

QTMP – Torbanlea Train Manufacturing Facility

Response to Request for Information (RFI) EPBC Ref 2022/09301

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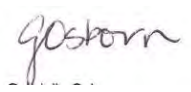
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1 Introduction

1.1 Background

On 22nd August 2022, a referral for the Queensland Train Manufacturing Program (QTMP) – Torbanlea Train Manufacturing Facility Project (the Project) was submitted to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

On 16th September 2022, a delegate for the Commonwealth Minister for the Environment and Water determined that the Project was a 'Controlled Action' due to its potential to have a significant impact on listed threatened species and communities (sections 18 & 18A of the EPBC Act). Subsequently, an additional information request (required for assessment by preliminary documentation) was issued by DCCEEW on 30th September 2022.

The Project is a program of works that has been initiated by Queensland Department of Transport and Main Roads (TMR) to modernise and allow the expansion of the South-East Queensland (SEQ) passenger train fleet to support the region's population and economic growth, while reducing road congestion and associated emissions.

The Project is proposing to establish a train manufacturing facility in Torbanlea, Queensland, on Lot 35 SP326250, and associated infrastructure on the Ritchie Road and Bruce Highway road reserves, and the North Coast Rail Line. The Project is located approximately 23 kilometres (km) north of Maryborough.

In the 2017 State election, the Queensland Government made a commitment that all future trains and associated infrastructure, for which Queensland has the manufacturing capacity to deliver, will be manufactured and maintained by Queenslanders to support jobs in Maryborough and other regional centres.

The QTMP will deliver an initial fleet of 65 six-car multiple units (MUs) under the first design, build and maintain contract. The purpose of the new QTMP fleet will be to service Queensland's growing need for efficient public transport, which is particularly driven by transformative infrastructure projects, such as Cross River Rail (CRR) and the 2032 Olympic and Paralympic Games.

The Project will likely include the following (subject to final design):

- Site preparation works, including clearing and earthworks
- Construction of a train manufacturing facility, consisting of a main assembly area, bogie frame manufacturing, assembly stores, main assembly stores and offices, and associated infrastructure
- Rail network connection to the North Coast Rail Line
- Internal road access connections from the Bruce Highway and Ritchie Road
- Widening and reconstruction of Ritchie Road.

1.2 Existing environment

The Project is bordered by the Bruce Highway on the western boundary, the North Coast Rail Line at the eastern boundary, Torbanlea township to the north and forest plantations to the south. The Project area has direct access to the Bruce Highway and Ritchie Road. The Project area has a total area of 1,289,040 square metres (m²) (128.90 hectares (ha)). The Project area and surrounding areas are zoned as 'Rural' under the Fraser Coast Planning Scheme.

The area encompassed by the Project has historically been subject to anthropogenic disturbance. Historic land management practices associated with agriculture has resulted in large areas surrounding the Project being cleared of vegetation. Much of the regenerated vegetation located in the centre of the Project area contains a mosaic of pine plantation and Acacia regrowth.

The area associated with the Project historically supported low intensity cattle grazing, and a single dwelling (now demolished), which was located within areas of non-remnant vegetation.

Areas containing mature vegetation communities within the Project area consists of open forest to woodland dominated by *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia*, and woodland dominated by *Eucalyptus latissinensis* +/- *Corymbia intermedia*, *Corymbia trachyphloia*, *Angophora leiocarpa* and *Eucalyptus exserta*.

The major industries in the surrounding the Project area are forestry, rural residential and farming. There are no natural features and/or any other important or unique values relevant to the Project area. The Project area is reasonably flat and undulates gently between approximately 27.5 metres (m) and 38.0 m Australian Height Datum (AHD). The highest elevation occurs towards the centre and southern portion of the Project area and slopes towards the north and west, to the Bruce Highway.

1.3 Purpose of document

The purpose of this document is to provide responses to address the request for additional information (required for assessment by preliminary documentation), issued by DCCEEW on 30th September 2022. This document has been partitioned into sections that reflect the format of the formal DCCEEW-issued Request for Information (RFI).

The proponent notes that the provided preliminary documentation, which includes this document, should be sufficient to allow the Minister (or delegate) to make an informed decision on whether to approve the Project, under Part 9 of the EPBC Act.

Appendix A includes a cross referencing table, that will provide the location of the responses to each question posed by DCCEEW for easy of reference.

1.4 Preliminary documentation contribution

Table 1-1: Names, roles and qualifications of all persons involved in preparing the preliminary documentation

Name	Role	Qualification
Andy Dalton	Senior Ecologist – Document author and survey team	Bachelor of Science (majoring in Ecology and Conservation Biology) 12 years' experience in industry
Kurtis Kemp	Ecologist – Document author and survey team	Bachelor of Science majoring in biological sciences 5 years' experience in the industry
Dr Chris Schell	Associate Ecologist – Document verifier and survey team	Bachelor of Science (Honours Class 1) and PhD in Zoology 20 years' experience in the industry
Jiordyn Trinca	Ecologist – Document author and survey team	Bachelor of Wildlife Science and Masters Conservation Science 1 year experience in the industry
Dr James Bone	Aquatic Ecologist and survey team	Bachelor of Science (Honours Class 1) and PhD in environmental science 9 years' experience in the industry
Bianca Voges-Haug	Senior Consultant – Document author	Bachelor of Laws (LLB) and BSc (Environmental Science) 9 years' experience in the industry
Stephen Cole	Strategic advisor and peer reviewer	Bachelor of Science and Master in Urban and Regional Planning 36 years' experience in industry

2 Responses

2.1 Description of action

RFI 1.1: Include updated information if any changes have been made to the project since the referral documentation was submitted. Include updated disturbance footprints (in hectares) and layout plans for the proposed action, where relevant. (DCCEEW, 2022)

The referral describes the Project area as including Lot 35 CK3261. However, following submission of the referral, a portion of the Ritchie Road road reserve was acquired by TMR and amalgamated with Lot 35 CK3261 to create one freehold lot, which is now referred to as Lot 35 SP326250. This was a change to the lot details only – noting the Project area and model disturbance footprint have not changed. Ritchie Road reserve was included in the model disturbance footprint as part of Lot 35 CK3261. The change to the lot numbering occurred on the 2nd September 2022.

There are otherwise no changes to the Project area since the initial referral submission.

2.2 Habitat assessment

DCCEEW has identified that the following listed species and ecological communities may be significantly impacted by the Project:

- Coastal Swamp Sclerophyll Forest of NSW and SEQ (Coastal Swamp Sclerophyll Forest Threatened Ecological Community (TEC))
- Grey-headed flying fox (*Pteropus poliocephalus*).
- Greater glider (*Petauroides volans*).

A review of these species distributions within the Species Profile and Threats (SPRAT) Database has been undertaken, and is provided in **Appendix B**. Additionally, a recent Protected Matters Search Tool (PMST) report has been generated (refer **Appendix C**).

2.2.1 Species/communities general information

Survey adequacy

RFI 2.1.1: Include an assessment of the adequacy of any surveys undertaken (including survey effort and timing). In particular, the extent to which these surveys were appropriate for the listed species or community and undertaken in accordance with relevant departmental survey guidelines and/or best practice. (DCCEEW, 2022)

A number of surveys were undertaken by Aurecon in order to inform the significant impact assessments as part of the EPBC Act referral (2022/09301) for the Coastal Swamp Sclerophyll Forest TEC, Greater glider (*Petauroides volans*) and Grey-headed flying fox (*Pteropus poliocephalus*).

Below is a summary of the ecological surveys that were undertaken:

- May 2021 – Preliminary ecological field survey, including a Protected Plants Survey as per the Queensland Flora Survey Guidelines
- April 2022 – Ecological field investigation conducted within the Project area, including visual habitat assessment and an animal breeding place survey
- May 2022 – Field-based investigations to target matters of national environmental significance (MNES).

A detailed background on each survey has been provided below.

An additional survey was undertaken by the University of Queensland to assess the presence of the Koala's (*Phascolarctos cinereus*) in September 2022 (refer to Appendix F).

Preliminary Ecological Survey May 2021

Protected Flora Surveys were conducted on the 18th and 19th May 2021, to identify *Nature Conservation Act 1992* (Qld) (NC Act) Threatened and Near-threatened flora species which may be present within the Project clearing impact area.

Surveys in accordance with the Queensland Flora Survey Guidelines – Protected Plants were undertaken within the Project area in May 2021 (Aurecon 2021d). The ecological field assessment was conducted by suitably qualified and experienced senior ecologists Dr Chris Schell and Dr James Bone (refer **Appendix B** Figure 4 of **Appendix E** for the location of survey locations).

The timed meander survey methodology defined in Section 6.2.2 of the Flora Survey Guidelines (Department of Environment and Science (DES) 2020) was employed to identify and locate potentially occurring threatened or near threatened flora species within the Project clearing impact area.

Further information on the survey methodology is provided in the MID Ecological Assessment Report (Aurecon 2022) and Protect Plants Survey Report (Aurecon 2021a).

Field investigations confirmed habitat was present for the Grey-headed flying fox, however no species were observed to occur during surveys. In order to determine impacts to the Grey-headed flying fox, the presence of foraging habitat was used. In accordance with DCCEE's Conservation Advice, Habitat Critical to the survival of the species was determined through the presence of winter flowering species and proximity to camps of National Significance. The use of habitat as a proxy for species presence transcends issues associated with annual population fluctuations and seasonal oscillations. This technique exceeds regulatory fauna survey guidelines and is an example application of the precautionary principle as prescribed under the EPBC Act.

Vegetation surveys noted the presence of *Melaleuca quinquenervia* with *Eucalyptus tereticornis* and *Corymbia intermedia* open forest to woodland on alluvial plains. This Regional Ecosystem (RE12.3.6) was identified as analogous to the threatened ecological community Coastal Swamp Sclerophyll Forest of NSW and SEQ by the Commonwealth Conservation Advice (DCCEE 2022a) when the community was listed on the 8th December 2021. No condition threshold was conducted at the time of the survey, instead the survey data and ground-truthed habitat mapping was used to determine the extent of the threatened ecological community at the time of its listing.

Protected Plant Survey April 2022

An ecological field assessment was undertaken on the 7th April 2022, by one suitably qualified ecologist (Dr Chris Schell).

The fauna field survey consisted of visual habitat assessment as well as an animal breeding place survey. Observations of fauna species were made opportunistically throughout the ecological assessment. The vegetation was assessed for its applicability to support conservation significant species habitat. In addition, where required, specific habitat features were investigated to assess their importance to conservation significant species and whether they constituted an animal breeding place.

The ecological field survey of the Project area completed by Aurecon was conducted in accordance with Aurecon's Scientific Purposes Permit (WISP14453114) and Aurecon's Animal Ethics Committee approval (CA 2015/03/846).

Field investigations confirmed habitat was present for the Grey-headed flying fox, however no species were observed to occur during surveys.

Targeted Field Based Surveys May 2022

An ecological field assessment was undertaken in May 2022, by one suitably qualified ecologist (Kurtis Kemp). The fauna field survey consisted of visual habitat assessment, assessed for its applicability to support conservation significant species habitat.

The ecological field survey of the Project area completed by Aurecon was conducted in accordance with Aurecon's Scientific Purposes Permit (WISP14453114) and Aurecon's Animal Ethics Committee approval (CA 2015/03/846).

Field investigations confirmed habitat was present for the Grey-headed flying fox and Greater glider, however no species were observed to occur during surveys. In alignment with the precautionary principle the presence of habitat was used as a proxy for the species presence.

Ecological Surveys

RFI 2.1.2: Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation. (DCCEEW, 2022)

The following assessment reports were prepared in association with ecological investigations for the Project area:

- Aurecon (2022c). Queensland Train Manufacturing Program Torbanlea MID Ecological Assessment Report. Prepared for Department of Transport and Main Roads (refer **Appendix B**)
- Aurecon (2022b). Queensland Train Manufacturing Program Torbanlea Matters of National Environmental Significance Report. Prepared for the Department of Transport and Main Roads (refer **Appendix D**)
- Aurecon (2021a). Rollingstock Expansion Project Torbanlea Protected Plants Report. Prepared for Department of Transport and Main Roads (refer **Appendix E**)
- University of Queensland (2022) – Koala survey by detection dogs to detect presence of the species (refer **Appendix F**).

2.2.2 Community specific information

Coastal Swamp TEC Key Diagnostic Characteristics

RFI 2.2.1: Provide an assessment (in a cross-reference table) of vegetation composition against the key diagnostic characteristics provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice, including any remnant and regrowth vegetation. (Section 2.2.1, DCCEEW, 2022)

Table 2-1 details the key diagnostic characteristic for the Coastal Swamp Sclerophyll Forest TEC Conservation Advice (DCCEEW 2022a).

Table 2-1: Coastal Swamp Sclerophyll Forest TEC Assessment

Key diagnostic characteristic	Assessment
Occurs on the mainland and islands near to the coast (within 20 km) from South East Queensland to south-eastern NSW specifically within these IBRA Bioregions: South Eastern Queensland (SEQ); NSW North Coast (NNC); Sydney Basin (SYB) and the Bateman sub-region of the South East Corner (SEC).	The Project area is located on the mainland, 16 km from the coast in the South East Queensland Bioregion.
Occurs in coastal catchments typically below 20 m above sea level (ASL), but occasionally up to 220 m ASL.	The Project area is located within a coastal catchment at approximately 30 m ASL.
Occurs on hydric soils with inundation patterns ranging from intermittent to episodic.	The Coastal Swamp Sclerophyll Forest observed within the Project area is situated on a drainage line which experiences episodic inundation. The soil for this vegetation was observed to be alluvial in nature and saturated by water at times.

Key diagnostic characteristic	Assessment
The vegetation structure varies from tall closed to open forest to woodland, to dense (closed) shrubland or scrub forest. Minimum crown cover is at least 10%, but it is more typically in the range 50% to 70%.	The Coastal Swamp Sclerophyll Forest within the Project area had an observed range of 10% to 70% crown cover.
From South East Queensland to the Sydney Basin Bioregion, the canopy is typically dominated or co-dominated by <i>Melaleuca quinquenervia</i> and/or <i>Eucalyptus robusta</i> . In some areas, the canopy may be locally dominated by other melaleuca species, including <i>M. dealbata</i> (SEQ bioregion) (rarely); <i>M. biconvexa</i> (mid-NSW coast to south of Sydney); <i>M. decora</i> (north of Shoalhaven), frequently with <i>Parsonsia straminea</i> climbing on the trunks of canopy species. In the SEQ bioregion, <i>M. ericifolia</i> may occur as a dominant canopy or sub-canopy species.	The Coastal Swamp Sclerophyll Forest within the Project area was observed to be dominated by <i>Melaleuca quinquenervia</i> in the canopy layer.
Other tree species may occur in the canopy (or sub-canopy) in some areas, but they are not dominant across a patch, including <i>Casuarina glauca</i> , <i>Banksia</i> spp., <i>Callistemon salignus</i> , <i>Corymbia intermedia</i> (Pink Bloodwood), <i>E. tereticornis</i> , (Forest Red Gum/Queensland Blue Gum), <i>E. longifolia</i> (Woollybutt), <i>E. botryoides</i> (Southern Mahogany/Bangalay), <i>E. ovata</i> (Swamp Gum), <i>Livistona australis</i> and/or <i>Lophostemon</i> spp.	<i>Eucalyptus tereticornis</i> and <i>Corymbia intermedia</i> were observed to occur (but not dominant) in the canopy of the Coastal Swamp Sclerophyll vegetation within the Project area.
The understorey typically includes a variable ground layer, depending on the canopy cover and inundation rate/period. Tall sedges (typically <i>Gahnia</i> spp.) and/or ferns often dominate the ground layer, mixed with graminoids and other herbs, especially <i>Imperata cylindrica</i> (Blady Grass).	The Coastal Swamp Sclerophyll Forest understorey within the Project area was dominated by <i>Imperata cylindrica</i> , and <i>Gahnia aspera</i> .
While they can occur regularly in the ground layer, the ecological community is not present if halophytic species, more typically associated with estuarine/saltmarsh areas, dominate the ground layer of a patch, for example, <i>Appium prostratum</i> , <i>Atriplex cineria</i> , <i>Chenopodium glaucum</i> , <i>Rhagodia candolleus</i> and <i>Samolus repens</i> .	No halophytic species were observed to dominate the Coastal Swamp Sclerophyll Forest understorey within the Project area.

Total Coastal Swamp TEC Area

RFI 2.2.2: Provide the total area (in hectares) of identified Coastal Swamp Sclerophyll Forest TEC (i.e., all vegetation that meets the key diagnostic characteristics). (Section 2.2.2, DCCEEW, 2022)

Approximately **4.76 ha** of Coastal Swamp Sclerophyll Forest has been identified as being contained within the area of direct disturbance of the Project, and in total approximately 31.98 ha of the TEC has been identified in the Project Area (refer page 20 of **Appendix D**).

Coastal Swamp TEC Condition Thresholds

RFI 2.2.3: Provide an assessment of all Coastal Swamp Sclerophyll Forest TEC against the condition thresholds provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice. (Section 2.2.3, DCCEEW, 2022)

Table 4 within the MNES Report (refer **Appendix D**) identified the site condition (structure and condition of site, diversity of relevant endemic and non-endemic species) of the Coastal Swamp Sclerophyll Forest TEC areas (>5 ha) and determined that it meets criteria for condition threshold A of the listing advice (refer extract below).

The patch is larger than 5 ha, and was observed to comprise of less than 20% of non-native total ground layer vegetation cover. Table 2 from the Coastal Swamp Sclerophyll Forest TEC Conservation Advice has been provided in Table 2-2.

Table 2-2: Condition classes, categories, and thresholds for Coastal Swamp Sclerophyll Forest TEC (Table 2 of DCCEEW 2022)

Patch size thresholds	Large patch The patch is at least 5 ha. It may or may not be contiguous with other native vegetation.	Medium patch The patch is at least 2 ha and less than 5 ha. It may or may not be contiguous with other native vegetation.	Small contiguous patch The patch is at least 0.25 ha and less than 2 ha and is part of a larger area of native vegetation of at least 5 ha.	Small patch The patch is at least 0.5 ha and less than 2 ha which is isolated or part of a small native vegetation remnant less than 5 ha in total.
Biotic thresholds				
HIGH CONDITION Non-native species comprise < 20% of total ground layer vegetation cover*	CLASS A A large patch that meets key diagnostics AND has a predominantly native ground layer.	CLASS B1 A medium patch that meets key diagnostics AND has a predominantly native ground layer.	CLASS B2 A small patch that meets key diagnostics AND has a predominantly native ground layer AND is contiguous** with another large area of native vegetation.	CLASS C1 A small patch which meets key diagnostics AND has a predominantly native ground layer.
GOOD CONDITION Non-native species comprise 20% to 50% of total ground layer vegetation cover*	CLASS B1 A large patch that meets key diagnostics AND the ground layer is mostly native.	CLASS C1 A medium patch that meets key diagnostics AND the ground layer is mostly native.	CLASS C2 A small patch that meets key diagnostics AND has a mostly native ground layer AND is contiguous** with another large area of native vegetation.	CLASS C2 A small patch that meets key diagnostics AND has a mostly native ground layer.
MODERATE CONDITION Non-native species comprise 50% - 80% of total ground layer vegetation cover*	CLASS C1 A large patch which meets key diagnostics AND the ground layer has at least 20% native vegetation cover.	CLASS C2 A medium patch that meets key diagnostics AND the ground layer has at least 20% native vegetation cover.	Not protected.	Not protected.
LOW CONDITION Non-native species comprise more than 80% of total ground layer vegetation cover*	CLASS C2 A large patch which meets key diagnostics, but the ground layer has low native vegetation cover.	Not protected.	Not protected.	Not protected.

*Refers to total perennial ground layer vegetation cover for the patch of the ecological community. Includes vascular plant species with a lifecycle of more than two growing seasons. It includes herbs (graminoids and forbs), grasses, shrubs, and juvenile plants of canopy species, but does not include annual plants, cryptogams, leaf litter or exposed soil.

**Contiguous means the patch is connected or within 30 m of another area of native vegetation.

See **Appendix B** for further information on non-native/invasive alien plants associated with the Coastal Swamp Sclerophyll Forest.

2.3 Impact assessment

DCCEEW has determined that the Project is a 'Controlled Action' as a result of potential impacts to listed threatened species and communities, and the following impacts were found likely:

- Vegetation clearing and loss of habitat
- Fragmentation of habitat
- Altered hydrological regimes
- Habitat degrading processes such as weed invasion (and other edge effects)
- Increased risk of vehicle strike (DCCEEW 2022).

2.3.1 Likely impacts for the Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox habitat

RFI 3.3.1: [Provide] An assessment of the likely impacts associated with the proposed action, including construction and operational phases (DCCEEW, 2022)

An Ecological Assessment Report (Aurecon 2022b) was developed for the Project and finalised in August 2022. The purpose of this report was to assess the State and Commonwealth ecological impacts associated with the Project for the State based approvals. This report assessed the significant impacts on the Greater glider, Grey-headed flying fox and the Swamp Sclerophyll TEC, this was assessed in accordance with the Commonwealth Significant Impact Guidelines 1.1. This report is included in **Appendix B** and contains an analysis of potential Project impacts. In order to inform this process a precautionary principle was applied to determine the presence of the habitat for the Grey-headed flying fox using the presence of winter flowering species as per the national recovery plan for the species.

The Project footprint includes the construction of a manufacturing facility and associated infrastructure and are likely to impact the ecological values contained within the Project area through the clearing of vegetation and its associated impact on species habitat. The proposed development also has the potential to adversely impact the waterway within the Project footprint.

Project impacts which have the potential to cause harm to ecological values are summarised against construction and operational activities below.

Construction

- Removal of vegetation and wildlife habitat for Project activities (i.e. manufacturing facility and access tracks).
- Habitat removal also potentially leading to a reduction in connectivity and habitat fragmentation.
- Increased edge effects such as weed invasion.
- Project construction activities potentially causing alterations to hydrology.
- Project construction activities which have the potential to impact ecological values directly and indirectly, including direct mortality of plants and animals, and indirect effects from noise, dust vibration and light.

Operation

- Operational transportation along the rail which has the potential to impact fauna due to direct mortality/injury via collision or disturbance associated with noise, light, and vibration.
- Increased erosion and sediment movement and dispersion.
- Increased activity increasing risk of bushfire in the area.
- Increased edge effects such as weed invasion.

Further detail against each impact (below) is detailed in Section 4.1 of **Appendix B**.

2.3.2 Direct and indirect loss for the Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox habitat

RFI 3.1.2: Include the direct and indirect loss and/or disturbance of habitat as a result of the proposed action. This must include the quality and area (in hectares) of habitat to be impacted (Section 3.1.2, DCCEEW, 2022)

Indirect impacts

Indirect impacts for the Coastal Swamp Sclerophyll TEC and Grey-headed flying fox habitat include flora and fauna edge effects, spreading of weed and pest species as well as erosion and sediment release offsite. In addition, changes to hydrology, from construction of access roads can potentially impact ecosystem structure. This can result in the potential reduction of the extent of habitat for the Coastal Swamp Sclerophyll TEC and Grey-headed flying fox if no mitigation measures are implemented. Mitigation measures will be implemented such that there will be no indirect loss of habitat to adjoining habitat areas as a result of the Project. The most relevant mitigation measures which will enable the Project to avoid indirect impacts include:

- Pest and Weed Management Plan (PWMP) will be developed and implemented as part of the Project Environmental Management Plan (EMP) as per existing government approved management measures to reduce indirect impacts upon species habitat
- A Water Quality Management Plan will be developed and implemented as part of the Project EMP and include measures to reduce indirect water quality impacts on downstream environmental values
- An Erosion and Sediment Control Plan (ESCP) will be developed and implemented to minimise erosion and sediment movement offsite
- Guidelines provided in TMR's Road Drainage Manual have been incorporated into the Project's design to reduce impacts to the identified MNES, particularly in relation to any potential indirect impacts to aquatic species.

Further detail on additional mitigation measures is provided in **Section 2.4** of this report.

Direct impacts

The Project will encompass approximately 68 ha and have a perimeter of approximately 10 km. Within this footprint, 17.42 ha of regulated vegetation will be removed. Table 2-3 provides the maximum area of regulated vegetation to be removed (i.e. direct impact).

Table 2-3: Direct impacts

Vegetation Community	Description	Maximum area to be removed within the model disturbance footprint (ha)	Relevant MNES values
RE12.3.6	<i>Melaleuca quinquenervia</i> +/- <i>Eucalyptus tereticornis</i> , <i>Lophostemon suaveolens</i> , <i>Corymbia intermedia</i> open forest to woodland on alluvial plains	4.76	■ Identified as habitat critical to the survival of the species for the Grey-headed flying fox by the national recovery plan ■ Identified as analogous to the Coastal Swamp Sclerophyll TEC by the DCCEEW Conservation Advice

Vegetation Community	Description	Maximum area to be removed within the model disturbance footprint (ha)	Relevant MNES values
RE12.5.4	<i>Eucalyptus latisinensis</i> +/- <i>Corymbia intermedia</i> , <i>Corymbia trachyphloia</i> , <i>Angophora leiocarpa</i> and <i>Eucalyptus exserta</i> woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments	12.66	Identified as habitat critical to the survival of the species for the Greater glider and Grey-headed flying fox by the national recovery plan
Total area of vegetation to be removed		17.42	

2.3.3 Habitat fragmentation Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox

RFI 3.1.3: [Provide] An assessment of the impacts of habitat fragmentation in the proposed action area and surrounding areas, including consideration of species' movement patterns (Section 3.1.3, DCCEEW, 2022)

Section 4.1.3 of the MID Ecological Assessment Report (refer **Appendix B**) examines the impacts of habitat fragmentation on the proposed area and surrounding areas. For ease of reference, below is an excerpt from this report.

Reduction in connectivity of biodiversity corridors and habitat fragmentation

Habitat fragmentation has been identified as a threatening process by the Commonwealth Conservation Advice for the Swamp Sclerophyll TEC. The Project will result in the creation of additional fragmentation by severing a relatively large patch of RE 12.3.6 in two separate locations. Fragmentation can lead to reduced buffering for remaining patches and alter the integrity of swamp systems to more dryland communities, which particularly impact species reliant on sheltered and inundated habitat. Decreased connectivity can lead to reduced seed dispersal and limit migration for species that require a large home range (DCCEEW 2022b).

Due to the vagile nature of the Grey-headed flying fox, fragmentation of habitat is unlikely to impact the species.

2.3.4 Duration of impacts for Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox

RFI 3.1.4: [Provide] An assessment of the likely duration of impacts as a result of the proposed action (Section 3.1.4, DCCEEW, 2022)

The Project's proposed duration includes:

- 20-30 months for construction of the Project
- 8 years for operation of the Project, and potential for future operations to be confirmed
- 20 years for the rehabilitation of the Project.

The above estimated duration of impacts is subject to change based on the final site design and further Project approvals.

The impacts described in Section 2.3.1 for both construction and operation timeframes provide a description of the types of impacts.

2.3.5 Repeated impacts for Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox

RFI 3.1.5: *[Provide]* A discussion of whether the impacts are likely to be repeated, for example as part of maintenance (Section 3.1.5, DCCEEW, 2022)

The primary Project impact to MNES, being the clearing of vegetation, will not be a repeated impact during the operational period of the Project.

The following impacts may be repeated and will therefore have a continual regime of monitoring and management:

- Erosion and sediment movement transport will be monitoring and managed continually throughout the construction, operation and rehabilitation periods of the Project via an ESCP under the Project EMP.
- Any surface water and hydrology impacts across the life of the Project will be managed through the development and implementation of a Stormwater Management Plan, to manage release of stormwater offsite.
- Monitoring and management of weeds and pest species will be continually managed across the life of the Project, due to possible encroachment at all stages of the Project. A PWMP will be implemented at all Project stages to manage weed and pest encroachment, and movement of pest species to and from site.

2.3.6 Unknown, unpredictable or irreversible impacts for Coastal Swamp Sclerophyll TEC and Grey-headed flying fox

RFI 3.1.6: *[Provide]* A discussion of whether any impacts are likely to be unknown, unpredictable or irreversible. (Section 3.1.6, DCCEEW, 2022)

Multiple ecological surveys have been undertaken so that the proponent has a comprehensive knowledge of the environmental setting within the Project area. All impacts which may be caused by the Project are well-known and established impacts that are consistent across similar projects (i.e., vegetation clearing, construction activities). The Project is not proposing any new or novel technology or activities in an unknown environmental setting which may result in unknown or unpredictable impacts to the environment.

Any disturbance caused by Project activities will be rehabilitated to an outcome which reflects the pre-existing natural environment, wherever possible, as per a Rehabilitation Control Plan (RCP) and TMR's Specifications [MRTS16 Landscape and Revegetation Works](#).

While impacts to the environment may not be completely reversible, impacts can be mitigated so that ongoing harm is minimised, and environmental conditions reflect the surrounding environment once the Project has ceased operations and completed rehabilitation activities.

A combination of measures, including offsets and rehabilitation activities, are being proposed so that a net environmental benefit will occur to mitigate any potential residual impacts or irreversible impacts.

2.3.7 Consistency with obligations and plans

RFI 3.1.7: [Provide] Justification, with supporting evidence, as to how the proposed action will not be inconsistent with:

- Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and
- Any relevant recovery plan or threat abatement plan. (Section 3.1.7, DCCEEW, 2022)

The Project has not proposed any inconsistencies with Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Threat abatement plans and species recovery plans have been used to inform the significant impact assessments undertaken in the MNES Report (Aurecon 2022a), under the Commonwealth's Significant Impact Assessment Guidelines 1.1 (DCCEEW 2022).

Threat abatement plans relevant to MNES associated with the Project include:

- Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*
- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (*Rhinella marina*)
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)
- Threats identified in the threat abatement plan for competition and land degradation by rabbits
- Threat abatement plan for predation by feral cats
- Threat abatement plan for predation by the European red fox.

Species recovery plans for the following MNES relevant to this Project have been adopted by DCCEEW and have been considered as part of this assessment of likelihood of occurrence and tests of significance, in particular the:

- National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) published March 2022
- National Recovery Plan for the Grey-headed flying fox *Pteropus poliocephalus*.

For further evidence in relation to the application of the above plans, refer to the MNES Report (**Appendix D**).

2.4 Avoidance, mitigation and management measures

2.4.1 Summary of avoidance, mitigation and management measures

RFI 4.1: [Provide] A detailed summary of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of the proposed action on relevant MNES (Section 4.1, DCCEEW, 2022).

Section 4.1 of the MNES Report (Aurecon 2022a) (refer **Appendix D**) provides information on general measures to avoid, minimise and mitigate potential impacts on MNES and other environmental values. **Appendix G** provides a summary regarding management plans and proposed specifications that are relevant to MNES. For ease of reference, this information has been summarised below.

- Construction Environmental Management Plan (EMP(C))

- Project EMP
- Stormwater Management Plan (SWMP)
- Bushfire Management Plan (BMP)
- Species Management Program (SMP)
- Protected Plants Clearing Permit
- TMR Fauna Sensitive Road Design Manual
- TMR Road Drainage Manual
- TMR Landscape and Revegetation Works Specification
- Environmental Specifications for Rail
- General mitigation measures.

Further explanation of each of the above avoidance, mitigation and management measures have been included below.

Construction Environmental Management Plan (EMP(C))

The total amounts of vegetation to be removed and removal process will be addressed prior to removal in the Project EMP(C).

To minimise the risk of weed and pest animal establishment within and adjacent to the Project area, the measures outlined in the EMP(C) will be implemented by the appointed contractor(s) and be overseen and audited by the relevant Site Environmental Officer. Pest fauna will be monitored throughout the Project and management measures within the project EMP(C) will reduce impacts.

The EMP(C) will manage all incoming vehicles, fill material and vegetation for rehabilitation purposes to ensure that no weed species that are particularly harmful to swamp, wetland and riparian habitat suitable for Wallum froglet are introduced into the Project footprint. The EMP(C) includes an internal 'permit to disturb' process to ensure construction does not occur outside of the authorised and designated footprint.

Project Environmental Management Plan (Project EMP)

The Project EMP will be established for the operational life of the Project and will include an array of sub-management plans and monitoring programs to monitor, measure and minimise impacts on the environment.

A PWMP will be developed and implemented as part of the Project EMP. The PWMP will outline specific measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area. Only chemicals suitable for use near waterways will be approved for use in reasonable proximity of watercourses/drain lines within the Project area. Weed control measures will be designed to minimise impacts on native fauna (e.g. use of aquatic and frog friendly chemicals).

A Water Quality Management Plan will be developed and implemented as part of the Project EMP and will include management measures to minimise indirect water quality impacts on downstream environmental values.

An Air Quality Management Plan will be developed and implemented as part of the Project EMP and will include management measures to reduce air quality impacts.

Stormwater Management Plan (SWMP)

A SWMP water quality component has been developed to provide stormwater quality analysis and identify any impacts associated with the proposed changes to land use on the site.

A range of treatment measures have been assessed and a treatment strategy has been proposed to target specific stormwater pollutants. Water quality modelling (MUSIC model) and indicative sizing of treatment measures has been undertaken to support this assessment and confirm the appropriateness of the proposed treatment measures for the site.

The following stormwater quality treatment measures are proposed for the Project:

- Rainwater tanks are proposed as the primary treatment device to treat runoff from roof areas. The stored water provides opportunities for reuse.
- Bio retention swales.

Results of the MUSIC modelling demonstrate that the development site and the above adopted mitigation strategies and water quality treatment train will sufficiently reduce and prevent any adverse impact to the health and quality of nearby waterways.

Bushfire Management Plan (BMP)

A BMP was completed alongside the MID Environment Assessment Report (Aurecon 2022c). The purpose of the BMP is to identify hazards within and adjoining the Project area, and provide actions on how to manage the hazards.

The BMP identifies the main bushfire hazards within the Project area and its immediate surroundings as the vegetation that is pervasive of the area. The vegetation is characterised by high and medium potential bushfire intensity flora, containing open forest, pine plantation and grazed grassland. Historically, regular hazard reduction measures have been adopted to reduce the intensity of potential bushfires, specifically within the Wongi State Forest. Grazing on the Project area has also assisted in reducing the intensity of bushfires.

Additionally, the machinery that will be used in the operation of the facility may provide an ignition source if not managed appropriately.

To mitigate bushfire risk to people and property the following measures are recommended and will be incorporated into the design of the facility:

- The implementation of asset protection zones of up to 25 m around the facility
- Buildings being designed in accordance with relevant bushfire guidelines
- Implementation of fire breaks
- Planned and controlled burning to reduce fine fuels and grasses
- Building maintenance during fire season, including the clearing of gutters, fire extinguisher servicing, and fire hose and alarm system testing.

Species Management Program (NC Act)

A High Risk Species Management Program (SMP) under the NC Act will be prepared due to the presence of potential animal breeding places for threatened and Special Least Concern species (i.e. the NC Act Vulnerable species Wallum froglet [*Crinia tinnula*] and colonial breeding species, including gliders and Microchiropteran bats) (Aurecon 2022b).

Works undertaken in accordance with the proposed High Risk SMP for State listed acid frog (*Crinia tinnula*), will provide environmental benefits for the surrounding communities, including the TEC.

Appendix E of the MNES Report (**Appendix D**) (Aurecon 2022a) provides the High Risk SMP. **Appendix C** in the High Risk SMP includes a table 'Impact mitigation measures' which includes control activities to avoid, minimise and management impacts.

Protected Plants Clearing Permit

No vegetation clearing is to take place without an appropriate vegetation clearing permit in place. A permit is required under the NC Act to undertake clearing that may impact Critically endangered, Endangered, Vulnerable, or Near Threatened (CEEVNT) species.

A protected plants survey was undertaken within the Project area on 18th and 19th May 2021. The survey identified no CEEVNT flora species protected under the provisions of the NC Act present within the Project area. The NC Act provides exemptions for work that will not impact CEEVNT flora species.

It is proposed that clearing works involved with the development of train manufacturing facility will qualify for such an exemption, as the flora species that were recorded were identified as either Least Concern or not deemed to be 'in the wild' under the NC Act.

An exemption for a Protected Plant Clearing Permit has been granted for the Project (Department of Environment and Science Reference: APP0083083) and will be applicable for three years from the date of survey (May 2021) (Aurecon 2022c).

TMR Fauna Sensitive Road Design Manual

The conservation and protection of native fauna, including threatened and endangered species, is important to TMR. Road corridors are maintained where possible to support unique flora and fauna species. As part of the planning stage for this Project, TMR completes environmental assessments to understand the potential risks on fauna corridors, fauna habitat and the potential for road kills, to inform the Project design where possible.

As part of the design process, TMR's Fauna Sensitive Road Design Manual is used to design, construct and maintain roads that better accommodate the needs of fauna, by reducing habitat or population fragmentation and the impact of road traffic. The Fauna Sensitive Road Design Manual has been divided into two parts, including:

- Part 1 (<https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Fauna-sensitive-road-design-volume-1>) provides information to assist practitioners to design, construct and maintain roads that better accommodate the needs of fauna, including:
 - Chapter 2: Current legislation regarding fauna conservation
 - Chapter 3: Population ecology and animal behaviour
 - Chapter 4: Wildlife corridors
 - Chapter 5: Effects of roads
 - Chapter 6: Existing practices
 - Chapter 7: Review of field data
- Part 2 (<https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Fauna-Sensitive-Road-Design-Volume-2>) provides information to assist practitioners to design, construct and maintain roads that better accommodate the needs of fauna, including:
 - Chapter 3: Preferred planning for mitigation measures
 - Chapter 4: Site assessment of monitoring
 - Chapter 5: Maintenance requirement
 - Chapter 6: Measures to achieve fauna sensitive roads
 - Chapter 7: Target species design considerations
 - Chapter 8: Non-native species design consideration
 - Chapter 9: Case studies.

When considering the suitability of fauna friendly infrastructure as a possible mitigation measure, TMR consider a number of issues, including:

- The design needs of the target species
- Existing landscape connectivity
- Current and future land uses adjacent to the Project
- Physical design constraints such as topography, geometry, accessibility and drainage
- Road safety and funding availability for both construction and an ongoing maintenance commitment

- The suitability of alternative mitigation measures such as signage, habitat restoration and reduced speed limits.

Measures as outlined in TMR's Fauna Sensitive Road Design Manual have been incorporated into the Project's road design to reduce impacts to the identified MNES.

TMR Road Drainage Manual

TMR's Road Drainage Manual provides information related to the planning, design, construction, maintenance and operation of road drainage infrastructure. It provides the technical reference required for all aspects of hydraulic, road drainage, erosion, environmental and sediment control throughout Queensland.

TMR has generally agreed to adopt the guidance published in Austroads' Guides to [Road Design series](https://austroads.com.au/safety-and-design/road-design/guide-to-road-design) (<https://austroads.com.au/safety-and-design/road-design/guide-to-road-design>) as part of national harmonisation. While the Road Drainage Manual remains the primary document, it references and adopts criteria and methodology as published in the Austroads' Guide to Road Design.

Guidelines provided in TMR's Road Drainage Manual have been incorporated into the Project's design to reduce impacts to the identified MNES, particularly in relation to any potential indirect impacts to aquatic species.

Landscape and Revegetation Works (Specification MRTS16)

This Technical Specification (Specifications MRTS16) applies to the construction of landscape and revegetation treatments in road works. This Technical Specification provides a standardised approach to ensure that landscape and revegetation treatments are of sufficient standard and quality to meet TMR's expectations and minimise impacts to the surrounding landscape.

Site rehabilitation will be undertaken in accordance with TMR's Specifications MRTS16.

Environmental Specifications for Rail

The functional environmental specifications for the construction of rail and facility are to conform with the two Queensland Rail standards (*MD-10-64 Policy Statement – Environment* and *MD-13-320 Framework Environmental Planning and Management*) as well as one International Standard (ISO-14001 – Environmental management systems).

General mitigation measures

General mitigation measures to be applied to the Project, include:

- A Suitably Qualified and Experienced Person (SQEP) will be nominated to oversee the environmentally relevant tasks and activities. This may include (but not limited to) overseeing vegetation clearing, liaising with any spotter/catcher contractors, reporting any environmentally relevant information to the appropriate regulatory authorities and ensuring conformance occurs for all environmental requirements documented in the Project EMP.
- Washdown and weed and seed certificates are to be gained in accordance with local and State government biosecurity requirements.
- Clearly delineate significant vegetation boundaries to prevent unnecessary vegetation clearing of MNES.
- All site personnel are to be made aware of local fauna that could occur on site and that all native fauna, including snakes, are protected. Fauna are only to be handled by suitably qualified spotter catchers.
- Discourage the feeding of wildlife by Project personnel throughout the Project area.
- Implement fauna escape devices where practical (such as planks within trenches or trench ramps designed with a 15-degree slope placed every 30 m along the trench) to enable fauna to exit hazardous areas within the construction site.
- Avoidance of direct impact to waterways (i.e. remain outside of the existing drainage system).

- Appropriate sediment and erosion control at all works sites.
- Works undertaken in accordance with the proposed High-risk SMP for State listed acid frog (*Crinia tinnula*), providing environmental benefits for the surrounding communities, including the TEC.
- Temporary fencing to be installed along clearing boundaries to identify no-go areas and reduce access to stream bank vegetation.
- A certified fauna spotter/catcher (i.e. holding a Damage Mitigation Permit (Removal and Relocation of Wildlife) and/or Rehabilitation Permit issued by DES) will be engaged to inspect the Project area within 48 hours prior to vegetation clearing. The fauna spotter/catcher will:
 - Undertake pre-clearance ecological assessments prior to any–vegetation clearing – Where practical, active breeding nests will be relocated prior to clearing
 - Identify infrastructure which are used by fauna (e.g. culverts that may be used by some species for roosting).
- Ensure that where a habitat tree requires removal, the habitat is removed by suitably qualified personnel with a certified spotter/catcher present prior to the commencement of any clearing in order to safely remove any fauna species which might be located inside. Actions to be implemented include:
 - Measures will be taken to avoid injuring animals.
 - Displaced fauna will then be relocated to a suitable, previously identified recipient site, provided the animal did not sustain any injuries. Any injured animals (native or introduced) are to be taken to receive veterinary attention immediately. Once recovered, animals will be relocated to an area of similar habitat adjoining the Project area.
 - In the case of the presence of other fauna species, the spotter/catcher will encourage the fauna to leave by reasonable means or capture and relocate it in the local environment prior to felling and trimming. If the spotter/catcher determines that a fauna species is present in a tree he/she will remove the animal prior to the felling of that tree or any tree of which the crown overlaps that tree. All members of staff have an obligation to report any fauna species seen in areas to be cleared to the fauna spotter/catcher prior to clearing.
- During construction works, a certified fauna spotter/catcher is to inspect trenches, culverts and other structures to determine whether there are any trapped or injured fauna species present and action as appropriate.
- Where practical, any fauna to be relocated will be moved to an area of similar habitat within close proximity to the Project site. It is preferable that this site is of similar vegetation characteristics in order to replicate habitat for displaced fauna. Suitable relocation areas will be identified prior to the commencement of clearing by the spotter/catcher.
- Environmental incidents will be reported, including those which involve harm to native wildlife, to DES within 24 hours of the incident occurring. The report will include details on the location and cause of the incident, extent of impact and corrective action taken.
- In the event of injury to fauna, works in the area will cease immediately and not recommence until rescue actions have been undertaken and a review of appropriate management actions to ensure the risk of reoccurrence is minimised.
- Contact details for qualified animal carers and vets within the area to be outlined provided to relevant staff.
- The placement and use of Project infrastructure lighting will be designed, with due consideration to safety, to have a minimal impact on surrounding habitats and fauna.
- Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of fauna throughout construction.
- Where practical use existing roads and access tracks. Design any new access tracks (permanent and temporary) with the aim of minimising the loss and/or impact on existing vegetation communities. Access tracks must not be constructed through vegetation not approved for clearing.

- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zones of trees (to avoid compaction)
- All contractors are to be made aware of the risks associated with fauna and vehicle movement. This is to be provided in a toolbox.
- All contractors must ensure that only appropriately sized machinery is used during Project works to minimise potential impact to adjacent flora (i.e., direct collision with flora).
- Avoid chemical contact (e.g., fuel spills, unnecessary use of insecticides/fertilisers, etc.) with the environment where possible.
- Fuel and chemical storage facilities should be bunded and designed in order to provide sufficient buffer zones and limited pathways to adjoining terrestrial and aquatic environments.
- Any waste storage facilities associated with the Project area are to be designed and located to restrict fauna access. Ensure all contractors are aware that all waste must be discarded in suitable waste receptacles that cannot be accessed by wildlife.
- Stockpile sites and storage of machinery, materials or equipment will be within designated areas that have already been disturbed and outside of the drip zone of any trees. Areas outside of the Project area must not be disturbed in order to create stockpile sites or storage areas.
- A PWMP is to be developed as part of the Project EMP and will outline specific measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area. Weed control measures will be designed to minimise impacts on native fauna (e.g. use of aquatic (fish-friendly) and frog friendly chemicals).
- To minimise the risk of weed and pest animal establishment within and adjacent to the proposed clearing area, the measures outlined in the PWMP will be implemented by the appointed contractor(s) and be overseen and audited by the relevant Site Environmental Officer.
- Fill and imported soil materials are to be declared weed free or to be sourced from weed free areas.
- No domesticated animals (e.g. dogs) to be allowed on site.
- No stormwater is to be discharged from the site without passing through appropriate treatment devices.
- Sediment fences shall be located along the construction boundary when down slope. Sediment fencing posts/pickets should have maximum spacing of 2 m and be installed in accordance with the certified ESCP and manufacturers specifications.
- Sediment fences will be inspected weekly for UV degradation, effectiveness and capacity (maintained at greater than 60%). Sediment fences shall not be removed until disturbed areas have been stabilised. Replacement may be required.
- Vehicle exit point(s) will incorporate designated shakedown area and access roads/driveways will have clean aggregate rock/stone/recycled concrete overlaid as soon as practicable to reduce the amount of sediment transfer onto the road.
- Equipment which is used intermittently should be shut down when not in use.
- Development of a site-specific Construction Air Quality Management Plan to reduce potential air quality impacts, including:
 - Specify locations of shake-down areas on drawings in locations where trucks will be moving from unsealed to sealed areas
 - Maintain sealed access roads to the Project area where reasonably practicable
 - Vehicles and plant to be operated at speeds appropriate to weather conditions
 - Cover loads on haul trucks
 - Ensure vehicles and plant use designated entry and exist points
 - Stabilisation and regular watering of main haul routes and traffic areas to minimise the generation of dust

- Ensure vehicles and plant comply with the relevant Australian Standards for emissions, and
- Ensure regular servicing of vehicles to maintain compliance with standards.

2.4.2 Best available practices, standards and evidence

RFI 4.2: The proposed measures must be based on best available practices, appropriate standards, evidence of success for other similar actions and supported by published scientific evidence (Section 4.2, DCCEEW, 2022).

A number of the mitigation measures referenced in the previous section relate to specifications and manuals developed by TMR which have been implemented across a wide range of sites. These include specifications and manuals include:

- Specification MRTS16: Landscape and Revegetation Works
- TMR Road Drainage Manual
- TMR Fauna Sensitive Road Design Manual.

TMR has referred 13 projects to the Commonwealth Minister for the Environment and Water for consideration in the last three years, with at least 10 projects being completed or in post-approval. These specifications have previously been reviewed and assessed as part of a wide range of projects.

Additionally, the environmental specifications for the construction of the rail and facility must conform to the following Queensland Rail standards, which have been used across a number of sites:

- MD-10-64 Policy Statement – Environment
- MD-13-320 Framework Environmental Planning and Management.

The Environmental Management Plan/Programs (Construction and Project versions) will be compliant with the International Standard ISO-14001 – Environmental management systems.

2.4.3 SMART Principles

RFI 4.3: All proposed measures for MNES must be drafted to meet the 'S.M.A.R.T' principle:

- S –Specific (what and how)
- M –Measurable (baseline information, number/value, auditable)
- A –Achievable (timeframe, money, personnel)
- R –Relevant (conservation advices, recovery plans, threat abatement plans)
- T –Time-bound (specific timeframe to complete)

(Section 4.3, DCCEEW, 2022)

As part of the development of management and monitoring plans and programs, measures which are compliant with the SMART principles will be developed and implemented. Management plans that will be compliant to SMART principles are outlined in **Appendix G**.

2.4.4 Commitments

RFI 4.4: Details of specific and measurable environmental outcomes to be achieved for relevant MNES. All commitments must be drafted using committal language (e.g. 'will' and 'must') when describing the proposed measures (Section 4.4, DCCEEW, 2022)

A number of commitments relating to mitigation and management measures for the Project, to reduce environmental degradation and impacts to MNES, are included in Table 2-4.

Table 2-4: Project commitments

#	Commitment
1	A Suitably Qualified and Experienced Person will be nominated to oversee the environmentally relevant tasks and activities.
2	The Project will be designed and constructed in accordance with TMR and Queensland Rail's specifications, manuals, standards and guidelines to reduce impacts to MNES.
3	The final Project design will adopt the hierarchy of mitigation (i.e. avoided, minimised, and mitigated where possible) to reduce the duration and severity of impacts.
4	Works will be undertaken in accordance with State-based legislative mechanisms geared towards environmental protection, which require specific approvals to be in place prior to disturbance, including: ■ Rehabilitation Permit (spotter catcher endorsement) (Part 14 of the Nature Conservation (Animals) Regulation 2020) ■ Damage Mitigation Permit (removal and relocation) (Part 10 of the Nature Conservation (Animals) Regulation 2020) ■ Species Management Plan (Section 335 of the Nature Conservation (Animals) Regulation 2020).
5	An EMP(C) will be developed in compliance with ISO 14001, and will be implemented at the Project to mitigate and manage environmental impacts during construction activities, and will include: ■ Measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area ■ Requirements for pre-clearance surveys to protect species (i.e. koala) ■ Management measures around the amounts of vegetation to be removed and the removal process ■ Construction Air Quality Management Plan to reduce potential air quality impacts.
6	A Project EMP will be developed and implemented for the duration of the Project's operations, and will be compliant with ISO 14001, and include the following management plans: ■ Water Quality Management Plan to reduce indirect water quality impacts on downstream environmental values ■ PWMP to implement existing government approved management measures to reduce indirect impacts upon species habitat ■ AQMP to implement management measures to reduce air quality impacts.
7	Project works will adhere to a certified Project ESCP in accordance with MTRS52 Erosion and sediment control processes.
8	Rehabilitation will occur for the areas disturbed by the Project, as per a RCP and as per TMR's Specification MRTS16: Landscape and Revegetation Works.
9	Rehabilitation areas within the Project area will seek to restore the pre-disturbance vegetation communities.
10	Offsets will be provided under the EPBC Act and EPBC Act Offset Assessment Guide to mitigate the loss of the Coastal Swamp Sclerophyll Forest of NSW and SEQ QLD. Offsets will also be provided to mitigate the loss of habitat for the Greater glider (<i>Petauroides volans</i>) and the Grey-headed flying fox (<i>Pteropus poliocephalus</i>). The Project will comply with the EPBC Act Offsets Policy for any significant residual impacts to MNES.

2.4.5 Other approvals

RFI 4.5: Details of the proposed measures to be undertaken to avoid, mitigate and manage the relevant impacts of the proposed action, including those required through other Commonwealth, State and local government approvals (Section 4.5, DCCEEW, 2022)

The following permits and management plans will be required for the Project, which will include additional measures to avoid, mitigate and management impacts caused by the Project:

- Rehabilitation Permit (spotter catcher endorsement) (Part 14 of the Nature Conservation (Animals) Regulation 2020)
- Damage Mitigation Permit (removal and relocation) (Part 10 of the Nature Conservation (Animals) Regulation 2020)
- SMP must be submitted to DES for approval for tampering with some animal breeding places (Section 335 of the Nature Conservation (Animals) Regulation 2020).

2.4.6 Timing, frequency and duration

RFI 4.6: Information on the timing, frequency and duration of the proposed avoidance, mitigation, management and monitoring measures, and any corrective actions to be implemented, where relevant (Section 4.6, DCCEEW, 2022)

A large number of avoidance, mitigation and management measures have been proposed in Section 2.4.1 and will be required over different stages of the Project. Management plans to be developed are listed in **Appendix G**. This is summarised below.

Further detail on the exact timing and frequency of monitoring, management and mitigation measures will be subject to the development of management plans and programs prior to construction (following obtaining all Project approvals).

Construction (20 to 30 months)

- TMR Fauna Sensitive Road Design Manual
- TMR Road Drainage Manual
- Environmental Specifications for Rail (Queensland Rail)
- Project EMP(C), including:
 - Weed and pest management
 - Erosion and sediment control
 - Vegetation clearing monitoring and pre-clearance surveys
 - Construction air quality monitoring.

Operational (8 Years – future operational use to be confirmed)

- Project EMP, including:
 - PWMP
 - Water Quality Management Plan
 - AQMP
- SWMP

- BMP
- SMP
- Protected Plants Clearing Permit.

Rehabilitation (as areas become available during and post construction)

- TMR Landscape and Revegetation Works Specification.

2.4.7 Effectiveness

RFI 4.7: An assessment of the expected or predicted effectiveness of the proposed measures. (Section 4.7, DCCEEW, 2022)

All proposed avoidance, mitigation and management measures are based on controls that have been used as a standard across a multitude of sites and follow the international standard ISO 14001 Environmental Management Systems.

The effectiveness of the proposed measures is predicted to be of a high standard, in consideration of the number of sites constructed, managed and remediated by TMR across Queensland.

2.4.8 Statutory or policy basis

RFI 4.8: Any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved conservation advice, recovery plan or threat abatement plan, and a discussion on how the proposed measures are not inconsistent with relevant plans. (Section 4.8, DCCEEW, 2022)

The below mentioned plans will be used to inform a number of mitigation measures, but are primarily relevant to the development of the PWMP.

Threat abatement plans relevant to MNES associated with the Project include:

- Threat abatement plan for disease in natural ecosystems by *Phytophthora cinnamomi*
- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (*Rhinella marina*)
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)
- Threats identified in the threat abatement plan for competition and land degradation by rabbits
- Threat abatement plan for predation by feral cats
- Threat abatement plan for predation by the European red fox.

Species recovery plans for the following MNES relevant to this Project have been adopted by DCCEEW and have been considered as part of this assessment of likelihood of occurrence and tests of significance, in particular the:

- National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) published March 2022
- National Recovery Plan for the Grey-headed flying fox *Pteropus poliocephalus*.

2.4.9 Adaptive management approach

Ongoing monitoring of environmental conditions is proposed and will support an adaptive management

RFI 4.9: Details of ongoing management, including monitoring programs to support an adaptive management approach, that validate the effectiveness of the proposed measures and overall demonstrate that environmental outcomes will be achieved (Section 4.9, DCCEEW, 2022)

approach to implementing mitigation measures. These monitoring regimes are summarised below and are described further in **Section 2.4.1** under each of the relevant measures.

- Stormwater and water quality monitoring
- Pest and weed monitoring
- Erosion and sediment monitoring
- Species (breeding places) monitoring.

2.4.10 Corrective actions

RFI 4.10: Details of tangible, on-ground corrective actions that will be implemented in the event the monitoring programs indicate that the environmental outcomes have not or will not be achieved. (Section 4.10, DCCEEW, 2022)

Trigger Action Response Plans (TARPs) are a standard component of monitoring and management programs and will provide opportunity for the identification of triggers that may result in environmental degradation (i.e. early identification) and the implementation of actions to mitigate impacts prior to significant harm being caused.

TARPs are required as part of emergency preparedness and response procedures within ISO 14001 and to be included in the EMP(C) and Project EMP at a minimum. TARPS will be incorporated within the management plans to be developed in **Appendix G**.

2.5 Rehabilitation requirements

2.5.1 Rehabilitation acceptance criteria

RFI 5.1: Rehabilitation acceptance criteria, including for the restoration of habitat for relevant listed threatened species and communities. (Section 5.1, DCCEEW, 2022)

Rehabilitation will occur within the areas temporarily disturbed by the Project. These areas will include, but not be limited to, construction laydown areas and disturbance areas without permanent infrastructure. All rehabilitation areas will be commensurate to the areas of temporary disturbance. Rehabilitation areas within the Project area will seek to restore the pre-disturbance vegetation communities (refer page 1, MNES Report in **Appendix D**).

The Project will follow procedures which will include an RCP.

A Rehabilitation Permit (spotter catcher endorsement) will be required for the Project under the NC Act.

This Technical Specification (Specifications MRTS16) applies to the construction of landscape and revegetation treatments in road works. This Technical Specification provides a standardised approach to ensure that landscape and revegetation treatments are of sufficient standard and quality to meet TMR's expectations and minimise impacts to the surrounding landscape.

Site rehabilitation will be undertaken in accordance with TMR's Specifications MRTS16, which includes completion criteria for the following:

- Weed management (Clause 9.1.1.3 MRTS16)
- Seeding treatment (Clause 9.1.2.1 MRTS16)
- Turfing treatments (Clause 9.1.2.2 MRTS16)
- Planting treatments (Clause 9.1.2.3 MRTS16).

RFI 5.2: A summary of the procedures, including contingency measures, that will be undertaken to achieve the rehabilitation acceptance criteria (Section 5.2, DCCEEW, 2022)

2.5.2 Procedures and contingency measures

A Rehabilitation Management Plan will be prepared to provide guidance and procedures that will allow TMR, to achieve enhanced environmental outcomes as part of the development of the Project. This includes:

- A regeneration strategy
- Weed control techniques
- Revegetation
- Maintenance Inspection and reporting.

TMR will ensure that controls are properly implemented, regularly monitored and audited to assess their effectiveness. Changes to the vegetation management controls will be investigated if they are not achieving their objectives.

2.5.3 Rehabilitation monitoring program

RFI 5.3: A summary of a monitoring program to determine the success of rehabilitation activities implemented by the proponent. (Section 5.3, DCCEEW, 2022)

Monitoring for restoration is typically undertaken using quantitative methods (i.e. transect or quadrat-based monitoring) and qualitative methods (i.e. observations on daily record sheets and photo-point monitoring).

Prior to the commencement of restoration activities, a minimum of five photo-monitoring points are to be established in each regeneration zone. Baseline data is to be collected at each of these locations using transect and quadrat-based sampling techniques, to which progress can be measured. Data should be collected within stratified random quadrats of a minimum size of 20 m x 20 m.

Monitoring is to be conducted at three-monthly intervals for the first two years and then at six-monthly intervals thereafter until the performance targets have been achieved.

Performance indicators will be set along with an adaptive management strategy to be adopted to ensure compliance (i.e. in instances of drought, fire, disease, or planting failure). In instances where weeds persist on site, or excessive mortality within revegetation zones, management strategies are to be reevaluated and updated to ensure that performance indicators are met.

Any alterations to any component of this management plan will be approved the relevant regulatory authority and to be accompanied by an Adaptive Management Statement (AMS) which clearly outlines the plan component to be altered and the reasoning for the alteration.

2.5.4 Other rehabilitation approvals

RFI 5.4: The details of any rehabilitation activities proposed to be undertaken as required by Commonwealth, State or Territory, and local government legislation. Attach relevant Commonwealth, State or Territory, and local government approvals and permits as supporting documents to the preliminary documentation. (Section 5.4, DCCEEW, 2022)

Under Queensland legislation, including the NC Act, the following permits and management plans relating to rehabilitation activities, are being developed for the Project:

- Rehabilitation Permit (spotter catcher endorsement) under Part 14 of the Nature Conservation (Animals) Regulation 2020
- Rehabilitation Management Plan.

The permit and management plan have not yet been fully developed and approved and could not be attached to this report.

2.6 Offsets

2.6.1 Residual significant impacts

RFI 6.1: An assessment and conclusion on whether residual significant impacts will occur on relevant protected matters, after application of avoidance, mitigation and management measures. (Section 6.1, DCCEEW, 2022)

The Project will implement avoidance and mitigation measures (including the provision of offsets) to minimise the significant residual impacts on the MNES.

Offsets provided for under the policy include direct offsets. The provision of direct offsets is proposed based on the outcomes of the assessment of significance and the extent of the significant residual impacts on MNES (refer page 11, MNES Report in **Appendix D**).

The Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Greater glider (*Petauroides volans*) and Grey-headed flying fox (*Pteropus poliocephalus*) have been identified as likely to be subject to significant impacts when assessed against the Significant Impact Guidelines 1.1 (DoE 2013) as the Project will reduce the extent of the ecological community (i.e. removal of 4.76 ha) and habitats for the Greater glider and Grey-headed flying fox (i.e. removal of 17.46 ha). The removal of this area is unavoidable and therefore, in order to mitigate the loss of this area, direct offsets are proposed in accordance with the Commonwealth's EPBC Act Environmental Offsets Policy and calculated as per the EPBC Act Offset Assessment Guide (refer page 34, MNES Report in **Appendix D**).

The Project will comply with the EPBC Act Offsets Policy for any significant residual impacts to MNES. Areas of offsets for the direct disturbance of the TEC and habitat will occur within the Project area (land parcel of the Project). The total offset area is dedicated to 55 ha. The offset area will include 15.12 ha for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, 45.4 ha for the Grey-headed flying fox habitat, and 55 ha of habitat suitable for the Greater glider. Greater glider and Grey-headed flying fox habitat will be provided as a composite offset (refer page 2, MNES Report in **Appendix D**).

2.6.2 Summary of proposed environmental offset

RFI 6.2: A summary of the proposed environmental offset and key commitments to achieve a conservation gain for each relevant protected matter (Section 6.2, DCCEEW, 2022)

In order to ensure that a positive conservation outcome is achieved, it is proposed that an environmental offset of 55 ha for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Greater glider habitat, and Grey-headed flying fox habitat will be provided. This offset quantum has been calculated utilising the EPBC

Act Offset Assessment Guide. 15.12 ha of offset is required for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, 55 ha for the Greater glider, and 45.4 ha for the Grey-headed flying fox. These areas have been assessed and will be provided as a composite offset for the Greater glider and Grey-headed flying fox. The provision of this environment offset also has the potential to benefit other MNES within the location area that are unlikely to be subject to significant impacts from the Project (e.g. migratory species) (refer page 38, MNES Report in **Appendix D**).

Whilst assessment of the Project upon the Koala, White-throated needletail and migratory species indicated that these species are not likely to be subject to significant impacts from the Project, the provision of a direct offset for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Greater glider habitat, and Grey-headed flying fox habitat would ensure that these species are subject to a positive conservation outcome as a result of the Project (refer page 35, MNES Report in **Appendix D**).

2.6.3 Offset Area Management Plan

RFI 6.3: Where offset area/s have been nominated, include a draft OAMP as an appendix to the PD. The draft OAMP must meet the minimum information requirements set out in **Appendix B.1**, and must be prepared by a suitably qualified ecologist and in accordance with the department's Environmental Management Plan Guidelines (2014), available at: www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines. (Section 6.3, DCCEEW, 2022)

An Offset Area Management Plan (OAMP) has been developed for the Project and is provided in **Appendix H**.

2.7 Ecologically Sustainable Development (ESD)

RFI 7.1: *[Provide]* A description of how the proposed action meets the principles of ESD, as defined in section 3A of the EPBC Act.

- a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
- b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and
- e) improved valuation, pricing and incentive mechanisms should be promoted. (Section 3.1.7, DCCEEW, 2022)

TMR understands, and are committed to, meeting the intent of the EPBC Act and DCCEEW's requirements. Using the precautionary principle, TMR identified that this Project would be a Project which could significantly impact upon MNES, and subsequently the Project was referred to the Commonwealth Minister for the Environment and Water for a controlled action determination under the EPBC Act.

Table 2-5 has been developed to provide responses against each Ecologically Sustainable Development (ESD) principle, as per Section 3A of the EPBC Act.

Table 2-5: ESD principles

Principle	Response
Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.	The Project will implement avoidance and mitigation measures (including the provision of offsets) to minimise the significant residual impacts on the MNES. Offsets provided for under the policy include direct offsets, and other compensatory methods (or indirect offsets). The provision of direct offsets is proposed based on the outcomes of the assessment of significance and the extent of the significant residual impacts on MNES. The Project will comply with the EPBC Act Offsets Policy for any significant residual impacts to MNES.
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	A number of field surveys by qualified ecologists, in compliance with relevant standards, have been undertaken in order to understand the existing environment and develop a strong understanding of any environmental degradation that would be caused by the Project and its activities. Reference has been made to the relevant MNES Guidelines, Species Recovery Plans and Threat Abatement Plans for the relevant MNES to develop this understanding of the Project and reduce any uncertainty. All possible measures to prevent environmental degradation have been considered, including avoidance, management and monitoring measures, rehabilitation, and offsets under the EPBC Act framework.
The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	Inter-generational equity has been considered and promoted as part of the Project's design and proposed activities. A number of mitigation measures are being proposed to ensure that the health, diversity and productivity of the environment is maintained or enhanced for future generations. These include rehabilitation activities to ensure disturbed areas are transitioned back to pre-disturbance environmental values, as well as offsets under the EPBC Act. An offset area of 55 ha will provide approximately 100.09% of the direct offset requirement, resulting in a positive conservation outcome for MNES identified in the Project area.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.	Wherever possible, the Project has been designed to conserve biological diversity and ecological integrity, which included consideration of options to vary Project designs or methodologies to minimise impact on the threatened species breeding places. Additionally, mitigation measures have been designed to reduce the magnitude and severity of potential impacts upon the environment, including animals, plants and animal breeding places. Refer to Section 2.4 which provides further detail on mitigation strategies proposed for the Project.

Principle	Response
Improved valuation, pricing and incentive mechanisms should be promoted.	The Project has used the latest version of the EPBC Act Offsets Policy and calculated as per the Offset Assessment Guide.

2.8 Economic and social matters

2.8.1 Economic and social impacts

RFI 8.1: An analysis of the economic and social impacts of the action, both positive and negative. (Section 8.1, DCCEEW, 2022)

QTMP is a program of works that has been initiated by TMR to modernise and allow the expansion of the SEQ passenger train fleet to support the region's population and economic growth, while reducing road congestion and associated emissions.

Following delivery of the QTMP, the State-owned manufacturing facility will revert to the State after the contractor's term is fulfilled.

The key strategic objectives of the QTMP are to:

- Ensure the provision of affordable, safe, accessible, and high-quality passenger rail services for the people of SEQ
- Grow passenger rail customer satisfaction and facilitate the predicted increase of passenger rail patronage in SEQ
- Deliver trains and associate infrastructure which integrates with, and enhances SEQ's existing and future rail operating environment, including CRR
- Improve train availability and reliability to meet operational requirements
- Create genuine, quality, secure, and ongoing jobs for Queenslanders, and to increase manufacturing capability and encourage supply chain resilience through the engagement of local suppliers and local workforces.

A full summary of the Torbanlea rail facility site key benefits is provided in **Appendix I**.

2.8.2 Public consultation

RFI 8.2: Details of any public consultation activities undertaken and their outcomes (Section 8.2, DCCEEW, 2022)

Section 1.2.4 (Stakeholder engagement) of the MNES Report (refer **Appendix D**) describes the stakeholder engagement and public consultation that has occurred. This information has been included below for ease of reference. It is important to note that some engagement activities are still underway, and therefore outcomes are not yet available for discussion in this report.

Ministerial Infrastructure Designation (MID) submission engagement

An Initial Advice Request (IAR) was lodged to the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) in seeking initial advice regarding the MID proposal.

TMR undertook preliminary stakeholder engagement with the Torbanlea community in August 2021 in accordance with the Minister's Guidelines and Rules for the MID process and the Operational Guidance for

Making or Amending a Ministerial Infrastructure Designation. This correspondence included a brief program overview letter and frequently asked questions (FAQ) sheet, which was mailed in early November 2021 to residents within the vicinity of the site. The letters served as preliminary advice of the MID process and the related upcoming public consultation period. Contact details for the QTMP Project team were provided within the contents of the letter, however limited response was received.

The MID public consultation period was open between 28 April 2022 and 30 May 2022. As part of this process, the local community and key stakeholders had the opportunity to provide feedback about the future train manufacturing facility. Letters were sent advising stakeholders and 100 surrounding residents of the MID process, QTMP MID submission and guidance for to provide feedback to DSDILGP. Approval of the MID application could not be received until the public notification period closed and submissions from stakeholders and residents are considered by DSDILGP. In total, there were four submissions received in relation to the Project which all related to objections to the acquisition of the land.

Local industry and community engagement

A briefing event was held at Maryborough in early December 2021 to engage local suppliers and manufacturers and introduce QTMP's supply chain opportunities. Strong attendance and encouraging survey outcomes suggest positive public perception was established and maintained from the November 2021 media coverage following the Premier's announcement of the Program. Over 500 members of the Maryborough region community were engaged at five drop-in information sessions held around the region between 26 April and 7 May 2022. To conduct the engagement program, the QTMP Communications Team collaborated with representatives of DSDILGP, Department of Employment Small Business and Training, Department of Regional Development Manufacturing and Water and Translink Wide Bay.

The purpose of the engagement program was to inform the community about the current status of the QTMP, and to understand from local communities, the current and future potential operational, access and environmental impacts of the manufacturing site. The information sessions served as the initial face-to-face engagement with the local community to create awareness and education about the Program.

From community information sessions, general project information, supply chain, employment and training enquiries accounted for the majority of all interactions. No significant environmental concerns were raised by community members. Overall, the sentiment QTMP within the community was overwhelmingly positive and supportive of the future Torbanlea manufacturing facility.

Future engagement programs will target local industry, job seekers, local community and small business owners.

Stakeholders, local government, and council

The QTMP team has engaged the local government and Fraser Coast Regional Council through regular briefings and Project updates.

The Butchulla people of the Maryborough region have been engaged during various stages of the Project. Representatives from the Butchulla Native Title Aboriginal Corporation were present during geotechnical and site investigation works. Discussions are have been continuing regarding the development of a Cultural Heritage Management Plan for the Project.

Additional details on consultation process, undertaken specifically for the MID Environmental Assessment Report, are provided in **Appendix B** (Aurecon 2022c).

2.8.3 Indigenous stakeholder engagement

RFI 8.3: Details of any consultation with Indigenous stakeholders.

Indigenous engagement

Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the proposed action and the potential for managing those impacts. (Section 8.3, DCCEEW, 2022)

Native title

The Project area is located within the external boundary of the Butchulla People Land & Sea Claim #2 native title determination area. The nature and extent to which native title is determined to exist within the determination area (including over the Project area) has been considered as part of this process.

Cultural heritage

Everick Heritage Pty Ltd (Everick Heritage) was commissioned by TMR to undertake two Cultural Heritage Field Assessments (CHFAs) of the proposed location of the Rollingstock Expansion Project manufacturing site, haul road and truck turn around bay.

Aboriginal cultural heritage has been identified in the Project area which includes a number of features such as artefact scatters and scarred trees. Following provision of the CHFAs, and consideration of the recommendations, TMR has undertaken further consultation with the Aboriginal party. It is proposed that the parties will develop a Cultural Heritage Management Plan to protect and manage Aboriginal cultural heritage within the Project area.

2.8.4 Projected economic costs and benefits

RFI 8.4: Projected economic costs and benefits of the project, including the basis for their estimate through cost/benefit analysis or similar studies. (Section 8.4, DCCEEW, 2022)

The proposed train manufacturing facility represents the largest investment in rail in Queensland's history by the Queensland Government, in improving the efficiency of the SEQ public transport network, regional growth, and local manufacturing. In the 2017 State election, the Queensland Government made a commitment that all future trains and associated infrastructure, for which Queensland has the manufacturing capacity to deliver, will be manufactured and maintained by Queenslanders to support jobs in Maryborough and other regional centres.

The QTMP will deliver an initial fleet of 65 six-car units under the first design, build and maintain contract. The purpose of the new QTMP fleet will be to service Queensland's growing need for efficient public transport which is particularly driven by transformative infrastructure projects, such as CRR and the 2032 Olympic and Paralympic Games. After the initial fleet of 65 trains is delivered through the QTMP, the State-owned manufacturing facility will revert back to State after the design, build and maintain provider's contract term is fulfilled.

A full summary of the Torbanlea rail facility site key benefits is provided in **Appendix I**.

2.8.5 Employment opportunities

RFI 8.5: Employment opportunities expected to be generated by the project (including construction and operational phases). (Section 8.5, DCCEEW, 2022)

As the State's single largest rail investment, QTMP will help support the economy and bolster Queensland as a leader in rail manufacturing with long-term jobs and skills development. In the Maryborough region, the

construction and operation of the manufacturing facility will produce a major jobs boost, creating hundreds of construction, rail and manufacturing jobs.

2.9 Environmental record of the person proposing to take the action

RFI 9.1: Include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against: the person proposing to take the action; (Section 9.1, DCCEEW, 2022)

TMR has a satisfactory record of responsible environment management. TMR, as the proponent, are highly experienced in the planning, delivery and operation of major transport infrastructure projects. TMR's core role is the planning, building and maintaining of Queensland's road, rail, freight, and maritime infrastructure (Aurecon 2022). Further details of TMR's approach to environmental management can be found at <https://www.tmr.qld.gov.au/Community-and-environment/Environmental-management>, and copies of TMR EPBC Act annual compliance reports can be found at <https://www.tmr.qld.gov.au/Community-and-environment/Environmental-management/Federal-EPBC-Compliance-Reports-and-Offset-Management-Plans>.

TMR North Coast has an excellent and long track record in coordinating environmental assessments and delivery of environmentally sensitive transport solutions, evidenced through recent major infrastructure on the Bruce Highway upgrades.

RFI 9.2: For an action for which a person has applied for a permit, the person making the application (Section 9.2, DCCEEW, 2022)

Refer to the response to RFI 9.1.

RFI 9.3: If the person is a body corporate—the history of its executive officers in relation to environmental matter (Section 9.3, DCCEEW, 2022)

Not applicable – TMR is not a body corporate.

3 Conclusion

This report has provided comprehensive responses to each of the questions posed by DCCEEW as part of the RFI issued on 30th September 2022 for the QTMP Project (reference 2021/09301) (DCCEEW 2022). The recommendations and instructions on how to respond to questions in the RFI document has been followed wherever possible. For instance, to enable a streamlined assessment, a cross reference table has been provided in **Appendix A**.

Construction activities at the manufacturing facility site are required to commence from early 2023 to meet planned project milestones and delivery timeframes. The manufacturing facility is on the critical path for train delivery, and delays in commencement date will result in undesirable program and delivery delays. These delays would impact the local and regional economy, train availability and operations, and potentially impact the public transport needs for the 2032 Olympic and Paralympic Games.

To assist this Project to meet these scheduled timeframes, it is respectfully requested that any further requests for information are provided as soon as possible to the proponent for immediate response.

4 References

Aurecon (2021a). Rollingstock Expansion Project Torbanlea Protected Plants Report. Prepared for Department of Transport and Main Roads.

Aurecon (2021b). Rollingstock Expansion Project Manufacturing Facility – Options Analysis Report. Prepared for Department of Transport and Main Roads.

Aurecon (2022a). Queensland Train Manufacturing Program Torbanlea EPBC Referral Application Number 01197. Accessed via EPBC Business Portal on 09/05/2022.

Aurecon (2022b). Queensland Train Manufacturing Program Torbanlea Matters of National Environmental Significance Report. Prepared for the Department of Transport and Main Roads.

Aurecon (2022c). Queensland Train Manufacturing Program Torbanlea MID Environment Assessment Report. Prepared for Department of Transport and Main Roads.

Aurecon (2022c). Queensland Train Manufacturing Program Torbanlea MID Ecological Assessment Report. Prepared for Department of Transport and Main Roads.

Department of Climate Change, Energy, Environment and Water (DCCEEW) (2022a), *Additional information for assessment by preliminary documentation QTMP – Torbanlea Train Manufacturing Facility, Queensland* (2022/09301) DCCEEW, Canberra.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022b). Species Profile and Threats Database (SPRAT): *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*. Available from:

<http://www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=171&status=Endangered>

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Everick Heritage (2022). *Rollingstock Expansion Project Manufacturing Site: Cultural Heritage Field Assessment* Everick Heritage Pty Ltd. Unpublished report prepared for the Department of Transport and Main Roads.

The University of Queensland Australia (2022). Koala Survey by Detection Dogs – Torbanlea. Prepared for the Queensland Department of Transport and Main Roads.

5 Definitions

Terminology	Definition
AHD	Australian Height Datum
AQMP	Air Quality Management Plan
BMP	Bushfire Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DES	Department of Environment and Science (Queensland Government)
EP Act	<i>Environmental Protection Act 1994</i> (Queensland)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EMP	Environmental Management Plan
EMP(C)	Construction Environmental Management Plan
ESCP	Erosion and Sediment Control Plan
MNES	Matters of National Environmental Significance
NC Act	<i>Nature Conservation Act 1992</i> (Queensland)
OAMP	Offset Area Management Plant
PWMP	Pest and Weed Management Plan
PMST	Protected Matters Search Tool
QTMP	Queensland Train Manufacturing Program
SEQ	South-East Queensland
SIA	Significant Impact Assessment
SPRAT	Species Profile and Threats Database
SMP	Species Management Program
SWMP	Stormwater Management Plan
TEC	Threatened Ecology Community
TMR / DTMR	Transport and Main Roads (Qld) / Department of Transport and Main Roads (Qld)
RFI	Request for Information
WQMP	Water Quality Management Plan

Appendix A Cross Reference Table

The table below provides information to allow the cross-referencing of information requested in the formal Request for Information, as per Condition A1.7 (**Appendix A**) of the formal RFI itself.

Item #	RFI (DCCEEW)	Location of response (QTMP)
1. DESCRIPTION OF ACTION		
1.1	Include updated information if any changes have been made to the project since the referral documentation was submitted. Include updated disturbance footprints (in hectares) and layout plans for the Project, where relevant.	Refer to Section 2.1 in this document.
2. HABITAT ASSESSMENT		
2.1.1	Include an assessment of the adequacy of any surveys undertaken (including survey effort and timing). In particular, the extent to which these surveys were appropriate for the listed species or community and undertaken in accordance with relevant departmental survey guidelines and/or best practice.	Refer to Section 2.2.1 in this document.
2.1.2	Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation.	Refer to Section 2.2.1 in this document.
2.2.1	Provide an assessment (in a cross-reference table) of vegetation composition against the key diagnostic characteristics provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice, including any remnant and regrowth vegetation.	Refer to Section 2.2.1 in this document.
2.2.2	Provide the total area (in hectares) of identified Coastal Swamp Sclerophyll Forest TEC (i.e. all vegetation that meet the key diagnostic characteristics).	Refer to Section 2.2.2 in this document.
2.2.3	Provide an assessment of Coastal Swamp Sclerophyll Forest TEC against the condition thresholds provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice.	Refer to Section 2.2.2 in this document.
3. IMPACT ASSESSMENT		
3.1.1	An assessment of the likely impacts associated with the Project, including construction and operational phases.	Refer to Section 2.3.1 in this document.
3.1.2	Include the direct and indirect loss and/or disturbance of habitat as a result of the Project. This must include the quality and area (in hectares) of habitat to be impacted.	Refer to Section 2.3.2 in this document.
3.1.3	An assessment of the impacts of habitat fragmentation in the Project area and surrounding areas, including consideration of species' movement patterns.	Refer to Section 2.3.3 in this document.

Item #	RFI (DCCEEW)	Location of response (QTMP)
3.1.4	An assessment of the likely duration of impacts as a result of the Project.	Refer to Section 2.3.4 in this document.
3.1.5	A discussion of whether the impacts are likely to be repeated, for example as part of maintenance.	Refer to Section 2.3.5 in this document.
3.1.6	A discussion of whether any impacts are likely to be unknown, unpredictable or irreversible.	Refer to Section 2.3.6 in this document.
3.1.7	Justification, with supporting evidence, as to how the Project will not be inconsistent with: ■ Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and ■ Any relevant recovery plan or threat abatement plan.	Refer to Section 2.3.7 in this document.
4. AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES		
4.1	A detailed summary of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of the Project on relevant MNES.	Refer to Section 2.4.1 in this document.
4.2	The proposed measures must be based on best available practices, appropriate standards, evidence of success for other similar actions and supported by published scientific evidence.	Refer to Section 2.4.2 in this document.
4.3	All proposed measures for MNES must be drafted to meet the 'S.M.A.R.T' principle: ■ S –Specific (what and how) ■ M –Measurable (baseline information, number/value, auditable) ■ A –Achievable (timeframe, money, personnel) ■ R –Relevant (Conservation Advices, recovery plans, threat abatement plans) ■ T –Time-bound (specific timeframe to complete)	Refer to Section 2.4.3 in this document.
4.4	Details of specific and measurable environmental outcomes to be achieved for relevant MNES. All commitments must be drafted using committal language (e.g., 'will' and 'must') when describing the proposed measures.	Refer to Section 2.4.4 in this document.
4.5	Details of the proposed measures to be undertaken to avoid, mitigate and manage the relevant impacts of the Project, including those required through other Commonwealth, State and local government approvals.	Refer to Section 2.4.5 in this document.
4.6	Information on the timing, frequency and duration of the proposed avoidance, mitigation, management and monitoring measures, and any corrective actions to be implemented, where relevant.	Refer to Section 2.4.6 in this document.
4.7	An assessment of the expected or predicted effectiveness of the proposed measures.	Refer to Section 2.4.7 in this document.

Item #	RFI (DCCEEW)	Location of response (QTMP)
4.8	Any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved Conservation Advice, recovery plan or threat abatement plan, and a discussion on how the proposed measures are not inconsistent with relevant plans.	Refer to Section 2.4.8 in this document.
4.9	Details of ongoing management, including monitoring programs to support an adaptive management approach, that validate the effectiveness of the proposed measures and overall demonstrate that environmental outcomes will be achieved.	Refer to Section 2.4.9 in this document.
4.10	Details of tangible, on-ground corrective actions that will be implemented in the event the monitoring programs indicate that the environmental outcomes have not or will not be achieved.	Refer to Section 2.4.10 in this document.
5. REHABILITATION REQUIREMENTS		
5.1	Rehabilitation acceptance criteria, including for the restoration of habitat for relevant listed threatened species and communities.	Refer to Section 2.5.1 in this document.
5.2	A summary of the procedures, including contingency measures, that will be undertaken to achieve the rehabilitation acceptance criteria.	Refer to Section 2.5.2 in this document.
5.3	A summary of a monitoring program to determine the success of rehabilitation activities implemented by the proponent.	Refer to Section 2.5.3 in this document.
5.4	The details of any rehabilitation activities proposed to be undertaken as required by Commonwealth, State or Territory, and local government legislation. Attach relevant Commonwealth, State or Territory, and local government approvals and permits as supporting documents to the preliminary documentation.	Refer to Section 2.5.4 in this document.
6. OFFSETS		
6.1	An assessment and conclusion on whether residual significant impacts will occur on relevant protected matters, after application of avoidance, mitigation and management measures.	Refer to Section 2.6.1 in this document.
6.2	A summary of the proposed environmental offset and key commitments to achieve a conservation gain for each relevant protected matter.	Refer to Section 2.6.2 in this document.
6.3	Where offset area/s have been nominated, include a draft OAMP as an appendix to the PD. The draft OAMP must meet the minimum information requirements set out in Appendix B.1 , and must be prepared by a suitably qualified ecologist and in accordance with the department's Environmental Management Plan Guidelines (2014), available at: www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines .	Refer to Section 2.6.3 in this document.
7. ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)		

Item #	RFI (DCCEEW)	Location of response (QTMP)
7.1	A description of how the Project meets the principles of ESD, as defined in section 3A of the EPBC Act. ■ decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations; ■ if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation; ■ the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations; ■ the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and ■ improved valuation, pricing and incentive mechanisms should be promoted.	Refer to Section 2.7 in this document.
8. ECONOMIC AND SOCIAL MATTERS		
8.1	An analysis of the economic and social impacts of the action, both positive and negative.	Refer to Section 2.8.1 in this document.
8.2	Details of any public consultation activities undertaken and their outcomes.	Refer to Section 2.8.2 in this document.
8.3	Details of any consultation with Indigenous stakeholders. <u>Indigenous engagement</u> Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the Project and the potential for managing those impacts. Describe any Indigenous consultation that has been undertaken, or will be undertaken, in relation to the Project and their outcomes. The department considers that best practice consultation, in accordance with the Guidance for proponents on best practice Indigenous engagement for environmental assessments under the EPBC Act (2016) includes: ■ identifying and acknowledging all relevant affected Indigenous peoples and communities; ■ committing to early engagement; ■ building trust through early and ongoing communication for the duration of the project, including approvals, implementation and future management; ■ setting appropriate timeframes for consultation; and ■ demonstrating cultural awareness. Describe any state requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the Project with regards to Indigenous peoples and communities.	Refer to Section 2.8.3 in this document.

Item #	RFI (DCCEEW)	Location of response (QTMP)
8.4	Projected economic costs and benefits of the project, including the basis for their estimate through cost/benefit analysis or similar studies.	Refer to Section 2.8.4 in this document.
8.5	Employment opportunities expected to be generated by the project (including construction and operational phases).	Refer to Section 2.8.5 in this document.
9. ENVIRONMENTAL RECORD OF THE PERSON PROPOSING TO TAKE THE ACTION		
9.1	Include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against: a) the person proposing to take the action;	Refer to Section 2.9 in this document.
9.2	b) for an action for which a person has applied for a permit, the person making the application	Refer to Section 2.9 in this document.
9.3	c) if the person is a body corporate—the history of its executive officers in relation to environmental matters; and	Refer to Section 2.9 in this document.
9.4	a) if the person is a body corporate that is a subsidiary of another body or company (the parent body)—the history in relation to environmental matters of the parent body and its executive officers.	Refer to Section 2.9 in this document.

Appendix B: MID Ecological Assessment Report

Queensland Train Manufacturing Program

Ecological Assessment Report

Department of Transport and Main Roads

Reference: 511003

Revision: 4

2023-03-02



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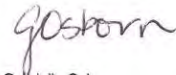
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Executive summary

This Ecological Assessment Report has been prepared to identify the ecological constraints at the proposed Queensland Train Manufacturing Program (QTMP) site (Lot 35 SP326250) at Torbanlea. The findings of this assessment will be used to advise the future development of the manufacturing facility.

The key findings of this assessment are:

- The assessment identified ecological values present within the Project area including regulated vegetation, waterway for barrier works and wildlife habitat mapped areas. No conservation significant species were identified during the field investigations.
- The waterway identified within the Project area was ground truthed as drainage features and poor aquatic habitat. No significant aquatic habitat constraint was identified from the Project area.
- The Project area contains mapped Essential habitat for the Koala (listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Nature Conservation Act 1992* (NC Act)) and the Wallum froglet (listed as Vulnerable under the *Nature Conservation Act 1992*). Essential habitat for the Greater glider (listed as Endangered under the EPBC Act and NC Act) and the Grey-headed flying fox (listed as Vulnerable under the EPBC Act) was also identified within the Project area.
- The total amount of vegetation proposed to be removed for the Project will not exceed 17.42 ha of Category B vegetation. This consists of 4.76 ha of RE 12.3.6 and 12.66 ha of RE 12.5.4.
- It is recommended that a High Risk Species Management Program (SMP) under the *Nature Conservation Act 1992* be prepared due to the presence of potential animal breeding places for threatened and Special Least Concern species (i.e. the NC Act Vulnerable species Wallum froglet [*Crinia tinnula*] and colonial breeding species including gliders and Microchiropteran bats).
- A significant residual impact is anticipated for several Matters of State Environmental Significance (MSES) including;
 - Regulated vegetation that is remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map; and essential habitat as identified on the essential habitat map.
- Protected wildlife habitat for four threatened species will be removed. A total of 17.42 ha of suitable habitat for the Koala (*Phascolarctos cinereus*), Greater glider (*Petauroides volans*) and Grey-headed flying fox (*Pteropus poliocephalus*), and a total of 4.76 ha of suitable habitat for the Wallum froglet (*Crinia tinnula*).

1 Introduction

1.1 Document purpose

The Department of Transport and Main Roads (DTMR) has started the Queensland Train Manufacturing Program (QTMP) to identify the requirements for new rollingstock and associated infrastructure including a train manufacturing facility.

The train manufacturing facility is to proceed through a Ministerial Infrastructure Designation (MID) in accordance with Chapter 2, Part 5 of the *Planning Act 2016*. The MID will enable the use of each facility as 'railway infrastructure' as defined under Schedule 5 of the *Planning Regulation 2017*.

Aurecon have been requested to undertake an ecological investigation and assessment of Lot 35 SP326250 (Project area) to support the proposal of a Ministerial Infrastructure Designation (MID) application. Specifically, the purpose of the ecological investigation and assessment is to:

- Undertake an ecological field assessment to ground-truth vegetation community mapping and species habitat
- Prepare an ecological assessment report which:
 - Is prepared and approved by suitably qualified and experienced ecologists
 - Identifies ecological values and the likely ecological legislative constraints associated with site development
 - Identifies the potential ecological approval obligations for the proposed development

The outcomes of the ecological assessment described in this report include;

- Definition of the Project area in relation to the ecological assessment
- Methodology undertaken to complete the desktop and field ecological assessment
- Results from desktop and field ecological assessment
- Assessment of direct and indirect impacts on ecological values associated with the Project area and surrounds.
- Significant impact assessment on matters of National and State environmental significance
- Additional approval requirements for the Project

1.2 Project location

The Project area (Lot 35 SP326250) is located approximately 25 km North of Maryborough. The site is bordered by the Bruce Highway on the western boundary and the North Coast rail line at the eastern boundary (refer Figure 1). The site has a total area of 1,289,040 m² (128.90 ha).

The manufacturing facility and associated infrastructure will be constructed within the Project footprint illustrated in Figure 1.

1.3 Current land use

The Project area contains predominately undeveloped and densely vegetated land. A portion of the site located in the south east, is cleared and used for grazing purposes. This area of the site also includes a residential dwelling and multiple enclosed structures. A high voltage overhead powerline traverses the eastern portion of the proposed manufacturing facility.



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Legend

- Roads
- Rail
- Project area
- Cadastre boundaries
- Proposed disturbance footprint



Date: 15/08/2022 12:45 AM Version:0



A3 scale: 1:24,000
0 250 500 750Meters

Job No: P511263
Coordinate system:

Department of Transport and Main Roads QTMP - Torbanlea Train Manufacturing Facility

**Figure 1:
Locality Map**

Figure 1 Project location

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1.4 Document author

This report has been prepared by a suitably qualified ecologists Kurtis Kemp and Andy Dalton. Andy Dalton and Kurtis Kemp are ecologists with 12 and 5 years' experience respectively conducting ecological field assessments and reporting. Andy holds a Bachelor of Science (majoring in Ecology and Conservation Biology) and Kurtis holds a Bachelor of Science majoring in biological sciences from the Queensland University of Technology (QUT). Andy and Kurtis' CV can be provided upon request.

The ecological field assessment was conducted by suitably qualified and experienced senior ecologist's Dr Chris Schell and Dr James Bone. Chris is a senior ecologist with over 20 years of industry experience. Chris holds a Bachelor of Science (Honours Class 1) and a PhD in Zoology. James is a senior ecologist with over 9 years' experience conducting ecological assessments. James holds a Bachelor of Science (Honours Class 1) and a PhD in environmental science. CVs for Chris and James can be provided upon request.

2 Methodology

2.1 Desktop assessment

Prior to the commencement of the ecological field survey of the Project area, a desktop review of government ecological databases and vegetation mapping was conducted to identify potential ecological constraints, including conservation significant flora and fauna species, which may occur within the Project area.

The following databases, maps and documents were reviewed:

- Protected Matters Search Tool (DoEE 2022), search area defined by a 2 km buffer of the Project area.
- Wildlife Online Database (DES 2022a), search area defined by a 2 km buffer of the Project area.
- Protected Plants Flora Survey Trigger Map (DES 2022).
- Regulated Vegetation Management Mapping (DNRME 2022).
- Essential Habitat Mapping (DNRME 2022).
- Matters of State Environmental Significance (DES 2022b).
- South East Queensland Koala habitat areas and Koala priority areas mapping (DES 2022c).

The outputs of the database and mapping reviews have been provided in Appendix A.

2.2 Field assessment

A preliminary ecological field assessment was conducted within the Project area to ground-truth the mapped ecological values of the sites (i.e. vegetation community mapping, habitat values for threatened flora and fauna species). As part of the preliminary ecological field assessment the following tasks were undertaken:

- A Protected Plant Survey undertaken at the Project area was required under the provisions of the *Nature Conservation Act 1992* (NC Act) (Qld) (triggered by the Department of Environment and Science (DES) Flora Survey Trigger Map) to identify Critically Endangered, Endangered, Vulnerable, or Near Threatened (CEEVNT) flora species which may be present at the site. The protected plant survey was conducted for the sites 'clearing impact area', defined as the Project area and a surrounding 100m buffer. The outcomes of the survey have been captured in a separate Protected Plant Flora Survey Report, as per the requirements of the DES Flora Survey Guidelines (DES 2020).
- Analysis of habitat values and likelihood of occurrence assessment of:
 - Conservation significant terrestrial and aquatic flora and fauna species (i.e. CEEVNT species listed under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or NC Act.
 - Animal breeding places to determine if a high risk of impact species management program is required.
- Analysis of the dominant species that define the vegetation communities within the Project area, including identifying and mapping any CEEVNT flora species present, and identifying any areas of suitable habitat for CEEVNT species which may be present within the Project area. Targeted vegetation communities were traversed to gather information such as vegetation structure (including remnant status) and composition (species richness), dominant species present and plant identification to genus and/or species level.

- Collection of an incidental list of fauna, including bird, reptile, mammal, and amphibian species which were encountered during the field assessment. Opportunistic diurnal searches for reptile species were conducted during the ecological field assessment.
- Preliminary AUSRIVAS physical habitat assessments were conducted at unmapped drainage features and watercourses present within the Project area.

The ecological field assessment sites at which quaternary assessments of vegetative and habitat values were conducted are detailed in Table 2-1. The field assessment sites and associated ecological survey track log are illustrated in Figure 2.

Table 2-1 Ecological field assessment site locations

Site Name	Latitude	Longitude	Date assessed	Aquatic site name	Latitude	Longitude	Date assessed
1	-25.37341003	152.60413	18.5.2021	W01	-25.36206203	152.608458	19.5.2021
2	-25.37070603	152.602649	18.5.2021	W02	-25.366544	152.602709	19.5.2021
3	-25.36882396	152.599995	18.5.2021	W03	-25.36974002	152.599269	19.5.2021
4	-25.366991	152.59993	18.5.2021	W04	-25.47442001	152.655976	20.5.2021
5	-25.36680803	152.602635	18.5.2021				
6	-25.363683	152.601739	18.5.2021				
7	-25.36314396	152.605723	18.5.2021				
8	-25.361108	152.605576	18.5.2021				
9	-25.37063202	152.606737	19.5.2021				
10	-25.36919578	152.604492	19.5.2021				
11	-25.36667702	152.607604	19.5.2021				
12	-25.36451298	152.612465	19.5.2021				
13	-25.36398903	152.610818	19.5.2021				
14	-25.36340397	152.60864	19.5.2021				
15	-25.36226202	152.609152	19.5.2021				
16	-25.36078898	152.608432	19.5.2021				
17	-25.48233597	152.653751	20.5.2021				
18	-25.481091	152.65711	20.5.2021				

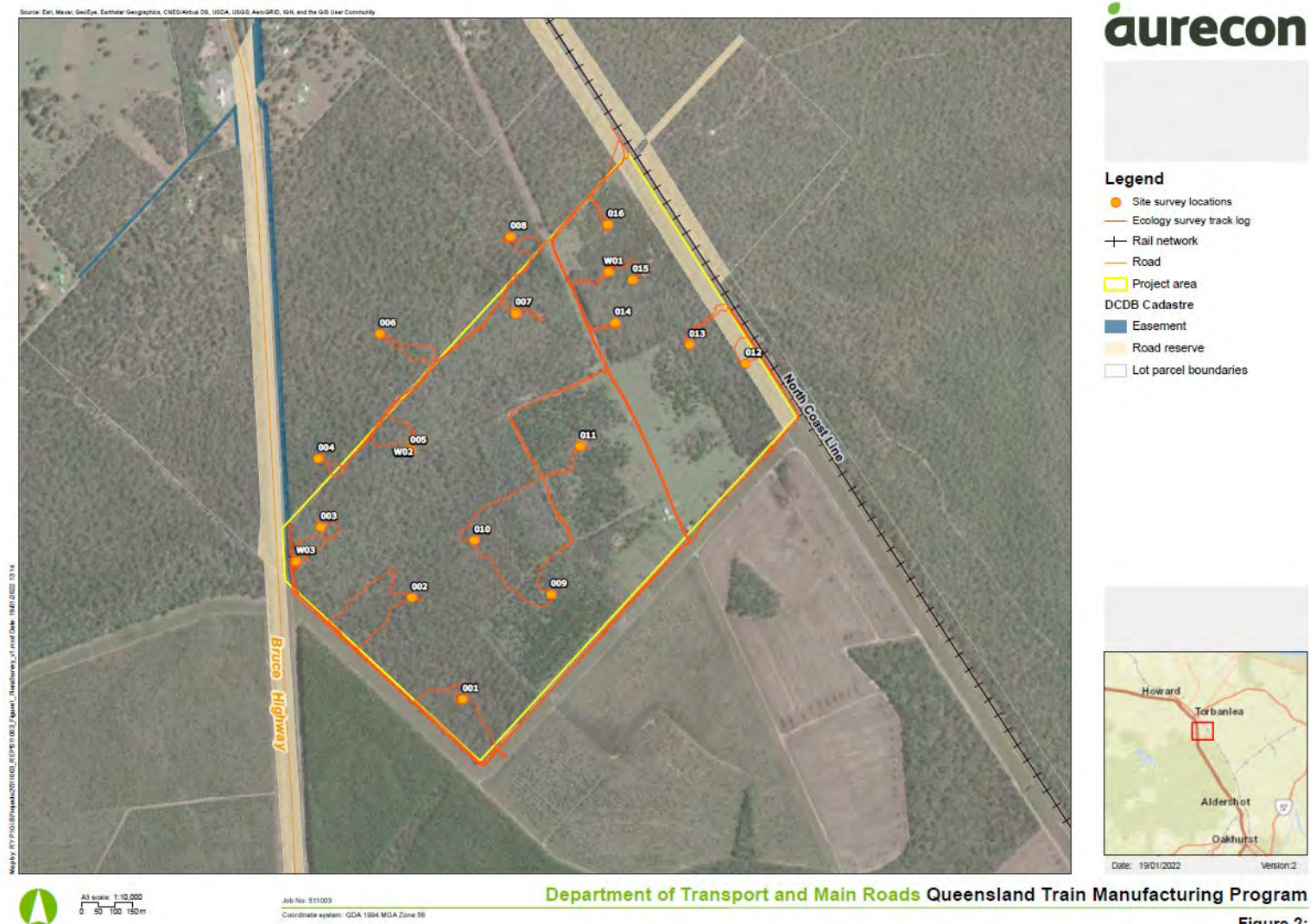


Figure 2:
Torbanlea ecological field survey

Figure 2 Ecological field survey sites and track logs for the field survey within the Project area

2.3 Likelihood of occurrence assessment

The likelihood of threatened ecological communities (TEC), threatened flora species or threatened fauna species, as listed under the provisions of the NC Act and/or the EPBC Act, to occur within the Project area and immediate surrounds was determined based on:

- The results of the desktop study.
- Species and habitat observations collected during the ecological field assessment.
- Consideration of a species current (known) distribution range.
- Presence and condition of suitable habitat in the Project areas and immediate surrounds.

Species considered **unlikely to occur** include species that fit one or more of the following criteria:

- The Project area is beyond the species current distributional limits.
- The species is associated with specific habitat types or resources that are known not to be present in the Project area (e.g. intertidal saltmarshes and estuarine wetlands for the Eastern curlew (*Numenius madagascariensis*)).
- The species is considered locally extinct (e.g. Red goshawk [*Erythrotriorchis radiatus*]).

Species considered to have a **low** likelihood of occurrence include species that fit one or more of the following criteria:

- No records of the species within 20km of the Project area, but the species uses habitat types or resources that are present in the Project area.
- The species has been recorded within 20km of the Project area, but habitat present is generally in a poor or modified condition or is limited in extent (e.g. wetland bird species).
- The species is unlikely to maintain sedentary populations, however, may seasonally utilise resources within the Project area opportunistically during variable seasons or migration (e.g. Grey-headed flying-fox [*Pteropus poliocephalus*]).

Species considered to have a **moderate** likelihood of occurrence include species that fit one or more of the following criteria:

- The species has been recorded within 20km of the Project area (but not directly within the site), within the last 20 years and suitable habitat is present within the Project area as supported by ecological observations recorded during the ecological field survey.
- The species uses habitat types or resources that are present in the Project area, which are in good condition (with condition based on field review).
- The species is likely to maintain sedentary populations within the Project area.

Species is considered **known to occur** as it fits the following criteria:

- The species has been recorded within the Project area.

2.4 Impact assessment

The impact assessment process included the identification of potential Project impacts on ecological values within and adjacent to the Project footprint (refer to Section 4.1). The direct and indirect impacts to ecological values within the Project footprint were also assessed. Mitigation measures were then defined and applied to the potential Project impacts (refer to Section 4.2).

2.5 Significant residual impact assessment

A significant impact assessment was then conducted for ecological values that qualified as a Matter of National Environmental Significance (MNES) or a Matter of State Environmental Significance (MSES) defined under the provisions of the *Environmental Offsets Act 2014* (EO Act). The significant impact assessments were based on the potential Project residual impacts, that is those potential impacts which remain following the application of the Project mitigation measures. The significant impact assessments were based on the direct impacts within the Project footprint as well as the indirect impacts adjacent to the Project footprint and in the local and regional context.

The significant impact assessments were conducted in accordance with the appropriate guideline document.

The significant impact assessment guidelines which were referenced during the assessment included:

- MNES Significant impact guidelines 1.1 (DotE 2013a).
- Significant Residual Impact Guideline for MSES and prescribed activities assessable under the Sustainable Planning Act 2009 (DSDIP, 2014).

MNES and MSES potentially subject to significant residual Project impacts were assessed against the relevant guidelines and discussed in Sections 5 and 5.4.

2.6 Permits to conduct works

The ecological field assessment was conducted in accordance with Aurecon's Scientific Purposes Permit, WISP14453114 (valid between 20 April 2019 and 19 April 2024).

2.7 Survey limitations

The information presented in this report is subject to survey limitations. The ecological field assessment was conducted to provide an overview of the ecological values within the Project area.

The Protected Plant Survey completed during this ecological field investigation included a comprehensive flora species list (i.e. all plants encountered). The flora species list from this survey has been included as Appendix C. The survey encompassed all habitat across the Project area. It is important to note that some flora species may not have been identified due to a lack of fertile material or plants lying dormant (e.g. terrestrial orchids) at the time of the survey. However, most of the targeted CEEVNT flora species may be considered distinctive, even when reproductive material is absent, to overcome the limitations of surveying in autumn.

The survey works did not include targeted threatened fauna surveys and were limited to incidental observations and analysis of habitat suitability. It should be noted that not all fauna species inhabiting the area were identified during the ecological field survey due to season variations and survey limitations associated with time and scope.

Handheld Garmin GPS units (GPS map 76) were used during the field investigations. It should be noted that while efforts were made to ensure the GPS co-ordinates provided in this report are accurate, a margin of error of approximately +/- 5m is expected due to the limitations of the devices used and the recording environment.

3 Results

3.1 Desktop assessment

The desktop ecological assessment has identified multiple environmental considerations, including Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES), as potentially occurring within and immediately surrounding the Project area. The findings of the desktop assessment for the Project area are provided in Table 3-1.

Table 3-1 Summary of desktop assessment results regarding ecological considerations within and surrounding the Project area

Ecological	Details
Matters of National Environmental Significance	
Threatened ecological communities (TECs)	The following two TECs have been identified by the EPBC Act protected matters search tool (PMST) as potentially occurring within 2 km of the Project area: - Coastal Swamp Sclerophyll Forest of NSW and SE QLD - Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland - Lowland Rainforest of Subtropical Australia
Protected flora and fauna	The EPBC Act PMST has identified 27 threatened species and 15 migratory species as potentially occurring within a 2 km radius of the Project area
RAMSAR wetlands	There are no RAMSAR wetlands identified on the PMST search for the Project area.
Matters of State Environmental Significance	
Regulated vegetation	The Project area, as illustrated in Figure 3 is mapped as containing: - Regulated vegetation – Category R GBR Riverine - Regulated vegetation – Essential habitat (Koala and Wallum froglet) - Regulated vegetation – 100 m from wetland
Regulated vegetation (Vegetation Management Act 1999)	The Project area, as illustrated in Figure 4, is mapped as containing the following vegetation: - Category B (Least Concern) remnant vegetation - Category C high value regrowth vegetation - Category R reef regrowth vegetation - Wetland vegetation - Essential habitat (Koala and Wallum froglet) This includes Regional Ecosystems: 12.5.4 (Least Concern Category B and C): <i>Eucalyptus latisinensis</i> with or without <i>Corymbia intermedia</i>, <i>C. trachyphloia</i> subsp. <i>trachyphloia</i>, <i>Angophora leiocarpa</i>, <i>Eucalyptus exserta</i> woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments 12.3.6 (Least Concern Category B, containing wetland vegetation and essential habitat): <i>Melaleuca quinquenervia</i> with or without <i>Eucalyptus tereticornis</i>, <i>Lophostemon suaveolens</i>, <i>Corymbia intermedia</i> open forest on coastal alluvial plains.

Ecological	Details
State protected areas	There are no State protected areas located within the site.
Wetland values	A defined watercourse, as illustrated in Figure 3, traverses the northern portion of the Project area. This watercourse is mapped as a Palustrine waterbody.
Wildlife habitat	The Project area, as illustrated below in Figure 3, is mapped as containing wildlife habitat for the NC Act Vulnerable listed species Wallum froglet (<i>Crinia tinnula</i>) and Koala (<i>Phascolarctos cinereus</i>).
Protected plants (<i>Nature Conservation Act 1992</i>)	The Project area, as illustrated in Figure 5, is mapped within a flora survey trigger area.
Threatened species	<i>Prasophyllum exilis</i> , a Near Threatened Orchid under the NC Act, has been recorded within 2km of the Project area (one record identified on the Queensland Government WildNet database search)
Watercourses (<i>Water Act 2000</i>)	There are no <i>Water Act 2000</i> mapped watercourses or drainage features located within the Project area. There are however unmapped watercourses (i.e. determination yet to be made by Department of Regional Development, Manufacturing and Water (DRDMW) as to whether these features are watercourses or drainage features) in the northern and western portion. Refer to Figure 6.
Waterway barrier works (<i>Fisheries Act 1994</i>)	One moderate (amber) waterway for waterway barrier works, as illustrated in Figure 6, traverses the northern portion of the Project area.



Legend

- MSES wildlife habitat (endangered or vulnerable wildlife)
- MSES Regulated vegetation essential habitat (Koala and Wallum froglet)
- MSES Regulated vegetation - category R GBR riverine
- MSES Regulated vegetation 100m from wetland
- Project footprint
- Project area



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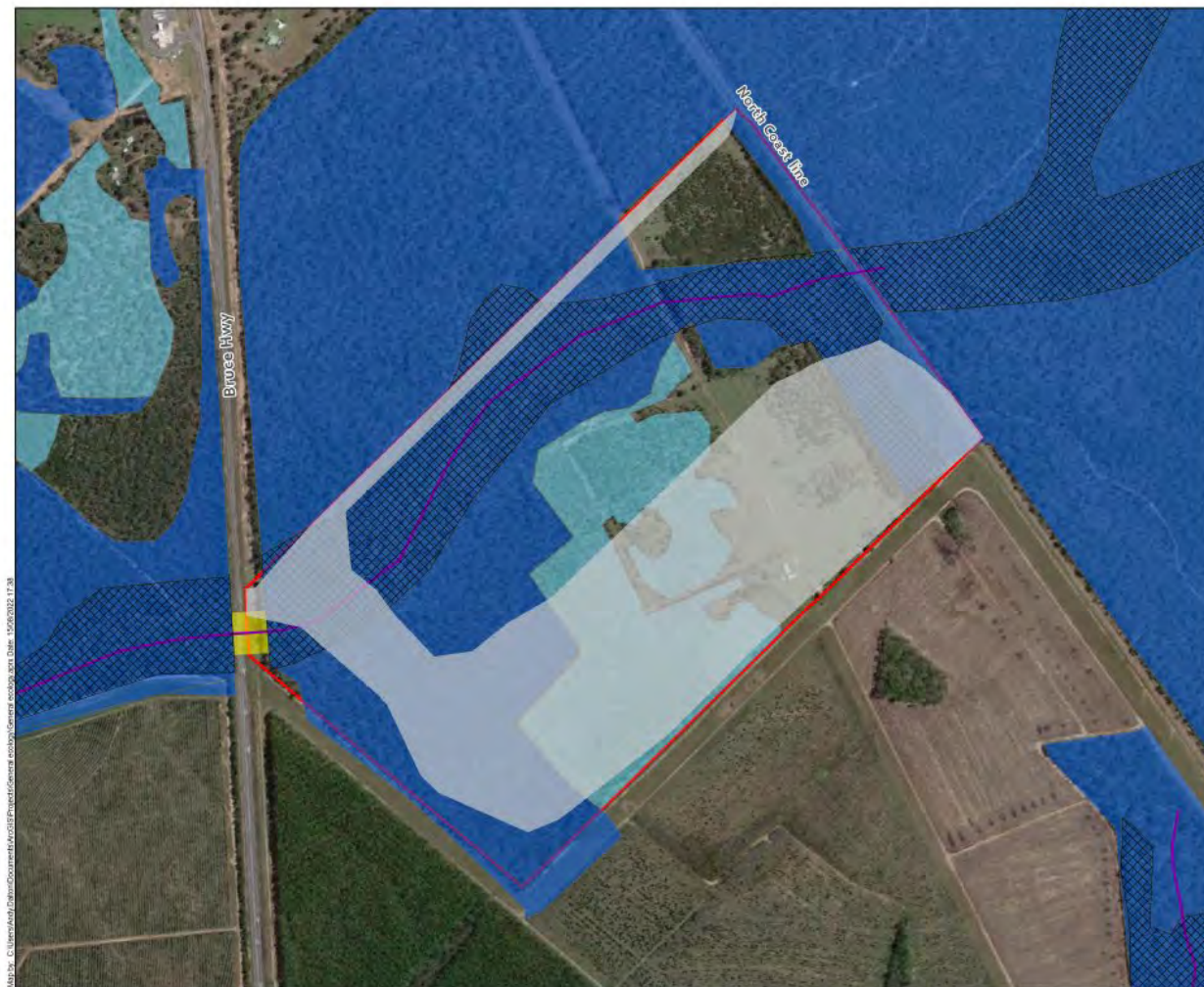
A3 scale: 1:9,000
0 90 180 262 Meters

Job No: PS11203
Coordinate system:

Department of Transport and Main Roads QTMP - Torbanlea Train Manufacturing Facility

Figure 3:
MSES - Regulated vegetation

Figure 3 MSES Regulated vegetation identified from Desktop analysis within the Project area



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A3 scale: 1:9,000
0 94 188 282 Meters

Job No: P511003
Coordinate system:

Department of Transport and Main Roads QTMP - Torbanlea Train Manufacturing Facility

Figure 4:
Regulated vegetation

Figure 4 VMA Regulated Vegetation identified from Desktop analysis within the Project area



Legend

- Protected Plants (Nature Conservation Act 1992) - High risk area
- Project footprint
- Project area



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A3 scale: 1:10,000
0 100 200 300 Meters

Job No: PS11003
Coordinate system:

Department of Transport and Main Roads QTMP - Torbanlea Train Manufacturing Facility

**Figure 5:
Protected Plants**

Figure 5 Protected Plant mapping identified from Desktop analysis within the Project area



Figure 6:
Watercourses and Waterways for Waterway Barrier Works

Figure 6 Waterways and Waterways for Barrier Works Permits identified from desktop analysis within the Project area

3.2 Likelihood of occurrence assessment

Following the likelihood of occurrence assessment for the Project area, the following was identified:

- 30 matters considered to have a low likelihood of occurrence
- 7 matters considered to have a moderate likelihood of occurrence
- One matter known to occur

The likelihood of occurrence assessment is provided in Appendix B, with the results summarised in Table 3-2 for those matters considered to have a 'moderate' or 'known' likelihood of occurrence within the Project area.

Table 3-2 Summary of matters with a moderate or known likelihood of occurrence within the Project area

Ecological matter	Conservation status		Likelihood of occurrence
	EPBC Act	NC Act	
Threatened flora species			
<i>Acacia attenuata</i>	V	V	Low
<i>Bosistoa transversa</i>	V	LC	Low
<i>Cossinia australiana</i>	E	E	Low
<i>Cryptostylis hunteriana</i> (Leafless tongue-orchid)	V	SLC	Low
<i>Cupaniopsis shirleyana</i>	V	V	Low
<i>Fontainea venosa</i>	V	V	Low
<i>Macadamia integrifolia</i>	V	V	Low
<i>Macrozamia lomandroides</i>	V	E	Low
<i>Macrozamia pauli-guilielmi</i> (Pineapple zamia)	E	E	Low
<i>Phaius australis</i> (Lesser swamp-orchid)	E	E	Low
<i>Prasophyllum exilis</i> (Thin leek orchid)	-	NT	Low
<i>Rhodomyrthus psidioides</i> (Native guava)	CE	CE	Low
<i>Samadera bidwillii</i> (Quassia)	V	V	Low
Threatened fauna species			
Curlew Sandpiper (<i>Calidris ferruginea</i>)	CE	E	Low
Greater Sand Plover (<i>Charadrius leschenaultii</i>)	V	V	Low
Coxen's Fig-Parrot (<i>Cyclopsitta diophthalma coxeni</i>)	E	E	Low
Red goshawk (<i>Erythrotriorchis radiatus</i>)	V	E	Low
Grey Falcon (<i>Falco hypoleucos</i>)	V	V	Low
Squatter Pigeon (<i>Geophaps scripta scripta</i>)	V	V	Low
Eastern Curlew (<i>Numenius madagascariensis</i>)	CE	E	Low
Australian Painted Snipe (<i>Rostratula australis</i>)	E	E	Low
Black-breasted Button-quail (<i>Turnix melanogaster</i>)	V	V	Low
White-throated needletail (<i>Hirundapus caudacutus</i>)	V, M	V	Moderate
Large-eared pied bat (<i>Chalinolobus dwyeri</i>)	V	V	Low
Northern Quoll (<i>Dasyurus hallucatus</i>)	E	LC	Low
Ghost Bat (<i>Macroderma gigas</i>)	V	E	Low
Greater glider (<i>Petauroides Volans sensu lato</i>)	E	V	Moderate
Yellow-bellied Glider (<i>Petaurus australis australis</i>)	V	V	Low
Koala (<i>Phascolarctos cinereus</i>)	E	E	Moderate
Grey-headed flying-fox (<i>Pteropus poliocephalus</i>)	V	V	Moderate
Migratory species			
Fork-tailed swift (<i>Apus pacificus</i>)	M	SLC	Moderate
Oriental cuckoo (<i>Cuculus optatus</i>)	M	SLC	Moderate
Spectacled Monarch (<i>Symposiachrus trivirgatus</i>)	M	SLC	Moderate
Black-faced Monarch (Monarcha melanopsis)	M	SLC	Low
Satin flycatcher (<i>Myiagra cyanoleuca</i>)	M	SLC	Known

Ecological matter	Conservation status		Likelihood of occurrence
	EPBC Act	NC Act	
Osprey (<i>Pandion haliaetus</i>)	M	SLC	Low
Rufous fantail (<i>Rhipidura rufifrons</i>)	M	SLC	Moderate
Threatened Ecological Communities			
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	E	-	Low
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	E	-	Known
Lowland Rainforest of Subtropical Australia	CE	-	Low

Table Notes

Moderate: Records for the species are from a reliable data source but not specifically recorded within the Project area. Suitable habitat for this species exists within the Project area

CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near Threatened, M = Migratory, SLC = Special Least Concern

3.3 Field assessment

The following sections will present the results of the ecological field investigation. Results are based on ground truthing of the Project area with relevance to environmental values identified in Section 3.1 and 3.2.

3.3.1 Threatened ecological communities

Field investigations identified the presence of one EPBC Act listed threatened ecological community, Coastal Swamp Sclerophyll Forest of NSW and SEQ Threatened Ecological Community, within the Project area. Approximately 4.76 ha of the TEC analogous with RE 12.3.6 was mapped within the Project area.

3.3.2 Threatened flora and fauna species

Field investigations did not identify the presence of any CEEVNT flora or fauna species listed under the provisions of the NC Act and/or the EPBC Act within the Project area.

Whilst no CEEVNT flora or fauna species were identified, suitable habitat for the following threatened species was identified within the Project area:

- Greater glider (*Petauroides volans*), Endangered under the provisions of the EPBC Act and the NC Act.
- Koala (*Phascolarctos cinereus*), Endangered under the provisions of the EPBC Act and the NC Act.
- Grey-headed flying fox (*Pteropus poliocephalus*), Vulnerable under the provisions of the EPBC Act.
- Wallum froglet (*Crinia tinnula*), Vulnerable under the provisions of the NC Act.

3.3.3 Migratory species

Field investigations conducted in May 2021, identified the presence of a Satin Flycatcher (*Myiagra cyanoleuca*), a EPBC Act listed migratory species within the Project area.

3.3.4 Special Least Concern species

Eight Special Least Concern flora species were identified within the Project area during field investigation. These flora species were:

- Lobelia purpurascens (White root).
- *Drosera burmanni* (Annual sundew).
- *Drosera peltata* (Pale sundew).

- *Geodorum densiflorum* (Pink nodding orchid).
- *Pterostylis nutans* (Greenhood orchid).
- *Stylidium graminifolium* (Grassy-leaved trigger-flower).
- *Xanthorrhoea fulva* (Swamp grasstree).
- *Xanthorrhoea johnsonii* (Grasstree).

No Special Least Concern fauna species were identified during field-based investigations.

3.3.5 Flora species

In total, 104 flora species were identified within the Project area during the ecological field investigation conducted in May 2021. Of these species, 86 (82.7%) were native and 18 (17.3%) were non-native. Of the non-native species 2 (11.1%) were listed as Restricted matters under the *Biosecurity Act 2014* (refer to Section 3.3.11).

A list of flora species identified within the Project area during the ecological field investigation is provided in Appendix C.

3.3.6 Vegetation communities

A large portion of the Project area (approximately 55%) is mapped as containing Category B regulated vegetation (i.e. remnant vegetation). The site is also mapped as containing Category C regulated vegetation (i.e. regrowth). Category C and Category X (non-remnant) vegetation comprise of approximately 44% of the Project area. Category R (Reef regrowth) vegetation comprises of approximately 1% of the Project area.

Remnant vegetation within the Project area is comprised of two distinct Regional Ecosystems (REs) (i.e. RE 12.3.6 and RE 12.5.4). These vegetation communities are discussed below. Non-remnant and regrowth areas within the Project area are typically dominated by pasture grasses (e.g. African lovegrass – *Eragrostis curvula*), or infestation by Slash Pine (*Pinus elliottii*) or Black Wattle (*Acacia leiocalyx*). The ecological field investigations confirmed the government RE mapping for the area.

The Project area currently supports low intensity cattle grazing, and a single dwelling is located within areas of non-remnant vegetation. The following sections further describe the vegetation within the site and the potential to support CEEVNT flora and fauna species.

3.3.6.1 Remnant vegetation (RE 12.3.6)

Areas of remnant RE 12.3.6 within the Project area consists of open forest to woodland, dominated by *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* with a grassy ground layer dominated by species such as *Imperata cylindrica*. *Eucalyptus tereticornis* may be present as an emergent layer. Occurs on quaternary floodplains and fringing drainage lines in coastal areas. This community is analogous with the TEC, Coastal Swamp Sclerophyll Forest of NSW and SEQ Threatened Ecological Community.

Photos of RE 12.3.6 within the Project area are provided in Photo Plate 3-1.

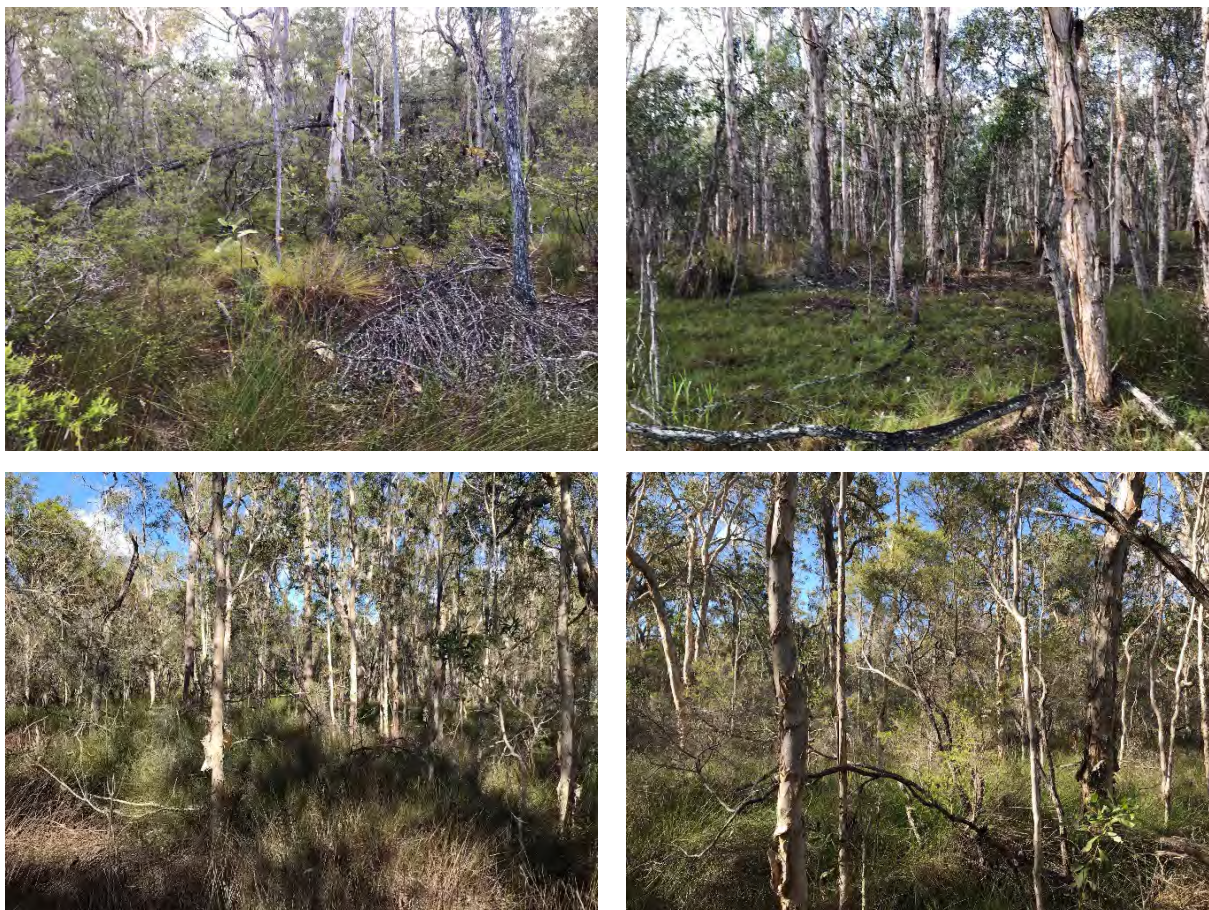


Photo Plate 3-1 Typical vegetation associated with RE 12.3.6 within the Project area

3.3.6.2 Remnant vegetation (RE 12.5.4)

Areas of remnant RE 12.5.4 within the Project area consist of woodland, dominated by *Eucalyptus latisinensis* +/- *Corymbia intermedia*, *Corymbia trachyphloia*, *Angophora leiocarpa* and *Eucalyptus exserta*. Other characteristic species include *Eucalyptus siderophloia*, *Lophostemon suaveolens*, *Melaleuca quinquenervia* and *Grevillea banksii*. Patches of *Banksia oblongifolia* are present locally and *Xanthorrhoea johnsonii* is common in ground layer. Occurs on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments.

Photos of RE 12.5.4 within the Project area are provided in Photo Plate 3-2.





Photo Plate 3-2 Typical vegetation associated with RE 12.5.4 within the Project area

3.3.6.3 Non-remnant and regrowth areas

Non-remnant and regrowth areas within the Project area have been regenerated to be dominated by non-native trees (e.g. Slash pine [*Pinus elliottii*]), or native pioneering species (e.g. Black wattle [*Acacia leiocalyx*]). In all instances, the ground stratum was dominated by non-native species, most prominently African love grass (*Eragrostis curvula*) and Praxelis (*Praxelis clematidea*).

The non-remnant areas provided relatively low habitat value for CEEVNT flora species due to the prevalence of highly competitive non-native, and native pioneering species.

Photographs of non-remnant areas within the Project area are provided in Photo Plate 3-3.



Photo Plate 3-3 Typical vegetation associated with non-remnant areas within the Project area

3.3.7 Habitat value

The Project area is mapped as containing essential habitat for the NC Act and EPBC Act Endangered listed species Koala (*Phascolarctos cinereus*) and Greater glider (*Petauroides volans*), EPBC Act Vulnerable listed species Grey-headed flying fox (*Pteropus poliocephalus*), and the NC Act Vulnerable listed species Wallum froglet (*Crinia tinnula*). Ecological field investigations conducted in May 2021 confirmed the presence of habitat for these species within the Project area. The vegetation communities within the site are dominated by Non-Juvenile Koala Habitat Trees (NJKHTs) and provide potential habitat for the Koala, Greater glider and Grey-headed flying fox. The low-lying riparian areas within the site are conducive to suitable habitat for the Wallum froglet. It is noted that there were no scats or scratch marks considered conducive to the Koala observed within the Project area during the field investigation.

3.3.8 Animal breeding places

The Project area supports suitable animal breeding places for CEEVNT and Least Concern species (including Special Least Concern and colonial breeders) species. Special Least Concern fauna species are listed under Schedule 1 of the *Nature Conservation (Animals) Regulation 2020* (Animals Regulation). Colonial breeder species are defined under the provisions of the NC Act as Least Concern animals that co-exist in close association for breeding purposes and are of the same species.

The low-lying areas of the Project area which have the capacity to hold water for periods of the year provide suitable potential breeding places for the NC Act vulnerable listed species Wallum froglet (*Crinia tinnula*).

The Project area also supports several hollow bearing trees which provide suitable potential breeding places for Special Least Concern gliders and microchiropteran bat species.

3.3.9 Incidental fauna observations

Twenty-nine incidental fauna observations were recorded within the Project area during the ecological field assessment. This included 26 (86.2%) native species and 4 introduced species (13.8%). One of the introduced species is listed as a Restricted matter under the *Biosecurity Act 2014* (refer to Section 3.3.11). A list of fauna species identified within the Project area during the ecological field investigation is provided in Appendix D.

3.3.10 Aquatic values

Limited aquatic habitat values were present within the Project area. Desktop analysis identified aquatic habitat within the Project area consisting of isolated artificial waterbodies linked by first order unmapped water features (under *Water Act 2000*). On-ground truthing identified that aquatic habitat presented as drainage features throughout the whole site, with poor habitat present throughout the entire length of the drainage feature (refer Photo Plate 3-4). Limited evidence of a channel was present within the head section (W01) and lower section (W03), while bank structure was present within the mid-section (W02), however was likely scoured from overflow from the upstream artificial waterbody rather than from any regularity of flow. Noting this, surrounding vegetation communities at the mid-and lower sections of the drainage feature was indicative of soaks and comprised of *Melaleuca* spp., with fringing communities of emergent wetland indicator species of, *Lomandra* spp. and *Cyperus* spp. and *Baumea* spp. The head section (W01) did not present with any wetland indicator species. A soak was located downstream of W03, with a depression associated with the intersect of an easement at the western side of the Project area. In summary, no significant aquatic habitat constraint was identified from the Project area.



Photo Plate 3-4 Unmapped drainage feature within the Project area

3.3.11 Restricted matters

Restricted invasive matters are established in Queensland and seriously threaten Queensland's primary industries, natural environment livestock, human health, and people's livelihoods. The following 'Restricted Invasive Plants' under the *Biosecurity Act 2014* (Qld) were recorded within the Project area during the ecological field investigation conducted in May 2021:

- Lantana (*Lantana camara*) – Category 3¹
- Giant Parramatta grass (*Sporobolus fertilis*) – Category 3¹

The following 'Noxious Fish' under the Biosecurity Act 2014 (Qld) were recorded within the Project area during the ecological field investigation conducted in May 2021:

- Mosquito fish (*Gambusia holbrooki*) – Category 3, 5, 6 and 7¹

¹Category 3 restricted matters must not be released into the environment, given away or sold.

Category 5 restricted matters must not be kept.

Category 6 restricted matters must not be fed.

Category 7 restricted matters must be killed and buried (includes only Noxious fish)

4 Potential impacts and mitigation measures

4.1 Project Impacts

The project footprint includes the construction of a manufacturing facility and associated infrastructure. The proposed works are likely to impact the ecological values contained within the project footprint through the clearing of vegetation and its associated impact on species habitat. The proposed development also has the potential to adversely impact the waterway within the project footprint.

Project impacts which have the potential to negatively impact the surrounding ecological values include;

- Removal of vegetation and wildlife habitat for Project activities (i.e. manufacturing facility and access tracks) (refer to Sections 4.1.1 and 4.1.2).
- Habitat removal also potentially leading to a reduction in connectivity and habitat fragmentation (refer to Section 4.1.3).
- Increased edge effects such as weed invasion (refer to Section 4.1.4).
- Project construction activities potentially causing alterations to hydrology (refer to Section 4.1.5).
- Project construction activities which have the potential to impact ecological values directly and indirectly including direct mortality of plants and animals (refer to Section 4.1.6), and indirect effects from noise, dust vibration and light (refer to Section 4.1.7).
- Operational transportation along the rail which has the potential to impact fauna due to direct mortality/injury via collision or disturbance associated with noise, light, and vibration.
- Increased activity increasing risk of bushfire in the area (refer to Section 4.1.8).

4.1.1 Removal of vegetation

Vegetation clearing will be required during the construction of the Project. The clearing of vegetation is managed under the *Vegetation Management Act 1999* (VM Act).

The total amount of vegetation to be removed for the Project is 17.42 ha. This vegetation consists of Category B remnant vegetation. A detailed breakdown of where vegetation is to be removed as part of the Project is shown in Table 4-1.

Table 4-1 Vegetation within the Project footprint to be removed

Vegetation community	Description	Maximum area to be removed within the model disturbance footprint (ha)
RE12.3.6	<i>Melaleuca quinquenervia</i> +/- <i>Eucalyptus tereticornis</i> , <i>Lophostemon suaveolens</i> , <i>Corymbia intermedia</i> open forest to woodland on alluvial plains	4.76
RE12.5.4	<i>Eucalyptus latisinensis</i> +/- <i>Corymbia intermedia</i> , <i>Corymbia trachyphloia</i> , <i>Angophora leiocarpa</i> and <i>Eucalyptus exserta</i> woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments	12.66
Total area of vegetation to be removed		17.42

Vegetation associated with the Regional Ecosystem (RE) 12.3.6 will be prioritised to be retained where possible due to its higher ecological significance as riparian corridor and wildlife habitat (refer to Section 4.1.2). The total amounts of vegetation to be removed and removal process will be addressed prior to removal in the Project EMP(C).

Regulated vegetation is considered a MSES which are a component of the biodiversity state interest that is defined under the State Planning Policy (SPP) and defined under the Environmental Offsets Regulation 2014 (Offset Regulation). Removal of regulated vegetation may result in a significant residual impact which is discussed in Section 5.

4.1.2 Removal of wildlife habitat

Existing habitat values within the proposed project footprint were associated with remnant vegetation towards the north west of the Project area. Habitat values in the southern portion of the project footprint were minimised due to previous degradation caused by cattle grazing activity and weed invasion.

Essential habitat under the VM Act is mapped in the northern portion of the project footprint for two conservation significant species, the Koala (*Phascolarctos cinereus*) and the Wallum froglet (*Crinia tinnula*) (refer to Section 3.1). The mapped essential habitat within the project footprint is associated with RE 12.3.6 and was field verified as suitable habitat for the two species. This essential habitat mapping is similarly suitable habitat for the Greater glider and Grey-headed flying fox. Potential habitat for the Koala, Greater glider and Grey-headed flying fox also exists within areas associated with remnant patches of RE 12.5.4.

It is noted that no threatened fauna or flora species were observed as present within the Project area during the May 2021 surveys.

The maximum amount of field verified suitable habitat within the project footprint to be removed for the Project includes;

- Greater glider (*Petauroides volans*) (Endangered under the EPBC Act and NC Act): 17.42 ha of suitable habitat (considered as habitat critical to the survival of the Greater glider as defined by the Conservation Advice) (refer to Sections 5.2 and 6.1)
- Koala (*Phascolarctos cinereus*) (Endangered, NC Act and EPBC Act): 17.42 ha of suitable habitat (which is not considered habitat critical to the survival of the Koala, refer to Sections 5.3 and 6.1)
- Grey-headed flying fox (*Pteropus poliocephalus*) (Vulnerable under the EPBC Act): 17.42 ha of suitable habitat (considered as habitat critical to the survival of the Grey-headed flying fox as defined by the Conservation Advice) (refer to Sections 5.4 and 6.1)
- Wallum froglet (Vulnerable, NC Act): 4.76 ha of suitable habitat (which is considered habitat critical to the survival of the Wallum froglet as defined by the National recovery plan for the species, refer to Section 6.1).

4.1.3 Reduction in the connectivity of biodiversity corridors and habitat fragmentation

Vegetation clearing for the Project can reduce habitat connectivity and create habitat fragmentation. It can also introduce “edge effects” due to changes in environmental conditions (i.e. altered light levels, wind speed, temperature). This can lead to changes in the local environment, by promoting the growth of different vegetation types (including weed species), promoting invasion by pest animals specialising in edge habitats, or changing the behaviour of resident native animals (Moenting and Morris 2006).

Woodlands within the project footprint are connected to larger patches of remnant vegetation to the north of the Project. Vegetation to the east and west of the project footprint is limited but not restricted by the existing Bruce Highway and North Coast Line. Due to the width of these major traffic corridors it is unlikely that fauna cross the barriers regularly and it is likely that there is high mortality along the highway. However, there is still accessibility for fauna to cross the transport corridors due to lack of fencing and minimal drainage line passage. Vegetation to the south includes a pine plantation that is intermittently cleared and lacking in suitable habitat. It can be used by larger fauna and avian species as transient vegetation. Pine plantations are not a habitable connection for foraging and breeding populations and are a restriction in connectivity for smaller fauna species.

The vegetation to the east includes patches such as Vernon Conservation Park, Vernon State Forest, and a patch of approximately 15,000 ha of remnant vegetation (i.e. Category B regulated vegetation). The vegetation to the west is connected to the western ranges associated with Lake Lenthall. The major traffic

corridors are all that separate these large patches of vegetation of which the Project is located between. Remnant riparian corridors throughout the pine plantation are mapped as State corridors under the Biodiversity Planning Assessment (BPA) mapping (DES 2021d). The clearing of vegetation within the project footprint would reduce connectivity between east and west vegetation but would not block or further disconnect the patches.

To assess the extent of potential Project connectivity impacts, the DES 'landscape fragmentation and connectivity' tool is used. The tool has been applied to the project footprint and determined that any impact on connectivity areas is not significant. It has defined that reduction in core remnant vegetation at the local scale is non-significant (0.95%) and that a change from core to non-core remnant vegetation at the site scale is also non-significant.

4.1.4 Displacement of flora and fauna species from invasion of weed and pest species

Weed and pest species have the potential to impact on terrestrial and aquatic biodiversity. Exotic species can displace native species through predation and competition. The most likely causes of pest dispersal and pest introduction associated with the Project include vegetation and soil movement, and attachment of seed (and other propagules) to vehicles and machinery.

Numerous non-native flora species have been recorded in the project footprint and surrounds. Non-remnant patches within the project footprint are dominated by introduced grasses, particularly African love grass (*Eragrostis curvula*). Non-remnant patches are also experiencing heavy recruiting of exotic pine (*Pinus elliottii*) from nearby pine plantations to the south of the Project area. Two Category 3 restricted plants, Lantana (*Lantana camara*) and Giant rat's tail grass (*Sporobolus pyramidalis*) listed under the provisions of the *Biosecurity Act 2014* were recorded by Aurecon within the Project area during the May 2021 field survey. Given the presence of these weeds in the Project area, it is unlikely the Project will increase weed populations any more than existing cattle grazing activities. Weed controls will be put in place under the project EMP(C) and will be applied to the Project in accordance with other operational procedures.

Three exotic fauna species were recorded in the Project area and surrounds by Aurecon during the May 2021 field survey. This included one Restricted matter, the mosquito fish (*Gambusia holbrooki*) classed as a Noxious fish and a Category 3, 4, 5 and 6 under the provisions of the *Biosecurity Act 2014*. The species was observed within the waterway within the project footprint. Presently, feral animals were not commonly observed within the Project area nor was there evidence of these fauna (scats, tracks, and signs etc). The Project is unlikely to introduce new pest animals to the area due to the previous disturbance. Pest fauna will be monitored throughout the Project and management measures within the Project EMP(C) will reduce impacts.

4.1.5 Aquatic impacts

Impacts to aquatic values within the project footprint are limited due to low aquatic values present (refer to Section 3.3.10). Aquatic ecology such as habitat value for aquatic species or wetland ecosystems is minimal throughout the unmapped waterway within the project footprint which has no regular flow. The aquatic habitat does however provide essential habitat for amphibian species such as the Wallum froglet.

The impacts to surface water are deemed minimal due to influx likely from artificial waterbodies. The Project will minimise its impacts to the waterway where possible and will be managed to avoid loss of waterway integrity. Indirect impacts to the waterway will be managed under the *Technical specification MRTS52 Erosion and Sediment Control* (MRTS52) and associated Erosion Sediment Control Plan (ESCP).

4.1.6 Fauna species injury or mortality

Direct impacts to fauna have the potential to occur during all phases of the Project, with the highest potential to occur during vegetation clearing. This potential impact will be proportionate to the extent of vegetation and habitat potential for species that is removed.

No conservation significant species are known to occur within the project footprint. There are twelve (12) conservation significant fauna species with a moderate likelihood of occurrence within the Project area. In addition to conservation significant species, all native fauna (including those listed as Least Concern species) are protected under the *Nature Conservation Act 1992*.

Some diurnal and mobile species, such as birds, may move away from areas being disturbed (i.e. vegetation removal) and may not be adversely impacted unless fauna are nesting. However, other species that are less mobile, or those that are nocturnal and nest or roost in tree hollows during the day, such as arboreal mammals, may be adversely affected.

The operational use of access tracks and roads across the project footprint will result in increased vehicle movements that may cause injury or death to fauna by vehicle strike.

4.1.7 Dust, noise, and light impacts

In general, construction activities can generate noise, dust, and light, which may impact on adjacent vegetation and fauna. The likelihood of potential impacts is anticipated to be greatest where Project activities take place near vegetated areas and known habitat. These areas include the remnant vegetation adjacent to the project footprint to the north, east and west.

In general, dust deposition from construction activities has the potential to impact upon vegetation if excessive quantities are sustained over extended periods of time. Excessive dust deposition on foliage reduces photosynthetic processes, which in turn stunts floral growth rates, and reduces the overall health of the remaining remnant communities within, and adjacent to, the project footprint.

Impacts from noise and light can create an edge effect around the construction site driving fauna away from the area reducing biodiversity during construction. These impacts can also be present during the operational life of the Project. These impacts are not considered to significantly impact the species within and adjacent to the project footprint.

4.1.8 Bushfire

The operation of ignition sources such as machinery and hot works during the Project may cause an increased risk of fire. There is also potential for bushfire to impact the project from surrounding vegetation. The Project is largely surrounded by eucalypt woodland and pine plantation which have the potential to be impacted by fire. Currently a large fire break (70 m) exists between the Project area and the neighbouring pine plantation to the south, reducing fire risk dependant on maintained firebreaks. Remnant vegetation within the Project area may require firebreaks during construction and operational stages of the Project to minimise the risk of fire. This will be addressed within the Project specific Bushfire Management Plan.

4.2 Management of Impacts and mitigation measures

4.2.1 Mitigation measures

Mitigation measures which are recommended to be implemented by the Project to minimise adverse impact on ecological values contained within the project footprint (including indirect impacts to adjacent areas) are listed below;

- The final design will adopt the hierarchy of mitigation (i.e. avoided, minimised, and mitigated where possible) to reduce the duration and severity of impacts.
- The Project will follow procedures associated with the MRTS51 (Environmental Management), MRTS52 (Erosion and Sediment Control) and MRTS16 (Landscape and Revegetation Works) and provisional ESCP, EMP(C) and Rehabilitation Control Plan (RCP) with associated plans and programs (refer to Section).
- No vegetation clearing is to take place without the appropriate vegetation clearing permits in place. An exemption for a Protected Plant Clearing Permit has been granted for the Project (DES Reference: APP0083083) and will be applicable for three years from the date of survey (May 2021).

- The clearing of all areas will be restricted to the minimal area required to enable safe construction, operation, and maintenance of the Project infrastructure.
- Vegetation will be avoided where possible within 20m of the waterway mapped in the north of the project footprint. Where infrastructure is proposed within this area, fauna movement along the riparian corridor is to be maintained, with particular attention to Wallum froglet and Koala.
- Clearing to be undertaken in a sequential manner to allow fauna to move safely into areas of existing bushland to the north.
- Ensure that vegetation clearing boundaries are established with appropriate signage at regular intervals and visible and physical markings. High visibility tape, barricade webbing or similar should be utilised. Ensure that all contractors are aware of these boundaries.
- Where possible, minimise loss of canopy vegetation and works that will lead to the proliferation of weed species.
- Obtain all the appropriate approvals under local, State and Commonwealth legislation. This includes relevant approvals required to undertake site preparation and pre-clearing surveys and works.
- Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions.
- All site personnel are to be made aware of local fauna that could occur on site and that all native fauna, including snakes, are protected. Fauna are only to be handled by suitably qualified personnel.
- Discourage the feeding of wildlife by project personnel throughout the project area.
- Consider mechanisms to facilitate fauna movement (i.e. culvert design and bridging).
- Where temporary fencing is required consideration will be given to fauna movement, current land uses and construction staff safety requirements. Special consideration will be given to frogs and Koalas.
- Implement fauna escape devices where practical (such as planks within trenches or trench ramps designed with a 15-degree slope placed every 30 m along the trench) to enable fauna to exit hazardous areas within the construction site.
- A suitably qualified and licenced Ecologist/Fauna Spotter Catcher with the appropriate permits will be engaged to conduct a preclearance survey and be present for all habitat clearing. During the preclearance survey the Ecologist/Fauna Spotter Catcher will inspect the Project area at least 3 days prior to vegetation clearing. The Contractor will give notice to the Principal prior to commencing any clearing within the project footprint.
- Ensure that all hollow bearing tree clearing is supervised and managed by the Ecologist/ Fauna Spotter Catcher.
- During construction works, a certified Ecologist/ Fauna Spotter Catcher is to inspect trenches, culverts, and other structures to determine whether there are any trapped or injured fauna species present and action as appropriate.
- Where practical, minimise night work to reduce impacts to nocturnal and diurnal species.
- Project infrastructure lighting will be designed, with due consideration to safety, to have a minimal impact on surrounding habitats and fauna.
- Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of fauna throughout construction.
- Where practical, maintenance works are to be carried out within designated areas or offices and away from sensitive environments such as REs, riparian vegetation, and waterways.
- No vegetation is to be burnt either as a form of removal or disposal.
- Dust suppression techniques are to be adopted during construction to minimise smothering of native vegetation
- The EMP(C) will outline specific measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area. Only chemicals suitable for use near waterways will be approved for use in reasonable proximity of watercourses/drain lines within the project area. Weed control measures will be designed to minimise impacts on native fauna (e.g. use of aquatic and frog friendly chemicals)

- To minimise the risk of weed and pest animal establishment within and adjacent to the Project area, the measures outlined in the EMP(C) shall be implemented by the appointed contractor(s) and be overseen and audited by the relevant Site Environmental Officer
- Fill and imported soil materials are to be declared weed free or to be sourced from weed free areas.
- Fill and imported soil materials are to be sourced from outside fire ant biosecurity zones or otherwise permitted.
- Any identified Class 1 or 2 infestations are to be reported to the Queensland Department of Primary Industries and Fisheries (QPIF).
- Any vehicles or machinery coming onto site from an area known to contain Category 1, 2 or 3 weeds are to be washed down prior to entry to site.
- Vegetation removed from the site will be managed to reduce the spread or introduction of myrtle rust and other plant pathogens.
- Chytrid fungus will be managed under the technical manual '*Interim Hygiene Protocol for Handling Amphibians*' which will be implemented by the onsite environmental representatives, ecologists and fauna spotter catchers. Dewatering practices will also be managed to ensure water is distributed on and off site without spreading the pathogen.

5 Significant residual impact assessment for Matters of National Environmental Significance

Following field-based investigations specifically designed to target potentially occurring MNES (Aurecon 2022), two MNES (i.e. Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland TEC and Satin flycatcher), were identified as present within, and immediately adjacent to the Project site.

In addition, habitat for the following MNES has been identified within and/or immediately adjacent to the Project site:

- Greater glider (*Petauroides volans*) – Endangered
- Koala (*Phascolarctos cinereus*) – Endangered
- Grey-headed flying-fox (*Pteropus poliocephalus*) – Vulnerable
- White-throated needletail (*Hirundapus caudata*) – Vulnerable
- Four Migratory species:
 - Satin flycatcher (*Myiagra cyanoleuca*)
 - Fork-tailed swift (*Apus pacificus*)
 - Oriental cuckoo (*Cuculus optatus*)
 - Spectacled Monarch (*Symposiachrus trivirgatus*)

Under the EPBC Act these matters require assessment using the *MNES Significant Impact Guidelines 1.1*.

5.1 Coastal Swamp Sclerophyll Forest of NSW and SEQ Threatened Ecological Community

The Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC was listed as Endangered under the EPBC Act on the 8th December 2021.

The ecological community includes the plants, animals and other organisms typically associated with forested palustrine wetlands, or swamp forests, found in the temperate to subtropical coastal valleys of Australia's east coast. The Coastal Sclerophyll Swamp Forest often has a layered canopy, dominated by melaleucas and/or *Eucalyptus robusta* and occurs between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of New South Wales (DCCEEW 2022b).

The ecological community typically occurs in low-lying coastal alluvial areas with minimal relief, such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces, and behind fore-dune. The ecological community most commonly occurs at elevations below 20 m above sea-level (ASL) but may occur occasionally up to 220 m ASL on hill slopes, for example in association with perched swamps and lakes, or a naturally high-water table (DCCEEW 2022b).

The structure of the Coastal Swamp Sclerophyll Forest ecological community varies from open woodland to closed forest with a crown covers of at least 10% and typically no more than 70%. In an intact forest, the canopy can be layered, with a sub-canopy of melaleuca grading into a taller mixed

melaleuca and/or eucalypt canopy. Canopy density, light availability, water regime, salinity level and soil fertility influence the development and composition of the understorey flora (DCCEEW 2022b).

Within Queensland, there are five Regional Ecosystems (REs) (as regulated under the Queensland *Vegetation Management Act 1999*) that are considered to be analogous to the Coastal Swamp Sclerophyll Forest ecological community where they meet the necessary condition class and patch size as defined within the Commonwealth conservation advice for the Coastal Swamp Sclerophyll Forest ecological community. These vegetation communities consist of the following:

- RE 12.2.7 – *Melaleuca quinquenervia* or rarely *Melaleuca dealbata* open forest on sand plains
- RE 12.3.4 and 12.3.4a – *Melaleuca quinquenervia*, *Eucalyptus robusta* woodland on coastal alluvium/*Eucalyptus bancroftii* open woodland often with *Melaleuca quinquenervia*.
- RE 12.3.5 – *Melaleuca quinquenervia* open forest on coastal alluvium.
- RE 12.3.6 – *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* open forest on coastal alluvial plains
- RE 12.3.20 (in part) - *Melaleuca quinquenervia*, *Casuarina glauca* +/- *Eucalyptus tereticornis*, *Eucalyptus siderophloia* open forest on low coastal alluvial plains.

Of the REs identified above, the Proposed Action is likely to impact upon RE 12.3.6 which is located within the northern and eastern portion of the Project site, and the northern section of Ritchie Road. Approximately **4.76 ha** of Coastal Swamp Sclerophyll Forest has been identified as being contained within the area of direct disturbance of the Proposed Action.

5.2 Greater glider (*Petauroides volans*)

5.2.1 Ecology and distribution

The Greater glider is Australia's largest gliding marsupial with a head and body length of 35-46 cm and a tail measuring up to 60 cm. This species has thick fur that is pale below and the upper side varies from dark grey, brown to light mottled grey and cream. The tail lacks the ability to curl around objects and the ears are large and rounded.

Greater gliders are arboreal and nocturnal, largely restricted to eucalypt forests and woodlands. The diet is mostly florivorous, feeding on eucalypt leaves and occasionally flowers. The largest populations are in taller, montane forests with old trees and abundant hollows. Even in suitable habitat, the species may have a patchy distribution. Due to the seasonal variation of eucalypts, this species prefers forests of high species diversity.

During the day it shelters in tree hollows, with a preference for large hollows in large, old trees. In Southern Queensland, greater gliders require at least 2-4 live den trees for every 2 ha of suitable forest habitat.

Home ranges are small, becoming larger in lower productivity forests. This species is particularly sensitive to forest clearance and to intensive logging and wildfire. Following disturbance, it is slow to recover. Due to the sensitivity of the species and the low dispersal ability, it is sensitive to habitat fragmentation.

5.2.2 Distribution in context to the Project

There were no signs of Greater glider presence (i.e. individuals, scats, and scratch marks) within the Project site during the field survey conducted by Aurecon. Greater glider food trees and hollows were recorded throughout the vegetation within the Project site.

There are scattered database records (i.e. WildNet) beyond the Project site. The nearest species occurrence record is 5km northeast of the Project site near Vernon Conservation Park.

5.2.3 Recovery plans/threat abatement plans

There have been no adopted or made Recovery Plan for this species. No Threat Abatement Plan has been identified as being relevant for this species.

5.2.4 Habitat critical to the survival of the Greater glider

The conservation advice for the Greater glider listed by DCCEEW in July 2022 lists the considerations for habitat critical to the survival of the species, as addressed in Table 5-1 below.

Table 5-1 Assessment of Habitat critical to the survival of the species criteria for Greater glider

Considerations for habitat critical to the survival of the species	Response for the Project site
Large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region	Within the Project site approximately 17.42 ha of Greater glider habitat is proposed to be cleared. This habitat is remnant (ie mature). The Project site is contiguous with vegetation to the north, but is fragmented by land clearing, rail and road infrastructure to the east, south and west.
Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization	The Project site is contiguous with vegetation to the north, but is fragmented by land clearing, rail and road infrastructure to the east, south and west. Movement of individuals from the north has potential to occur.
Cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes)	The vegetation within the Project site contains coastal low-land areas which have the potential to provide a cool micro-climate.
Areas identified as refuges under future climate changes scenarios	The Project site is unlikely to provide refuge under climate change scenarios due the isolation of the vegetation and surrounding fragmentation on all but one side.
Short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.	The Project site has the potential to provide refuge for short term or long term post-fire recolonisation due to its proximity to existing infrastructure and the existing fragmentation that may acts as firebreaks.
Conclusion of assessment:	The Project site <u>does</u> contain habitat critical to the survival of the species.

The following factors have been considered in relation to the potential impact to Greater glider as part of the Project:

- The clearing of **17.42 ha** of potential Greater glider habitat.
- The nature of potential impacts and disturbance.
- Presence of habitat critical to the survival of the species.
- Lack of records within 5 km of the Project Site.
- Connectivity in habitat within the Project site to external habitat (contiguous habitat is only present to the north of the Project site).

In consideration of these factors, an assessment of significance related to potential impacts upon the Greater glider (and its habitat), as a result of the Project, has been undertaken in accordance with the Matters of National Environmental Significance: Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999 (DoE 2013) (refer Table 5-2).

Table 5-2 Significant impact assessment of Greater Glider

Significant impact criteria	Assessment of the Project against the Significant impact criteria
Will the action lead to a long-term decrease in the size of a population	No. No. The species was not observed to occur within the project site.
Will the action reduce the area of occupancy of a population	No. Field-based surveys indicate that the species is not present onsite, with the closet record of the species identified as occurring 5km to the north of the Project site. Approximately 17.42 ha of potential Greater glider habitat is proposed to be removed, which is located on the edge of a larger patch. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%. The proposed removal is not considered to significantly reduce the area of occupancy of the species.
Will the action fragment an existing population into two or more populations	No. Field-based surveys indicate that the species is not present onsite, with the closet record of the species identified as occurring 5km to the north of the Project site. Approximately 17.42 ha of potential Greater glider habitat is proposed to be removed alongside a local road and North Coast Rail Line, which is located on the edge of a larger patch. As such, the Proposed Action is considered unlikely to fragment an existing population of this species into two or more populations.
Will the action adversely affect habitat critical to the survival of a species	Yes. Approximately 17.42 ha of potential Greater glider habitat is proposed to be removed. This habitat is considered to fulfil the requirements of habitat critical to the survival of the species.
Will the action disrupt the breeding cycle of a population	No. The proposed Action is unlikely of disrupt the breeding cycle if a population of the Greater glider.
Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. Habitat modification from the Project is considered unlikely to lead to the species declining, as the Project site area does not contain important connectivity.
Will the action 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. It is unlikely that the Proposed action will result in an increase in the presence and establishment of invasive species which may impact on the Greater glider. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management will be implemented during the life of the Project site to manage potential impacts from invasive species. As such, the Project site area considered unlikely to result in invasive species becoming established in habitat that are harmful to an endangered species.
Will the action introduce disease that may cause the species to decline	No. The proposed action is unlikely to introduce disease which may lead to decline of these species. While it is unknown whether individuals that may use the Project site for transient foraging or resting opportunities are disease free, no additional risk to the health of these species is considered likely as a result of construction of the Project site. Pathogens, such as Myrtle rust (<i>Austropuccinia psidii</i>) and Phytophthora (<i>Phytophthora cinnamomi</i>), have the potential to be introduced to the Project site area during Project construction, by means of increased vehicular and pedestrian movements and imported soils. These pathogens may result in reduced quality and integrity of habitats for Greater glider. The potential risks associated with the introduction and spread of these pathogens are considered relatively low risk where appropriate construction hygiene protocols are implemented for the Project site. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management are recommending during the life of the Project site to manage potential impacts from invasive species. As such, the Project is

Significant impact criteria	Assessment of the Project against the Significant impact criteria
	considered unlikely to introduce disease that may cause these species to decline.
Will the action interfere with the recovery of the species.	Possible. The clearing of habitat critical to the survival of the species is country to the recovery of the species. As such, the Project site is considered likely to interfere substantially with the recovery of the species.
Determination of assessment: Significant impact <u>likely</u>	

As per the significant residual impact assessment detailed in Table 5-2 there is likely to be a significant residual impact on the Greater glider or Greater glider habitat as a result of the Project activities.

5.3 Koala (*Phascolarctos cinereus*)

5.3.1 Ecology and distribution

The Koala is a leaf-eating specialist feeding primarily during dawn, dusk or during the night. Its diet is restricted mainly to foliage of *Eucalyptus* spp.; however, it may also consume foliage of related genera, including *Corymbia* spp., *Angophora* spp. and *Lophostemon* spp. Koala habitat can be broadly defined as any environment containing Koala food tree species or shelter trees. Along the Great Dividing Range and the coastal belt throughout the species' range, Koalas inhabit moist forests and woodlands dominated by *Eucalyptus* species. Koalas are also known to occur in highly modified (i.e. urbanised) or regenerating native vegetation communities. Female Koalas generally produce one offspring each year, with births occurring between October and May (DAWE 2020). The species home range size is dependent on the quality of habitat. In central Queensland home ranges may be as large as 135ha (Ellis et al. 2002), and as little as 37ha in northern New South Wales (Goldingay and Dobner 2014). Koalas are generally sedentary, with longer movements largely restricted to dispersing males which may extend several kilometres through lands cleared of vegetation (DAWE 2020).

The Koala is distributed along the east coast of Australia extending from Queensland south to Victoria and the eastern portion of South Australia. In Queensland, the Koala's distribution extends across several bioregions, encompassing a great diversity of habitats, with the greatest concentration thought to occur in south-east Queensland (DES 2017).

5.3.2 Distribution in context to the Project

There were no signs of Koala presence (i.e. individuals, scats, and characteristic scratch marks) within the Project area during the May 2021 field survey.

Koala food trees were recorded throughout the vegetation within the project footprint. The southern portion of the project footprint is largely cleared for cattle grazing and contains disturbed areas dominated by pine and regrowth vegetation where limited koala food trees were present. The remnant vegetation areas on the western side of the project footprint and adjacent to the north comprised of favourite koala food trees such as Queensland blue gum (*Eucalyptus tereticornis*) and Mahogany (*Eucalyptus latissinensis*) (Mitchell, 2015). The riparian vegetation surrounding the waterway within the project footprint (RE 12.3.6) contained a higher density of Queensland blue gum than the rest of the project footprint. Within the broader landscape, extensive patches of suitable habitat occur to the north of the project footprint. Large patches of contiguous Koala habitat also exist either side of the Bruce Highway and the North Coast Rail line. However, it is likely that linear infrastructure and large tracts of pine plantation surrounding the Project site create barriers to long distance dispersal (Norman et al. 2019).

There are scattered database records (i.e. WildNet) well beyond the Project site, but no records that indicate that Koala historically occurred within the region. The nearest species occurrence record is from Maryborough (2010 record from approximately 18 km south of the Project site) and one record from south of Childers (1987 record from approximately 32 km north of the Project site). Records occur more frequently 20 km towards the south. An assessment of significance related to potential impacts upon the Koala (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Matters of National Environmental Significance: Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999 (DoE 2013) (refer Aurecon 2022).

5.3.3 Recovery plans/threat abatement plans

The current Commonwealth adopted recovery plan applicable to Koala is the National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) published March 2022. The National Koala Conservation and Management Strategy 2009-2014 (NRMMC 2009) expired in 2014. The DAWE Approved Conservation Advice (DSEWPaC 2012) notes the following potentially threatening processes for Koala:

- Habitat loss, modification, or fragmentation because of urbanisation
- Secondary threats such as predation by domestic dogs, vehicle strikes and stress
- Extreme heat events, drought and climate change
- Chlamydia and other diseases (such as Koala retrovirus) which reduces the life expectancy of the species (DCCEEW 2022).
- Natural systems modification including altered fire regimes and native forestry

5.3.4 Habitat critical to the survival of the Koala

The conservation advice for the Koala listed by DCCEEW in February 2022 lists the considerations for habitat critical to the survival of the species, Table 5-3 below.

Table 5-3 Assessment of Habitat critical to the survival of the species criteria

Considerations for habitat critical to the survival of the species	Response for the Project site
Is the habitat is used during periods of stress (examples: flood, drought or fire)	There is no historic evidence of Koala presence within the Project site. There are large barriers to connectivity (e.g. Bruce Highway & North Coast line) It is not foreseeable that during periods of stress Koalas could move back into the Project site.
Is the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes)	Habitat for Koala within the Project site is unlikely to sustain Koala for long periods given its poor connectivity with contiguous habitats.
What is the extent to which the habitat is used by important populations	There are no current records of Koala populations within 2 km of the project area, Koala surveys conducted in 2022 by Koala scat detection dogs did not detect the species. There were no evidence of scats, scratches or direct Koala presence observed in 2021 surveys.
Is the habitat necessary to maintain genetic diversity and long-term evolutionary development	Given the location of the site between the Bruce Highway and the North Coast Line, it is unlikely to support a flow in genetic diversity.
Is the habitat necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements	Habitat for Koala within the Project site is unlikely to sustain Koala for long periods given its relatively poor connectivity with contiguous habitats.
Is the habitat necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation	Due to limited connectivity to habitat to the of the Project site is it not foreseeable that Koalas could recolonise into the area. Any re-introduction of the species into the area could lead to a sink population due to high mortality rates associated with vehicle strikes.
Conclusion of assessment:	The Project site does not <u>contain habitat critical to the survival of the species</u>

The following factors have been considered in relation to the potential impact to Koala as part of the Proposed Action:

- The area of disturbance (i.e. **17.42 ha**).
- The localised nature of potential impacts.
- The nature of disturbance.
- The absence of an important population.
- Absence of habitat critical to the survival of the species.
- No utilisation of the area by Koalas
- The proposed mitigation measures
- Inability for the Koala to recolonise due to lack of connectivity in habitat within the Project site to external habitat.

In accordance with the Significant Impact Guidelines, an action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:

lead to a long-term decrease in the size of a population

- Reduce the area of occupancy of the species
- Fragment an existing population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a population
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in invasive species that are harmful to a Critically endangered or Endangered species becoming established in the Endangered or Critically endangered species' habitat
- Introduce disease that may cause the species to decline, or
- Interfere with the recovery of the species.

An assessment of the Proposed Action described in Section 1 against the Commonwealth's Significant Impact Guideline for the Koala is provided in Table 5-4.

Table 5-4 Assessment against the MNES Significant Impact Guidelines 1.1 criteria: Koala (Endangered species)

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
Matter: Koala	
Will the action reduce the area of occupancy of the species	No. On ground surveys and a review of existing data indicates Koala did not occur within a 2 km radius to the proposed works. Approximately 17.42 ha of potential Koala habitat is proposed to be removed, which is located on the edge of a larger patch. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%. The proposed removal is not considered to significantly reduce the area of occupancy of the species.
Will the action fragment an existing population into two or more populations	No. On ground surveys and a review of existing data indicates Koala did not occur within a 2 km radius to the Proposed Action. Approximately 17.42 ha of potential Koala habitat is proposed to be removed alongside a local road and North Coast Rail Line, which is located on the edge of a larger patch. As such, the Proposed Action is considered unlikely to fragment an existing population of this species into two or more populations.
Will the action adversely affect habitat critical to the survival of a species	No. On ground surveys and a review of existing data indicates Koala did not occur within a 2 km radius to the proposed works. Approximately 17.42 ha of potential Koala habitat is proposed to be removed, which is located on the edge of a larger patch. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%. Habitat for Koala within the proposed works area is unlikely to sustain Koala for long periods given its relatively small extent and poor connectivity with larger more contiguous habitats to the north, east and west.

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	However, vegetation is likely to provide transient foraging and resting opportunities for the species across its local range. The habitat contained within the Project site is not habitat critical to the survival of the species. As such, the proposed works are considered unlikely to adversely affect habitat critical to the survival of Koala.
Will the action disrupt the breeding cycle of a population	No. Habitat for Koala within the proposed works is unlikely to sustain Koala for long periods given its relatively small extent and poor connectivity with larger more contiguous habitats to the north, east and west. However, vegetation is likely to provide transient foraging and resting opportunities for the species across its local range. Since the proposed works area is unlikely to be used for breeding by the species, impacts from the proposed works are unlikely to disrupt the Koala breeding cycle.
Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. Habitat modification from the Project is considered unlikely to lead to the species declining, as the proposed works area does not contain important connectivity.
Will the action 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 identified within the proposed works area are not considered a primary threat for Koala (DCCEEW 2022). It is unlikely that the proposed works will result in an increase in the presence and establishment of invasive species which may impact on the Koala. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management will be implemented during the life of the proposed works to manage potential impacts from invasive species. As such, the proposed works area considered unlikely to result in invasive species becoming established in habitat that are harmful to a vulnerable species.
Will the action introduce disease that may cause the species to decline	No. The proposed works is unlikely to introduce disease which may lead to decline of these species. While it is unknown whether individuals that may use the Project site for transient foraging or resting opportunities are disease free, no additional risk to the health of these species is considered likely as a result of construction of the proposed works. Pathogens, such as Myrtle rust (<i>Austropuccinia psidii</i>) and Phytophthora (<i>Phytophthora cinnamomi</i>), have the potential to be introduced to the proposed works area during Project construction, by means of increased vehicular and pedestrian movements and imported soils. These pathogens may result in

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	reduced quality and integrity of habitats for Koala. The potential risks associated with the introduction and spread of these pathogens are considered relatively low risk where appropriate construction hygiene protocols are implemented for the proposed works. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management are recommending during the life of the proposed works to manage potential impacts from invasive species. As such, the Proposed Action is considered unlikely to introduce disease that may cause these species to decline.
Will the action interfere with the recovery of the species.	No. The Proposed Action is unlikely to interfere substantially with the recovery of this species, as the Project site area is only considered to contain marginal transient or foraging habitat for this species. As such, the proposed works is considered unlikely to interfere substantially with the recovery of the species.
Determination of assessment: Significant impact unlikely	

Within the Koala guidelines, Figure 2 provides guidance on the requirement for referral of an action likely to adversely impact Koala habitat (DotE 2014). Where habitat to be impacted is not considered habitat critical to the survival of the Koala (as per the habitat assessment results in Table 5-3). There is no habitat critical to the survival of the Koala considered to occur within the project footprint. As per the significant residual impact assessment detailed in Table 5-4, there is unlikely to be a significant residual impact on Koala or Koala habitat as a result of the Project activities.

5.4 Grey-headed Flying fox (*Pteropus poliocephalus*)

5.4.1 Ecology and distribution

The Grey-headed flying-fox (*Pteropus poliocephalus*) weighs approximately 600 g to 1 kg, and typically measures 23 cm to 28 cm from head to body. The Grey-headed flying-fox exhibits a collar of orange/brown around its neck, whilst its head is covered in light grey. The fur on the body is grey, often with flecks of white and ginger. The fur on the back exhibits two morphs, which are possibly related to age, moult, or sub-population. Winter fur is typically darker than summer fur, and pronounced moulting is known to occur in June (DCCEEW 2022b).

The Grey-headed flying-fox occurs in the coastal belt of Eastern Australia, typically ranging from Rockhampton in central Queensland to Melbourne in Victoria. It is noted that only a small portion of this range is used at any one time, as the species selectively forages where resources are available (DCCEEW 2022b).

The availability of food resources have a direct influence on the occurrence and relative abundance within the Grey-headed flying-foxes distribution in various seasons and years (DCCEEW 2022b).

Nectar and pollen from *Eucalyptus*, *Corymbia*, *Angophora*, *Melaleuca*, and *Banksia* species are considered the primary food source for Grey-headed flying-foxes. This species is known to supplement its diet with a wide range of rainforest fruits and introduced species (DCCEEW 2022b).

The Grey-headed flying-fox is a canopy-feeding species that eats fruit and nectar. This species utilises a range of vegetated habitats, including rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands. In an urban setting, this species is known to feed on commercial fruit crops, and on introduced tree species (DCCEEW 2022b).

Roost sites are generally located near water bodies. This species is known to roost in vegetation ranging from rainforest, *Melaleuca* stands, mangroves and riparian vegetation. The species has a high level of roost site fidelity, although new sites have been known to be colonised (DCCEEW 2022b).

Mating is known to occur in the early autumn months, after which time the larger camps begin to separate, reforming in late spring/early summer when food resources become more abundant. Males and females typically separate in October, when the young are born. Each year, following six months of gestation, females bear single young. For one month after giving birth, the mother carries her offspring on her ventral surface to feeding sites. When completely furred, the young are left in maternal camps, and are nursed until they are independent, at approximately 12 weeks of age. Sexual maturity typically occurs at about three years of age (DCCEEW 2022b).

5.4.2 Distribution in context to the Project

Three camps have been identified by the DCCEEW National Flying-fox monitoring viewer containing Grey-headed flying-foxes within the last 10 years. A camp at Maryborough (21 km south of the Project) has contained large numbers (16,000-50,000) of the species on several occasions until 2021. A camp at Childers (33 km west of the Project) recorded more than 2,500 individuals in 2013. The camp at Woocoo (25 km south-west of the Project) had more than 50,000 individuals estimated in 2021.

Important populations are not identified in the *National recovery plan for the Grey-headed flying-fox (Pteropus poliocephalus)* (DCCEEW 2021) as the population is considered to be national. Although they are spatially structured into colonies, there are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' entire geographic range. Therefore, for the purpose of this assessment, all individuals are considered to be part of an important population.

5.4.3 Recovery plans/threat abatement plans

A National Recovery Plan for the Grey-headed flying fox (*Pteropus poliocephalus*) has been developed for the species (DAWE 2021). No Threat Abatement Plan has been identified as being relevant to the species. However, the following have been identified as potentially threatening processes to the Grey-headed flying-fox:

- Clearing of native vegetation for agriculture and forestry operations has accelerated the destruction and disturbance of roosting and foraging habitats of the species in eastern Australia (DCCEEW 2022b)
- Lack of foraging resources can also force Grey-headed flying-foxes into commercial fruit crops, increasing conflict with growers and subsequent culling of individuals (DCCEEW 2022b)
- Urban-dwelling Grey-headed flying-foxes can accumulate lethal levels of lead from the environment and are prone to electrocution on powerlines (DCCEEW 2022b)
- Displacement leading to competition and hybridisation with the Black flying-fox (*P. alecto*) is also a known threat (DCCEEW 2022b).

The Referral guideline for management actions in grey-headed and spectacled flying-fox camps (DotE 2015a) identifies 'nationally important' camps for Grey-headed flying-fox as:

- Camps that have contained $\geq 10,000$ Grey-headed flying-foxes in more than one year in the last 10 years, or
- Have been occupied by more than 2,500 Grey-headed flying-foxes permanently or seasonally every year for the last 10 years.

5.4.4 Habitat critical to the survival of the Grey-headed flying fox

The National recovery plan for the Grey-headed flying-fox (*Pteropus poliocephalus*) (DCCEEW 2021) defines habitat critical to the survival of the species as:

- Important winter or spring flowering vegetation communities that contain one or more of the following species:
 - *Eucalyptus tereticornis*, *E. albens*, *E. crebra*, *E. fibrosa*, *E. melliodora*, *E. paniculata*, *E. pilularis*, *E. robusta*, *E. seeana*, *E. sideroxylon*, *E. siderophloia*, *Banksia integrifolia*, *Castanospermum australe*, *Corymbia citriodora citriodora*, *C. eximia*, *C. maculata*, *Grevillea robusta*, *Melaleuca quinquenervia* or *Syncarpia glomulifera*.

As well as vegetation communities not containing the above trees species but which:

- Contain native species that are known to be productive as foraging habitat during the final weeks of gestation and during the weeks of birth, lactation and conception (August to May)
- Contain native species used for foraging and occur within 20 km of a nationally important camp
- Contain native and or exotic species used for roosting at the site of a nationally important Grey-headed flying-fox camp.

Vegetation communities associated with the Melaleuca woodland comprise at least one of these important foraging species listed above and is therefore considered foraging habitat for the species. Given the proximity to known roost sites (including three which qualify as nationally important flying-fox camps), surveys have identified areas containing suitable foraging habitat as Habitat critical to the survival of the species. The mapping process determined that **17.42 ha** of Habitat critical to the survival of the species may be impacted by the Project.

The following factors have been considered in relation to the potential impact to Grey-headed flying-fox as part of the Proposed Action:

- Area of disturbance (i.e. **17.42 ha**).
- The localised nature of potential impacts.
- The nature of disturbance.
- The proposed mitigation measures.

In consideration of these factors, and in consideration of Significant impact guidelines 1.1, the Proposed Action is likely to result in a significant impact to the Grey-headed flying-fox (refer Table 5-5).

Table 5-5 Significant impact assessment of Grey-headed flying-fox

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
Matter: Grey-headed flying-fox	
Will the action lead to a long-term decrease in the size of an important population of a species	No. Grey-headed flying-fox are considered to form one single interbreeding population across most states of Australia. As

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	such, local populations of the species may be considered to be an important population. Grey-headed flying-foxes are capable of nightly flights of up to 50 km from their roost to different feeding areas as food resources change (DCCEEW 2022). It is likely that individuals from the camps in the region may utilise foraging resources within the Project site. Three camps have been identified by the DCCEEW National Flying-fox monitoring viewer containing Grey-headed flying-foxes within the last 10 years. A camp at Maryborough (21 km south of the project) has contained large numbers (16,000-50,000) of the species on several occasions until 2021. A camp at Childers (33 km west of the Project) recorded more than 2,500 individuals in 2013. The camp at Woocoo (25 km south-west of the Project) had more than 50,000 individuals estimated in 2021. Approximately 17.42 ha of Grey-headed flying-fox habitat is proposed to be removed. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%. As such, the proposed works are considered unlikely to lead to a long-term decrease in the size of an important population of this species.
Will the action reduce the area of occupancy of an important population	No. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest. The proposed works area is not considered to significantly reduce the area of occupancy of an important population of this species.
Will the action fragment an existing population into two or more populations	No. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest. However, given the highly mobile nature of the species, availability of other suitable foraging habitats within the region and data indicating lack of nationally-important Flying-fox roost within the Project site, the Project is not considered likely to fragment an existing important population into two or more populations.
Will the action adversely affect habitat critical to the survival of a species	Yes. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest.

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	The action associated with the proposed works are considered likely to adversely affect habitat critical to the survival of a species.
Will the action disrupt the breeding cycle of a population	No. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%. Given the availability of other suitable foraging habitats within the region and the highly mobile nature of the species and data indicating lack of recent Flying-fox presence indicates the action associated with the proposed works are considered unlikely to adversely disrupt the breeding cycle of a population.
Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Possible. As there is habitat critical to the survival of the species within the proposed works, there is the potential for the action to modify and remove the availability of foraging habitat for the species that may lead to their decline, despite their highly mobile nature and the availability of other suitable foraging habitats within the region. However, this species is not considered likely to be wholly reliant on vegetation within the proposed works area. As such, the proposed works are considered to possibly modify, destroy, remove or isolate or decrease the availability or quality of foraging habitat to the extent that this species is likely to decline.
Will the action 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 identified within the proposed works area are not considered a primary threat for Grey-headed flying-fox (DCCEEW 2021b). It is unlikely that the proposed works will result in an increase in the presence and establishment of invasive species which may negatively impact on the Grey-headed flying-fox. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management are recommending during the life of the Project to manage potential impacts from invasive species. As such, the proposed works are considered unlikely to result in invasive species that are harmful becoming established in habitat for this species.
Will the action introduce disease that may cause the species to decline	No. The proposed works are unlikely to introduce disease which may lead to declines of these species. While it is unknown whether individuals that may use the proposed works area for transient foraging or resting opportunities are

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	disease free, no additional risk to the health of these species is considered likely as a result of construction of the proposed works. Pathogens, such as Myrtle rust (<i>Austropuccinia psidii</i>) and Phytophthora (<i>Phytophthora cinnamomi</i>), have the potential to be introduced to the proposed works area during proposed works construction, by means of increased vehicular and pedestrian movements and imported soils. These pathogens may result in reduced quality and integrity of habitats for Grey-headed flying-fox. The potential risks associated with the introduction and spread of these pathogens are considered relatively low risk where appropriate construction hygiene protocols are implemented.
Will the action interfere with the recovery of the species	Possible. The proposed works could interfere substantially with the recovery of this species, as the proposed works area is considered to contain habitat critical to the survival of the species in the form of foraging habitat. Mitigation measures will be recommended to ensure that adjoining fauna habitat is suitably protected and that the proposed works does not result in indirect impacts that will affect adjoining habitat areas. The proposed works are considered likely to interfere with the recovery of the species.
Determination of assessment: Significant impact <u>likely</u>	

5.5 White-throated needletail (*Hirundapus caudacutus*)

The White-throated needletail (*Hirundapus caudacutus*) is a summer migratory bird to Australia and is widespread throughout east and south-east Australia. They enter Australia from the Torres Strait, between September and October (Draffan et al. 1983). They leave between March and April (Higgins 1999).

The species is seldom seen on the ground, living most of its life between 1 m and 1,000 m from the ground floor. The bird roosts in trees that have dense foliage in the canopy, or in hollows (Tarburton 1993). In Australia, they are mostly found in woody areas, including open forest and rainforest, and over heathland. They nest in tall coniferous trees or on vertical rockfaces, with breeding only occurring in Southeast Asia and not within Australia.

There were no White-throated needletail observed during field surveys however its associated habitat was confirmed to be present.

An assessment of significance related to potential impacts upon the White-throated needletail (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013) (refer Table 5-6).

In consideration of the localised nature of potential impacts, the nature of disturbance, the aerial nature of the species, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1, the Proposed Action is not likely to result in a significant impact to the White-throated needletail.

Table 5-6 Significant impact assessment of White-throated needletail

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
Matter: White-throated needletail	
Will the action lead to a long-term decrease in the size of an important population of a species	No. The White-throated needletail is a high elevation aerial forager that flies over huge areas in its daily movements. The habitats important to the species will not be affected by the proposed works and are located above the Project site (i.e. airspace). As such, the Proposed Action is considered unlikely to lead to a long-term decrease in the size of an important population of this species.
Will the action reduce the area of occupancy of an important population	No. The White-throated needletail is a high elevation aerial forager that flies over huge areas in its daily movements. The habitats important to the species will not be affected by the proposed works. As such the Project site area is not considered to significantly reduce the area of occupancy of an important population of this species.
Will the action fragment an existing population into two or more populations	No. The White-throated needletail occurs as a single, migratory non-breeding population when present in Australia. The proposed works is not considered likely to fragment an existing important population into two or more populations.
Will the action adversely affect habitat critical to the survival of a species	No. The White-throated needletail is a high elevation aerial forager that flies over huge areas in its daily movements. The habitats important to the species will not be affected by the proposed works. As such, the action associated with the Proposed Action is considered unlikely to adversely affect habitat critical to the survival of a species.
Will the action disrupt the breeding cycle of a population	No. White-throated needletails do not breed in Australia, and the proposed works would not result in impacts (e.g. via impacts to migration or mortality of adults) that could affect breeding success elsewhere. The Proposed Action is therefore likely to have no capacity to disrupt the breeding cycle of White-throated needletails.
Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No. Given their highly mobile nature the fact that is a high elevation aerial forager that flies over huge areas in its daily movements, it is highly likely the habitats important to the species will not be affected by the proposed works As such,

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	the Proposed Action is considered unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline.
Will the action 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. The Proposed Action would not result in the establishment or introduction of an invasive species or disease that could cause the species to decline. As such, the Proposed Action is considered unlikely to result in invasive species becoming established in habitat for this species.
Will the action introduce disease that may cause the species to decline	No. The Proposed Action would not result in the establishment or introduction of an introduced disease that could cause the species to decline. As such, the Proposed Action is considered unlikely to result in introduced disease becoming established in habitat for this species.
Will the action interfere with the recovery of the species	The Proposed Action is unlikely to interfere substantially with the recovery of this species, as the proposed works area is only considered to contain marginal transient or foraging habitat for this species. In addition, mitigation measures will be recommended to ensure that adjoining fauna habitat is suitably protected and that the proposed works does not result in indirect impacts that will affect adjoining habitat areas. As such, the Proposed Action is considered unlikely to interfere substantially with the recovery of the species
Determination of assessment: Significant impact unlikely	

5.6 Migratory species

5.6.1 Satin flycatcher (*Myiagra cyanoleuca*)

The Satin flycatcher (*Myiagra cyanoleuca*) ranges in size from 15 cm to 17 cm. This species is blue-black and white bird with a small crest. The sexes are dimorphic. Males are glossy blue-black dorsally, with a blue-black chest and white below. Females are duskier blue-black dorsally, with an orange-red chin, throat and breast, and white underparts and pale-edged wing and tail feathers. Immature birds are dark brown-grey above, with pale streaks and buff edges to the wing feathers, and a mottled brown-orange throat and chest (Pizzey and Knight 2007).

The Satin flycatcher occurs along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. In Queensland, it is widespread but scattered in the east. The Satin flycatcher is a migratory species, moving northwards in winter to northern Queensland and Papua New Guinea, returning south to breed in spring (Pizzey and Knight 2007).

Satin flycatchers are mainly insectivorous although very occasionally they will also eat seeds.

The Satin flycatcher builds a neat cup of bark strips, moss and spiders webs on a horizontal dead branch located 5 cm to 25 m above the ground under living foliage. This species has been reported to nest in loose groups with each individual pair spaced between 20 m to 50 m apart. Both sexes build the nest, incubate the eggs and feed the young. Clutch size ranges from two to three eggs and breeding occurs between October and February (Pizzey and Knight 2007).

The Satin flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. This species is known to inhabit heavily vegetated gullies in Eucalypt dominated forests and taller woodlands usually above the shrub layer. On migration, this species occurs in coastal forests, woodlands, mangroves and drier woodlands and open forests as well as trees in open country and gardens (Pizzey and Knight 2007).

There was one Satin flycatcher and its associated habitat was confirmed to be present during surveys in May 2021. Approximately **17.42 ha** of Satin flycatcher habitat has been identified as being contained within the area of direct disturbance of the Proposed Action.

An assessment of significance related to potential impacts upon the Satin Flycatcher (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013) (refer Table 5-7).

In consideration of the area of disturbance (i.e. **17.42 ha**), the localised nature of potential impacts, the nature of disturbance, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015), the Proposed Action is not likely to result in a significant impact to the Satin flycatcher.

5.6.2 Fork-tailed swift (*Apus pacificus*)

The Fork-tailed swift (*Apus pacificus*) is a non-breeding visitor to all States and Territories of Australia. In Queensland, 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 in much of the south south-eastern region, more so west of the Great Divide, and are commonly found west of the line joining Chinchilla and Hughenden.

The Fork-tailed swift is an almost exclusively aerial species, flying from less than 1 m to at least 300 m above ground, and probably much higher. In Australia, Fork-tailed swifts predominately occur over inland plains, but sometimes occur above foothills, or in coastal areas. They often occur over cliffs, beaches, islands, and sometimes far out to sea. This species is also known to occur in the skies above settled areas, including urban areas and cities. Sometimes, Fork-tailed swifts may feed among tree-tops in open forests. Breeding for the species only occurs in Southeast Asia and not within Australia.

An assessment of significance related to potential impacts upon the Fork-tailed swift (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015) (refer Table 5-7).

In consideration of the localised nature of potential impacts, the nature of disturbance, the aerial nature of the species, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1, the Proposed Action is not likely to result in a significant impact to the Fork-tailed swift.

5.6.3 Oriental cuckoo (*Cuculus optatus*)

The Oriental cuckoo (*Cuculus optatus*) is a non-breeding migrants from Asia, wintering across northern Australia from the Kimberley region in Western Australia, to Brisbane in Queensland, and occasionally south to Narooma, NSW.

Oriental cuckoos inhabit monsoon forests, wet sclerophyll forests, paperbark swamps, dense open forests, scrubby gullies, and mangroves and is also known to use rainforest edges, leafy trees in paddocks, river flats and roadsides. This species prefers dense vegetation with a closed canopy.

There were no Oriental cuckoos confirmed to be present during surveys in May 2021. However, approximately **4.76 ha** of Oriental cuckoo habitat has been identified as being contained within the area of direct disturbance of the Proposed Action.

An assessment of significance related to potential impacts upon the Oriental cuckoos (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013, refer to Table 5-7)

In consideration of the relatively small area of disturbance (i.e. **4.76 ha**), the localised nature of potential impacts, the nature of disturbance, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015), the Proposed Action is not likely to result in a significant impact to the Oriental cuckoo.

5.6.4 Spectacled monarch (*Symposiachrus trivirgatus*)

The Spectacled monarch (*Symposiachrus trivirgatus*) is found in coastal north eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, NSW. It is much less common in the south. It is also found in Papua New Guinea, the Moluccas and Timor.

The Spectacled monarch inhabits both dense low vegetation and habitats with fairly open understoreys. The species prefers the understorey of mountain and lowland rainforests, thickly wooded gullies and waterside vegetation.

There were no Spectacled monarchs confirmed to be present during surveys in May 2021. However, approximately **17.42 ha** of Spectacled monarch habitat has been identified as being contained within the area of direct disturbance of the Proposed Action.

An assessment of significance related to potential impacts upon the Spectacled monarch (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013) (refer Table 5-7).

In consideration of the area of disturbance (i.e. **17.42 ha**), the localised nature of potential impacts, the nature of disturbance, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015), the Proposed Action is not likely to result in a significant impact to the Spectacled monarch.

5.6.5 Assessment of significance

In accordance with the Significant Impact Guidelines, an action is likely to have a significant impact on Migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or

- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An assessment of the Proposed Action against the Commonwealth's Significant Impact Guideline for the migratory species is provided in Table 5-7.

Table 5-7 Significant impact assessment of listed migratory species

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
Matter: Migratory species: Fork-tailed swift (<i>Apus pacificus</i>) Oriental cuckoo (<i>Cuculus optatus</i>) Spectacled Monarch (<i>Symposiachrus trivirgatus</i>) Satin flycatcher (<i>Myiagra cyanoleuca</i>)	
Will the action 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	No. Approximately 17.42 ha of habitat for the migratory species will be impacted by the proposed work. In the local context (1 km radius) this represents approximately 0.03%. The proposed works are unlikely to substantially modify destroy or isolate an area of important habitat for a migratory species.
Will the action 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. Pest management strategies and procedures will apply to the Project to minimise the potential to create favourable environments and/or sustain existing populations of invasive pests which are known to present a threat to Fork-tailed swift, Oriental cuckoo, Spectacled monarch, and Satin flycatcher.
Will the action seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	No. Approximately 17.42 ha of habitat for the migratory species will be impacted by the proposed work. It would be unlikely for this small area of habitat to support an ecologically significant proportion of the population. Therefore, it is concluded that it is highly unlikely that the Project would seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the Fork-tailed swift, Oriental cuckoo, Spectacled monarch, and Satin flycatcher.
Determination of assessment: Significant impact unlikely	

6 Significant residual impact assessment for Matters of State Environmental Significance

An environmental offset condition may be imposed under various State assessment frameworks (including the EP Act) for a prescribed environmental activity under the Offsets Act (i.e. a MSES), if the activity will, or is likely to have a significant residual impact on the matter.

In the case of the *Planning Act 2016*, a Project may require assessment against the criteria set out in the *Significant Residual Impact guideline for matters of state environmental significance and prescribed activities assessable under the Sustainable Planning Act 2009 (sic)* hereon referred to as the 'State guidelines'.

The State Guidelines refer to the *Sustainable Planning Act 2009* and provisions including the State Development Assessment Provisions (SDAP) and its associated modules. The *Sustainable Planning Act 2009* has been replaced by the *Planning Act 2016* and the provisional SDAP has been updated. Therefore, the significant residual impact assessment has been undertaken in accordance with SDAP v2.6 and associated State codes.

It is understood that the Project will obtain an 'Use' approval through the Ministerial Infrastructure Designation (MID) process, under Section 44(6)(b) of the *Planning Act 2016* (Qld) (refer to Section 6). Once designated the following approval requirements will be Accepted Development:

- Vegetation clearing under the *Vegetation Management Act 1999*
- Waterway barrier works under the *Fisheries Act 1994*

This will not include environmental matters listed under the *Nature Conservation Act 1992*.

Although some environmental matters will become Accepted Development, assessment against the State guidelines has been completed for all relevant matters to measure the direct and indirect impacts for the Project. Determining a significant impact will help to focus future management plans in mitigating impacts during construction and operational stages of the Project.

A desktop and field assessment of the presence of MSES within the Project area and immediate surrounds identified the following as present within the project footprint (refer to Section 3):

- Mapped regulated vegetation.
- Protected wildlife habitat.
- Waterway providing for fish passage.
- Connectivity areas.

Table 6-1 presents the significant residual impact assessment of the MSES identified as present within the project footprint, in accordance with the SRI Guideline criteria, SDAP v2.6 and associated State codes. Assessment against the State code 16 is provided in Appendix E.

Table 6-1 MSES significant impact assessment for the Project

MSES present within the project footprint	SRI Guideline criteria (DSDIP 2014)	Significant impact assessment
<i>Regulated vegetation</i> ■ remnant vegetation within the defined distance of a watercourse identified on the vegetation management watercourses map;	■ An action is LIKELY to have a SRI on <u>remnant vegetation within the defined distance of a watercourse</u> if the action will result in: permanent removal of vegetation within the defined distance of a stream order 2 or higher where no rehabilitation is proposed.	Significant impact anticipated ■ It is unlikely that the Project will have a significant residual impact on <u>remnant vegetation within the defined distance of a watercourse</u> as the action will not remove vegetation within the defined distance of a stream order 2, build an online detention basin or permanently clear endangered or of concern RE.

MSES present within the project footprint	SRI Guideline criteria (DSDIP 2014)	Significant impact assessment
■ remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map; ■ essential habitat (EH) as identified on the essential habitat map.	building of an online detention basin greater than 1ha in size or other similar works that result in the clearing of vegetation which fragments up and downstream remnant areas on any stream order; OR permanent clearing of more than 0.5ha of an endangered or of concern RE, within the defined distance of a watercourse. ■ An action is LIKELY to have a SRI on <u>remnant vegetation intersecting with a wetland</u> if the action will result in: - clearing within the defining banks of a defined wetland area exceeding the thresholds specified in Table 2, SDAP Module 8 (Table 16.3.2, SDAP State code 16); - clearing involving the permanent removal of more than 25% of the vegetation located within 50m of the defining bank of a defined wetland; - clearing involving the permanent removal of more than 50% of the vegetation located between 50m and 100m of the defining bank of a defined wetland. ■ An action is LIKELY to have a SRI on <u>Essential habitat</u> if the action will result in: - clearing of Essential habitat exceeding the thresholds specified in Table 1, SDAP Module 8 (Table 16.3.1, SDAP State code 16), and resulting in a greater than 10% permanent reduction in the extent of EH mapped on site.	However, the Project is likely to clear 'least concern' RE of more than 1 ha on a stream order 1. There will be removal of vegetation from a heavily vegetated stream order 1 where revegetation will only occur where permanent infrastructure is not constructed.
Connectivity areas Areas of remnant vegetation outside urban areas containing prescribed regional ecosystems that are required for ecosystem functioning (a connectivity area)	■ In deciding if a SRI is likely to occur on a connectivity area, an administering agency (that is the State) must consider the significance of the vegetation in the context of the local and the regional landscape. The measure of impact significance is based on how the prescribed activity will change the size and	No significant impact anticipated To assess the extent of potential Project connectivity impacts, the DES 'landscape fragmentation and connectivity' tool is used. The tool determined that any impact on connectivity areas is not significant. It has defined that reduction in core remnant vegetation at the local scale is non-significant (0.95%) and that a change from core to non-core remnant vegetation at the site scale is also non-significant.

MSES present within the project footprint	SRI Guideline criteria (DSDIP 2014)	Significant impact assessment
	configuration of remnant vegetation areas and the level of fragmentation that will result at the local scale (5km radius) given regard to the regional scale (20km radius). Impact significance is measured by the reduction in the extent of remnant vegetation and increase in patchiness at the local scale.	
<i>Protected wildlife habitat</i> Wildlife habitat for endangered or vulnerable fauna	Assessed under relevant significant residual impact assessment criteria for prescribed activities assessable under SPA (refer to Section 6.1)	Significant impact anticipated The Project area contains mapped Essential habitat for the Wallum froglet and Koala. This area was field verified during the surveys in May 2021. Significant impact assessment against the relevant criteria is provided in Section 6.1.
<i>Waterway providing for fish passage</i> One moderate (amber) waterway for waterway barrier works traverses the northern portion of the Project area.	An action is LIKELY to have a SRI on a <u>waterway providing for fish passage</u> if the action will result in: - a permanent modification to the volume, depth, timing, duration, or flow frequency of the waterway; - 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; - the mortality or injury of fish species; OR - 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 significant impact anticipated The Project is not anticipated to have a significant residual impact on a <u>waterway providing for fish passage</u> as the Project will not permanently modify the volume, depth, timing, duration, or flow frequency of the waterway. The water feature onsite was ground-truthed as drainage features with poor aquatic habitat and limited evidence of channel. Any bank integrity likely scoured from overland flow from artificial waterbodies. Any infrastructure within the drainage features would be mitigated with culverts to retain fauna movement. Fish and aquatic species will be managed onsite during all construction works by an onsite suitably qualified person able to manage and relocate any animals within the project footprint. Any dewatering works undertaken during the Project will be managed under the appropriate permits.

6.1 Protected wildlife habitat

Section 4.1.2 identifies four threatened species with mapped and field verified habitat within the project footprint. These species include the Wallum froglet (*Crinia tinnula*), Greater glider (*Petauroides volans*), Koala (*Phascolarctos cinereus*) and Grey-headed flying fox (*Pteropus poliocephalus*). The Koala, Greater glider and Grey-headed flying fox has been assessed under the MNES significant impact guidelines (refer to Sections 5.2, 5.3 and 5.4). The Project was assessed as to have a likely

significant impact on the Greater glider and Grey-headed flying fox. The Project is unlikely to have a significant impact upon the Koala. Therefore, the species will also be assessed under the MSES significant residual impact criteria for Protected wildlife habitat as the species is also a State-based matter and the area is outside of the South-east Queensland planning area. Evidence of these species was not recorded within the project footprint or the surrounding area. However, suitable habitat for these species was confirmed within the project footprint during the field surveys in May 2021. Assessment of these species under the SRI Guideline criteria (DEHP 2014) has been completed in Table 6-2 and Table 6-3 below.

Table 6-2 MSES (Protected wildlife habitat) significant impact assessment for the project footprint as per EP Act: Wallum froglet (*Crinia tinnula*)

Criteria (DEHP 2014)	Assessment against significance criteria
An action is likely to have a significant impact on endangered and vulnerable wildlife if the impact on the habitat is likely to:	
Lead to a long-term decrease in the size of a local population	The Wallum froglet has not been recorded within the project footprint. The nearest recording is approximately 9 km to the East of the project footprint (WildNet). The species is known from Coastal Eastern Australia from Bundaberg to just south of Sydney. Preferred habitat includes wallum heathland, drainage lines and melaleuca forests with acidic waters. It prefers dense vegetation around waterways usually with an abundance of ferns (e.g. <i>Blechnum indicum</i>). The project footprint is within the northern portion of this species' distribution. The total Essential habitat for the Wallum froglet to be cleared is 4.76 ha. During clearing the frog species will be managed by onsite suitably qualified and experienced persons to minimise any impacts to individuals. With conditions addressed in the EMPI in place, it is unlikely that the Project will result in a decrease in the size of the local population.
Reduce the extent of occurrence	Wallum froglet is distributed from Bundaberg to just south of Sydney. The project footprint is within the northern portion of the species' distribution but not at the edge of the distribution. The project footprint is surrounded by areas of suitable habitat which will not be impacted. It is unlikely that the Wallum froglet will experience a reduction in the extent of occurrence for the species.
Fragment an existing population	The project footprint is surrounded by areas of suitable habitat for Wallum froglet which will not be impacted. The suitable habitat within the broader landscape scale is riparian melaleuca woodland associated with waterways and ephemeral swamps. The irregular flow of the unmapped waterway within the project footprint and its ability to act as Wallum froglet dispersal network will not be impacted throughout the Project. Currently the connectivity of the suitable habitat associated with the unmapped waterway is partially disrupted by the North Coast Rail Line and the Bruce Highway. Underpass for water and prostrate aquatic vegetation is present under both transport infrastructures allowing the species to periodically disperse between nearby populations. Therefore, the Project will not further fragment the population from existing populations.
Result in genetically distinct populations forming as a result of habitat isolation	Connectivity between populations within the broader area is through riparian vegetation associated with waterways. The irregular flow of the unmapped waterway within the project footprint and its ability to act as Wallum froglet dispersal network will not be impacted throughout the Project. Vegetated areas 20 m around the waterway will be retained where possible. Where infrastructure is proposed in these areas, fauna connectivity and movement will be retained. Currently the connectivity of the suitable habitat associated with the unmapped waterway is partially disrupted by the North Coast Rail Line and the Bruce Highway. Underpass for water and prostrate aquatic vegetation is present under both transport infrastructures allowing the species to periodically disperse between nearby populations. Therefore, the Project will not cause habitat isolation to occur which would result in genetically disjunct populations forming.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established	Two exotic flora species have been identified within the project footprint that are classed as Category 3 Restricted matters under the <i>Biosecurity Act 2014</i> which include Giant rat's tail grass (<i>Sporobolus fertilis</i>) and Lantana (<i>Lantana camara</i>). Lantana is known to inhabit areas of RE 12.3.6 but is not likely to reduce habitat value for Wallum froglet. The I(C) will manage all incoming vehicles, fill material and vegetation for rehabilitation purposes to ensure that no weed species that are

Criteria (DEHP 2014)	Assessment against significance criteria
in the endangered or vulnerable species' habitat	particularly harmful to swamp, wetland and riparian habitat suitable for Wallum froglet are introduced into the project footprint. The Cane toad (<i>Rhinella marina</i>) was identified within the project footprint in May 2021. The Cane toad is known to feed on smaller frog species and out compete local frog species. The species has already become established however, during construction stages invasive fauna will be managed by onsite suitably qualified personal in accordance with the relevant permits and tIEMP(C).
Introduce disease that may cause the population to decline	The EMP(C) will manage all incoming vehicles, fill material and vegetation for rehabilitation purposes to ensure that no foreign material, wetland vegetation or amphibian individuals that may carry chytrid fungus are introduced into the project footprint. All suitably qualified personnel holding the relevant permits to handle native wildlife will adhere to the <i>Hygiene protocols for the control of disease within Australian frogs</i> during all survey and fauna spotter catcher work throughout the life of the Project.
Interfere with the recovery of the species	The Wallum froglet is covered under the <i>National recovery plan for the Wallum sedge frog and other wallum-dependant frog species</i> (Meyer, 2006). This plan identifies the recovery objectives for the species which include; ■ To identify areas of habitat critical to the survival of wallum frog species more accurately ■ To protect habitat critical to wallum frog survival and important wallum frog populations from threatening processes ■ To rehabilitate degraded wallum frog habitat ■ To determine population trends in areas of disturbed, undisturbed, and rehabilitated habitat The project footprint contains melaleuca ephemeral swamp which is recognised as habitat critical to the survival of the species (Meyer, 2006). The removal of habitat critical survival of the species will interfere with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration, or resting sites)	The suitable habitat within the project footprint is likely to be used for foraging, breeding, and resting for the Wallum froglet. No Wallum froglet individuals were recorded within the field survey in May 2021. However ecological surveys following the <i>Terrestrial vertebrate fauna survey guidelines for Queensland</i> which are required to be undertaken to determine the presence of the Wallum froglet were not completed. Therefore, the precautionary principle is applied, and the presence of the species is assumed. The removal of 4.76 ha of Wallum froglet habitat for the Project will cause disruption to ecologically significant locations such as breeding, foraging, and resting habitat for the species.
Assessment of potential for significant residual impacts	It is determined that a significant residual Project impact is considered likely to occur to the Wallum froglet. The Project will result in the clearing of up to 4.76 ha of habitat critical to the survival of the species and it will cause disruption to ecologically significant locations such as breeding, foraging, and resting habitat for the species.

Table 6-3 MSES (Protected wildlife habitat) significant impact assessment for project footprint as per EP Act: Koala (*Phascolarctos cinereus*)

Criteria (DEHP 2014)	Assessment against significance criteria
An action is likely to have a significant impact on endangered and vulnerable wildlife if the impact on the habitat is likely to:	
Lead to a long-term decrease in the size of a local population of the species	The species was not identified as present (scats / scratches) within the project footprint. No nearby occurrences (not within 18km) have been recorded within the surrounding area. The species occurs but appears to occur in low densities in the wider area. Pre-clearance surveys will be carried out where suitable habitat for this species is identified within the project footprint. Provisions to protect Koalas will be included within the Project EMP(C). Individuals will remain undisturbed and allowed to leave

Criteria (DEHP 2014)	Assessment against significance criteria
	the project footprint of their own volition. All Koala management will be in accordance with the <i>Nature Conservation (Koala) Conservation Plan 2020</i>. There are no recognised important populations of the Koala. The Project will require clearing up to a total of 17.42 ha of suitable habitat for the species. The habitat removed is previously isolated by pine plantation and two major traffic corridors. It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of Koala.
Reduce the extent of occurrence of the species	The Project will require clearing up to 17.42 ha of suitable habitat for the species. It is uncertain to what extent the species occurs in the habitat within the project footprint (if at all). The suitable habitat within the project footprint is the southern edge of a larger area. There is abundant habitat on the opposite sides of the Bruce highway and North Coast Rail Line. The Project is considered unlikely to reduce the extent of occurrence of the species.
Fragment an existing population	The species appears to occur in low densities in the wider area. There are large patches of suitable habitat for the Koala adjacent to the north of the project footprint and on either side of the Bruce Highway and the North Coast Rail Line. The area to be cleared will not further separate or fragment existing patches of Koala habitat. Much of the project footprint is previously cleared paddocks with encroaching pine recruits. The Project is considered unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation	There are large patches of suitable habitat for the Koala adjacent to the north of the project footprint and on either side of the Bruce Highway and the North Coast Rail Line. The area to be cleared will not further separate or fragment existing patches of koala habitat. Much of the area to be cleared is previously cleared paddocks with encroaching pine recruits. The suitable habitat within the project footprint is the southern edge of a larger area. The Project is considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	There are no weed species identified as relevant to Koala. Feral predators are identified as a threat to the species (DSEWPaC 2012). No evidence of dingoes or wild dogs were recorded within the project footprint in the May 2021 field survey. The project footprint is already heavily impacted due to clearing of remnant vegetation. Invasive species will be managed under the EMP(C) created for the Project. The Project is considered unlikely to result in invasive species becoming established in this species' habitat.
Introduce disease that may cause the population to decline	The project footprint is already impacted due to clearing of woody vegetation. It is unlikely that the Project will contribute to the spread of diseases directly affecting Koala (i.e. Chlamydia). Vegetation movement will be managed under the Weed and Pest Management Plan to minimise the risk of spreading myrtle rust or <i>Phytophthora cinnamomi</i> and other diseases that may affect Koala habitat trees. The Project is considered unlikely to introduce disease that may cause the species to decline.

Criteria (DEHP 2014)	Assessment against significance criteria
Interfere with the recovery of the species	There is no State or Commonwealth recovery plan for Koala. The <i>EPBC Act referral guidelines for the vulnerable Koala</i> (DotE 2014a) notes the following actions that may substantially interfere with the recovery of the Koala in areas associated with critical habitat: ■ Increasing koala fatalities due to dog attacks to a level that is likely to result in multiple, ongoing mortalities ■ Increasing koala fatalities due to vehicle-strikes to a level that is likely to result in multiple, ongoing mortalities. ■ Facilitating the introduction or spread of disease or pathogens for example Chlamydia or <i>Phytophthora cinnamomi</i>, to habitat critical to the survival of the koala ■ Creating a barrier to movement that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala ■ Changing hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long-term With mitigation of potential Project impacts through measures incorporated within the Project Fauna Management Plan, any potential impact on Koala will be very minor and is considered unlikely to interfere substantially with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration, or resting sites) of a species	The removal of koala habitat within the project footprint will result in the removal of koala habitat trees defined under the <i>Koala Conservation (Koala) Conservation Plan 2020</i>. The removal of these koala habitat trees will result in the removal of feeding and resting sites for the Koala. Therefore, the Project will result in the disruption to ecologically significant locations such as feeding and resting sites for the species.
Assessment of potential for significant residual impacts	The Project will result in the removal of 17.42 ha of suitable habitat for the Koala. This habitat includes koala habitat trees which are ecologically significant feeding and resting locations for the species. Therefore, the Project is considered likely to have a significant residual impact on the species.

7 Conclusion

The project footprint provides ecological values associated with remnant vegetation, wetland vegetation and suitable habitat for threatened species and other wildlife.

During the field investigations in May 2021, the vegetative and habitat features were assessed and showed patches of remnant vegetation with complex habitat structure including mature and frequent hollows. The remnant vegetation includes eucalypt woodland and eucalypt wetland vegetation. Large patches to the south of non-remnant vegetation consist of a dominated pine canopy with associated eucalypts and wattles. Fields of maintained lawn grasses and herbs were also present due to the history of cattle use. The project footprint did not support defined drainage features and were likely resulting from overland flow from artificial waterbodies.

The Project will remove areas of regulated vegetation and essential habitat for the Greater glider (listed as Endangered under the EPBC Act and NC Act), the Koala (listed as Endangered under the EPBC Act and NC Act), the Grey-headed flying fox (listed as Vulnerable under the EPBC Act) and the Wallum froglet (Listed as Vulnerable under the NC Act). Assessment under the MNES Guidelines determined that a significant impact is likely for the Greater glider and Grey-headed flying fox. Assessment under the State Guidelines determined that a significant residual impact is anticipated for the Koala and the Wallum froglet. Significant Residual Impacts may vary dependant on the total vegetation removed within the project footprint.

Approximately up to 4.76 ha of the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC and 17.42 ha of Greater glider and Grey-headed flying fox habitat (inclusive of the 4.76 ha of TEC) is proposed to be removed as part of the Proposed Action. Upon contract award a design will be selected which may vary the spatial extent and location of the model disturbance footprint, however this maximum quantum of area to be removed will not be exceeded. In consideration of EPBC Act Significant impact guidelines 1.1, the Proposed Action will result in reduction to the extent of an ecological community and fragmentation, ultimately resulting in a likely significant impact to the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC and habitat for the Greater glider and Grey-headed flying fox.

Koala habitat within the project footprint is not considered to constitute habitat critical to the survival of the Koala, as per the definitions listed in the conservation advice for the species (DAWE 2022). As the site does not support critical Koala habitat, and providing that the works will not interfere substantially with the recovery of the Koala through the introduction or exacerbation of key threats in adjacent areas of potential critical Koala habitat, a EPBC Act referral for potential impacts to the Koala within the project footprint is considered unlikely to be required.

To ensure that the Project will not interfere substantially with the recovery of the Koala through the introduction or exacerbation of key threats into adjacent areas of potential critical Koala habitat, Project measures must be put in place to ensure the works will not:

- Increase koala fatalities due to dog attacks to a level that is likely to result in multiple, ongoing mortalities.
- Increase koala fatalities due to vehicle-strikes to a level that is likely to result in multiple, ongoing mortalities.
- Facilitate the introduction or spread of disease or pathogens that are likely to significantly reduce the reproductive output of koalas or reduce the carrying capacity of the habitat.
- Create a barrier to movement to, between or within habitat critical to the survival of the koala that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala.

- Change hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long-term.

It is recommended that a High Risk SMP would be required due to the presence of potential animal breeding places for threatened and Special Least Concern species (i.e. the threatened Wallum froglet).

8 References

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Appendix A

Database search results



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: 17-Feb-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

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

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Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	33
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

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

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

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

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

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Great sandy strait (including great sandy strait, tin can bay and tin can inlet)	10 - 20km upstream from Ramsar site	In buffer area only

Listed Threatened Ecological Communities	[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps. Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.	

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In feature area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area	In feature area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species			[<u>Resource Information</u>]
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			
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area	In feature area
Erythroriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Acacia attenuata [10690]	Vulnerable	Species or species habitat may occur within area	In feature area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat may occur within area	In feature area
Cossinia australiana Cossinia [3066]	Endangered	Species or species habitat likely to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area	In feature area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Fontainea venosa [24040]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Macrozamia lomandroides cycad [55406]	Endangered	Species or species habitat may occur within area	In feature area
Macrozamia pauli-guilielmi Pineapple Zamia [5712]	Endangered	Species or species habitat likely to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area	In feature area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area

REPTILE			
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat may occur within area	In feature area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		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 may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species	[Resource Information]		
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely 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 likely 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area overfly marine area	In feature area

Reptile
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]
Species or species habitat likely to occur within area
In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Burrum	Fish Habitat Area (B)	QLD	In buffer area only

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Controlled action					
Raising of Lenthalls Dam, Doongal Creek	2004/1716	Controlled Action	Post-Approval	In buffer area only	
Not controlled action					
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area	

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest
Lot: 35 Plan: SP326250

Environmental Reports - General Information

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

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

Figures in tables may be affected by rounding.

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

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

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

Disclaimer

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



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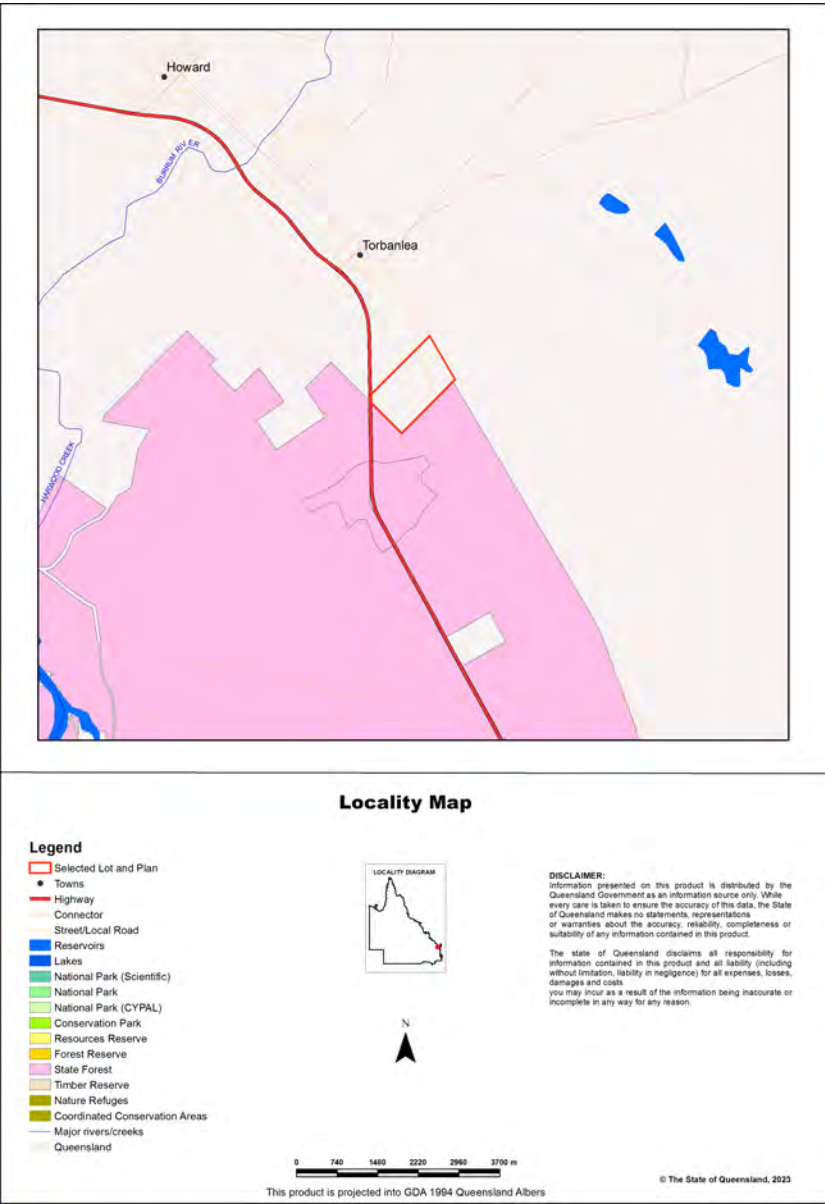
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Assessment Area Details

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

Table 1: Summary table, details for AOI Lot: 35 Plan: SP326250

Size (ha)	132.74
Local Government(s)	Fraser Coast Regional
Bioregion(s)	Southeast Queensland
Subregion(s)	Burnett - Curtis Coastal Lowlands
Catchment(s)	Burrum



Matters of State Environmental Significance (MSES)

MSES Categories

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

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

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

The SPP defines matters of state environmental significance as:

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

MSES Values Present

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

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	32.53 ha	24.5%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
7d Sea turtle nesting areas	0.0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	0.0 ha	0.0 %
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.0 ha	0.0 %
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.41 ha	0.3%
8d Regulated Vegetation - Essential habitat	32.53 ha	24.5%
8e Regulated Vegetation - intersecting a watercourse	1.6 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	51.85 ha	39.1%
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

1c. Protected Areas - special wildlife reserves

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

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

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

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

(no results)

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

(no results)

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

(no results)

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

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

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

Not applicable

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

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

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

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

Threatened (endangered or vulnerable) wildlife species records

(no results)

Special least concern animal species records

(no results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

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

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

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

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

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

MSES - Regulated Vegetation

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

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

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

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

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

Not applicable

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

Not applicable

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

Regulated vegetation map category	Map number
R	9447

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

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

Regulated vegetation map category	Map number
B	9447
C	9447
R	9447

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

MSES - Offsets

9a. Legally secured offset areas - offset register areas

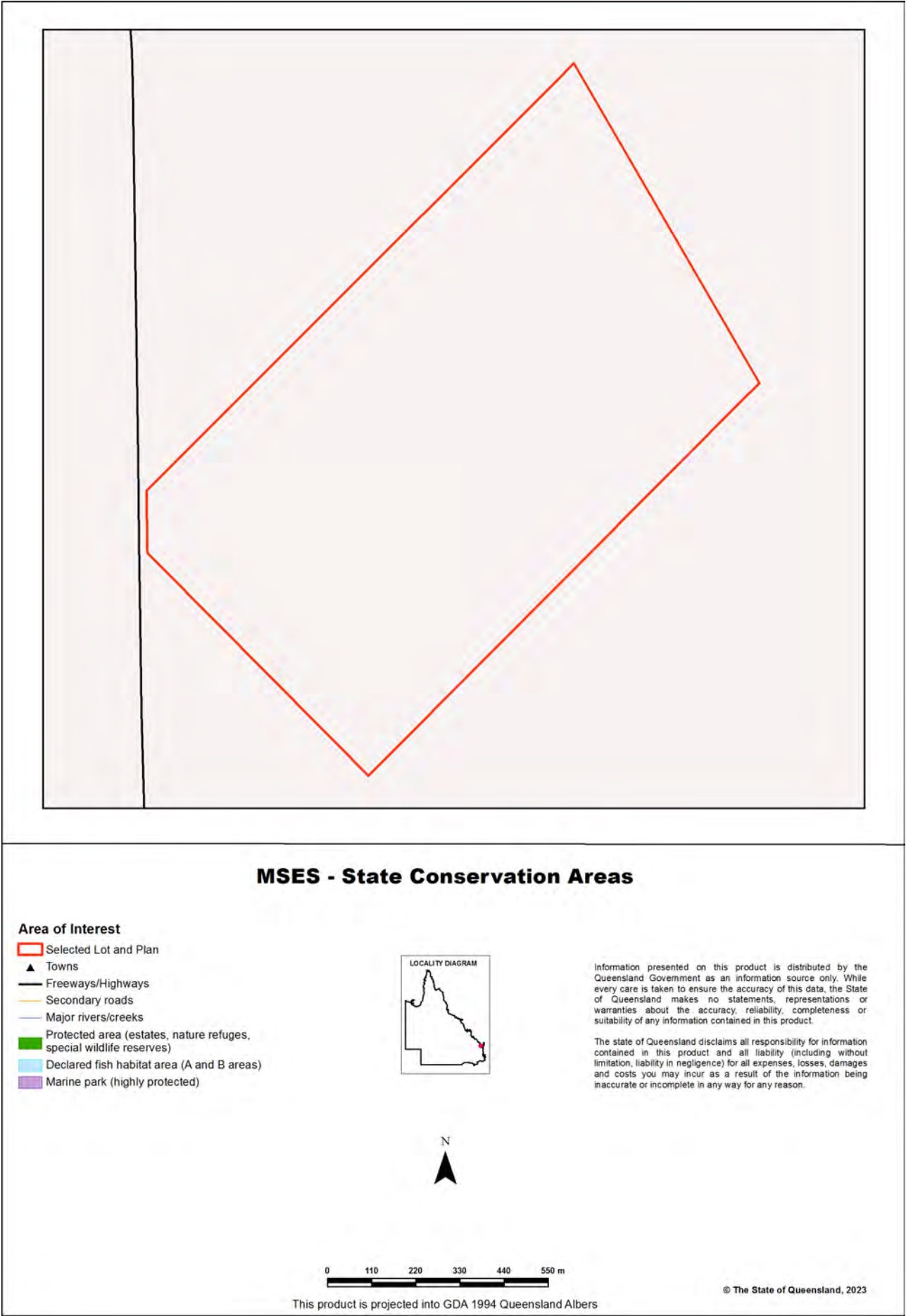
(no results)

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

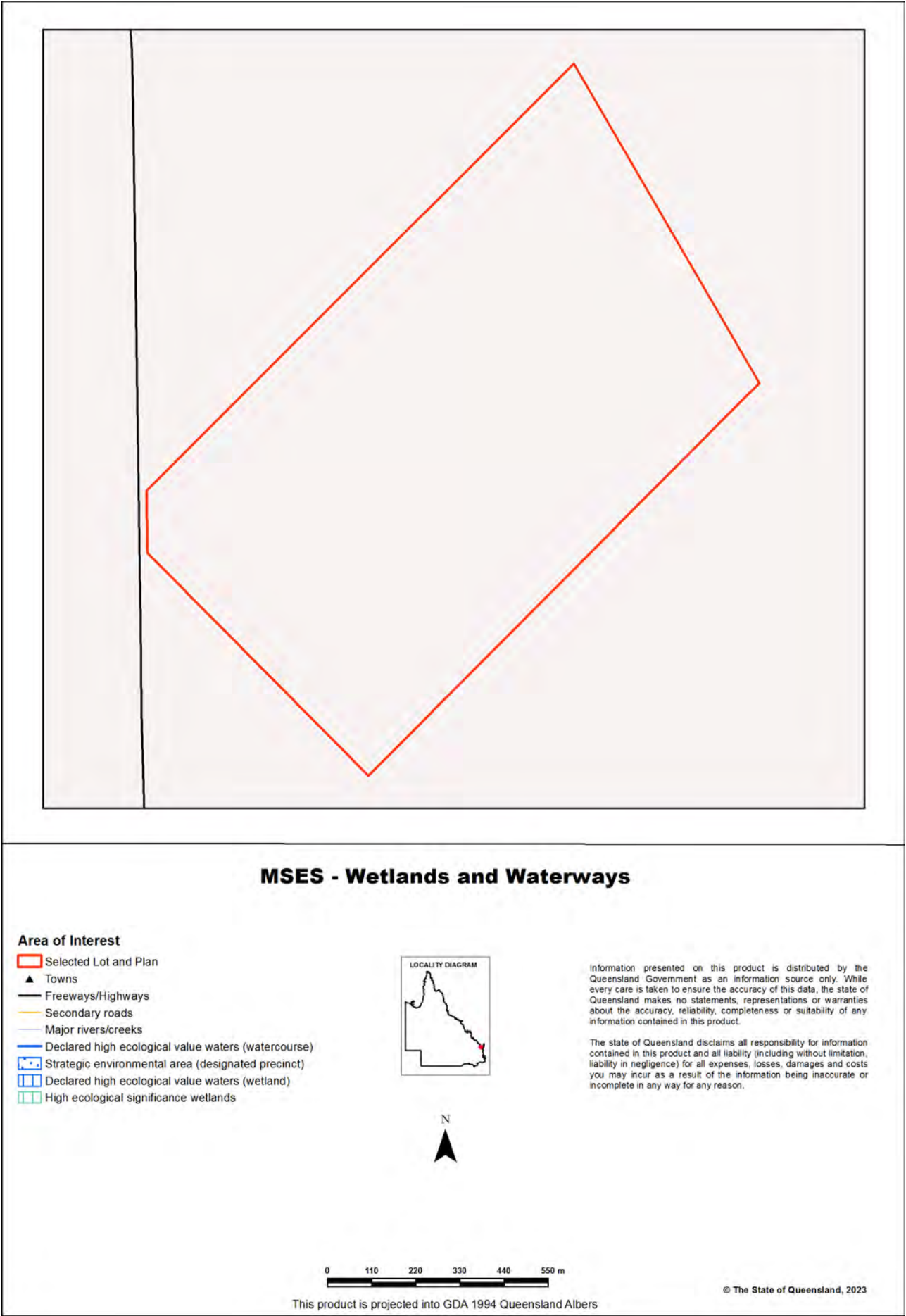
(no results)

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

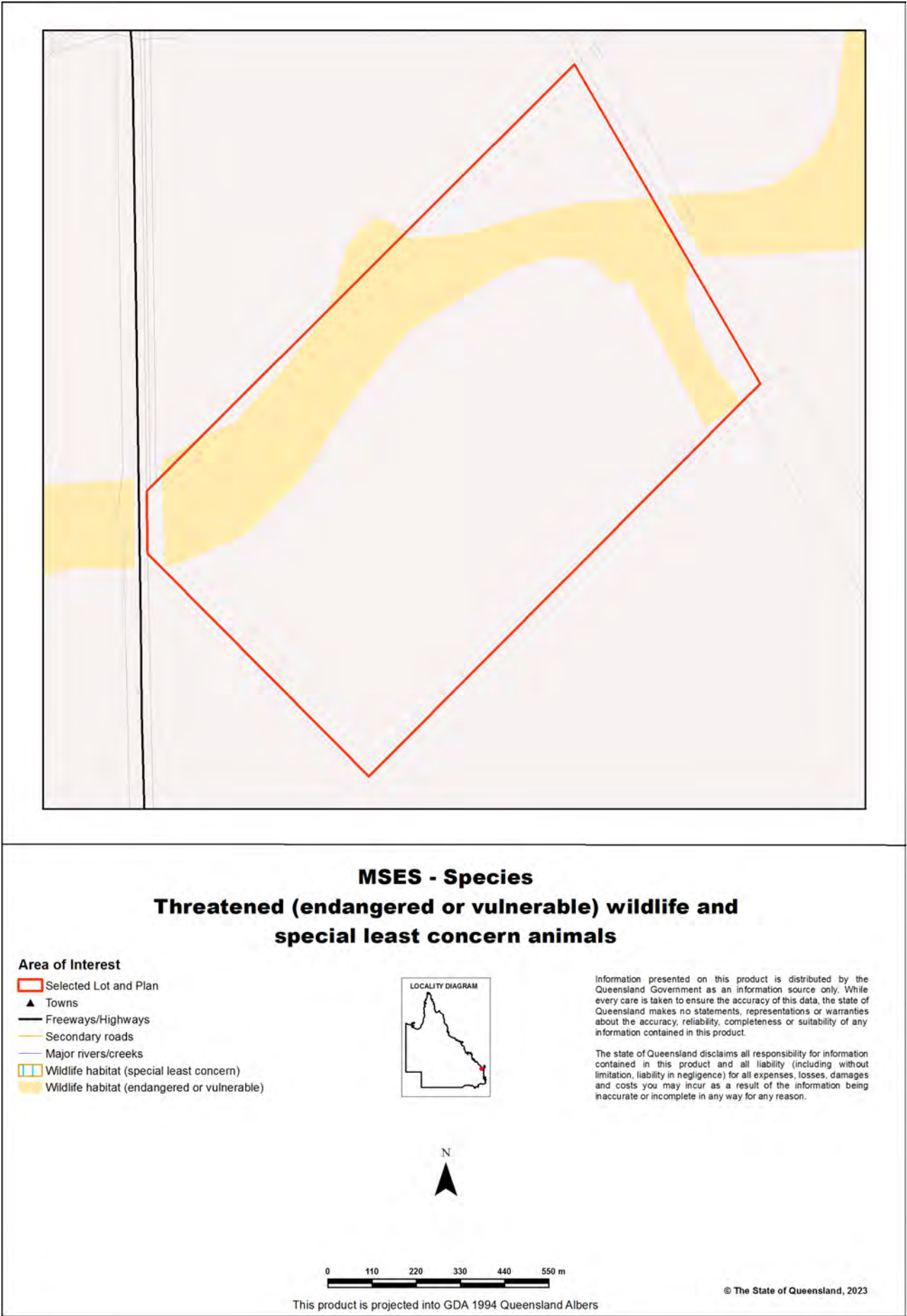
Map 1 - MSES - State Conservation Areas



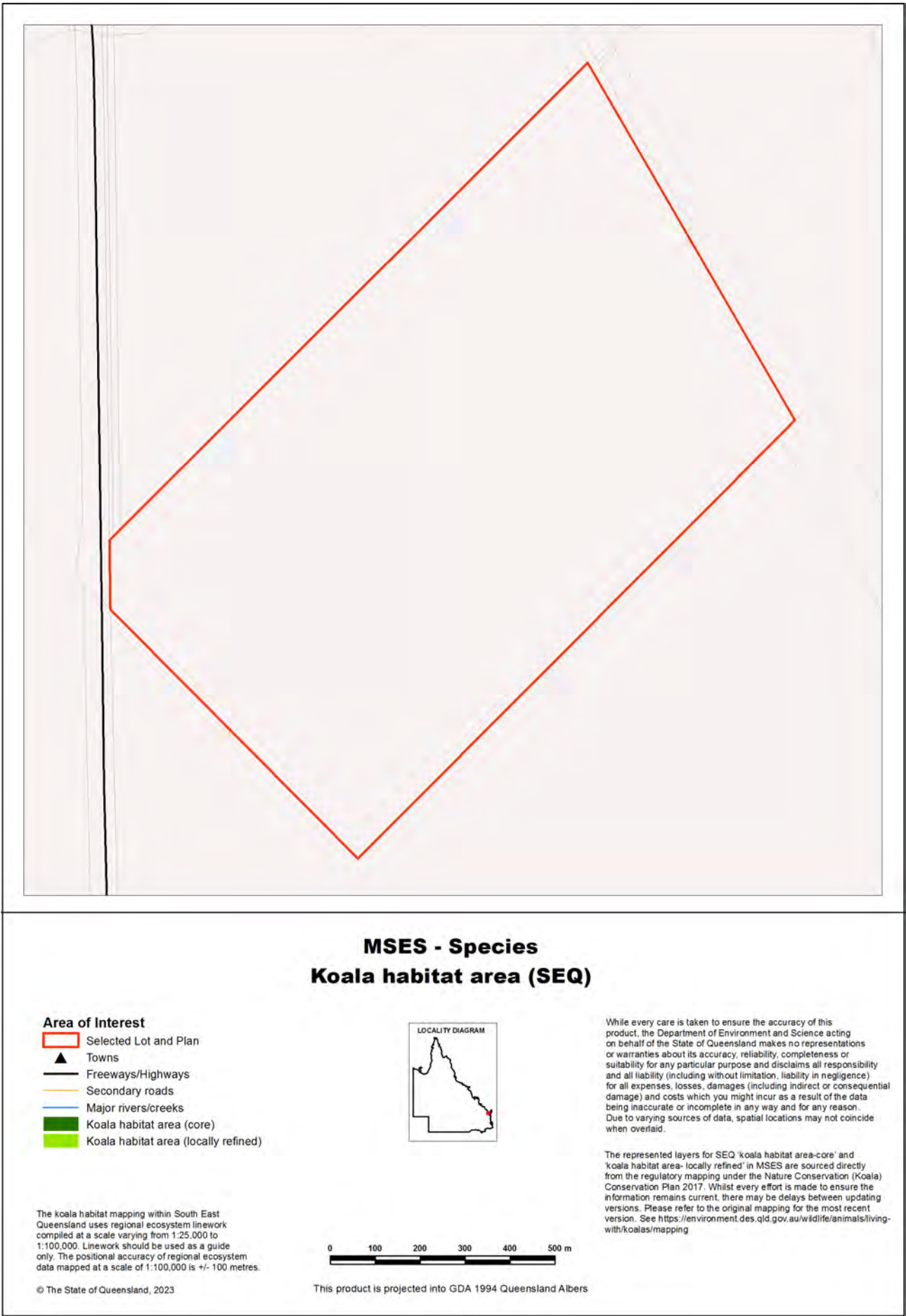
Map 2 - MSES - Wetlands and Waterways



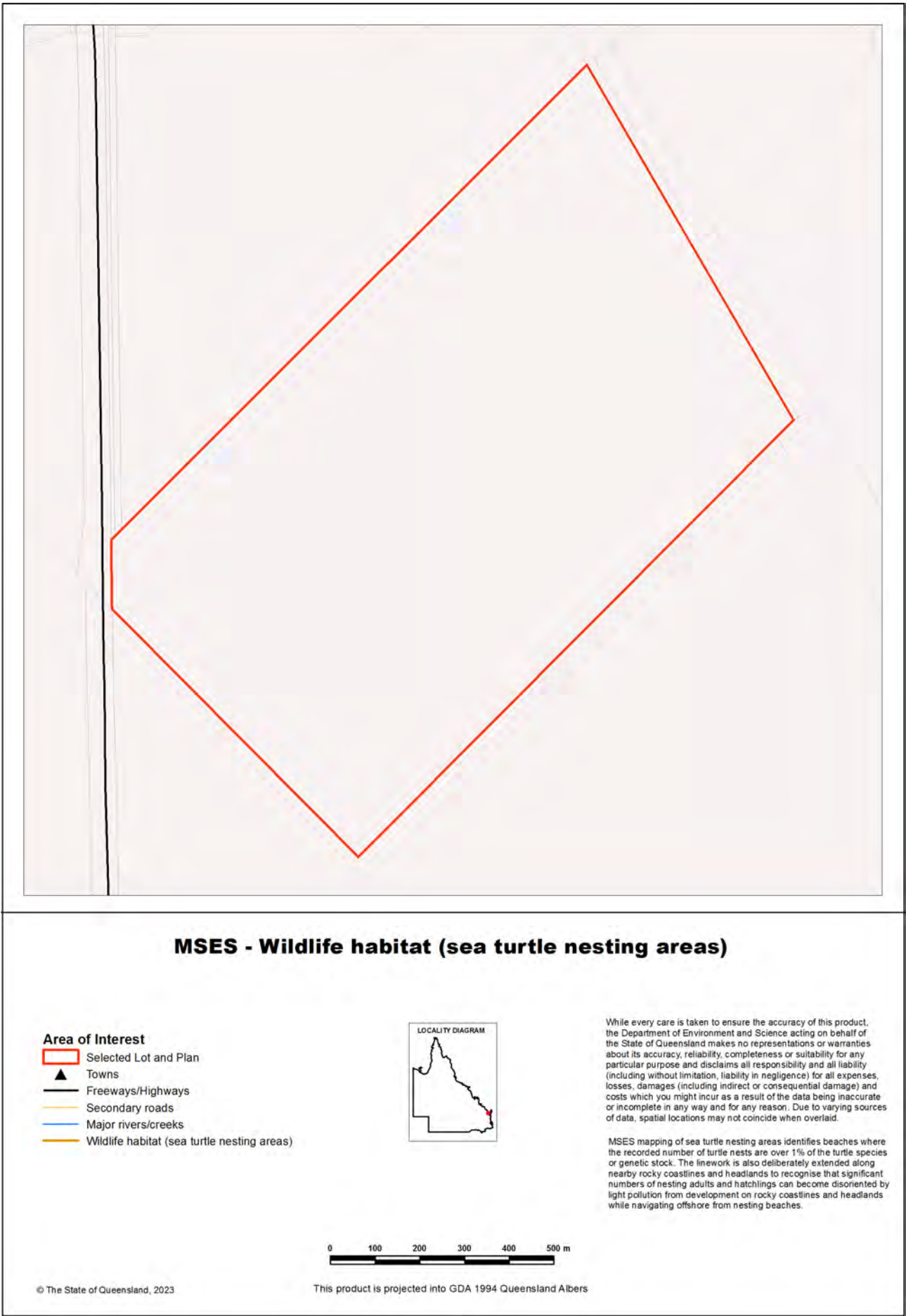
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



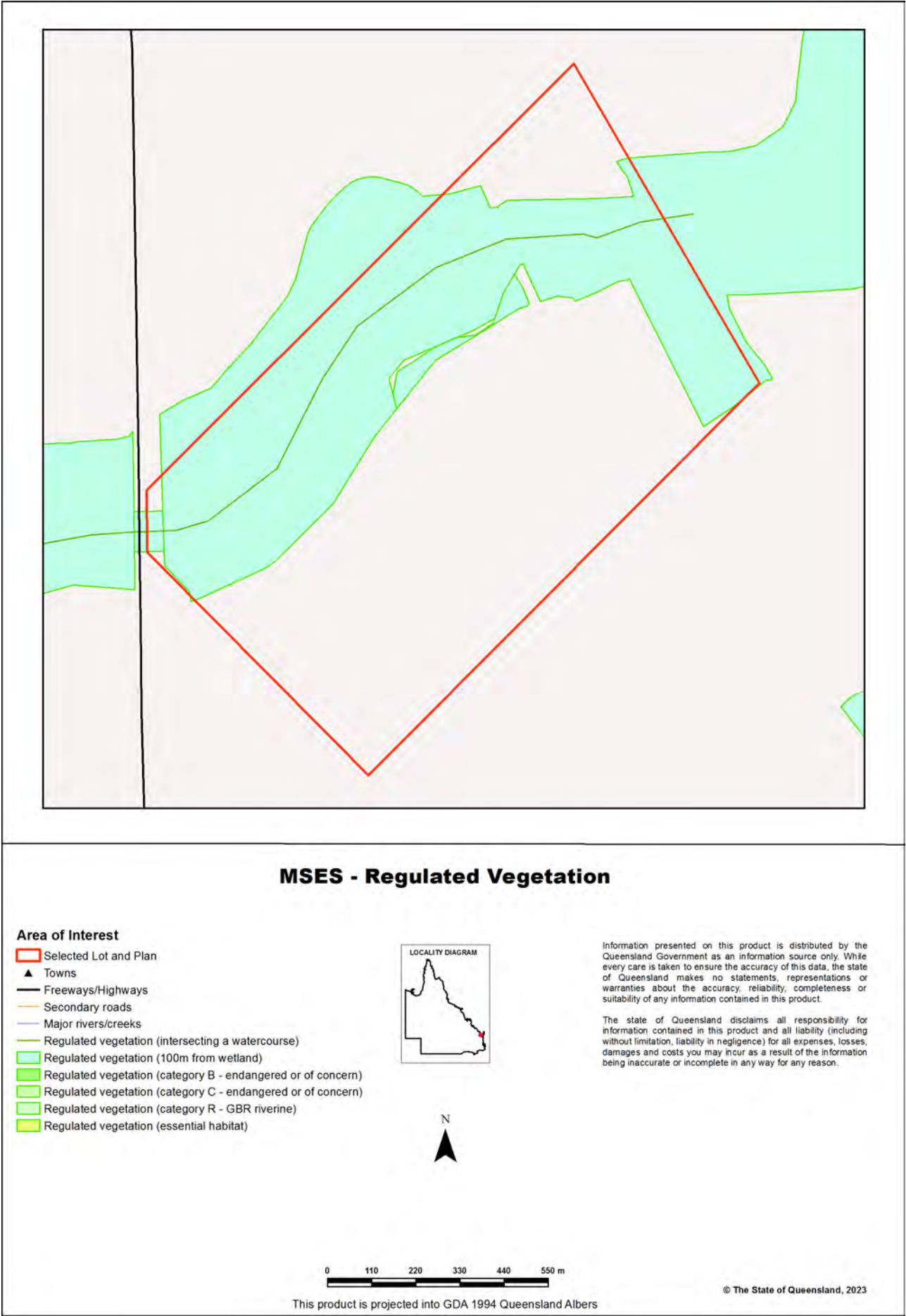
Map 3b - MSES - Species - Koala habitat area (SEQ)



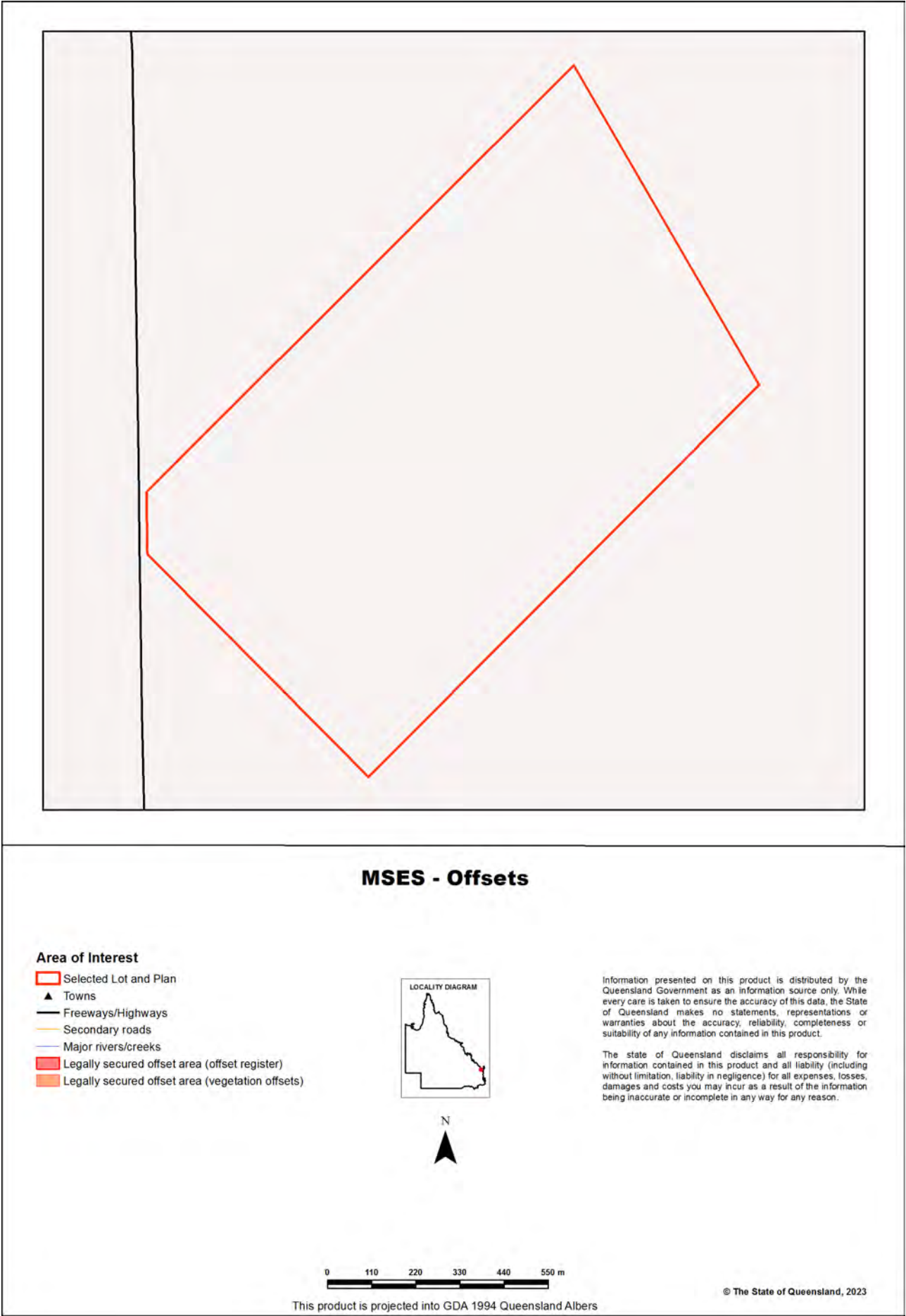
Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

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

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

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

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

Appendix 2 - Source Data

The datasets listed below are available on request from:

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

- Matters of State environmental significance

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

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

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

Appendix 3 - Acronyms and Abbreviations

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



Queensland Government

Department of Environment and Science

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
Custom Geometry

Environmental Reports - General Information

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

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

Figures in tables may be affected by rounding.

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

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

Important Note to User

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

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

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

Disclaimer

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



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Summary Information

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

Table 1: Area of interest details: Custom Geometry

Size (ha)	1,295.46
Local Government(s)	Fraser Coast Regional
Bioregion(s)	Southeast Queensland
Subregion(s)	Burnett - Curtis Coastal Lowlands
Catchment(s)	Burrum

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

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.0	0.0
Of concern	25.35	1.96
No concern at present	646.99	49.94
Total remnant vegetation	672.34	51.9

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

Regional Ecosystems

1. Introduction

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

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

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

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

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

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

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

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

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

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

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

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

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

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

2. Remnant Regional Ecosystems

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

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

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
12.3.11	Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast	Of concern	25.35	1.96
12.3.6	Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest on coastal alluvial plains	No concern at present	137.87	10.64
12.5.4	Eucalyptus latissinensis +/- Corymbia intermedia, C. trachyphloia subsp. trachyphloia, Angophora leiocarpa, Eucalyptus exserta woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments	No concern at present	507.52	39.18
12.5.7	Corymbia citriodora subsp. variegata +/- Eucalyptus portuensis or E. acmenoides, E. fibrosa subsp. fibrosa open forest on remnant Tertiary surfaces. Usually deep red soils	No concern at present	1.6	0.12
non-remnant	None	None	332.25	25.65
plantation	None	None	290.87	22.45

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

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

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

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
12.3.11	Pre-clearing 164000 ha; Remnant 2019 41000 ha	16c	Contains Palustrine	Low
12.3.6	Pre-clearing 31000 ha; Remnant 2019 12000 ha	22a	Palustrine	Medium
12.5.4	Pre-clearing 207000 ha; Remnant 2019 100000 ha	9g	Contains Palustrine	Medium

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
12.5.7	Pre-clearing 63000 ha; Remnant 2019 30000 ha	10b	Not a Wetland	Low
non-remnant	None	None	None	None
plantation	None	None	None	None

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

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

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

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

Regional Ecosystem	Special Values
12.3.11	Potential habitat for NCA listed species: <i>Acronychia littoralis</i> , <i>Alectryon ramiflorus</i> , <i>Arthraxon hispidus</i> , <i>Cupaniopsis shirleyana</i> , <i>Eulophia bicallosa</i> , <i>Gossia gonoclada</i> , <i>Macrozamia lomandroides</i> , <i>Macrozamia pauli-guilielmi</i> , <i>Marsdenia coronata</i> , <i>Maundia triglochinos</i> . This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.3.11a: Habitat for threatened fauna species including the Black-breasted Button-quail <i>Turnix melanogaster</i> (Aridis, Melzer and Hamley, 1998). This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.3.11b: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).
12.3.6	Habitat for threatened fauna species including the wallum froglet <i>Crinia tinnula</i> . This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).
12.5.4	Habitat for threatened plant species including <i>Macrozamia lomandroides</i> and near threatened species including <i>Melaleuca cheelii</i> . This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.5.4a: Habitat for threatened plant species including <i>Macrozamia lomandroides</i> , <i>Germainia capitata</i> and near threatened species including <i>Melaleuca cheelii</i> . This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).
12.5.7	Potential habitat for NCA listed species: <i>Eulophia bicallosa</i> , <i>Macrozamia pauli-guilielmi</i> . This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.5.7b: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.5.7c: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).
non-remnant	None
plantation	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

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

A comprehensive description of BVGs is available at:

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

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

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

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	623.12	48.1
10b	Moist open forests to woodlands dominated by <i>Corymbia citriodora</i> (spotted gum). (land zones 12, 11, 9, 5, 8) (SEQ, CQC, EIU, WET)	1.6	0.12
16c	Woodlands and open woodlands dominated by <i>Eucalyptus coolabah</i> (coolabah) or <i>E. microtheca</i> (coolabah) or <i>E. largiflorens</i> (black box) or <i>E. tereticornis</i> (blue gum) or <i>E. chlorophylla</i> on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	25.35	1.96
22a	Open forests and woodlands dominated by <i>Melaleuca quinquenervia</i> (swamp paperbark) in seasonally inundated lowland coastal areas and swamps. (land zones 3, 2, 1, [11]) (SEQ, WET, CQC, CYP, [BRB])	137.87	10.64
9g	Moist woodlands dominated by <i>Eucalyptus tindaliae</i> (Queensland white stringybark) or <i>E. racemosa</i> or <i>E. tereticornis</i> (blue gum) and <i>Corymbia intermedia</i> (pink bloodwood) on remnant Tertiary surfaces. (land zone 5) (SEQ)	507.52	39.18

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

4. Technical and BioCondition Benchmark Descriptions

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

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

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

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

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

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

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

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

Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the

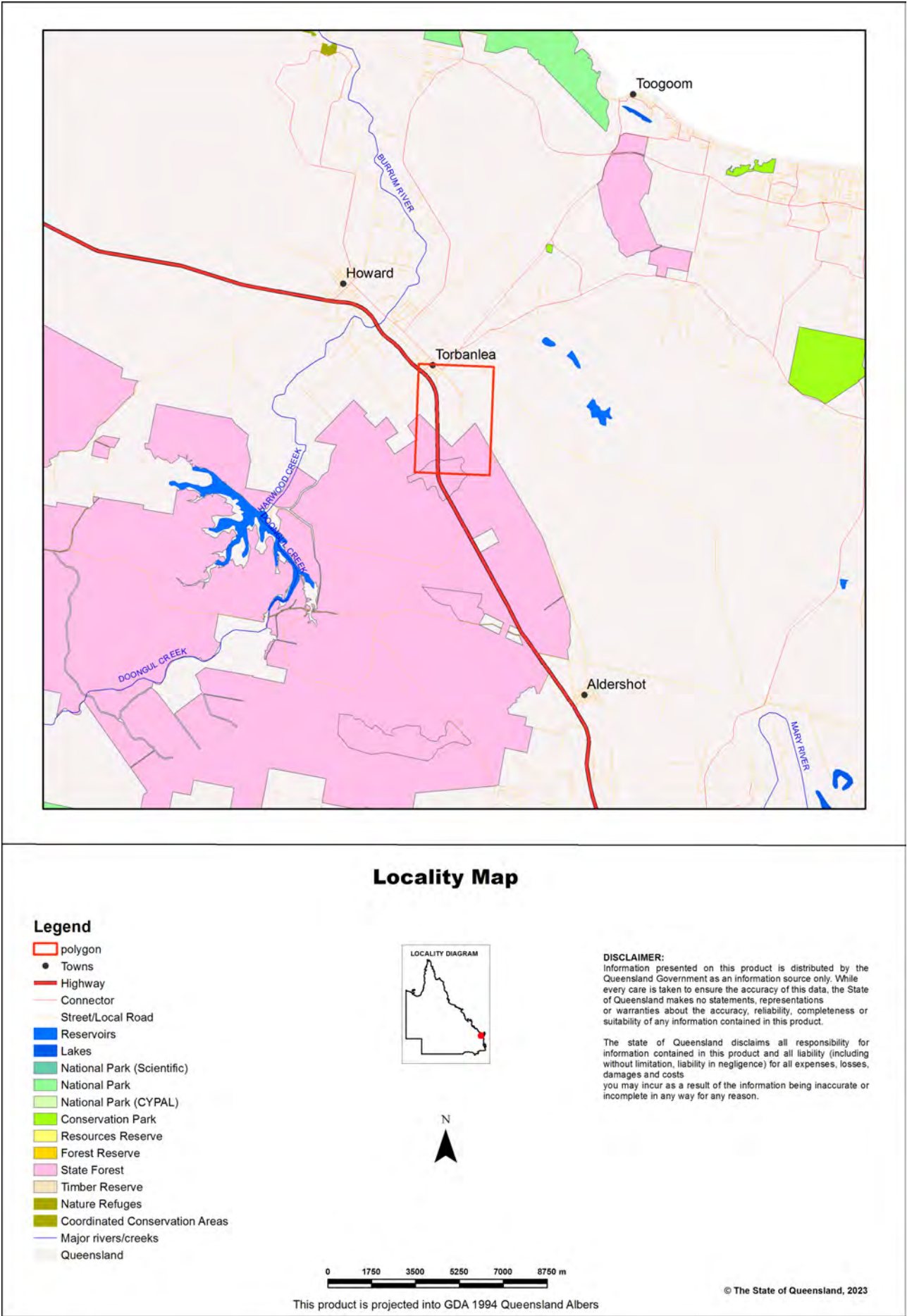
geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

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

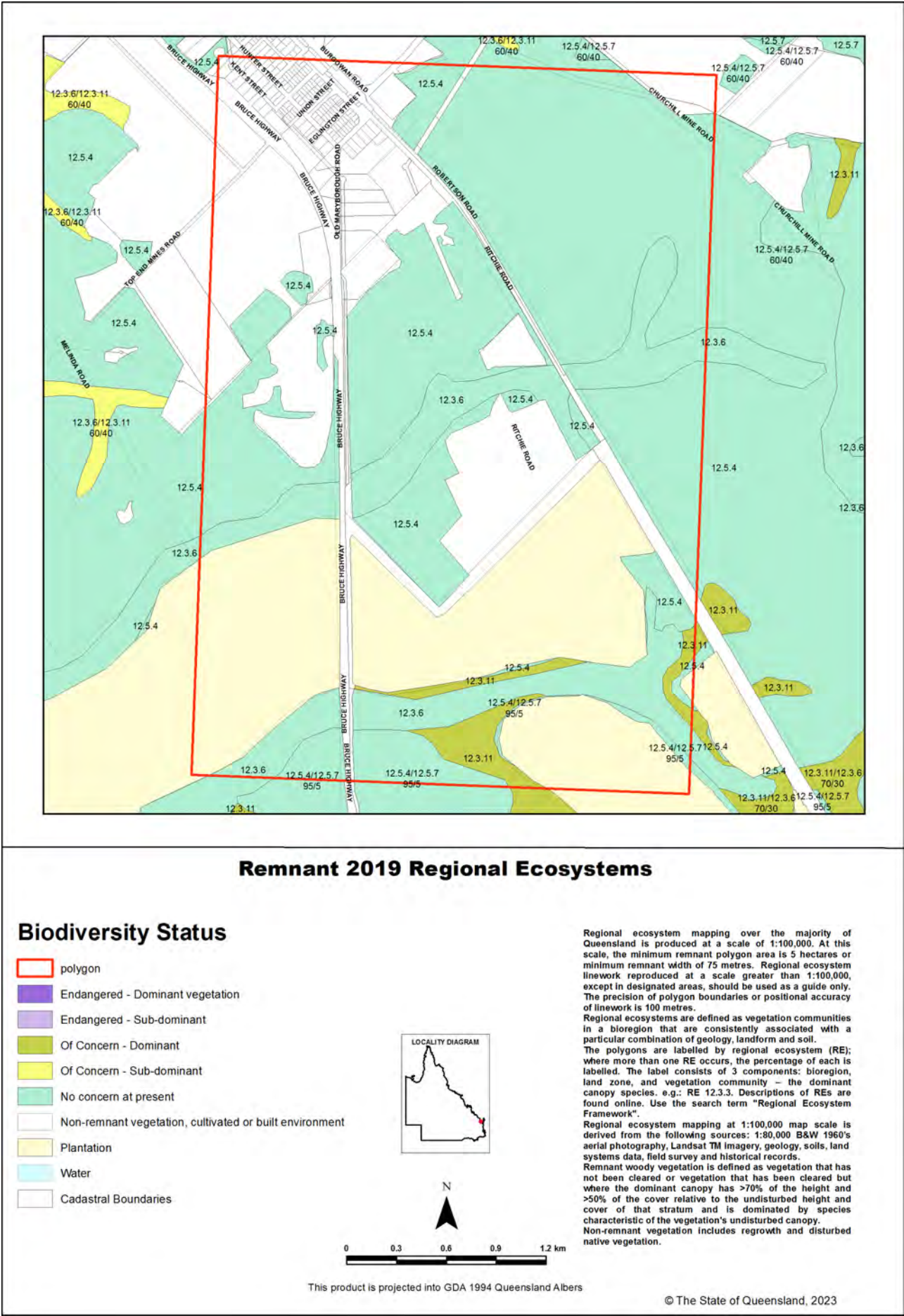
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
12.3.11	Available	Available
12.3.6	Available	Available
12.5.4	Available	Available
12.5.7	Available	Available
non-remnant	Not currently available	Not currently available
plantation	Not currently available	Not currently available

Maps

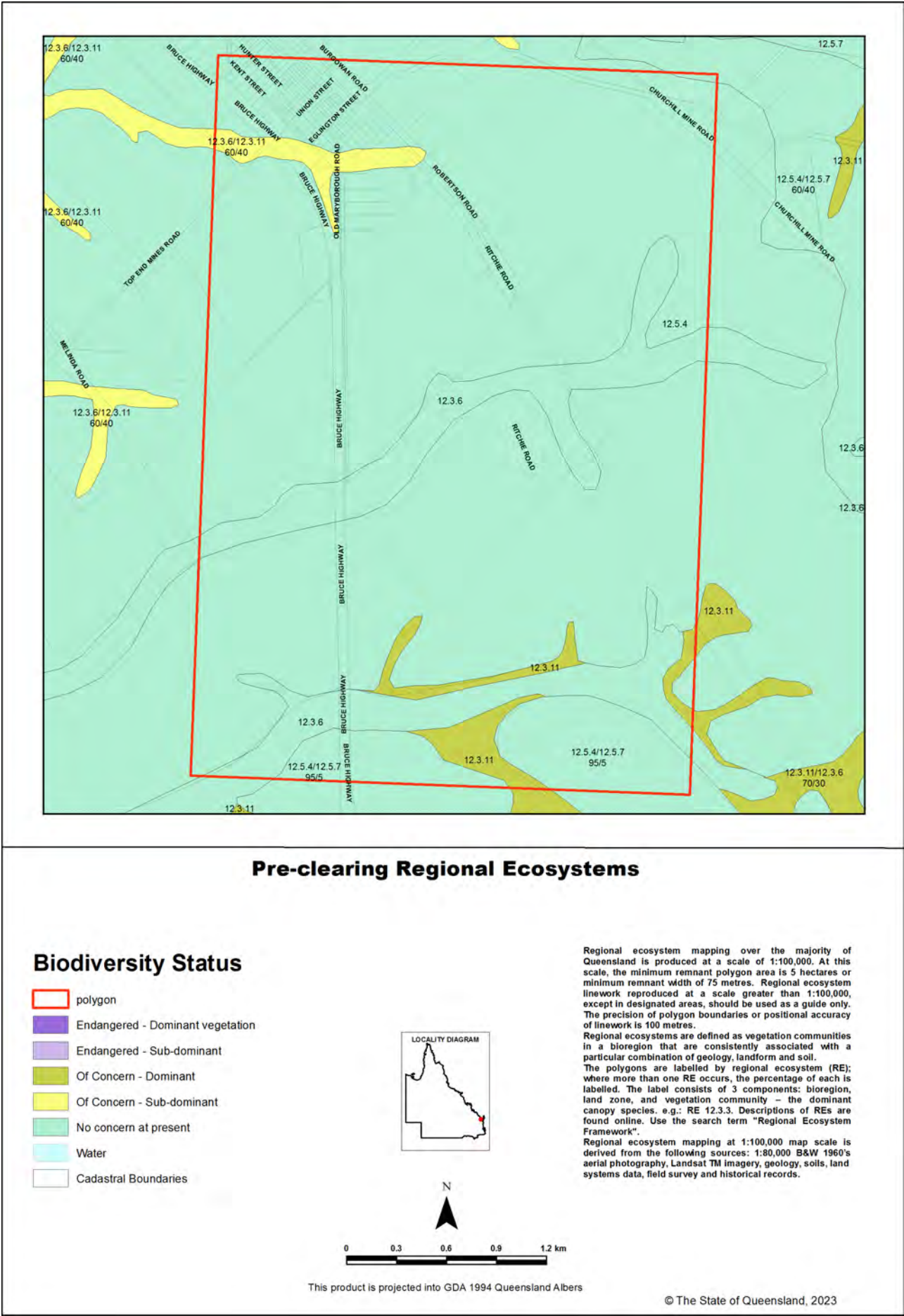
Map 1 - Location



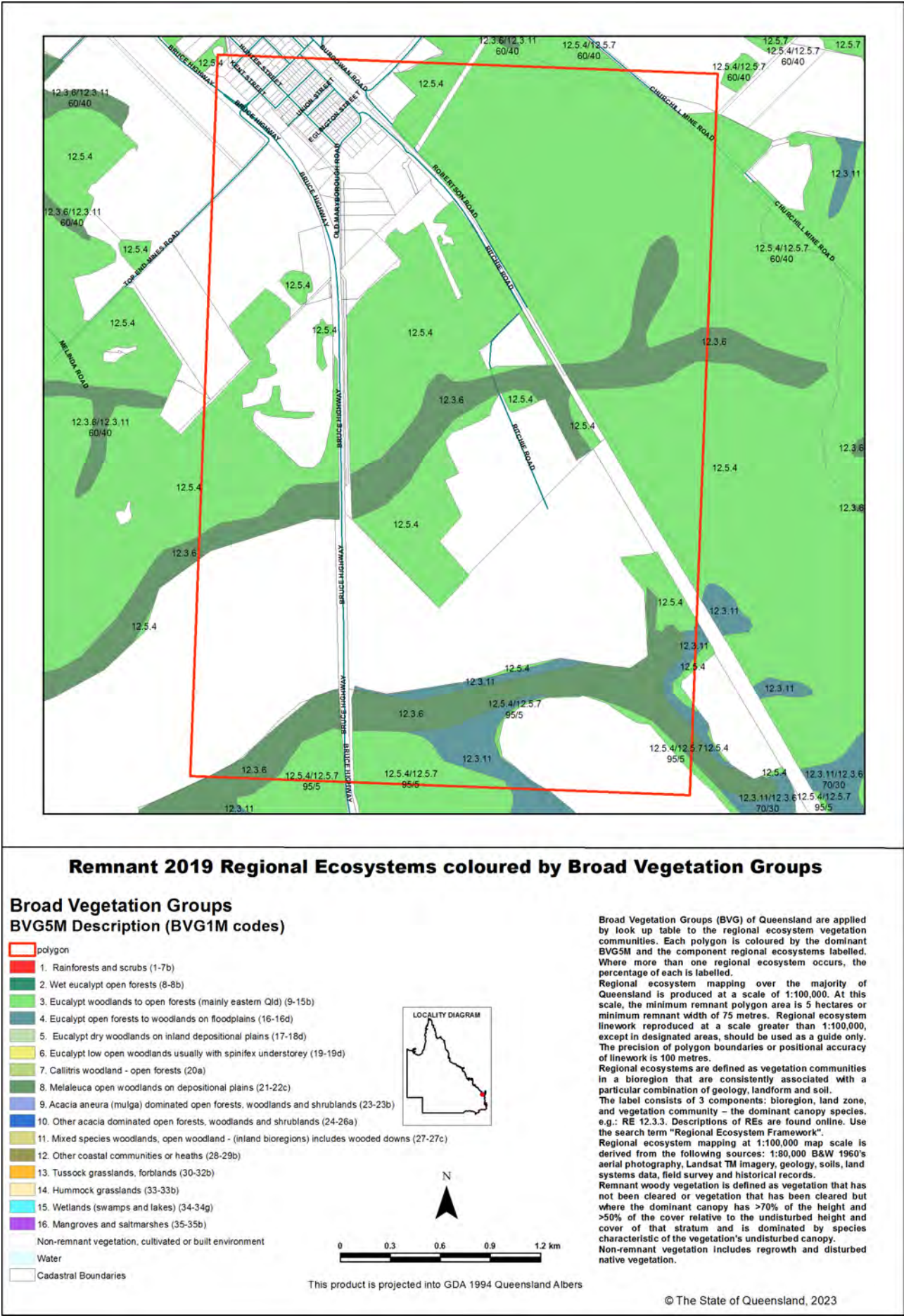
Map 2 - Remnant 2019 regional ecosystems



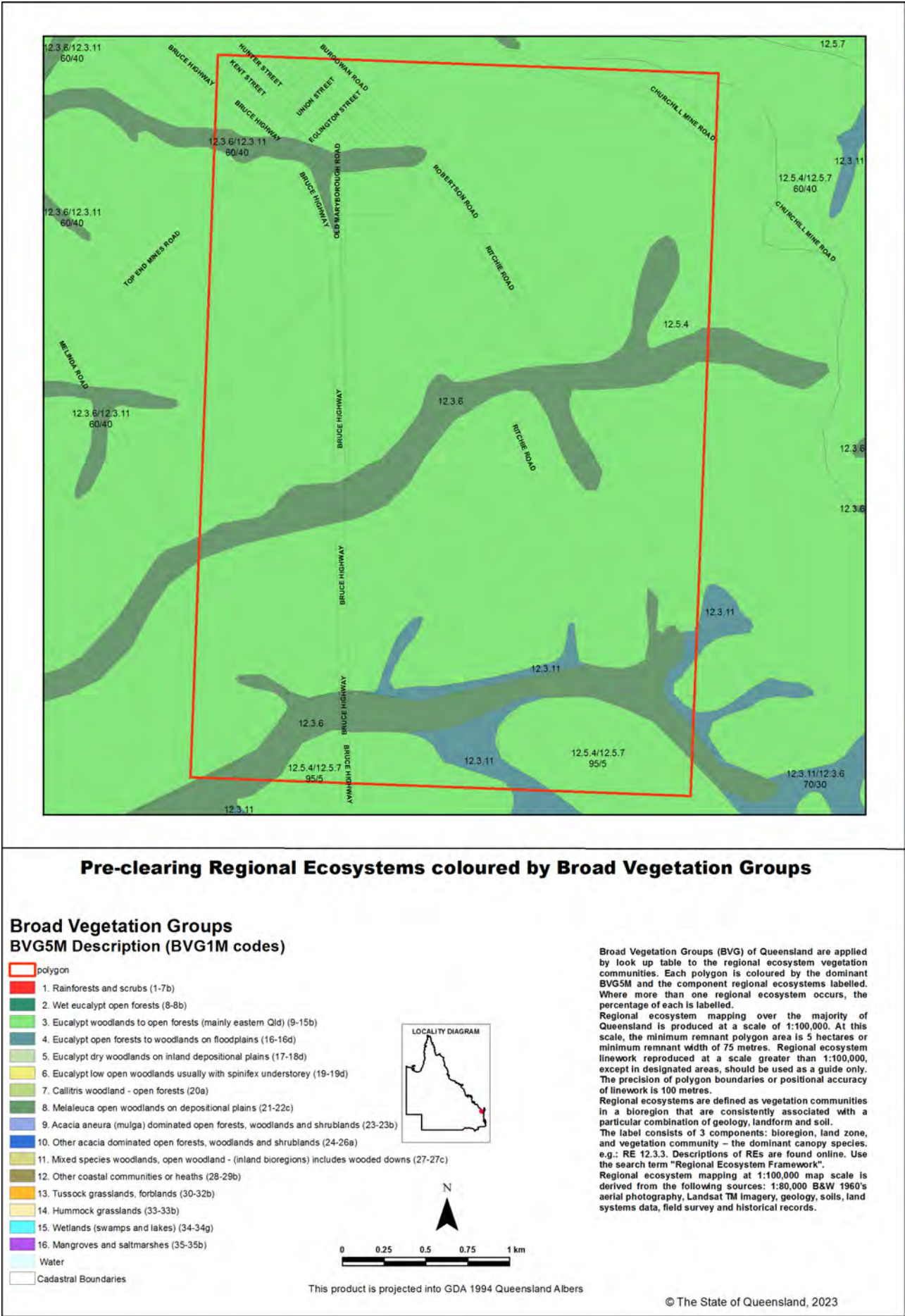
Map 3 - Pre-clearing regional ecosystems



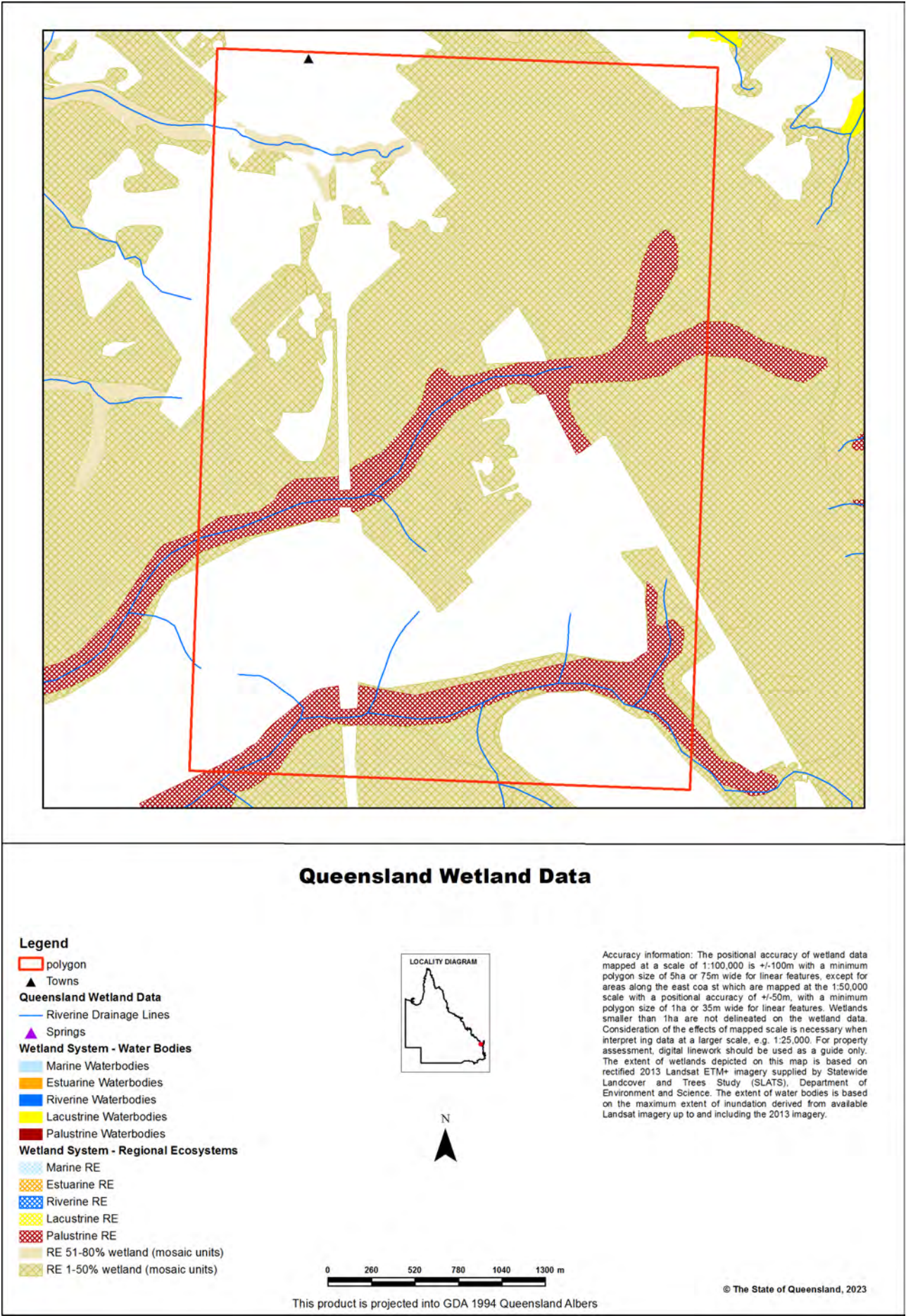
Map 4 - Remnant 2019 regional ecosystems by BVG (5M)



Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of Environment and Science's Website -

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

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

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

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

The methodology for mapping regional ecosystems can be downloaded from:

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

Technical descriptions for regional ecosystems can be obtained from:

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

Benchmarks can be obtained from:

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

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

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

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

<https://qldglobe.information.qld.gov.au/>

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

<https://publications.qld.gov.au/dataset/redd/resource/78209e74-c7f2-4589-90c1-c33188359086>

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

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

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

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

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

- Regional Ecosystem Description Database

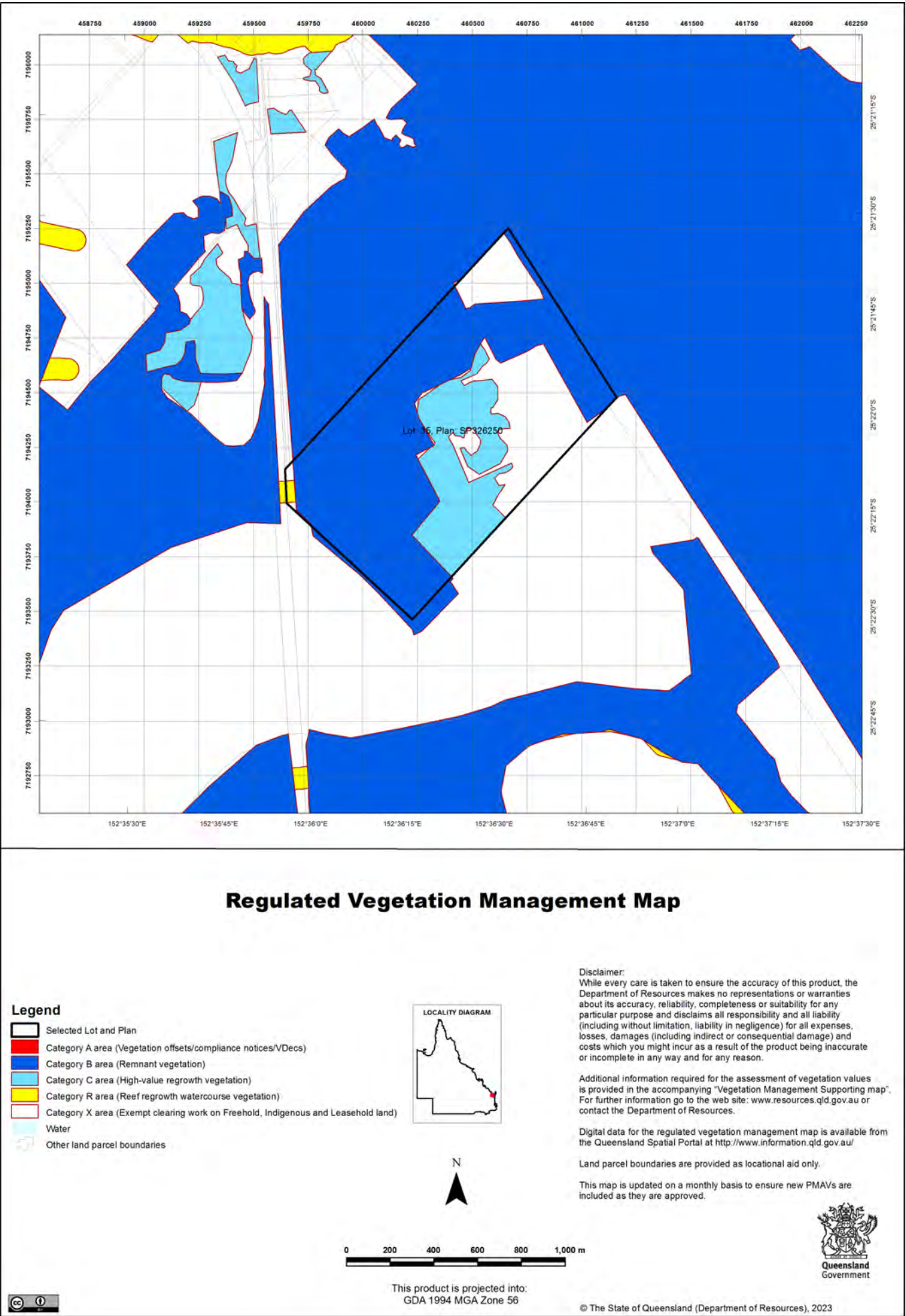
The datasets listed below are available for download from:

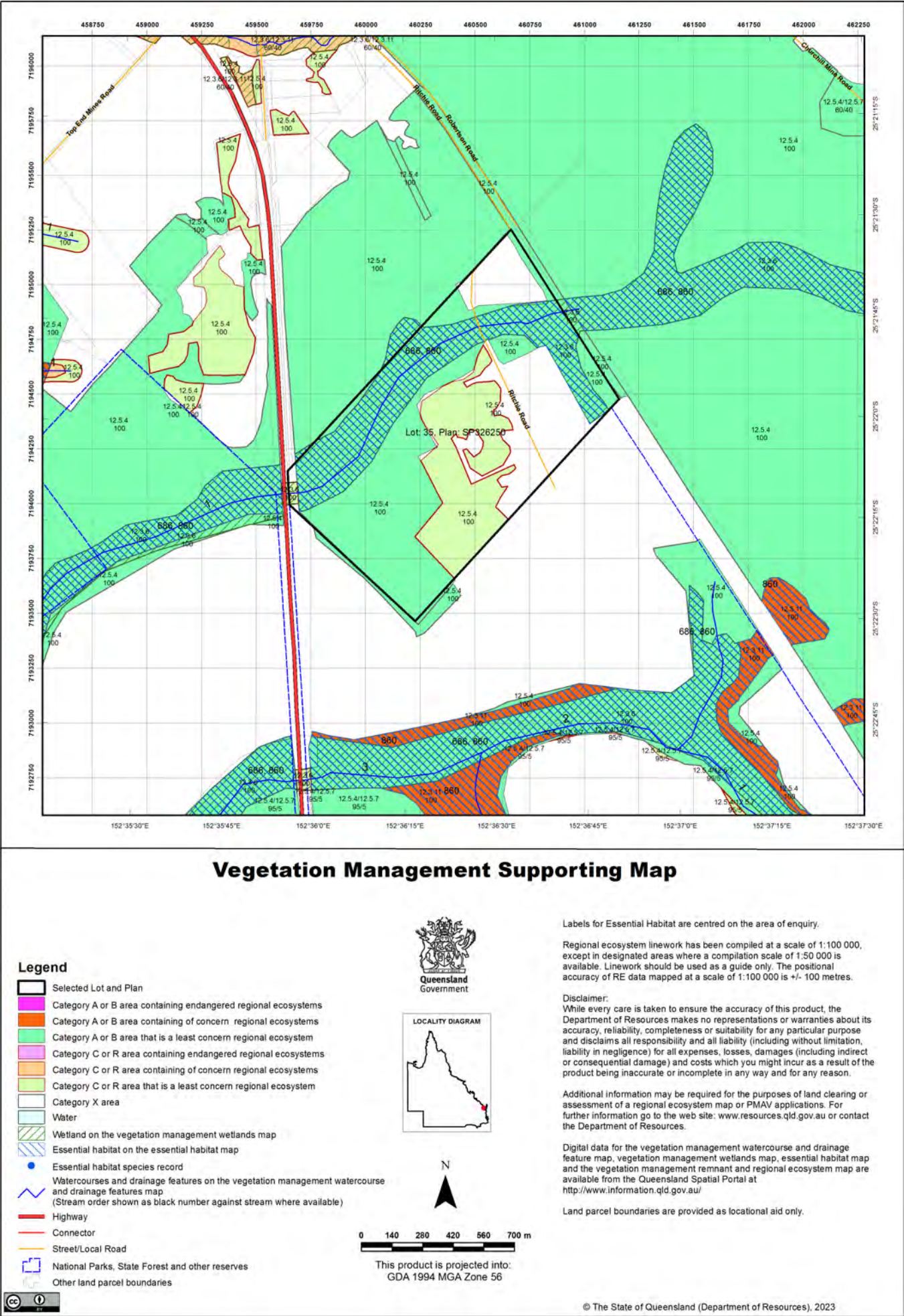
<http://dds.information.qld.gov.au/dds/>

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

Appendix 2 - Acronyms and Abbreviations

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





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
686	Crinia tinnula	wallum froglet	V	Vegetation community is a mandatory essential habitat factor for this species. Permanent to ephemeral acidic (pH 4.3 - 5.2), soft freshwater in Melaleuca (e.g. M. quinquenervia) swamps, sedgeland, wet and dry heathland (e.g. Banksia robur, Xanthorrhoea) and wallum (Banksia aemula shrubland/woodland) areas coastal lowlands on sand or sandstone, occasionally in adjacent open forest/woodland (e.g. Eucalyptus racemosa, Corymbia citriodora) with heathy understorey; known to persist in small remnants (<10ha); may be found well away from water.	Sea level to 150m.	Sandy and sandy-alluvial substrates.	None
860	Phascolarctos cinereus	koala	E	Open forests and woodlands containing Eucalyptus, Corymbia, Lophostemon or Melaleuca trees having a trunk of a diameter of more than 10cm at 1.3m above the ground. Tree species used for food and habitat varies across the state and can include: Corymbia citriodora, Corymbia henryi, Corymbia intermedia, Eucalyptus acmenoides, Eucalyptus bancroftii, Eucalyptus biturbinata, Eucalyptus blakeyi, Eucalyptus brownii, Eucalyptus camaldulensis, Eucalyptus carnea, Eucalyptus chloroclada, Eucalyptus coolabah, Eucalyptus crebra, Eucalyptus dealbata, Eucalyptus drepanophylla, Eucalyptus dunni, Eucalyptus eugenioides, Eucalyptus exserta, Eucalyptus fibrosa, Eucalyptus grandis, Eucalyptus helidonica, Eucalyptus latisinensis, Eucalyptus longirostrata, Eucalyptus major, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus microcarpa, Eucalyptus microcorys, Eucalyptus microtheca, Eucalyptus moluccana, Eucalyptus montivaga, Eucalyptus orgadophila, Eucalyptus papuana, Eucalyptus pilularis, Eucalyptus platyphylla, Eucalyptus populnea, Eucalyptus portuensis, Eucalyptus propinqua, Eucalyptus racemosa, Eucalyptus resinifera, Eucalyptus robusta, Eucalyptus saligna, Eucalyptus seeana, Eucalyptus siderophloia, Eucalyptus sideroxylon, Eucalyptus tereticornis, Eucalyptus thozetiana, Eucalyptus tindaliae, Eucalyptus umbra, Lophostemon confertus, Melaleuca leucadendra, Melaleuca quinquenervia.	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.

Label	Regional Ecosystem (mandatory unless otherwise specified)
686	12.2.5, 12.2.7, 12.2.9, 12.2.10, 12.2.12, 12.2.15, 12.3.4, 12.3.5, 12.3.6, 12.3.12, 12.3.14, 12.3.20, 12.5.2, 12.5.10. These regional ecosystems are not a mandatory essential habitat factor for this species.
860	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.17, 10.3.20, 10.3.27, 10.3.28, 10.4.3, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.21, 11.3.23, 11.3.25, 11.3.26, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.18, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.7.7, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.9, 11.9.10, 11.9.11, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.12, 11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.13, 11.12.14, 11.12.15, 11.12.16, 11.12.17, 11.12.19, 11.12.20, 12.2.5, 12.2.6, 12.2.7, 12.2.8, 12.2.10, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.14, 12.3.18, 12.3.19, 12.3.20, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.5.7, 12.5.10, 12.5.12, 12.8.1, 12.8.8, 12.8.9, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.17, 12.8.20, 12.8.24, 12.8.25, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.11, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.21, 12.9-10.25, 12.9-10.26, 12.9-10.27, 12.9-10.28, 12.9-10.29, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.11.14, 12.11.15, 12.11.16, 12.11.17, 12.11.18, 12.11.22, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.4, 12.12.5, 12.12.6, 12.12.7, 12.12.8, 12.12.9, 12.12.11, 12.12.12, 12.12.14, 12.12.15, 12.12.23, 12.12.24, 12.12.25, 12.12.28, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.11.9, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.6, 13.12.8, 13.12.9, 13.12.10.

Appendix B

Likelihood of occurrence assessment

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
Threatened Ecological Communities					
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	E	-		Occurs in sub-tropical, sub-humid and temperate climatic zones from Curtis Island, north of Gladstone, in Queensland to Bermagui in southern New South Wales. Occurs in coastal catchments, mostly at elevations of less than 20 m above sea-level (ASL) that are typically found within 30 km of the coast. Typically associated with low-lying coastal alluvial floodplains and alluvial flats. The TEC is associated with two Regional Ecosystems in Queensland, RE 12.1.1 and 12.3.20.	Not present / Unlikely A review of the RE mapping and on site values did not identify the presence of REs conducive to the TEC (i.e. REs 12.1.1 and 12.3.20 were not present within the Project area). The site inspection confirmed that the TEC is not present within the Project area.
Lowland Rainforest of Subtropical Australia	CE	-		Occurs in South Eastern Queensland Bioregion and NSW North Coast Bioregion. Occurs on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on enriched rhyolitic soils and basaltically enriched meta-sediments. Lowland Rainforest mostly occurs in areas <300 m above sea level with annual rainfall >1,300 mm. The ecological community is generally a moderately tall (≥20 m) to tall (≥30 m) closed forest (canopy cover ≥70%). Tree species with compound leaves are common and leaves are relatively large (notophyll to mesophyll). Typically, there is a relatively low abundance of species from the genera <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Casuarina</i> . Buttresses are common, as is an abundance and diversity of vines. Typically, non-rainforest species such as eucalypts and brush box comprise <30% of canopy emergent. The TEC is associated with the following Regional Ecosystems in Queensland, RE 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.11.1, 12.11.10, 12.12.1 and 12.12.16	Not present / Unlikely A review of the RE mapping and on site values did not identify the presence of REs conducive to the TEC (i.e. REs 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.11.1, 12.11.10, 12.12.1 and 12.12.16 were not present within the Project area). The site inspection confirmed that the TEC is not present within the Project area.
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	E	-		The ecological community includes the plants, animals and other organisms typically associated with forested palustrine wetlands, or swamp forests, found in the temperate to subtropical coastal valleys of Australia's east coast. The Coastal Sclerophyll Swamp Forest often has a layered canopy, dominated by <i>melaleucas</i> and/or <i>Eucalyptus robusta</i> and occurs between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of New South Wales Within Queensland, there are five Regional Ecosystems (REs) (as regulated under the Queensland Vegetation Management Act 1999) that are	Known This TEC was observed on site during field investigations.

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
				considered to be analogous to the Coastal Swamp Sclerophyll Forest ecological community where they meet the necessary condition class and patch size as defined within the Commonwealth conservation advice for the Coastal Swamp Sclerophyll Forest ecological community. These vegetation communities consist of the following: ■ RE 12.2.7 – <i>Melaleuca quinquenervia</i> or rarely <i>Melaleuca dealbata</i> open forest on sand plains ■ RE 12.3.4 and 12.3.4a – <i>Melaleuca quinquenervia</i>, <i>Eucalyptus robusta</i> woodland on coastal alluvium/<i>Eucalyptus bancroftii</i> open woodland often with <i>Melaleuca quinquenervia</i>. ■ RE 12.3.5 – <i>Melaleuca quinquenervia</i> open forest on coastal alluvium. ■ RE 12.3.6 – <i>Melaleuca quinquenervia</i> +/- <i>Eucalyptus tereticornis</i>, <i>Lophostemon suaveolens</i>, <i>Corymbia intermedia</i> open forest on coastal alluvial plains ■ RE 12.3.20 (in part) - <i>Melaleuca quinquenervia</i>, <i>Casuarina glauca</i> +/- <i>Eucalyptus tereticornis</i>, <i>Eucalyptus siderophloia</i> open forest on low coastal alluvial plains.	
Flora					
<i>Acacia attenuata</i>	NCN	V	V	<i>Acacia attenuata</i> is a slender shrub growing to about 5 m tall. The species occurs in high rainfall areas of south-east Queensland and is confined to coastal lowland sand plains. Across this range <i>A. attenuata</i> typically occurs in seasonally waterlogged areas of wet heathland or heathland margins, open forest, and woodland communities, and specifically on sandy poorly drained soils or peat swamps which are infertile. <i>Acacia attenuata</i> has been recorded growing in shrublands with <i>Leptospermum whitei</i> and <i>Baekkea frutescens</i>; in wallum with <i>Banksia aemula</i> and <i>Eucalyptus robusta</i>; in woodlands with <i>Corymbia trachyphloia</i>, <i>E. umbra</i> and <i>Banksia oblongifolia</i>; and in open forests of <i>E. umbra</i>, <i>E. racemosa</i> and <i>Melaleuca quinquenervia</i>.	Low The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Bosistoa transversa</i>	Three-leaved bosistoa	V	LC	In Queensland, suitable habitat for Three-leaved bosistoa includes: ■ Reddish loam over basalt rock on a very steep slope in complex notophyll vine forest with emergent Brush box (<i>Lophostemon confertus</i>)	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation).

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
				- On brown loamy soils on a hillside within a complex notophyll vine forest with Brush poison tree (<i>Excoecaria dallachyana</i>) and Hauer (<i>Dissiliaria baloghioides</i>) - Remnant vine forest pockets with varying slope, from relatively flat to a steep slope. The species appears to occur only in areas that have experienced minimal disturbance.	The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Cossinia australiana</i>	Cossinia	E	E	<i>Cossinia australiana</i> is a shrub to small slender tree, growing to 7 m in height with a sparse crown. Cossinia is known from fragmented relict patches of Araucarian vineforest or vine thickets on fertile soils.	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation). The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Cryptostylis hunteriana</i>	Leafless tongue-orchid	V	SLC	The Leafless Tongue Orchid has no leaf. It produces an upright flower-stem to 45 cm tall, bearing five to 10 flowers between November and February. The species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland	Low The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Cupaniopsis shirleyana</i>	Wedge-leaf tuckeroo	V	V	A small tree to 10m usually found within a variety of rainforest types including vine thicket and dry rainforest communities on hillsides, mountain tops, lower slopes of valleys, stream beds and along riverbanks Distribution of the species has been recorded between Brisbane and Mount Larcom.	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation). The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Fontainea venosa</i>	NCN	V	V	Occurs south west of Beenleigh near Brisbane, and along the Koolkooroon Creek in the Boyne Valley in Queensland. Occurs in Araucarian microphyll vine forest with a mean annual rainfall of 1,000 mm on alluvial soil along creeks	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation). The species was not identified within the Project area during ecological field investigations conducted in May 2021

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
<i>Macadamia integrifolia</i>	Queensland nut tree	V	V	Queensland nut tree occurs from Mt Bauple, near Gympie, to Currumbin Valley in the Gold Coast hinterland, southeast Queensland. Queensland nut tree grows in remnant rainforest, including complex mixed notophyll forest, and prefers partially open areas such as rainforest edges. This species occurs within the Northern Rivers (NSW) and southeast Queensland Natural Resource Management regions. Queensland nut tree is known to prefer to grow in mild frost-free areas with a reasonably high rainfall. There have been records of planted specimens bearing fruit as far south as Sydney.	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation). The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Macadamia tetraphylla</i>	Rough-shelled macadamia nut	V	V	Rough-leaved Queensland nut occurs from northeast NSW (chiefly in the Richmond and Tweed River areas) to southeast Queensland (Mt Glorious, near Brisbane). It inhabits areas in subtropical rainforest and notophyll vine forest in near coastal areas. The species has been noted to occur on steep slopes especially at ecotones.	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation). The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Macrozamia pauli-guilielmi</i>	Pineapple zamia	E	E	<i>Macrozamia pauli-guilielmi</i> is a small cycad with an underground ovoid trunk and spiral leaves. The species is distinguished by its very narrow and pale-green leaflets. The species occurs in occurs in lowland (5–230 m altitude) open forest or woodland (wallum) dominated by banksias or eucalypts, or in shrub land or heath land, generally on stabilised sand dunes	Moderate The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Phaius australis</i>	Lesser swamp-orchid	E	E	The Lesser-swamp orchid is endemic to Australia and occurs in eastern Queensland and northern NSW. Records indicate the species extending as far as Lake Cathie near Port Macquarie and as far south at South West Rocks (Brown 2010; DEE 2018; Harden 1993). This species is associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved paperbark (<i>Melaleuca leucadendra</i>) or Swamp mahogany (<i>Eucalyptus robusta</i>) are found. Less commonly, the species has been found in drier forest near the coast. The species are known to be restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest, swampy rainforest, or fringing open forest.	Low The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Prasophyllum exilis</i>	Thin leek orchid	-	NT	<i>Prasophyllum exilis</i> is a slender orchid with a single, round, tubular onion-like leaf which encloses the flowering stem. The species flowers are brown to greenish with a white labellum, with the flowering period occurring between July-August, usually following winter rain. <i>Prasophyllum exile</i> grows in damp, grassy places in coastal and near-coastal forest and woodland.	Low The species has been previously recorded within 2 km of the Project area and the Project area provides potential suitable habitat for the species. The species was not identified within the Project area during ecological field investigations conducted in May 2021

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
<i>Rhodomirtus psidioides</i>	Native guava	CE	CE	Distributed from Sydney to Maryborough in Queensland. Habitat consists of lowland coastal and subcoastal areas of eucalypt and dry rainforest. Pioneer species for littoral subtropical rainforest and riparian wet sclerophyll.	Low The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. The species was not identified within the Project area during ecological field investigations conducted in May 2021
<i>Samadera bidwillii</i>	Quassia	V	V	<i>Samadera bidwillii</i> commonly occurs in lowland rainforest often with <i>Araucaria cunninghamii</i> or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland, it is commonly found in areas adjacent to both temporary and permanent watercourses up to 510m altitude.	Low The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. The species was not identified within the Project area during ecological field investigations conducted in May 2021
Birds					
<i>Calidris ferruginea</i>	Curlew sandpiper	M - CE	CE	Curlew sandpipers occur around coastal regions of Australia and are also quite widespread inland. In Queensland, widespread records occur along the coast south of Cairns and are widespread east of the Great Divide. The species mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They have also been recorded inland 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 and wet mats of algae or waterweed, or on banks of beach cast seagrass or seaweed.	Low The Project area is not considered to provide preferred habitat for the species

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
<i>Erythrotriorchis radiatus</i>	Red goshawk	V	E	The Red goshawk is distributed along the east coast of QLD, Cape York Peninsula and across into northern regions of Australia. It is estimated the species population is limited to the bioregions of the Wet Tropics, Cape York Peninsula and Mount Isa in QLD. The Red goshawk typically occurs in both coastal and sub-coastal areas, in wooded and forested lands of tropical and warm-temperate Australia. This species is closely associated with riverine forests. The Red goshawk nests in large trees, frequently the tallest and largest in a stand, which are within one kilometre of a permanent water source. This species typically avoids very dense, and very open habitats (Debus 1991; 1993; OEH 2017; Marchant and Higgins 1993). The species occupies large home ranges estimated to be up to 120 km ² (females) and 200 km ² (males). Preferred habitat requirements are extensive tracts or remnant woodlands/forests along watercourses or wetlands with fertile soils with a mosaic of vegetation types, access to permanent water, and large populations of birds. The species is considered locally extinct from South-east Queensland due to a lack of records in the last 10 years despite targeted ecological investigations.	Low The species is considered locally extinct due to no reputable records in 10 years.
<i>Falco hypoleucos</i>	Grey falcon	V	V	The known distribution of the Grey falcon is over Australia's arid and semi-arid zones. The species is very rare. It is absent from the Cape York Peninsula and south of the Great Diving Range in Queensland. The habitat of the Grey falcon is restricted to shrubland, grassland and wooded watercourses of arid or semi-arid regions, however, wetlands where surface water attracts potential prey is also capitalised on by the falcon. Grey falcon has a high affinity with arid and semi-arid habitats with annual rainfall less than 500 mm. During periods of drought, this species moves towards the coast regions, where it frequents wooded watercourses.	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation)
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V	V	The Squatter pigeon is now limited to an area from north Queensland to the northwest slopes of NSW, including southeast Queensland, the western slopes of the Great Diving Range, the Gwydir River region, and the Liverpool Plains. They inhabit grassy understorey of open eucalypt woodlands and plains featuring sandy areas within proximity to water. Areas of semi-arid or arid landscape with sandy, open, and short grass cover dissected by gravel ridges is the preferred habitat for the species. The ground cover in foraging and breeding habitat is typically patchy, consisting	Low The Project area is not considered to provide preferred habitat for the species. Furthermore, there are no species occurrence records within an approximately 65 km radius of the Project area

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
				of native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs. This vegetated ground layer rarely exceeds 33% of the ground area. The remaining ground surface typically consists of bare patches of gravelly or dusty soil, and areas lightly covered in leaf litter and coarse, woody debris (e.g. fallen trees, logs, and smaller debris). The species is also often found alongside tracks and roadsides.	
<i>Hirundapus caudacutus</i>	White-throated needletail	V, M	V	In Australia, the White-throated needletail is almost exclusively aerial, flying at heights of less than 1 m up to more than 1,000 m above the ground. White-throated needletails often forage along the edges of low pressure systems, which both lift their food sources, and assist with their flight. The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. This species is known to occur over most types of habitat; however, they are most often recorded above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy. In coastal areas, they are often seen flying over sandy beaches or mudflats, and often around coastal cliffs and areas with prominent up draughts, such as ridges and sand-dunes.	Moderate The species is an aerial foraging species and can occur in the skies above most habitat types. The species does not breed in Australia.
<i>Numenius madagascariensis</i>	Eastern curlew	M - CE	E	Within Australia, the Eastern curlew has a primarily coastal distribution and is found in all state and territories. The Eastern curlew can be found foraging and roosting in sheltered coasts, especially estuaries, bays, harbours, inlets, and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae). The species is known to inhabit ocean beaches, coral reefs, rock platforms, rocky islets, coastal saltworks and sewage farms. They are often recorded in saltmarshes and near mangrove forests.	Low The Project area is not considered to provide preferred habitat for the species
<i>Rostratula australis</i>	Australian painted snipe	E	E	The Australian painted snipe has been recorded at wetlands in all states and territories of Australia but is most common in eastern Australia, where it has been recorded at scattered locations throughout much of QLD. The species generally inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. The species has also been observed to use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.	Low The Project area is not considered to provide preferred habitat for the species
<i>Turnix melanogaster</i>	Black-breasted buttonquail	V	V	The Black-breasted button-quail (<i>Turnix melanogaster</i>) is a relatively large, plump, and pale-eyed quail. The males are about 18 cm long, with a wingspan of 32 to 35 cm, and weighing 65 g. The females tend to be larger weighing 100 g. Females are slightly larger than males and are the dominant sex. Suitable habitat includes rainforests and forests, mostly in areas with 770 to 1,200 mm rainfall per annum in areas characterised by highly fertile soils. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest. They may also be found in low, dense Acacia thickets and, in vegetation behind coastal sand dunes.	Low The Project area is not considered to provide preferred habitat for the species

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
Mammals					
<i>Chalinolobus dwyeri</i>	Large-eared pied bat	V	V	The former and current distribution of the Large-eared pied bat is poorly known. Records for current distribution exist from Shoalwater Bay and inland to Carnarvon in Queensland, through to Ulladulla, in NSW. This species requires a combination of sandstone cliffs/escarpments to provide roosting habitat that is adjacent to higher fertility sites (particularly box gum woodlands or river/rainforest corridors which are used for foraging). They have been observed in disused mine shafts, caves, overhangs, and disused Fairy martin (<i>Hirundo ariel</i>) nests for shelter and to raise young. This species possibly also roosts in tree hollows, within dry and wet sclerophyll forest, Cyprus-pine dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland, Brigalow, and sandstone outcrop country. In southeast Queensland, the species has primarily been recorded from higher altitude, among moist tall open forest adjacent to rainforest.	Moderate The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species
<i>Dasyurus hallucatus</i>	Northern quoll	E	LC	Known Queensland populations occur as far south as Gracemere and Mt Morgan, to Weipa in the north and west into central Queensland near Carnarvon Range National Park (DAWE 2020; DES 2018). The Northern quoll can be found in various habitats across its range including rocky areas, eucalypt forest and woodlands, sandy lowlands and beaches, rainforests, shrubland, grasslands and desert. They tend to require a habitat with some form of rocky area for denning purposes and surrounding vegetation used for foraging and dispersal. They are also known to inhabit areas around human dwellings and campgrounds. No database records occur within the Project area for this species.	Low The Project area is not considered to provide preferred habitat for the species
<i>Petauroides Volans sensu lato</i>	Greater glider	E	E	This species of greater glider is distributed in northern Queensland and shares genetic and morphological differences to its southern sister species. Its habitat is similar in that it prefers old woodland forest with large hollows focused around riparian areas.	Moderate The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species
<i>Phascolarctos cinereus</i>	Koala	E	E	The Koala is distributed along the east coast of Australia. In Queensland, the distribution extends across several bioregions, encompassing a great diversity of habitats with the greatest concentration on southeast Queensland. Koala habitat can be broadly defined as any environment containing Koala food tree species (<i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Angophora</i> spp. and <i>Lophostemon</i> spp.) or shelter trees. Preferred food and shelter trees are naturally abundant on fertile clayey soils.	Low The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species
<i>Pteropus poliocephalus</i>	Grey-headed flying-fox	V	SLC	The Grey-headed flying-fox occurs in the coastal belt of Eastern Australia, typically ranging from Rockhampton in central Queensland to Melbourne in Victoria. This is a canopy-feeding species that eats fruit and nectar. This species utilises a range of vegetated habitats, including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. In an urban setting, this species is known to feed on commercial fruit crops, and on introduced tree species. Roost sites are generally located near water bodies. This species is known to roost in vegetation ranging from rainforest, Melaleuca stands, mangroves and riparian vegetation. The species has a high level of roost site fidelity, although new sites have been known to be colonised.	Moderate The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. No roost sites were identified within the Project area during field investigations conducted in May 2021
Reptiles					

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
<i>Coeranoscincus reticulatus</i>	Three-toed snake-tooth skink	V	LC	The Three-toed snake-tooth skink occurs from Crescent Head in northeast NSW to Fraser Island in southeast Queensland. Most records are from the Border Ranges in the vicinity of the NSW/Queensland border. In Queensland, the Three-toed Snake-tooth Skink has been recorded in rainforest, closed forest, wet sclerophyll forest, tall open Blackbutt (<i>Eucalyptus pilularis</i>) forest, tall layered open eucalypt forest and closed Brush Box (<i>Lophostemon confertus</i>) forest. It has also been recorded from extensive regrowth in heavily logged areas.	Not predicted to be in the locality of the Project area through desktop analyses. Not observed during field survey.
<i>Delma torquata</i>	Collared delma	V	V	The Collared delma is endemic to southeast Queensland. The known distribution of the species occurs at Lockyer Forest Reserves, Western Creek near Millmerran, the Toowoomba Range eastward to Moggill on the western outskirts of Brisbane. The species typically inhabits Eucalypt-dominated woodlands and open-forests in Queensland RE Land Zones 3, 9 and 10 (Brigalow Belt Reptiles Workshop 2010). Recent studies indicate that the species is most frequently associated with open <i>Eucalyptus crebra</i> woodland (canopy cover between 10 to 30%) located on northwest facing slopes. The Collared delma has been recorded from rocky areas associated with dry open forests, open Eucalypt, acacia woodland with an understorey of native grasses and loose rocks and eucalypt woodland adjacent to semi-evergreen vine thicket. Rocks, fallen timber, leaf litter and in soil cracks provide refuge.	Low The Project area is not considered to provide preferred habitat for the species
<i>Furina dunmali</i>	Dunmall's snake	V	V	Dunmall's snake is endemic to Australia and inhabits areas near the Queensland border within the Brigalow Belt South bioregion to the Nandewar bioregion in NSW. In Queensland, the snake is often found in areas 200 to 500 m above sea level with recorded sightings in Oakey and Inglewood. Recent records exist only from a restricted area of inland south-eastern Queensland between Chinchilla and Morven. All suitable habitats (remnant or non-remnant vegetation) that are coincident with the known locations of the species are considered important habitats. Dunmall's snake has been found in a broad range of habitats, including: - Forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (<i>Acacia harpophylla</i>), other Wattles (<i>A. burrowii</i>, <i>A. deanei</i>, <i>A. leiocalyx</i>), native - Cypress (<i>Callitris</i> spp.) or Bull-oak (<i>Allocasuarina luehmannii</i>) - Various Spotted gum (<i>Corymbia citriodora</i>), Ironbark (<i>Eucalyptus crebra</i> and <i>E. melanophloia</i>), White cypress pine (<i>Callitris glaucophylla</i>) and Bull-oak open forest and woodland associations on sandstone derived soils	Low The Project area is not considered to provide preferred habitat for the species

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
				The edge of dry vine scrub near Tarong Power Station, Queensland, and hard ironstone country (Queensland RE Land Zone 7) at Lake Broadwater near Dalby, Queensland.	
Migratory species¹					
<i>Actitis hypoleucos</i>	Common sandpiper	M	SLC	In Australia, the Common sandpiper is most commonly found in the north, east and west from August to May. The species is found in shallow, pebbly, muddy, or sandy edges of rivers and streams. They occur in coastal to inland areas, recorded in dams, lakes, sewage ponds, margins of tidal rivers, mangrove forests, saltmarshes, mudflats, beaches, and drains	Low The Project area is not considered to provide preferred habitat for the species
<i>Apus pacificus</i>	Fork-tailed swift	M	SLC	The Fork-tailed swift is a non-breeding visitor to all states and territories of Australia (Higgins 1999). The species is almost exclusively aerial species, flying from less than 1 m to at least 300 m above ground, and probably much higher. In Australia, Fork-tailed swifts predominately occur over inland plains, but sometimes occur above foothills, or in coastal areas. They often occur over cliffs, beaches, islands, and sometimes far out to sea. This species is also known to occur in the skies above settled areas, including urban areas and cities. Sometimes, Fork-tailed swifts may feed among tree-tops in open forests.	Moderate The species is an aerial foraging species and can occur in the skies above most habitat types. The species does not breed in Australia.
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	M	SLC	The Sharp-tailed sandpiper visits Australia from August to May and commonly found in the south-east but widespread across Australia in both inland and coastal locations. The species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation including 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 use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets and estuaries or seashores. A database record for this species exists at the south of the Project area at Jellinbah from 2003.	Low The Project area is not considered to provide preferred habitat for the species
<i>Calidris melanotos</i>	Pectoral sandpiper	M	SLC	The Pectoral sandpiper is widespread occurring in Australia during the non-breeding season but most common in eastern Queensland and south eastern Australia. They utilise 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. It is occasionally found further inland within wetlands and inundated vegetation.	Low The Project area is not considered to provide preferred habitat for the species
<i>Cuculus optatus</i>	Oriental cuckoo	M	SLC	The Oriental cuckoo over-winters across northern Australia from the Kimberley region in Western Australia, to Brisbane in Queensland. They inhabit monsoon forests, wet sclerophyll forests, paperbark swamps, dense open forests, scrubby gullies, and mangroves and is also known to use rainforest edges, leafy trees in paddocks, river flats and roadsides. This species prefers dense vegetation with a closed canopy.	Moderate The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species

Species name	Common name	EPBC Act	NC Act	Description and habitat associations (information sourced from DoE SPRAT 2021)	Likelihood of occurrence within the Project area
<i>Gallinago hardwickii</i>	Latham's snipe	M	SLC	Latham's snipe is a non-breeding visitor to south eastern Australia, a passage migrant through northern Australia i.e. it travels through northern Australia to reach non-breeding areas located further south. The species has been recorded along the east coast of Australia from Cape York Peninsula, through to south eastern South Australia.	Low The Project area is not considered to provide preferred habitat for the species
<i>Monarcha melanopsis</i>	Black-faced monarch	M	SLC	The Black-faced Monarch is widespread in eastern Australia. In Queensland, it is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts and the eastern slopes of the Great Divide, to the NSW border. The species mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical rainforest, subtropical rainforest, mesophyll thicket/shrubland, warm temperate rainforest, dry rainforest, and cool temperate rainforest.	Low The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation)
<i>Monarcha trivirgatus</i>	Spectacled Monarch	M	SLC	The species occurs in the understorey of mountain/lowland rainforests; thickly wooded gullies; waterside vegetation; mostly well below canopy. Summer breeding migrant to SEQ/northeast NSW from September to May.	Moderate The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species
<i>Myiagra cyanoleuca</i>	Satin flycatcher	M	SLC	In Queensland the Satin flycatcher is widespread but scattered in the east. The species migrates northwards in winter to northern Queensland and Papua New Guinea, returning south to breed in spring. They occur in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. This species is known to inhabit heavily vegetated gullies in Eucalypt dominated forests and taller woodlands usually above the shrub layer. On migration, this species occurs in coastal forests, woodlands, mangroves and drier woodlands and open forests as well as trees in open country and gardens.	Known The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species
<i>Pandion haliaetus</i>	Osprey	M	SLC	The Osprey occurs almost entire along the coast of Australia and occasionally inland. The distribution of the species around the northern coast appears continuous except for a possible gap at Eighty Mile Beach. Typically, they are found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They frequent a variety of wetland habitats including inshore waters, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging sites.	Moderate The species has been previously recorded within the wider region and the Project area provides potential transitional habitat for the species
<i>Rhipidura rufifrons</i>	Rufous fantail	M	SLC	The Rufous fantail occurs in coastal and near coastal districts of northern and eastern Australia. The species typically inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts. Typical habitat usually has a dense shrubby understorey often including ferns. The species also occasionally occurs in secondary regrowth, following logging or disturbance in forests or rainforests. This species has also been recorded from parks and gardens during movement events.	Moderate The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species

Table Notes

- Unlikely: Identified from database searches only and no suitable habitat exists within the Project area
- Low: Records for the species are from a reliable data source but not specifically recorded within the Project area. Suitable habitat for this species does not exist within the Project area
- Moderate: Records for the species are from a reliable data source but not specifically recorded within the Project area. Suitable habitat for this species exists within the Project area

Known:

¹

The species has been recorded within the Project area

The migratory species below do not include those migratory species identified in database searches which are also listed as conservation significant under the EPBC Act or NC Act. These species have been discussed above

Appendix C

Flora species list

Summary:

Total flora species identified:	104 (100%)
Number of threatened species (flora):	0
Total native flora species:	86 (82.7%)
Number of SLC flora species:	8
Total non-native flora species:	18 (17.3%)
Number of Restricted matters (flora):	2

Family	Scientific name	Common name	NC Act	EPBC Act	Comments	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Incidental
Acanthaceae	<i>Pseuderanthemum variabile</i>	Pastel flower	LC	-						X			X		X							X
Acanthaceae	<i>Rostellularia adscendens</i>	Rostellularia	LC	-									X		X			X	X			X
Adiantaceae	<i>Cheilanthes sieberi</i>	Cloak fern	LC	-		X	X						X	X				X			X	X
Amaranthaceae	<i>Gomphrena celosioides</i>	Gomphrena weed	-	-	non-native									X		X						X
Apiaceae	<i>Centella asiatica</i>	Penny wort	LC	-									X					X			X	X
Apiaceae	<i>Platysace linearifolia</i>	Platysace	LC	-													X	X			X	X
Apocynaceae	<i>Gomphocarpus physocarpus</i>	Balloon cottonbush	-	-	non-native											X					X	X
Apocynaceae	<i>Parsonsia straminea</i>	Monkey rope	LC	-			X	X		X		X			X				X	X		X
Asteraceae	<i>Ageratum houstonianum</i>	Blue billygoat weed	-	-	non-native																	
Asteraceae	<i>Emilia sonchifolia</i>	Emilia	-	-	non-native									X		X					X	X
Asteraceae	<i>Praxelis clematidea</i>	Praxelis	-	-	non-native		X						X	X		X		X	X		X	X
Campanulaceae	<i>Lobelia purpurascens</i>	White root	SLC	-	Special least concern species	X	X	X		X		X		X		X	X	X	X	X	X	X
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black she oak	LC	-				X	X	X	X		X		X					X		X
Cyperaceae	<i>Baumea articulata</i>	Jointed twigrush	LC	-				X														X
Cyperaceae	<i>Baumea teretifolia</i>	Twigrush	LC	-				X		X		X								X		X
Cyperaceae	<i>Cyperus difformis</i>	Rice sedge	LC	-				X						X		X						X
Cyperaceae	<i>Cyperus exaltatus</i>	Tall flatsedge	LC	-				X														X
Cyperaceae	<i>Cyperus gracilis</i>	Small sedge	LC	-				X														X
Cyperaceae	<i>Cyperus polystachyos</i>	Bunchy sedge	LC	-				X														X
Cyperaceae	<i>Cyperus prolifer</i>	Dwarf papyrus	-	-	non-native																	
Cyperaceae	<i>Fimbristylis ferruginea</i>	Sedge	LC	-		X											X					X
Cyperaceae	<i>Gahnia sieberiana</i>	Sword grass	LC	-		X	X	X	X	X	X		X		X	X	X	X	X	X		X
Cyperaceae	<i>Isolepis inundata</i>	Swamp club rush	LC	-				X														X
Cyperaceae	<i>Lepidosperma laterale</i>	Variable sword sedge	LC	-																		
Cyperaceae	<i>Lepironia articulata</i>	Tall reed	LC	-																		

Family	Scientific name	Common name	NC Act	EPBC Act	Comments	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Incidental
Dilleniaceae	<i>Hibbertia vestita</i>	Hibbertia	LC	-		X	X			X			X		X		X			X		X
Droseraceae	<i>Drosera burmanni</i>	Annual sundew	SLC	-	Special least concern species																	X
Droseraceae	<i>Drosera peltata</i>	Pale sundew	SLC	-	Special least concern species					X							X					X
Ericaceae	<i>Acrotriche aggregata</i>	Red cluster heath	LC	-			X		X						X				X			X
Fabaceae	<i>Desmodium rhytidophyllum</i>	Native desmodium	LC	-															X			X
Fabaceae	<i>Glycine clandestina</i>	Glycine pea	LC	-		X	X								X							X
Fabaceae	<i>Glycine tabacina</i>	Glycine pea	LC	-		X	X						X							X		X
Fabaceae	<i>Gompholobium pinnatum</i>	Poor man's gold	LC	-		X	X		X		X											X
Fabaceae	<i>Macroptilium atropurpureum</i>	Siratro	-	-	non-native									X							X	X
Fabaceae	<i>Pultenaea myrtoides</i>	Eggs and bacon	LC	-		X	X		X													X
Fabaceae	<i>Stylosanthes scabra</i>	Stylo pea	-	-	non-native													X			X	X
Goodeniaceae	<i>Goodenia rotundifolia</i>	Goodenia	LC	-		X	X	X											X			X
Goodeniaceae	<i>Velleia spathulata</i>	Wild pansies	LC	-		X		X			X						X					X
Haemodoraceae	<i>Haemodorum tenuifolium</i>	Blood root	LC	-		X		X														X
Iridaceae	<i>Patersonia sericea</i>	Purple flag	LC	-		X																X
Juncaginaceae	<i>Triglochin procerum</i>	Water ribbons	LC	-																		X
Lamiaceae	<i>Westringia tenuicaulis</i>	Tufted westringia	LC	-				X														X
Lauraceae	<i>Cassytha filiformis</i>	Dodder laurel	LC	-		X									X				X			X
Laxmanniaceae	<i>Eustrephus latifolius</i>	Wombat berry	LC	-															X			X
Laxmanniaceae	<i>Laxmannia gracilis</i>	Slender wire lily	LC	-		X																X
Laxmanniaceae	<i>Lomandra confertifolia</i>	Small mat rush	LC	-		X	X		X			X	X				X					X
Laxmanniaceae	<i>Lomandra longifolia</i>	Long leaved mat rush	LC	-			X	X		X		X								X		X
Laxmanniaceae	<i>Lomandra multiflora</i>	Many headed mat rush	LC	-		X			X				X		X		X			X		X
Malvaceae	<i>Sida cordifolia</i>	Flannel weed	-	-	non-native		X						X	X					X		X	X
Malvaceae	<i>Sida rhombifolia</i>	Paddy's lucerne	-	-	non-native									X				X			X	X
Mimosaceae	<i>Acacia leiocalyx</i>	Black wattle	LC	-		X	X		X	X	X	X	X	X	X		X	X	X	X	X	X
Myrtaceae	<i>Angophora leiocarpa</i>	Rusty gum	LC	-							X	X							X			X
Myrtaceae	<i>Corymbia intermedia</i>	Pink bloodwood	LC	-		X	X	X	X									X				X
Myrtaceae	<i>Corymbia trachyphloia</i>	Brown bloodwood	LC	-		X	X				X		X		X		X			X		X
Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint	LC	-				X		X			X		X		X		X	X		X
Myrtaceae	<i>Eucalyptus latisinensis</i>	Mahogany	LC	-				X	X		X	X	X		X		X	X	X	X		X
Myrtaceae	<i>Eucalyptus siderophloia</i>	Grey ironbark	LC	-															X			X
Myrtaceae	<i>Eucalyptus tereticornis</i>	Queensland blue gum	LC	-						X	X		X									X
Myrtaceae	<i>Leptospermum polygalifolium</i>	Tantoon	LC	-						X										X		X
Myrtaceae	<i>Lophostemon suaveolens</i>	Swamp box	LC	-		X		X			X	X	X				X			X		X
Myrtaceae	<i>Melaleuca quinquenervia</i>	Swamp paperbark	LC	-		X	X	X		X		X	X		X			X		X	X	X
Orchidaceae	<i>Geodorum densiflorum</i>	Pink nodding orchid	SLC	-	Special least concern species																	X

Family	Scientific name	Common name	NC Act	EPBC Act	Comments	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Incidental
Orchidaceae	<i>Pterostylis nutans</i>	Greenhood orchid	SLC	-	Special least concern species	X	X			X												X
Oxalidaceae	<i>Oxalis chnoodes</i>	Wood sorrel	LC	-										X						X	X	X
Passifloraceae	<i>Passiflora subpeltata</i>	White passionflower	-	-	non-native	X	X		X	X			X					X	X	X		X
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee bush	LC	-			X						X			X			X			X
Phyllanthaceae	<i>Glochidion ferdinandi</i>	Cheese tree	LC	-				X		X						X						X
Phyllanthaceae	<i>Phyllanthus virgatus</i>	Green phyllanthus	LC	-			X	X	X				X	X	X				X			X
Picrodendraceae	<i>Petalostigma pubescens</i>	Quinine tree	LC	-		X																X
Pinaceae	<i>Pinus elliotii</i>	Slash pine	-	-	non-native	X	X			X		X		X		X						X
Pittosporaceae	<i>Pittosporum viscidum</i>	Black-fruited thornbush	LC	-					X													X
Plantaginaceae	<i>Limnophila aromatica</i>	Aromatic limnophila	LC	-																		X
Poaceae	<i>Alloteropsis semialata</i>	Cockatoo grass	LC	-			X		X	X									X			X
Poaceae	<i>Aristida vagans</i>	Awned grass	LC	-		X					X						X	X				X
Poaceae	<i>Cymbopogon refractus</i>	Barbed-wire grass	LC	-						X									X			X
Poaceae	<i>Digitaria brownii</i>	Finger grass	LC	-								X										X
Poaceae	<i>Entolasia stricta</i>	Wiry panic	LC	-		X	X		X	X			X		X		X			X		X
Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass	LC	-			X	X	X	X			X	X			X				X	X
Poaceae	<i>Eragrostis curvula</i>	African lovegrass	-	-	non-native			X		X			X	X		X		X			X	X
Poaceae	<i>Heteropogon contortus</i>	Black speargrass	LC	-		X											X			X		X
Poaceae	<i>Imperata cylindrica</i>	Blady grass	LC	-		X						X		X			X	X	X	X		X
Poaceae	<i>Ischaemum australe</i>	Ischaemum	LC	-							X	X	X				X			X	X	X
Poaceae	<i>Melinis repens</i>	Red natal grass	-	-	non-native									X								X
Poaceae	<i>Oplismenus aemulus</i>	Creeping shade grass	LC	-							X									X		X
Poaceae	<i>Ottochloa gracillima</i>	Pademelon grass	LC	-							X									X		X
Poaceae	<i>Sporobolus fertilis</i>	Giant Parramatta grass	-	-	non-native, RESTRICTED MATTER									X							X	X
Poaceae	<i>Urochloa decumbens</i>	Signal grass	-	-	non-native					X				X								X
Proteaceae	<i>Banksia integrifolia</i>	Coastal banksia	LC	-		X	X		X													X
Proteaceae	<i>Banksia robur</i>	Broad-leaved banksia	LC	-				X		X		X	X									X
Proteaceae	<i>Grevillea banksii</i>	Pink grevillea	LC	-		X		X	X		X		X		X			X	X	X	X	X
Proteaceae	<i>Grevillea leiophylla</i>	Wallum grevillea	LC	-													X					X
Proteaceae	<i>Hakea actites</i>	Wallum hakea	LC	-													X					X
Proteaceae	<i>Persoonia virgata</i>	Small-leaved geebung	LC	-		X																X
Proteaceae	<i>Xylomelum salicinum</i>	Woody pear	LC	-																		X
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap tree	LC	-		X	X	X	X	X		X	X		X	X		X	X	X	X	X
Rubiaceae	<i>Psydrax odorata</i>	Hat stand	LC	-															X			X
Solanaceae	<i>Solanum stelligerum</i>	Devil's needles	LC	-		X								X		X						X
Stylidiaceae	<i>Stylidium graminifolium</i>	Grassy-leaved trigger-flower	SLC	-	Special least concern species																	X
Thymelaeaceae	<i>Pimelea linifolia</i>	Rice flower	LC	-		X					X		X		X		X					X

Family	Scientific name	Common name	NC Act	EPBC Act	Comments	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 13	Site 14	Site 15	Site 16	Incidental
Verbenaceae	<i>Lantana camara</i>	Lantana	-	-	non-native, RESTRICTED MATTER		X							X		X		X			X	X
Verbenaceae	<i>Verbena litoralis</i>	Tall verbena	-	-	non-native											X						X
Violaceae	<i>Hybanthus stellarioides</i>	Spade flower	LC	-													X	X				X
Xanthorrhoeaceae	<i>Xanthorrhoea fulva</i>	Swamp grasstree	SLC	-	Special least concern species	X	X	X	X	X	X	X	X		X		X					X
Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>	Grasstree	SLC	-	Special least concern species		X		X						X							X

Table Notes
- Not listed
LC Least Concern
SLC Special least concern
X Observed

Appendix D

Fauna species list

Class	Family	Scientific name	Common name	NC Act	EPBC Act	Comments
amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	-	-	non-native
amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog	LC	-	
birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone	LC	-	
birds	Acanthizidae	<i>Smicrornis brevirostris</i>	weebill	LC	-	
birds	Artamidae	<i>Cracticus tibicen</i>	Australian magpie	LC	-	
birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird	LC	-	
birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike	LC	-	
birds	Climacteridae	<i>Climacteris picumnus</i>	brown treecreeper	LC	-	
birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove	LC	-	
birds	Columbidae	<i>Geopelia striata</i>	peaceful dove	LC	-	
birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough	LC	-	
birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren	LC	-	
birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater	LC	-	
birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner	LC	-	
birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater	LC	-	
birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird	LC	-	
birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater	LC	-	
birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird	LC	-	
birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush	LC	-	
birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler	LC	-	
birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote	LC	-	
birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin	LC	-	
birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail	LC	-	
birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail	LC	-	
birds	Timaliidae	<i>Zosterops lateralis cornwalli</i>	silvereye (eastern)	LC	-	
birds	Dicruridae	<i>Myiagra cyanoleuca</i>	Satin flycatcher	SLC	M	-

Class	Family	Scientific name	Common name	NC Act	EPBC Act	Comments
mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo	LC	-	
mammals	Bovidae	<i>Bos indicus</i>	zebu	-	-	non-native
mammals	Bovidae	<i>Bos taurus</i>	European cattle	-	-	non-native
ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	-	-	non-native RESTRICTED MATTER

Table Notes

- Not listed
LC Least Concern

Appendix E

State code assessment

State Code 16: Native vegetation clearing

Performance outcomes	Acceptable outcomes	Response
General		
Clearing avoids or minimises impacts		
PO1 Clearing and adverse impacts of clearing do not occur unless the application has demonstrated that the clearing and the adverse impacts of clearing have been: - reasonably avoided; or - reasonably minimised where it cannot be reasonably avoided.	No acceptable outcome is prescribed.	Complies with performance outcome Vegetation clearing has been reasonably avoided in high risk areas by positioning the manufacturing facility towards the southern end of the lot where category X vegetation occurs. Clearing has been minimised as much as possible by only clearing areas necessary for construction of infrastructure within the project footprint. A preliminary ecological investigation report which was undertaken to determine the ecological values present at the subject site concluded that the clearing of native vegetation at the subject site would not have adverse impacts on local fauna species with mitigation measures implemented.
Clearing on land in particular circumstances		
PO2 Clearing is consistent with any notice requiring compliance on the land subject to the development application, unless a better environmental outcome can be achieved. Note: The discharge of the vegetation management requirements under the notice requiring compliance can only occur in conjunction with the better environmental outcome being legally secured. Further guidance on meeting the requirements of a better environmental outcome can be found in State Development Assessment Provisions Guidance Material: State code 16: Native vegetation clearing, Department of Natural Resources and Mines and Energy, 2019.	No acceptable outcome is prescribed.	Not applicable There is no notice affecting the clearing of vegetation on the subject site.

Performance outcomes	Acceptable outcomes	Response
PO3 Clearing is consistent with vegetation management requirements for particular regulated areas unless a better environmental outcome can be achieved. Note: The discharge of the vegetation management requirements under the notice requiring compliance can only occur in conjunction with the better environmental outcome being legally secured. Further guidance on meeting the requirements of a better environmental outcome can be found in State Development Assessment Provisions Guidance Material: State code 16: Native vegetation clearing, Department of Natural Resources and Mines and Energy 2019.	No acceptable outcome is prescribed.	Not applicable The subject site is not affected by a particular regulated area.
PO4 Clearing of a legally secured offset area: is consistent with the offset delivery plan; or agreement for the offset area on the land subject to the development application; or only occurs if an additional offset is provided that is consistent with the <i>Environmental Offsets Act 2014</i> and the relevant policy in the Queensland Environmental Offsets Policy, Department of Environment and Heritage Protection, 2014. Note: Reference to 'agreement' above includes the 'agreed delivery arrangement' for the offset area as well as instruments associated with the legally secured offset area. Clearing should be consistent with any agreement however described.	No acceptable outcome is prescribed.	Not applicable The subject site has not been identified as a legally secured offset area under the <i>Environmental Offsets Act 2014</i>.
Clearing of vegetation as a result of the material change of use or reconfiguration of a lot		
PO5 Clearing as a result of a material change of use, or clearing as a result of reconfiguring a lot does not occur.	No acceptable outcome is prescribed.	Not applicable The project is being assessed under a Ministerial Infrastructure Designation therefore the clearing work required for the proposed rollingstock manufacturing facility is considered exempt under Schedule 21 of the Planning Regulation.
Clearing that could already be done under an exemption		
PO6 Clearing does not occur unless it is clearing that could be done as exempt clearing work for the purpose of the development (as prescribed under schedule 21 of the Planning Regulation 2017) prior to the material change of use or reconfiguring a lot application being approved.	No acceptable outcome is prescribed.	Complies with performance outcome The clearing work required for the proposed rollingstock manufacturing facility is considered exempt under Schedule 21 of the Planning Regulation. A protected plants clearing exemption form has been lodged with the appropriate State Government Department.

Performance outcomes	Acceptable outcomes	Response
Specific		
Clearing associated with wetlands (public safety, relevant infrastructure activities consequential development of IPA approval, a coordinated project, extractive industry)		
PO7 Clearing maintains the current extent of vegetation associated with any natural wetland to protect: bank stability by protecting against bank erosion; and water quality by filtering sediments, nutrients and other pollutants; and aquatic habitat; and terrestrial habitat.	AO7.1 Clearing does not occur in a natural wetland or within 100 metres of the defining bank of any natural wetland. OR AO7.2 Clearing within 100 metres of the defining bank of any natural wetland: does not occur within 10 metres of the defining bank of any natural wetland; and does not exceed widths in table 16.3.1 in this code. OR AO7.3 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with a natural wetland (matter of state environmental significance).	Complies with Acceptable Outcome AO7.3 Vegetation clearing will occur within 10m of a natural wetland with vegetation of mid-dense structure category. This will occur for access tracks, the test loop track and associated infrastructure. Vegetation will be avoided where possible within 20m of the waterway mapped in the north of the project footprint. Where infrastructure is proposed within this area, fauna movement along the riparian corridor is to be maintained, with particular attention to Wallum froglet and Koala. Clearing will be undertaken in such a way that protects bank stability, water quality, aquatic habitat, and terrestrial habitat outside of the project footprint.
Clearing associated with wetlands (necessary to control non-native plants or declared pests, encroachment, managing thickened vegetation, fodder harvesting)		
PO8 Clearing maintains vegetation associated with a natural wetland to protect: bank stability by protecting against bank erosion; and water quality by filtering sediments, nutrients and other pollutants; and aquatic habitat; and terrestrial habitat.	<i>Clearing necessary to control non-native plants or declared pests:</i> AO8.1 Mechanical clearing does not occur in any of the following areas, unless it is required to provide necessary access to control non-native plants or declared pests: inside the defining bank of any natural wetland; and within 20 metres of the defining bank of any natural wetland. AND	Not applicable The proposed clearing is not associated with controlling non-native plants, declared pests, encroachment, thickened vegetation, or fodder harvesting.

Performance outcomes	Acceptable outcomes	Response
	AO8.2 Clearing to provide necessary access to control non-native plants or declared pests only occurs where: - clearing does not exceed five metres in width; and - clearing retains all mature trees and habitat trees; and - the access track: a. runs parallel to a natural wetland and clearing is not within 10 metres of the defining bank of a natural wetland; or b. is required to provide access across the wetland. AND	
	AO8.3 Chemical clearing retains: - all mature trees; and - all habitat trees; and - at least 50 per cent of immature trees in each 50 metre by 50 metre area. AND	
	AO8.4 Root absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a natural wetland: 100 metres; or - the distance specified on the approved product label; or - the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. AND	
	AO8.5 Aerial application of a foliar herbicide does not occur within whichever is the greater distance from the defining bank of a natural wetland; 50 metres; or - the distance specified for wetlands on the approved product label; or - the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. AND	

Performance outcomes	Acceptable outcomes	Response
	<i>Clearing for managing thickened vegetation:</i> AO8.6 Mechanical clearing does not occur in any of the following areas: inside the defining bank of a natural wetland; and within 20 metres of the defining bank of a natural wetland. AND <i>Clearing for encroachment:</i> AO8.7 Mechanical clearing does not occur in any of the following areas: 1. inside the defining bank of any natural wetland; and 2. within 20 metres of the defining bank of any natural wetland. AND AO8.8 Root absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a natural wetland 100 metres; or the distance specified on the approved product label; or the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. AND	
	<i>Clearing for fodder harvesting:</i> AO8.9 Mechanical clearing does not occur in any of the following areas: inside the defining bank of any natural wetland; and within 20 metres of the defining bank of any natural wetland. AND	Not applicable The proposed clearing is not associated with controlling non-native plants, declared pests, encroachment, thickened vegetation, or fodder harvesting.

Performance outcomes	Acceptable outcomes	Response
	AO8.10 Mechanical clearing that is strip harvesting or block harvesting does not occur in any of the following areas: inside the defining bank of any natural wetland; and within 100 metres of the defining bank of any natural wetland.	Not applicable The proposed clearing is not associated with controlling non-native plants, declared pests, encroachment, thickened vegetation, or fodder harvesting.
Clearing associated with wetlands (necessary environmental clearing – land restoration and natural disaster preparation)		
PO9 Clearing maintains vegetation associated with any natural wetland or rehabilitates the cleared area to protect: bank stability by protecting against bank erosion; and water quality by filtering sediments, nutrients and other pollutants; and aquatic habitat; and terrestrial habitat.	AO9.1 Clearing does not occur in any of the following areas: inside the defining bank of any natural wetland; and within 100 metres of the defining bank of any natural wetland. OR	Not applicable The proposed clearing is not associated with necessary environmental clearing, land restoration or natural disaster preparation.
	AO9.2 Clearing within 100 metres of the defining bank of any natural wetland only occurs where: 1. clearing does not exceed 0.5 hectares; and 2. clearing retains all mature trees and habitat trees; and 3. clearing that is for flood preparation complies with all of the following: clearing is undertaken by felling only; and clearing does not exceed 100 square metres; and clearing does not occur outside the defining banks of a natural wetland; and clearing does not occur within 50 metres of other clearing for flood preparation. OR	
	AO9.3 Clearing to provide necessary access to undertake necessary environmental clearing only occurs where clearing: 1. does not exceed 10 metres in width; and 2. retains all mature trees and habitat trees; and 3. the access track: a. runs parallel to a natural wetland and clearing is not within 10 metres of the defining bank of a natural wetland; or b. is required to provide access across the wetland. OR	

Performance outcomes	Acceptable outcomes	Response
	AO9.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.	
Clearing associated with wetlands (necessary environmental clearing - natural channel diversion and contaminants removal)		
PO10 Clearing maintains the current extent of vegetation associated with any natural wetland or rehabilitates the cleared area to protect: bank stability by protecting against bank erosion; and water quality by filtering sediments, nutrients and other pollutants; and aquatic habitat; and terrestrial habitat.	AO10.1 Clearing does not occur in any of the following areas: inside the defining bank of any natural wetland; and within 100 metres of the defining bank of any natural wetland.	Not applicable The clearing proposed for the rollingstock manufacturing facility is not for the purpose of necessary environmental clearing, natural channel diversion, or the removal of contaminants.
	OR	
	AO10.2 Clearing within 100 metres of the defining bank of any natural wetland only occurs where: clearing does not exceed 0.5 hectares; and clearing retains all mature trees and habitat trees.	
	OR	
	AO10.3 Clearing to provide necessary access to undertake necessary environmental clearing only occurs where clearing: does not exceed 10 metres in width; and retains all mature trees and habitat trees; and the access track: runs parallel to a natural wetland and clearing is not within 10 metres of the defining bank of a natural wetland; or is required to provide access across the wetland.	
	OR	
	AO10.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.	
	OR	

Performance outcomes	Acceptable outcomes	Response
	AO10.5 Where clearing is for natural channel diversion or contaminants removal, and clearing cannot be reasonably avoided, and: clearing has been reasonably minimised; and the cleared area cannot be reasonably rehabilitated, an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with a natural wetland (a matter of state environmental significance).	
Clearing associated with watercourses and drainage features (public safety, relevant infrastructure activities, consequential development of IPA approval, coordinated project, extractive industry)		
PO11 Clearing maintains the current extent of vegetation associated with any watercourse or drainage feature to protect: 1. bank stability by protecting against bank erosion; and 2. water quality by filtering sediments, nutrients and other pollutants; and 3. aquatic habitat; and 4. terrestrial habitat.	AO11.1 Clearing does not occur in any of the following areas: inside the defining bank of a watercourse or drainage feature; and within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code.	Complies with Acceptable Outcome AO11.3 Vegetation clearing will occur within 10m of a stream order 1 drainage feature. This will occur for access tracks, the test loop track and associated infrastructure. Vegetation will be avoided where possible within 20m of the waterway mapped in the north of the project footprint. Where infrastructure is proposed within this area, fauna movement along the riparian corridor is to be maintained, with particular attention to Wallum froglet and Koala. Clearing will be undertaken in such a way that protects bank stability, water quality, aquatic habitat, and terrestrial habitat outside of the project footprint.
	OR	
	AO11.2 Clearing within any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code: does not exceed the widths in table 16.3.1 of this code; and does not occur within 10 metres of the defining bank, unless clearing is required into or across the watercourse or drainage feature.	
	OR	
	AO11.3 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with any watercourse or drainage feature (a matter of state environmental significance).	
Clearing associated with watercourses and drainage features (necessary environmental clearing- land restoration and natural disaster preparation)		

Performance outcomes	Acceptable outcomes	Response
PO12 Clearing maintains vegetation associated with any watercourse or drainage feature or rehabilitates the cleared area to protect: 1. bank stability by protecting against bank erosion; and 2. water quality by filtering sediments, nutrients and other pollutants; and 3. aquatic habitat; and 4. terrestrial habitat.	AO12.1 Clearing does not occur in any of the following areas: inside the defining bank of a watercourse or drainage feature; and within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code. OR AO12.2 Clearing in any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code only occurs where: clearing does not exceed 0.5 hectares; and clearing retains all mature trees and habitat trees; and clearing that is for flood preparation complies with all of the following: clearing is undertaken by felling only; and clearing does not exceed 100 square metres; and clearing does not occur outside of the defining bank of any watercourse or drainage feature; and clearing does not occur within 50 metres of other clearing for flood preparation. OR AO12.3 Clearing to provide necessary access to undertake necessary environmental clearing only occurs where clearing: does not exceed 10 metres in width; and retains all mature trees and habitat trees; and the access track: runs parallel to a watercourse or drainage feature and clearing is not within 10 metres of the defining bank of a watercourse or drainage feature; or is required to provide access across the watercourse or drainage feature. AO12.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.	Not applicable The clearing proposed for the rollingstock manufacturing facility does not involve clearing associated with watercourses and drainage features for necessary environmental clearing, land restoration and natural disaster preparation.
Clearing associated with watercourses and drainage features (necessary environmental clearing – natural channel diversion, and contaminants removal)		

Performance outcomes	Acceptable outcomes	Response
PO13 Clearing maintains the current extent of vegetation associated with any watercourse or drainage feature or rehabilitates the cleared area to protect: 1. bank stability by protecting against bank erosion; and 2. water quality by filtering sediments, nutrients and other pollutants; and 3. aquatic habitat; and 4. terrestrial habitat.	AO13.1 Clearing does not occur within any of the following areas: inside the defining bank of a watercourse or drainage feature; and within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code. OR AO13.2 Clearing in any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code only occurs where: clearing does not exceed 0.5 hectares; and clearing retains all mature trees and habitat trees. OR AO13.3 Clearing to provide necessary access to undertake necessary environmental clearing only occurs where: clearing does not exceed 10 metres in width; and clearing retains all mature trees and habitat trees; and the access track: runs parallel to a watercourse or drainage feature and clearing is not within 10 metres of the defining bank of a watercourse or drainage feature; or is required to provide access across the watercourse or drainage feature. OR AO13.4 Where clearing cannot be reasonably avoided, and: clearing has been reasonably minimised; and the cleared area cannot be reasonably rehabilitated, an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with a watercourse or drainage feature (a matter of state environmental significance).	Not applicable The clearing proposed for the rollingstock manufacturing facility will not be associated with watercourses and drainage features for necessary environmental clearing, natural channel diversion, or the removal of contaminants.
Clearing associated with watercourses or drainage features (necessary to control non-native plants or declared pests, managing thickened vegetation, fodder harvesting)		

Performance outcomes	Acceptable outcomes	Response
PO14 Clearing maintains vegetation associated with any watercourse or drainage feature to protect: - bank stability by protecting against bank erosion; and - water quality by filtering sediments, nutrients and other pollutants; and - aquatic habitat; and - terrestrial habitat.	<i>Clearing necessary to control non-native plants or declared pests:</i> AO14.1 Mechanical clearing does not occur in any of the following areas, unless it is required to provide necessary access to control non-native plants or declared pests: - inside the defining bank of any watercourse or drainage feature; and - within 10 metres of the defining bank of a watercourse or drainage feature that is a stream order 1 or 2 watercourse or drainage feature; and - within 15 metres of the defining bank of a watercourse or drainage feature that is a stream order 3 or 4 watercourse or drainage feature; and - within 20 metres of the defining bank of a watercourse or drainage feature that is a stream order 5 or more watercourse or drainage feature.	Not applicable The clearing proposed for the rollingstock manufacturing facility is not associated with clearing for watercourses and drainage features, the control of non-native plants or declared pests, the management of thickened vegetation or fodder harvesting.
	AND AO14.2 Clearing to provide necessary access to control non-native plants or declared pests only occurs where: - clearing does not exceed five metres in width; and - clearing retains all habitat trees and mature trees; and - the access track: - runs parallel to the watercourse or drainage feature and is not within 10 metres of the defining bank of the watercourse or drainage feature; or - is required to provide access across the watercourse or drainage feature.	
	AND AO14.3 Chemical clearing retains all of the following: - mature trees; and - habitat trees; and - at least 50 per cent of immature trees in any 50 metre by 50 metre area.	

Performance outcomes	Acceptable outcomes	Response
	AO14.4 Root absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a watercourse or drainage feature: 100 metres; or - any distance specified on the approved product label; or - the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. AND	
	AO14.5 Aerial application of a foliar herbicide does not occur within whichever is the greater distance from the defining bank of a watercourse or drainage feature: 50 metres; or - any distance specified on the approved product label; or - the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. AND	
	<i>Clearing for managing thickened vegetation:</i> AO14.6 Mechanical clearing does not occur in any of the following areas: - inside the defining bank of any watercourse or drainage feature; - within 10 metres of the defining bank of a watercourse or drainage feature that is a stream order 1 or 2 watercourse or drainage feature; - within 15 metres of the defining bank of a watercourse or drainage feature that is a stream order 3 or 4 watercourse or drainage feature; - within 20 metres of the defining bank of a watercourse or drainage feature that is a stream order 5 or more watercourse or drainage feature. AND	

Performance outcomes	Acceptable outcomes	Response
	<i>Clearing for fodder harvesting:</i> AO14.7 Mechanical clearing does not occur in any of the following areas: inside the defining bank of any watercourse or drainage feature; and within 20 metres of the defining bank of any watercourse or drainage feature. AND AO14.8 Mechanical clearing that is strip harvesting or block harvesting does not occur in any of the following areas: inside the defining bank of any watercourse or drainage feature; and within 100 metres of the defining bank of any watercourse or drainage feature.	
Clearing associated with watercourses or drainage features (encroachment)		
PO15 Clearing of encroachment maintains: 1. bank stability by protecting against bank erosion; and 2. water quality by filtering sediments, nutrients and other pollutants; and 3. aquatic habitat; and 4. terrestrial habitat.	AO15.1 Mechanical clearing does not occur in any of the following areas: inside the defining bank of any watercourse or drainage feature; and within 10 metres of the defining bank of a watercourse or drainage feature that is a stream order 1 or 2 watercourse or drainage feature; and within 15 metres of the defining bank of a watercourse or drainage feature that is a stream order 3 or 4 watercourse or drainage feature; and within 20 metres of the defining bank of a watercourse or drainage feature that is a stream order 5 or more watercourse or drainage feature. AND	Not applicable The clearing proposed for the rollingstock manufacturing facility is not associated with encroachment on watercourses or drainage features.

Performance outcomes	Acceptable outcomes	Response
	AO15.2 Root-absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a watercourse or drainage feature: 100 metres; or any distance specified on the approved product label; or the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.	
Maintaining connectivity (public safety, relevant infrastructure activities, consequential development of IPA approval, extractive industry)		
PO16 In consideration of vegetation on the land subject to the development application and on adjacent land, sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes.	AO16.1 Clearing occurs in accordance with table 16.3.3 in this code.	Complies with performance outcome
Connectivity areas (coordinated project)		
PO17 In consideration of vegetation on the land subject to the development application and on adjacent land: 1. sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes; or 2. where this not reasonably possible, the applicant provides an offset.	AO17.1 Clearing occurs in accordance with table 16.3.3 of this code.	Complies with Acceptable Outcome AO17.2 Clearing has been reasonably avoided and minimised where possible. The DES 'landscape fragmentation and connectivity' tool has been applied to the project footprint and determined that any impact on connectivity areas is not significant (0.95%). Clearing will be carried out only where construction of infrastructure is required. Additionally, multiple areas within and adjacent to the project footprint will be rehabilitated back to remnant status.
	AO17.2 Where clearing cannot be reasonably avoided; and clearing has been reasonably minimised; an offset is provided for any acceptable significant residual impact from clearing of vegetation that forms a connectivity area (a matter of state environmental significance).	
Maintaining connectivity (necessary environmental clearing - land restoration and natural disaster preparation)		
PO18 In consideration of vegetation on the land subject to the development application and on adjacent land, sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes, or where this is not reasonably possible, the cleared area is rehabilitated.	AO18.1 Clearing occurs in accordance with table 16.3.3 of this code.	Not applicable The clearing proposed for the rollingstock manufacturing facility is not associated with necessary environmental clearing.
	AO18.2 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.	
Connectivity areas (necessary environmental clearing – natural channel diversion and contaminants removal)		
PO19 In consideration of vegetation on the land subject to the development application and on adjacent land:	AO19.1 Clearing occurs in accordance with table 16.3.3 of this code.	Not applicable The clearing proposed for the rollingstock manufacturing facility is not associated with necessary environmental clearing.
	OR	

Performance outcomes	Acceptable outcomes	Response
- sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes; or - where this is not reasonably possible, the applicant rehabilitates the cleared area; or - where this not reasonably possible, the applicant provides an offset.	AO19.2 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated. OR AO19.3 Where clearing cannot be reasonably avoided, and: clearing has been reasonably minimised; and the cleared area cannot be reasonably rehabilitated an offset is provided for any acceptable significant residual impact from clearing of vegetation that forms a connectivity area (a matter of state environmental significance).	
Soil erosion (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act approval, coordinated project, necessary environmental clearing)		
PO20 Clearing does not result in accelerated soil erosion within or outside the land the subject of the development application.	AO20.1 Clearing only occurs if an erosion and sediment control plan is developed and implemented to: prevent accelerated soil erosion; or where prevention is not possible, minimise accelerated soil erosion. OR AO20.2 The local government is the assessment manager for the development application.	Complies with performance outcome Clearing will be conducted under a construction environmental management plan, which will contain management measures to reduce the possibility of erosion at the subject site.
Soil erosion (necessary to control non-native plants or declared pests, managing thickened vegetation, encroachment, fodder harvesting)		
PO21 Clearing does not result in accelerated soil erosion within or outside the land subject of the development application.	AO21.1 Clearing only occurs where recognised best practice methods are employed to: prevent increased soil erosion resulting from the clearing; and stabilise soil erosion which would result from clearing; and prevent increased sediment run-off entering a wetland, watercourse or drainage feature as a result of the clearing. AND	Not applicable The clearing proposed for the rollingstock manufacturing facility is not associated with necessary environmental clearing.

Performance outcomes	Acceptable outcomes	Response
	<i>Clearing necessary to control non-native plants or declared pests:</i> AO21.2 Mechanical clearing: 1. does not occur on a slope greater than 15 percent; and 2. in each 50 by 50 metre area (0.25 hectares), retains 50 per cent of the ground cover and does not disturb more than 50 per cent of the ground cover. AND AO21.3 New access tracks required to provide necessary access to control a non-native plant or declared pests do not exceed five metres in width or de-stabilise the banks of any watercourse or drainage feature as a result of crossing, construction or use AND <i>Clearing for managing thickened vegetation:</i> AO21.4 Mechanical clearing does not: 1. occur in a regional ecosystem in table 16.3.4 of this code that states 'mechanical clearing not permitted'; 2. disturb more than 50 per cent of the ground surface or result in any hectare having less than 50 per cent ground cover; 3. occur on a slope greater than five per cent; and 4. occur within 50 metres of an area of existing accelerated soil erosion. AND <i>Clearing for encroachment:</i> AO21.5 Mechanical clearing does not occur in any of the following areas: - within 50 metres of an area of soil erosion; and - slopes greater than 5 per cent. AND	

Performance outcomes	Acceptable outcomes	Response
	<i>Clearing for fodder harvesting:</i> AO21.6 Mechanical clearing does not occur on a slope greater than five percent. OR AO21.7 Mechanical clearing does not occur within 50 metres of an areas of soil erosion and instability.	
Salinity (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry, necessary environmental clearing, encroachment, fodder harvesting)		
PO22 Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater, surface water or soil.	AO22.1 Clearing does not occur within 100 metres of a salinity expression area.	Complies with performance outcome Clearing will be carried out under a construction environmental management plan, which will aim to avoid land degradation as a result of the clearing.
Conserving endangered and of concern regional ecosystems (public safety and relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry)		
PO23 Clearing maintains the current extent of endangered regional ecosystems and of concern regional ecosystems.	AO23.1 Clearing does not occur in an endangered regional ecosystem or an of concern regional ecosystem.	Complies with Accepted Outcome 23.1 The regional ecosystems mapped over the site are least concern under the <i>Vegetation Management Act 1999</i> .
	OR	
	AO23.2 Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed the widths prescribed in table 16.3.1 of this code.	
	OR	
	AO23.3 Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed areas prescribed in table 16.3.1 of this code.	
	OR	
	AO23.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of endangered regional ecosystems and of concern regional ecosystems (a matter of state environmental significance).	

Performance outcomes	Acceptable outcomes	Response
Essential habitat (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry, fodder harvesting)		
PO24 Clearing maintains the current extent of essential habitat.	AO24.1 Clearing does not occur in essential habitat.	Complies with Accepted Outcome 24.4 To facilitate construction of the Project approximately 4.76 ha of essential habitat will be cleared and will therefore exceed the widths prescribed in Table 16.3.1 of this code. Clearing will be carried out only where construction of infrastructure is required. Additionally, multiple areas within and adjacent to the project footprint will be rehabilitated back to remnant status.
	OR	
	AO24.2 Clearing in essential habitat does not exceed the widths prescribed in table 16.3.1 of this code.	
	OR	
	AO24.3 Clearing in essential habitat does not exceed the areas prescribed in table 16.3.1 of this code.	
	OR	
	AO24.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of essential habitat (a matter of state environmental significance).	
Essential habitat (necessary environmental clearing – land restoration and natural disaster preparation)		
PO25 Clearing does not occur in essential habitat, or where this is not reasonably possible, the applicant rehabilitates the cleared area.	AO25.1 Clearing does not occur in essential habitat.	Not applicable The proposed clearing is not for the purposes of necessary environmental clearing, land restoration, or natural disaster preparation.
	OR	
	AO25.2 Clearing in essential habitat does not exceed the widths prescribed in table 16.3.1 of this code.	
	OR	
	AO25.3 Clearing in essential habitat does not exceed the areas prescribed in table 16.3.1 of this code.	
	OR	
	AO25.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.	
Essential habitat (necessary environmental clearing – natural channel diversion and contaminants removal)		

Performance outcomes	Acceptable outcomes	Response
PO26 Clearing does not occur in essential habitat, or where this is not reasonably possible, the applicant rehabilitates the cleared area, or maintains the current extent of essential habitat.	AO26.1 Clearing does not occur in essential habitat.	Not applicable The proposed clearing is not for the purposes of necessary environmental clearing, natural channel diversions or the removal of contaminants.
	OR	
	AO26.2 Clearing in essential habitat does not exceed the widths prescribed in table 16.3.1 of this code.	
	OR	
	AO26.3 Clearing in essential habitat does not exceed the areas prescribed in table 16.3.1 of this code.	
	OR	
	AO26.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.	
	OR	
	AO26.5 Where clearing cannot be reasonably avoided, and: - clearing has been reasonably minimised; and - the cleared area cannot be reasonably rehabilitated an offset is provided for any acceptable significant residual impact from clearing of essential habitat (a matter of state environmental significance).	
Acid sulfate soils (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry, necessary environmental clearing, necessary to control non-native plants or declared pests, managing thickened vegetation, encroachment)		
PO27 Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either of the following: aeration of horizons containing iron sulphides; or	AO27.1 Clearing does not occur in land zone 1, land zone 2 or land zone 3.	Complies with performance outcome The subject site is mapped as having an extremely low probability of acid sulfate occurrence. The proposed clearing work is considered unlikely to result in or accelerate
	OR	

Performance outcomes	Acceptable outcomes	Response
mobilisation of acid or metals.	AO27.2 Clearing in land zone 1, land zone 2 or land zone 3 in areas below the five metre Australian Height Datum only occurs where: mechanical clearing does not disturb the soil to a depth greater than 30 centimetres; and acid sulfate soils are managed consistent with the State Planning Policy, Department of Infrastructure, Local Government and Planning, July 2017, and with the soil management guidelines in the Queensland Acid Sulfate Soil Technical Manual, Department of Science Information Technology Innovation and the Arts, 2014. OR AO27.3 The local government is the assessment manager for the development application.	the disturbance of acid sulfate soils or hydrology of the subject site.
Clearing is staged (extractive industry)		
PO28 Clearing: is staged in line with operational needs that restrict clearing to the current operational area; and only occurs in the area from which material will be extracted, and any reasonably associated built infrastructure, within the term of the development approval; and does not occur without required permits.	No acceptable outcome is prescribed.	Not applicable The proposed clearing is not for the purpose of an extractive industry.
Coordinated project – involving clearing for agriculture		
PO29 Clearing only occurs where the land is suitable for agriculture having regard to topography, climate and soil attributes.	No acceptable outcome is prescribed.	Not applicable The proposed clearing work is not for agricultural purposes.
PO30 For applications for irrigated crops, the owner of the land has, or may have, access to enough water for establishing, cultivating and harvesting the crops to which the clearing relates.	No acceptable outcome is prescribed.	Not applicable The proposed clearing work is not for agricultural purposes.
Clearing for necessary environmental clearing – land restoration and natural disaster preparation		
PO31 Clearing does not occur, or where this is not reasonably possible, the applicant rehabilitates the cleared area.	AO31.1 Clearing retains all of the following: habitat trees; mature trees; and the natural floristic composition and range of sizes across the application area. OR	Not applicable The proposed clearing is not for the purposes of necessary environmental clearing, land restoration, or natural disaster preparation.

Performance outcomes	Acceptable outcomes	Response
	AO31.2 Clearing is for the purpose of natural disaster preparation and does not exceed the widths prescribed in table 16.3.1 of this code. OR AO31.3 Clearing is for the purpose of natural disaster preparation and does not exceed the areas prescribed in table 16.3.1 of this code. OR AO31.4 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.	
Clearing for necessary environmental clearing - natural channel diversion and contaminants removal		
PO32 Clearing does not occur, or where this is not reasonably possible, the applicant rehabilitates the cleared area or maintains the current extent of vegetation.	AO32.1 Clearing retains all of the following: 1. habitat trees; 2. mature trees; and 3. the natural floristic composition and range of sizes across the application area. OR AO32.2 Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the regional ecosystem is rehabilitated. OR AO32.3 Where clearing an endangered regional ecosystem or of concern regional ecosystem cannot be reasonably avoided, minimised or rehabilitated, an offset is provided for any acceptable significant residual impact from clearing of an endangered regional ecosystem or of concern regional ecosystem (a matter of state environmental significance).	Not applicable The proposed clearing is not for necessary environmental clearing, natural channel diversion or the removal of contaminants.
Conserving remnant vegetation that are regional ecosystems (necessary to control non-native plants or declared pests)		

Performance outcomes	Acceptable outcomes	Response
PO33 Clearing activities: maintain the natural floristic composition and range of sizes of each species of the regional ecosystem evenly spaced across the application area; and retain all habitat and mature trees.	AO33.1 Mechanical clearing: 1. only occurs within 1.5 metres from the edge of the canopy of individual non-native plants, unless the clearing is required to provide necessary access to control a non-native plant or declared pest; and 2. does not occur using two machines linked by chain or cable; and 3. retains all habitat trees and mature trees. AND	Not applicable The proposed clearing is not for the purposes of necessary environmental clearing or control of non-native plants or declared pests.
	AO33.2 Clearing to provide necessary access to control non-native plants or declared pests does not exceed five metres in width. AND	
	AO33.3 Any regional ecosystem burn is undertaken in accordance with the fire guideline for the regional ecosystem, as outlined in the Regional Ecosystem Description Database (REDD). AND	
	AO33.4 Chemical clearing retains all of the following: mature trees; and habitat trees; and at least 50 per cent of immature trees in each 50 metre by 50 metre area. AND	
	AO33.5 Aerial application of a root-absorbed broad spectrum herbicides does not occur. AND	
	AO33.6 Root-absorbed broad spectrum herbicides are not applied within whichever distance is the greater from a mature tree or a habitat tree; 30 metres; or the distance specified on the approved product label; or the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.	
Restoring the regional ecosystem (managing thickened vegetation)		

Performance outcomes	Acceptable outcomes	Response
PO34 Clearing activities: restore the natural floristic composition and range of sizes of each species of the regional ecosystem evenly spaced across the application area; and retain mature trees, habitat trees and tall immature trees and thickets.	AO34.1 Clearing does not occur in thickets.	Not applicable The proposed clearing is not for the purposes of restoring a regional ecosystem or managing thickened vegetation
	AND	
	AO34.2 Clearing retains: all mature trees and habitat trees; a full range of sizes and species typical of the regional ecosystem in the area; and where the number of mature trees plus habitat trees is less than 20 per hectare, tall immature trees to total 20 mature trees, habitat trees and tall immature trees per hectare.	
	AND	
	AO34.3 Clearing does not result in debris stacked or pushed against a mature tree, habitat tree or tall immature tree.	
	AND	
	AO34.4 If clearing immature trees, retain immature trees in each 50 metre by 50 metre area to at least the density specified in table 16.3.4 of this code.	
	AO34.5 If clearing low shrubs: in regional ecosystems where clearing is restricted to low shrubs as specified in table 16.3.4 of this code – clearing retains all immature trees; in regional ecosystems where clearing is not restricted to low shrubs as specified in table 16.3.4 of this code – clearing retains at least the number of immature trees specified in table 16.3.4 of this code; and clearing retains at least 10 per cent of the predominate species that have thickened.	
	AND	
	AO34.6 Mechanical clearing does not occur within 5 metres of the trunk of a mature tree, habitat tree or tall immature tree.	
	AND	
	AND	

Performance outcomes	Acceptable outcomes	Response
	AO34.7 Clearing is not undertaken by: aerial application of any herbicide; application of a root-absorbed broad spectrum herbicide. AND AO34.8 Chemical clearing does not occur within five metres of the trunk of a mature tree, habitat tree or tall immature tree. AND AO34.9 Any regional ecosystem burn is undertaken in accordance with the fire guideline for the regional ecosystem, as outlined in the Regional Ecosystem Description Database (REDD).	
Clearing limited to specific regional ecosystems and specific clearing methods (managing thickened vegetation)		
PO35 Clearing must be for the purpose of restoring the remnant regional ecosystem and only occur if all of the following apply: - clearing is in regional ecosystems prescribed in table 16.3.4 of this code; and - clearing is in accordance with the clearing restrictions for the regional ecosystem prescribed in table 16.3.4 of this code, retain mature trees, habitat trees and tall immature trees and thickets.	No acceptable outcome is prescribed.	Not applicable The proposed clearing is not limited to specific regional ecosystems or managing thickened vegetation
Clearing limited to specific regional ecosystems (encroachment)		
PO36 Clearing of encroachment does not occur, other than in the regional ecosystems listed in table 16.3.5 of this code.	No acceptable outcome is prescribed.	Not applicable The proposed clearing is not limited to specific regional ecosystems
Conserving vegetation (encroachment)		
PO37 Clearing activities: result in the restoration of the regional ecosystem; and retain all habitat trees; and retain all groves; and retain species which make up the natural floristic composition of the regional ecosystem, distributed in a natural pattern.	AO37.1 Clearing retains all of the following: all mature trees; and all habitat trees; and all woody vegetation within a grove, unless it is undertaken by a regional ecosystem burn. AND	Not applicable The proposed clearing is not for the purpose of conserving vegetation or encroachment.

Performance outcomes	Acceptable outcomes	Response
	AO37.2 Any regional ecosystem burn is undertaken in accordance with the fire guideline for the regional ecosystem, as outlined in the Regional Ecosystem Description Database (REDD).	
	AND	
	AO37.3 Clearing does not result in debris being stacked or pushed against a mature tree or a habitat tree.	
	AND	
	AO37.4 Mechanical clearing does not occur within 10 metres of a mature tree or a habitat tree.	
	AND	
	AO37.5 Aerial application of a herbicide does not occur.	
	AND	
	AO37.6 Chemical clearing does not occur within five metres of a mature tree or a habitat tree.	
	AND	
	AO37.7 Root-absorbed broad spectrum herbicides are not applied in any of the following areas: regional ecosystems 11.4.11 and 11.8.11; and within whichever is the greater distance from a mature tree or a habitat tree: 10 metres; or the distance specified by the approved product label; or the safety and use conditions specified by the Australian Pesticides and Veterinary Medicines Authority; and within whichever is the greater distance from a grove: 30 metres; or the distance specified by the approved product label; or the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.	
Limits to clearing for fodder harvesting (fodder harvesting)		

Performance outcomes	Acceptable outcomes	Response
PO38 Clearing is limited to: the extent necessary to provide fodder for stock; and areas where the stock is located, and the stock have sufficient water.	No acceptable outcome is prescribed.	Not applicable No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility.
PO39 Clearing must only occur: in regional ecosystems listed in table 16.3.6 or table 16.3.7 of this code; and in accordance with the harvesting method limitations for the regional ecosystem listed in table 16.3.6 or table 16.3.7 of this code.	No acceptable outcome is prescribed.	Not applicable No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility.
PO40 Clearing consists predominantly of fodder species.	No acceptable outcome is prescribed.	Not applicable No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility.
Conserving vegetation (fodder harvesting)		
PO41 Clearing is carried out in a way that conserves: remnant vegetation in perpetuity; and the regional ecosystem in which the vegetation is situated.	A041.1 Clearing does not result in the removal of non- fodder species with a height of four metres or more. AND A042.2 Selective harvesting: retains all non-fodder species except where the damage is an unavoidable consequence of clearing the selected fodder tree; and when using a chainsaw in regional ecosystems listed in table 16.3.6 of this code, retains at least one fodder tree for every fodder tree cleared; and in least concern regional ecosystems listed in table 16.3.7 of this code, retains at least one fodder tree for each fodder tree cleared; and in of concern regional ecosystems listed in table 16.3.7 of this code, retains at least two fodder trees for each fodder tree cleared. AND	Not applicable No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility.

Performance outcomes	Acceptable outcomes	Response
	AO41.3 Strip harvesting and block harvesting: where fodder harvesting has previously occurred in an area of a lot, only occurs if all of the following apply: the vegetation has not been cleared in the last 10 years; and the average height of the fodder trees is at least 70 per cent of the height of the tallest stands of fodder species in the regional ecosystem; and the fodder trees that were previously harvested have now attained an average height of at least 4 metres; and aligns clearing along the contour where practical; and does not occur in patches of regional ecosystems that are less than 10 hectares in area or less than 500 metres wide. AND AO41.4 Strip harvesting: does not result in any strip harvesting area exceeding 50 metres in width; and results in all strip retention areas: being preserved along the length of strip harvest areas to a width of at least 1.5 times that of the adjacent strip harvest area; and containing fodder species with an average height of at least four metres; and does not result in clearing for machinery access between strip harvest areas exceeding 15 metres in width. AND AO41.5 Block harvesting: does not result in any block harvest area exceeding one hectare; and results in block retention areas: being preserved between block harvest areas in accordance with the widths specified in table 16.3.8 of this code; and containing fodder species with an average height of at least four metres; and does not result in clearing for machinery access between block harvest areas exceeding 10 metres in width.	

Performance outcomes	Acceptable outcomes	Response
Cleared vegetation (fodder harvesting)		
PO42 Fodder harvesting is carried out in a way that results in the woody biomass of the cleared vegetation remaining where it is cleared.	No acceptable outcome is prescribed.	Not applicable No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility.
Conserving the fodder resource (fodder harvesting)		
PO43 Fodder harvesting is carried out in a way that will conserve the fodder resource.	AO43.1 Clearing does not occur: in an area that has been cleared in the previous 10-year period; and more than once in the same area of a lot; and in more than 50 per cent of the area of the regional ecosystem listed in table 16.3.6 and table 16.3.7 of this code on the lot; and in areas required to be retained under this code, a development approval or any accepted development vegetation clearing code.	Not applicable No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility.
Duration of clearing, preventing land degradation, and maintaining biodiversity, ecological processes and regional ecosystems (Vegetation retention purposes)		
PO44 The duration of clearing for a vegetation retention purpose occurs only for a period that: will not contribute to land degradation; and ensures the ongoing maintenance of ecological processes and biodiversity; and maintains the regional ecosystem.	No acceptable outcome is prescribed.	Not applicable The proposed clearing is not for the purposes of vegetation retention.

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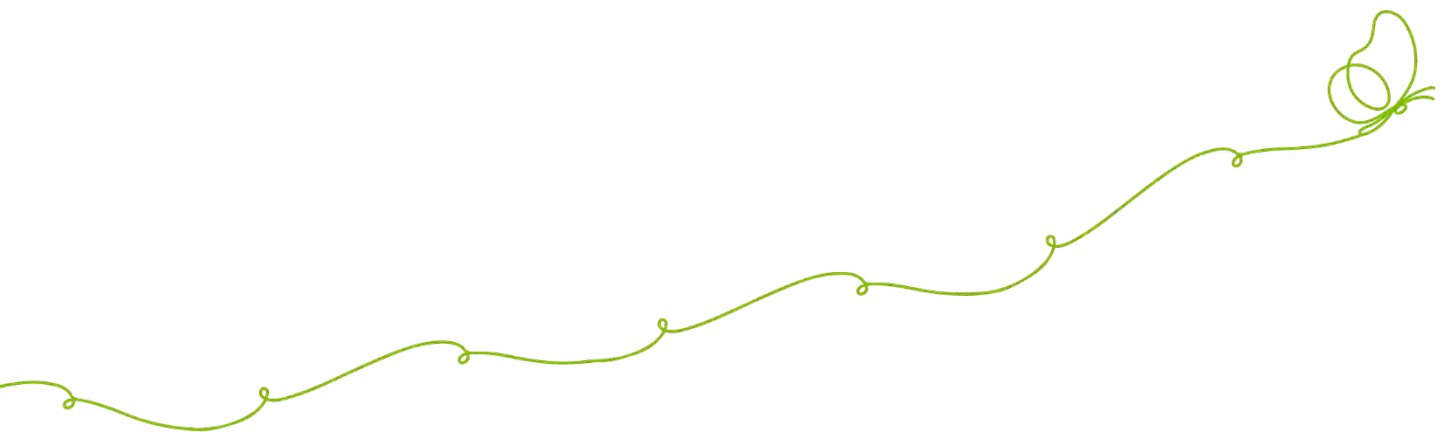
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Appendix C: PMST results



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: 17-Feb-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	33
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

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

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

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

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

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Great sandy strait (including great sandy strait, tin can bay and tin can inlet)	10 - 20km upstream from Ramsar site	In buffer area only

Listed Threatened Ecological Communities	[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps. Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.	

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area	
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species			[<u>Resource Information</u>]
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			
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area	In feature area
Erythroriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Acacia attenuata [10690]	Vulnerable	Species or species habitat may occur within area	In feature area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat may occur within area	In feature area
Cossinia australiana Cossinia [3066]	Endangered	Species or species habitat likely to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area	In feature area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Fontainea venosa [24040]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Macrozamia lomandroides cycad [55406]	Endangered	Species or species habitat may occur within area	In feature area
Macrozamia pauli-guilielmi Pineapple Zamia [5712]	Endangered	Species or species habitat likely to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area	In feature area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area

REPTILE			
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat may occur within area	In feature area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		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 may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species	[Resource Information]		
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely 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 likely 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area overfly marine area	In feature area

Reptile
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]
Species or species habitat likely to occur within area
In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Burrum	Fish Habitat Area (B)	QLD	In buffer area only

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Controlled action					
Raising of Lenthalls Dam, Doongal Creek	2004/1716	Controlled Action	Post-Approval	In buffer area only	
Not controlled action					
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area	

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

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

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