe between October and February when the species arrive and depart in Australia.	General habitat assessments were conducted throughout the study area.	areas were visited each day. Furthermore, several studies for the Port of Townsville have identified the species in the area. Due to the linear and disturbed nature of the Project area and the assumption that these species are present, survey effort is considered sufficient.
Mammals				
Water Mouse (<i>Xeromys myoides</i>)	Referral guideline for the vulnerable water mouse <i>Xeromys myoides</i> (Department of the Environment, 2015c)	Survey Techniques - Daytime searches 1-2 hours per hectare of intertidal habitat - Elliott trapping 100 trap nights per hectare of suitable water mouse habitat - Camera trapping	Daytime searches 6 hours of daytime searches in intertidal habitat Camera Traps - Camera traps were deployed throughout the study area, particularly along creek lines, totalling 42 camera trap nights following the Queensland Government terrestrial vertebrate fauna guidelines Previous survey effort	Requirements partially met Camera traps and daytime searches were used to supplement previous survey effort within the study area. Due to the linear and disturbed nature of the Project within the same area surveyed during previous studies, survey effort is considered sufficient.

Species	Survey guideline documents	Survey guideline requirement	Survey effort undertaken	Assessment of survey effort achieved
			- A 2019 survey by AECOM included a total survey effort of 240 trap nights, failed to detect the species. 2004 surveys conducted at the mouth of the Ross River and involving a total survey effort of 290 trap nights and active searches, also failed to detect the water mouse (BAAM, 2004).	
Bare-rumped sheath-tailed bat (<i>Saccolaimus saccolaimus nudiclunatus</i>)	Survey guidelines for Australia's threatened bats (Department of the Environment, Water, Heritage and the Arts, 2010a)	Survey techniques The survey guidelines for Australia's threatened bats recommends the following survey method and effort for the bare-rumped sheath-tailed bat: - Unattended bat recorders: 16 detector nights over 4 nights. - Mistnets: 16 trap nights over 4 nights. It should be noted that this species has never been caught in harp traps, mistnets or by using triplines. - Roost searches: 1-2 hours per survey day. Seasonal considerations Although virtually nothing is known about seasonal movements of this species, it is recommended that surveys be conducted between August and April.	General habitat assessments were conducted throughout the study area.	Requirements not met The survey was within the preferred seasonal timing. Habitat assessments did not find roosting habitat within the study area. However, survey techniques did not meet the guideline.

Species	Survey guideline documents	Survey guideline requirement	Survey effort undertaken	Assessment of survey effort achieved
Short-beaked echidna (<i>Tachyglossus aculeatus</i>)	Species-specific guidelines are not available. In absence the Terrestrial Vertebrate Fauna Survey Guidelines for Queensland for Medium to Large Terrestrial Mammals (Eyre <i>et al.</i>, 2022) applies.	Survey Techniques • Camera trapping - one camera per site for minimum of four nights. • Cage trapping (not needed if camera trapping used) - one trap per site open for four nights. • Spotlighting - Two 30 person-minute spotlight search within 100 x 100m survey site. • Scat and sign search - Scat and sign search can coincide with the systematic diurnal active searches, within 50 x 50 m quadrates of the survey site. Otherwise, incidental. • Incidental - Incidental detection of any species. Seasonal considerations Nil.	• Camera traps were deployed throughout the study area, particularly along creek lines, totalling 42 camera trap nights: • General habitat assessments were conducted throughout the study area.	Requirements met Survey techniques and seasonal requirements have been met. This species was detected during field surveys, and therefore presence is assumed across the study area.
Reptiles				
Saltwater crocodile (<i>Crocodylus porosus</i>)	No specific guideline, information sourced from literature - SPRAT (Department of Climate Change, Energy, the	Survey techniques Area survey and timed area counts (survey effort not specified). Seasonal considerations None	• Active searches during daytime for opportunistic observations, as well as signs such as tracks and bank slides	Requirements met Survey techniques and seasonal requirements have been met.

Species	Survey guideline documents	Survey guideline requirement	Survey effort undertaken	Assessment of survey effort achieved
	Environment and Water, 2023c)		• Spotlighting with call playback: 24 hours over four nights during May 2021. • Spotlighting with call playback: 3 hours over one night during November 2021. • General habitat assessments were conducted throughout the study area.	This species is considered present in the study area due to anecdotal evidence.