Jet Zero™

ECOLOGICAL ASSESSMENT REPORT

Jet Zero

PROJECT ULYSSES

ECOLOGICAL ASSESSMENT REPORT

PLANNING AND ENVIRONMENT
28011008-HSE-REP-00008
REV 0

Role	Name	Signature	Date	Document Control Only
Originator:	Lochlan Gibson		8/5/2025	Rev: 0
Reviewer:	Willy Vukan		9/5/2025	Review by date: 9/5/2025
Approver:	Andy Fielding			Approve by date:

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1. INTRODUCTION

Jet Zero Australia Pty Ltd (Jet Zero) is a leading Australian bio-energy company focussed on delivering Sustainable Aviation Fuel (SAF), via a certified technology known as the Alcohol-To-Jet (ATJ) pathway. Jet Zero are proposing to construct Australia's first ATJ plant converting ethanol feedstock into SAF at Townsville, Queensland, referred to as 'Project Ulysses' (in this report as 'Project'). The Project location is within the Townsville State Development Area (TSDA), approximately 8 km from the Port of Townsville (PoTL), and surrounded by existing and planned industrial facilities as shown in Error! Reference source not found..

1.1. Objectives

The purpose of this Ecological Assessment is to inform the statutory planning process and support the Development Permit for Material Change of Use (MCU) – Special Industry required prior to construction of Project (SAF Facility).

The objectives of this study are to:

- Review the background information related to ecological constraints in the local, regional, State and National context of the Project.
- Review the statutory requirements relating to ecological values and constraints.
- Describe the ecological values of the Project site area.
- Assess the potential ecological constraints, impacts and mitigation controls of the proposed Project.

1.2. Scope of Works

The scope of this study is to:

- Describe the ecological values and legislative framework related to the Project.
- Conduct an ecological field survey to verify and expand understanding of values.
- Complete a report explaining the methodology, results and conclusions of the assessment.

1.3. Site Description

The Project site comprises a 19.556 hectare (ha) total, which includes 16.71 ha of developable area and 2.85 ha of access handle, comprising a 1,050 m road access from Colinta Road to the plant site (see Error! Reference source not found.). The Project site is within the TSDA that is designated for industrial purposes strategically positioned at the intersection of the Bruce and Flinders Highways, with direct access to major rail networks and the port, facilitate industrial developments of regional, state, and national significance. It offers a streamlined assessment process under the *State Development and Public Works Organisation Act 1971*, providing a coordinated approach to planning and development. The Project site Cleveland Bay Industrial Park (CBIP) developer has existing Reconfiguring a lot (RAL) and Operational Works (OpWorks) for clearing native vegetation of the road access and plant site areas (AP2022/001, OPW22/0014, AP2023/013, OPW24/0107).

The Project site is a stable flat area with elevation of between 3 and 4 km (Australian Height Datum), on the edge of an intertidal zone with the Highest Astronomical Tide (HAT) surrounding the development extent to the north, east and west. The site has sensitive environments surrounding the area with a wetland protection area 0.5 km to the west (State Development Assessment Code (SDAC) Code 9: Great Barrier Reef protection area),the Great Barrier Reef Marine Park (GBRMP) 2 km to the north and Ramsar Convention listed wetlands and Bowling Green National Park approximately 7 km to the east.

The site has historically operated as a vacant allotment, accommodating cattle grazing with no built form constructed with the site.

Figure 1: Site Location

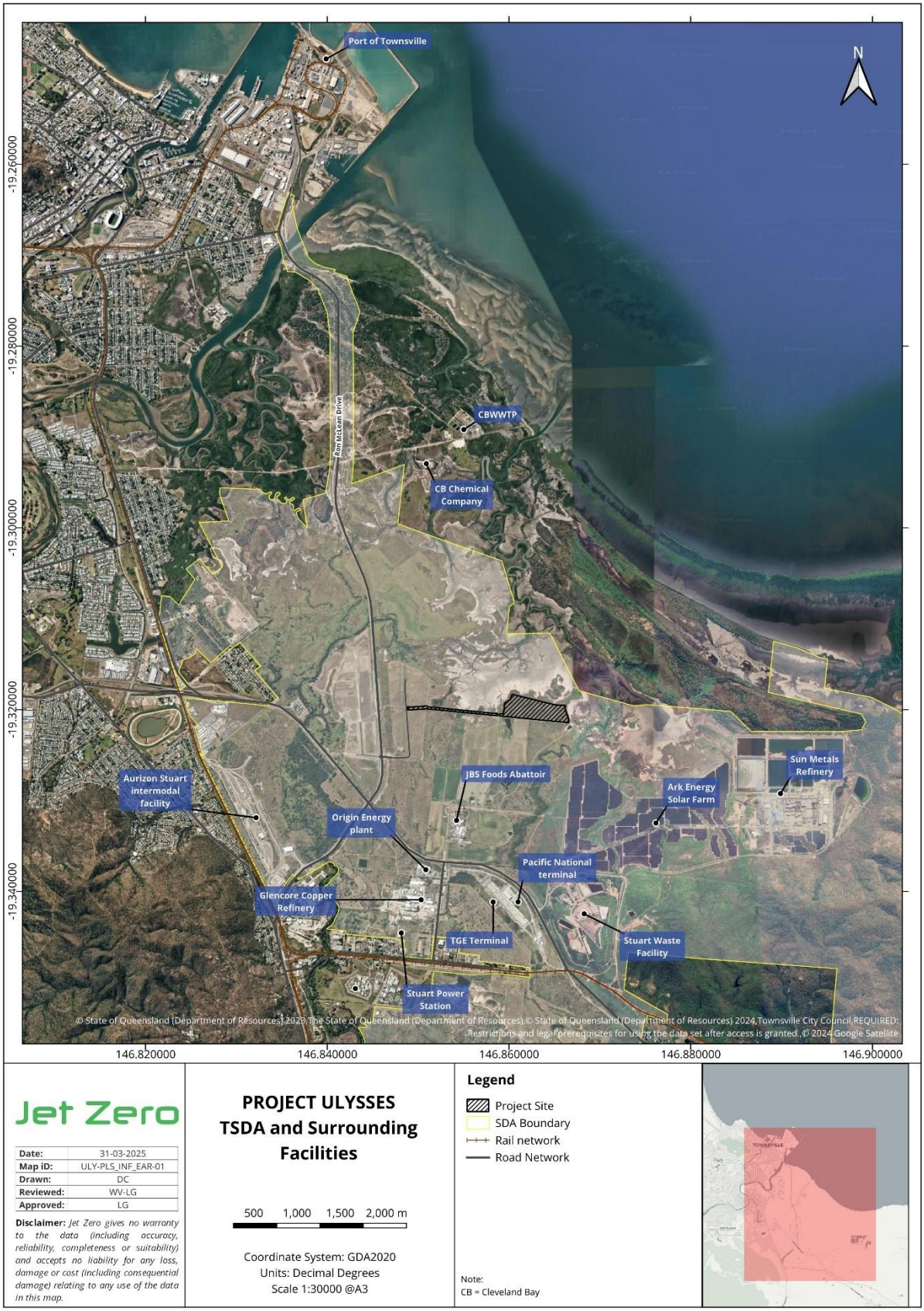
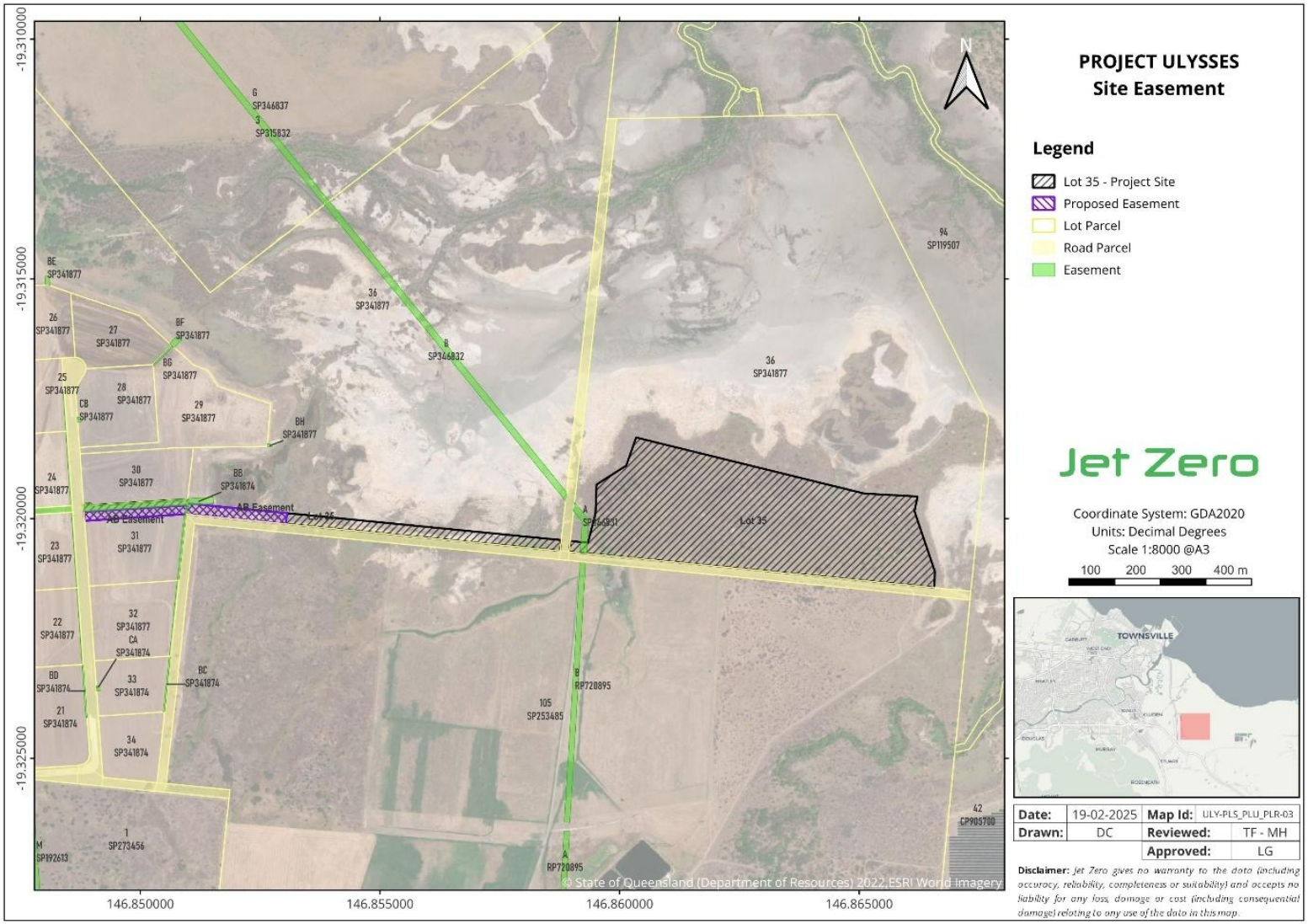


Figure 2: Site Location and Easement



1.4. Statutory Consideration

Table 1 summaries relevant environmental legislation relevant to the assessment of ecological constraints of the Project, showing section references to this report.

Table 1: Relevant Environmental Statutory Considerations

Legislation	Description	Relevance to Assessment
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	EPBC Act establishes a process for environmental assessment and approval of proposed actions that have, or are likely to have, a significant impact on Matters of National Environmental Significance (MNES) or the environment on Commonwealth land. Such an action is considered a 'controlled action'.	Project approval under EPBC Act (Decision 3/9/2021) – see **Section 1.5.1**
State		
Nature Conservation Act 1992 (NC Act)	The NC Act provides for the conservation of Queensland's biodiversity, including declaration and management of protected areas, protection of wildlife and habitat, and the sustainable use of native wildlife and areas. Under the NC Act, an activity must not interfere with a breeding place of protected animals. Breeding places can include bird's nests, tree hollows, hollow logs and ponds. A Species Management Programme (SMP) authorises activities that will impact on breeding places of protected animals. A SMP is only required where an animal breeding place has been identified within the proposed disturbance footprint.	**Section 1.5.2**
Vegetation Management Act 1999 (VM Act)	The VM Act is the planning initiative underlying regional management of vegetation in Queensland, including clearing of vegetation types, termed Regional Ecosystems (RE). • The RE classification is a hierarchical system formed by a three-part code with the primary subdivision being bioregion, followed by land zone, and then vegetation. The biogeographic region or bioregion is the primary level of classification for biodiversity values in Queensland describing where the RE is found on a state-wide basis; • The status of REs is based on their pre-clearing and remnant extent, is gazetted under the Act and listed in the RE Description Database (REDD) maintained by the Queensland Department of Environment and Heritage Protection (DEHP); and • The Act aims to conserve remnant endangered and of concern REs, prevent land degradation and further loss of biodiversity, manage the environmental impacts of clearing vegetation and reduce the emissions of greenhouse gases.	**Section 1.5.2**
Water Act 2000	*The Water Act 2000* (Water Act) provides for the sustainable management of water and other resources, a regulatory framework for water sewerage services, and the establishment and operation of water authorities. The Water Act governs the construction, control and management of works with respect to water conservation and protection, irrigation, drainage, water supply, flood control and prevention. The Water Act regulates the destruction/ disturbance of freshwater riverine vegetation in the bed and banks of	**Section 4.1.4**

Legislation	Description	Relevance to Assessment
	Department of Natural Resources and Mines (DNRM) watercourses. Section 266 of the Water Act identifies that: A person may apply to the chief executive for a permit to do any or all of the following activities: • Destroy vegetation in a watercourse, lake or spring; • Excavate in a watercourse, lake or spring; and • Place fill in a watercourse, lake or spring. Destruction of vegetation in accordance with the Water Act is "…the removing, clearing, killing, cutting down, felling, ringbarking, digging up, pushing over, pulling over or poisoning of the vegetation". In accordance with the Water Act, watercourses are determined as watercourses by the DNRM through topographical mapping, aerial imagery and a possible onsite assessment.	
Queensland Fisheries Act 1994	The *Fisheries Act 1994* (Fisheries Act) provides for the use, conservation and enhancement of the community's fisheries resources and fish habitat by providing for, amongst other things, the protection of fish habitats. The Fisheries Act has been integrated into the *Sustainable Planning Act 2009* (SP Act) so that development permits under the SP Act are required for certain operational works that are assessable development under the act. Operational works that are assessable development under the SP Act include waterway barrier works and works in a declared fish habitat.	**Section 3.5**
Environmental Offsets Act 2014 (EO Act) *Environmental Offsets Regulation 2014* (EO Reg)	*Environmental Offsets Act 2014* coordinates the delivery of environmental offsets across jurisdictions and is the overarching legislation for offsets in Queensland. *Environmental Offsets Regulation 2014* provides details of the prescribed activities regulated under existing legislation and prescribed environmental matters to which the Act applies. Queensland Environmental Offsets Policy which provides a single, consistent, whole-of-government policy for the assessment of offset proposals provided by authority holders to satisfy offset conditions.	Not applicable. Offsets requirements for Essential Habitat buffer and marine plants are conditioned under OPW24/0107for CBIP developer (refer to **Section 1.6**)

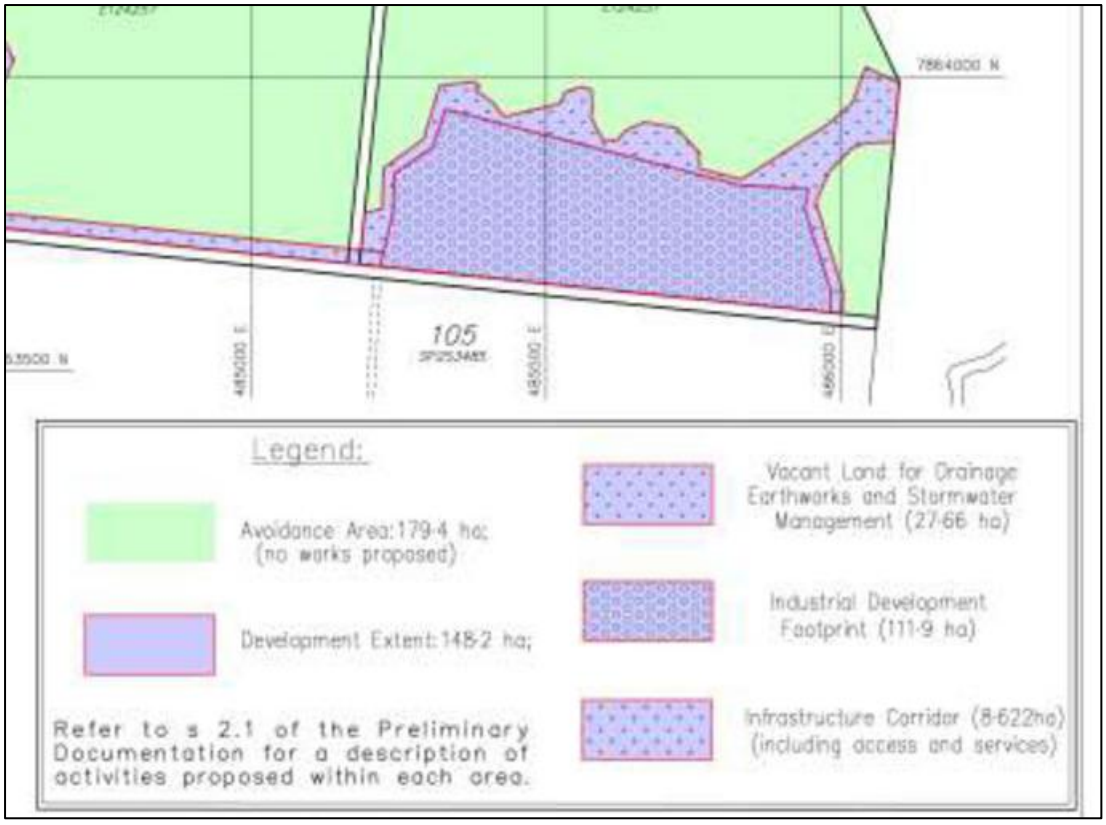
1.5. Existing Approvals

1.5.1. Commonwealth Approval

The Project has an existing approval under the *Environment Protection and Biodiversity Act 1999* (EPBC Act) (Commonwealth). The CBIP land developer submitted a Referral for the Project plant site to the Department of Climate Change, Environment, Energy and Water (DCCEEW), that was deemed a 'Controlled Action' with Preliminary Documentation (PD) (EPBC 2020/8810, application 24/6/2021). The PD was produced and submitted to DCCEEW with an approval gained under the EPBC Act with 'Conditions' (Decision 3/9/2021). This approval included the area boundary within the existing plant site as shown in Figure 3.

The approval conditions relate to the Bare-rumped Sheath Tailed Bat (EPBC listed species), with the conditions being added to the Project approvals register. This species and habitat were further field surveyed and assessed and is described in **Section 3.1** of this EAR.

Figure 3: EPBC Approval - Development Extent



1.5.2. State Approval

Current application AP2023/013 directly relates to the proposal, noting this approval is for the purpose of excising the proposed subject site as a separate freehold allotment from the current lot arrangement. It is noted the approved lot layout associated with AP2023/013, is yet to be formalised with the Titles Office given on-going works are being undertaken associated with demonstrating compliance with conditions of approval.

Refer to **Table 2** below for an associated development application summary, relevant to the bounds of this applications assessment.

Table 2: Relevant Development Applications

Application Reference and Status	Assessment Manager	Application Type	Description	Ecology
AP2022/001 OPW22/0014 (associated) Approved – 27 June 2022	Office of Coordinator-General	Combined Reconfiguring a Lot & Operational Works	Reconfiguring a lot (3 lots into 14 lots plus 2 balance lots and 1 service lot) and operational works for clearing native vegetation.	Essential habitat wetland buffer within the access road requiring ecological offset (see **Section 1.6** and **4.1.10.1**).
AP2023/013 Approved – 11 September 2024	Office of Coordinator-General	Combined Reconfiguring a Lot & Operational Works	Reconfiguring a lot (2 into 3 lots) and operational work for native vegetation clearing.	-
OPW24/0107 Approved – 20th March 2025	Townsville City Council	Operational Works	Associated with Reconfiguring a Lot (SDA Approval AP2023/013) – Civil Works, Marine Plant Clearing, Waterway Barrier Works and Prescribed Tidal Works.	Marine plants within access road requiring ecological offset (see **Section 1.6** and **4.1.10.1**).

1.6. Potential Offset Requirements

The EO Act and Environmental Offsets Policy (EO Policy) are the primary pieces of legislation and policy for the delivery of offsets in Queensland. An environmental offset is an activity which is undertaken to counterbalance a significant residual impact (SRI) for a prescribed activity on a prescribed environmental matter.

Section 9 of the EO Act defines a prescribed activity as an activity that is:

(a) The subject of an authority under another Act; and

(b) For which an offset condition may be imposed under the other Act on the authority; and

(c) That is prescribed under a regulation.

An environmental offset condition may be imposed under various State's assessment frameworks for prescribed activities under the EO Act, if the activity will, or is likely to have a SRI on a prescribed environmental matter that is a Matters of State Environmental Significance (MSES). An SRI is defined under the EO Act, section 8 as:

> *"an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a prescribed environmental matter that:*
> *a) remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site avoidance and mitigation measures for the prescribed activity; and*
> *b) is, or will or is likely to be, significant."*

The existing developer, CBIP has an Operational Works approval for the Project site with existing offset requirements as part of the prescribed activities (see **Table 2**).

The proposed Project activity will not meet the criteria proposed and therefore not require an offset granted by the administering agency. The Project does not directly impact regulated vegetation and High Ecological Value (HEV) watercourses.

2. METHODOLOGY

2.1. Desktop and Field Survey

The ecology baseline and assessment were developed in three phases, phase one, a desktop baseline (NRA, 2024) aiming to identify the environmental planning considerations related to development of Project site, and a second phase covering field-survey (NRA, 2025a), with additional shorebird survey (summer) (NRA, 2025b), and ecological impact assessment (see **Section 2.2**).

The initial surveys were completed between the months of August and October 2024 (NRA, 2025a), within Project site and surrounding areas, with an additional February 2025 survey (NRA, 2025b). All field surveys used recognised methodologies for the relevant component, covering:

- Terrestrial ecology field surveys to:
    - Assess watercourses and wetlands in the project footprint (i.e. Project site and access road).
    - Improve the accuracy of Regional Ecosystem (RE) mapping and fauna habitat mapping via quaternary vegetation assessments and habitat observations.
    - Map the extent and density of marine plants over the core infrastructure footprint[1].
    - Conduct targeted searches for Threatened, Near Threatened (T/NT) and/or Migratory species (and their habitat) identified as potentially present.
    - Map the locations of Commonwealth and State listed weed species and pest fauna.
- Migratory shorebird surveys within 300 m of the core the infrastructure footprint.
- Search of publicly available databases and Queensland Government mapping of key findings and potential project-related threats to MNES and MSES.

2.2. Ecological Impact Assessment

2.2.1. Sensitivity of Values / Receptors

The third phase of the ecology assessment was to complete an ecological impact assessment, utilising the data and knowledge gained from the first two phases. The methodology for establishing the sensitivity of values is provided in **Table 3** as an integral part of the identified environmental values. The referred section also describes the baseline environment and the sensitivity of these values. This sensitivity has been incorporated into the impact assessment to evaluate the overall severity of the project's activities.

[1] The areas to the north, east and west of the project site was preliminary identified as most likely to support migratory shorebirds; hence, the buffer reflects the minimum reasonable observation distance for detection and identification at high tide.

Table 3: Sensitivity / Vulnerability Criteria of Potential Impacts

Sensitivity / Vulnerability	Description
Extreme	• Environmental or social / cultural value is listed on a statutory national or international register as being of conservation significance. • Value is entirely intact and wholly retains its intrinsic value. • Value is unique in area in which it occurs, and isolated to the affected system/area, which is poorly represented in the country or the world. • Value/receptor is unable to recover from, or adjust to, change or disturbance. • Project activities would have an extreme adverse effect on the value.
High	• Environmental or social / cultural value is listed on a statutory State, national or international register as being of conservation importance. • Value is highly conserved and wholly retains its intrinsic value. • Value is unique in area in which it occurs, complete or partially isolated to the affected system/area, which is poorly represented in the region, State country or the world. • Value/receptor is unlikely to recover from, or adjust to, change or disturbance. • Project activities would have a high adverse effect on the value.
Significant	• Environmental or social / cultural value is listed as being important at a regional level and may be listed on recognised or statutory registers. • Value is in a moderate to good condition despite being exposed to threatening processes, it retains many of intrinsic characteristics and structural elements. • Value is represented in systems/areas that it occurs, but abundance and distribution are exposed to threatening processes. • Threatening processes have reduced resilience to change, so changes resulting from project activities may lead to degradation of the prescribed value. • Project activities would have a significantly adverse effect on the value.
Moderate	• Environmental or social / cultural value is not listed on any statutory register and not recognised locally by relevant suitably qualified experts or organisation. • Environmental value/receptor is not sensitive to change or disturbance and is able to fully recover. • Project activities would have a moderate adverse effect on the value.
Low	• Value is not unique or rare and numerous representative examples exist throughout the system / area. • The environmental or social / cultural value / receptor is highly disturbed, and the natural recovery of the impacted area to a pre-project condition is expected within less than one year. • Project activities would have a low adverse effect on the value.

2.2.2. Intensity of Potential Impacts

The intensity, or magnitude, of impacts is described with consideration of the geographic extent of the potential impact, the duration of the effect, and reversibility of the impact. More information on the descriptors of intensity and magnitude of impact are provided in **Table 4**.

Table 4: Intensity / Magnitude Criteria of Potential Impacts

Sensitivity / Vulnerability	Description
Extreme	• Impact that is widespread, permanent and results in substantial irreversible change to the environment and/or social value. • Avoidance through significant design modification and or relocation are required to address the intensity of the impact.
High	• Impact that is widespread, long lasting and results in substantial and possibly irreversible change to the environment and/or social / cultural value. • Avoidance through appropriate design responses or the implementation of environmental or social / cultural site-specific management controls are required to address the impact. • If avoidance is not possible, mitigation and management practices must be comprehensive and adequate to guarantee no irreversible change to the environment and/or social value.
Significant	• Impact extends beyond the area of disturbance to the surrounding area but is contained within the region where the project is being developed. • The impacts are short to medium term and result in changes that can be ameliorated with specific environmental or social / cultural management controls.
Moderate	• Impact is localised, temporary or short term and either unlikely to be detectable or could be effectively mitigated through standard environmental or social / cultural management controls.
Low	• Impact is localised that is barely discernible and effectively mitigated through standard environmental and social / cultural management controls.

2.2.3. Overall Impact Severity

To determine the impact severity, classified as 'significance,' the impact assessment process employs a 5 x 5 matrix, resulting in four impact levels (i.e., impact significance) as presented in **Table 5**. The overall ranking of impact significance is derived for each identified potential impact event using the classifications contained in this matrix. For example, a high impact intensity scored against a moderately sensitive environmental value would result in a major overall impact classification.

The impact significance criteria presented in **Table 5**. The acceptable level of impacts for the project is determined to be within the 'Minor' or 'Medium' range (as indicated by the bold borders).

Table 5: Environmental and Social Impact Significance Matrix

Impact Assessment – Planned Activities					
Intensity / Magnitude of Impact	**Sensitivity / Magnitude of Value / Receptor**				
	Low Sensitivity	**Moderately Sensitive**	**Significantly Sensitive**	**Highly Sensitive**	**Extremely Sensitive**
Extreme Intensity	Major	Major	Extreme	Extreme	Extreme
High Intensity	Medium	Major	Major	Extreme	Extreme
Significant Intensity	Medium	Medium	Major	Major	Extreme
Moderate Intensity	Minor	Minor	Medium	Medium	Major
Low Intensity	Minor	Minor	Minor	Medium	Medium

Table 6: Impact Significance Criteria

Sensitivity / Vulnerability	Description
Extreme	• Impact that is widespread, permanent and results in substantial irreversible change to the environment and/or social value. • Avoidance through appropriate design responses or the implementation of environmental or social / cultural controls are required to address the impact.
Major	• Impact that is widespread, long lasting and results in substantial and possibly irreversible change to the environment and/or social / cultural value. • Avoidance through appropriate design responses or the implementation of environmental or social / cultural site-specific management controls are required to address the impact. • If avoidance is not possible, mitigation and management practices must be comprehensive and adequate to guarantee no irreversible change to the environment and/or social value.
Medium	• Impact extends beyond the area of disturbance to the surrounding area but is contained within the region where the project is being developed. • The impacts are medium to short term and result in changes that can be ameliorated with specific environmental or social / cultural management controls.
Low	• Impact is localised, temporary or short term and either unlikely to be detectable or could be effectively mitigated through standard environmental or social / cultural management controls.

3. ECOLOGICAL VALUES

The ecological environmental values for the Project site are described in subsections below.

3.1. Matters of National Environmental Significance

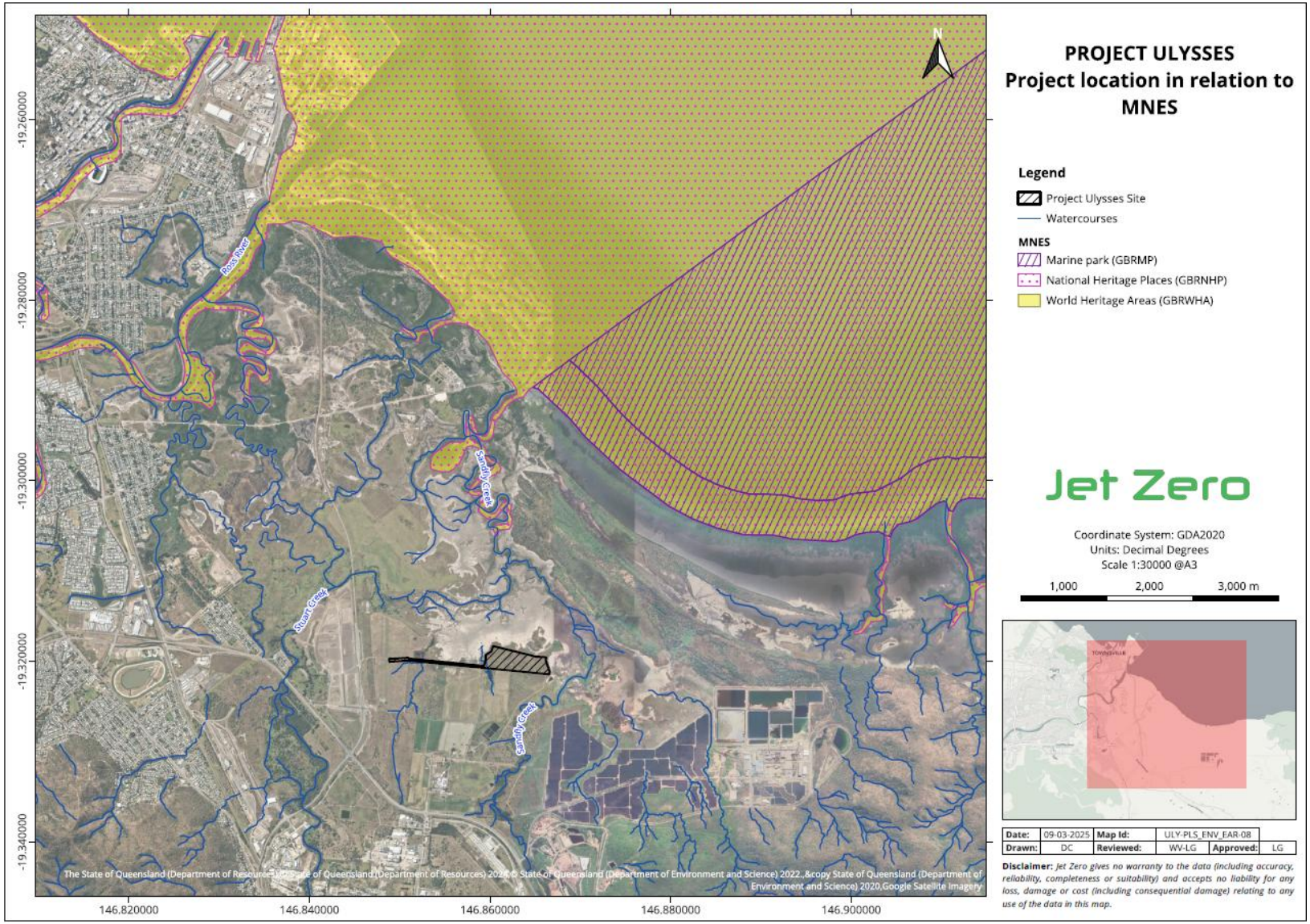
Matters of National Environmental Significance are defined under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in Australia. MNES are elements of the environment that have been identified as being of national importance and are therefore protected under the EPBC Act. The Act sets out the legal framework to protect and manage these significant aspects of the environment (DEWHA, 2013). The MNES identified intersecting or within the project area of influence, i.e., ecologically sensitive receptors located adjacent, in the vicinity, surrounding or distal surrounding areas are presented in **Table 7**.

Table 7: MNES and Corresponding Environmental Values

MNES	Relevant Values	Description of the Value	Intersects Project Footprint?
World heritage areas	GBR World Heritage Area (GBRWHA)	The project area is located on the periphery of the GBR World Heritage Area. Surface waters leaving the project site report to Sandfly Creek and discharge to Cleveland Bay, part of the GBRWHA. The area is critical for maintaining the ecological and heritage values of the GBRWHA, including its biodiversity, ecological processes, and aesthetic values (see **Figure 4**).	No. Within project area of influence (approx. 2.5 km downstream of project site).
National heritage places	GBR National Heritage Place (GBRNHP)	The GBRNHP is co-located with the GBRWHA and is protected for its significant natural and cultural heritage values (see **Figure 4**).	

MNES	Relevant Values	Description of the Value	Intersects Project Footprint?
Marine parks	GBR Marine Park (GBRMP)	Part of the GBRWHA, sharing the same environmental values (see **Figure 4**).	No. Within project area of influence (approx. 6.3 km from project site).
Listed Threatened species and ecological communities	Species observed: Sharp-tailed Sandpiper Latham's Snipe Eastern Curlew Bare-rumped Sheathtail Bat	Species and ecological communities that are identified as being at risk of extinction or significant decline under the EPBC Act.	Bare-rumped Sheathtail Bat is likely to maintain a regular presence (foraging) over the project footprint. Other species observed in the receiving environment north of the project site.
Listed Migratory species	Species observed: Common Sandpiper Sharp-tailed Sandpiper Latham's Snipe Eastern Curlew Whimbrel Pacific Golden Plover Caspian Tern Eastern Osprey Fork-tailed Swift Red-necked Stint Black-tailed Godwit Estuarine Crocodile Glossy Ibis	Species that migrate to, from, or within Australia and are protected by international agreements, including under the EPBC Act. The Project occurs on the southern margin of the 'Cleveland Bay' important Migratory shorebird habitat (see **Figure 4**).	Partially. The specie Black-tailed Godwit was observed intersecting Project site. Other species observed in the receiving environment north, east and west of the project site.
Bowling Green Bay National Park	Wetland of international importance (Ramsar site)	The park is known for its diverse and significant environmental values. A range of habitats, including wetlands, estuaries, mangroves, saltpans, and coastal dunes, which contribute to its ecological importance.	No. Distant from project site.
Cleveland Bay – Magnetic Island	Dugong conservation area.	Cleveland Bay and Magnetic Island together form a critical part of the GBR ecosystem, holding an important conservation area.	No. Distant from project site.

Figure 4: Project Location in Relation to Matters of National Environmental Significance



3.2. Matters of State Environmental Significance

Matters of State Environmental Significance are state-significant environmental values that are identified by the Queensland Government to aid in the protection of biodiversity through the planning system and environmental offsets framework (DETSI, 2024).

Where an MSES is triggered through activities administered through the *Planning Act 2016*, the 'Significant Residual Impact Guideline – For matters of state environmental significance and prescribed activities assessable under the *Planning Act 2016* (DSDIP, 2014) is used to determine the significance of the impact.

MSES are defined in Section 10 of the EO Act, being a 'prescribed environmental matter' by reference to a matter declared, defined, designated, established, listed, prescribed or otherwise described under this Act or another Act, with examples including:

- Protected areas (including all classes of protected area except coordinated conservation areas), Threatened, Vulnerable and special least concern wildlife prescribed under the *Natural Conservation Act 1992*
- 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
- Fish habitat area declared (Management A and B areas), under the *Fisheries Act 1994* / *Fisheries Regulation 2008*
- Marine plant within the meaning of the *Fisheries Act 1994*
- Regulated vegetation under the *Vegetation Management Act 1999*, including:
    - 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;
    - Category X (an area in which clearing of vegetation has happened, which has not been allocated to another category, unless otherwise determined by the chief executive).
    - Water (shown on a regulated vegetation management map as 'water'; 'water' is not defined under the VM Act).
    - 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.

The MSES identified as adjacent or within the Project area of influence are presented in **Table 8**. **Figure 4** shows the MSES conservation areas that does not intersect Project site and are not directly impacted by the Project.

Soils and erosion prone areas are also considered relevant State values, described in **Section 4.1.3.** The existing environment on surface and groundwater bodies and its corresponding values are detailed in **Section 4.1.4**.

Table 8: MSES and Corresponding Environmental Values

MSES	Relevant values	Description of value	Relevant to Project Site?
Regulated vegetation	High conservation value regional ecosystems (REs) and connectivity areas	REs are vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil under the VM Act (see **Section 1.4**).	Partially. Mostly non-remnant[1]. No prescribed RE. Existing CBIP approval for clearing native vegetation.
Designated Precinct	Strategic Environmental Area	A designated precinct in a strategic environmental area is a MSES.	Project area does not intersect or contain a strategic environmental area and so does not trigger the relevant MSES.
Wetlands and watercourses	High ecological significance (HES) wetlands	Wetlands that are identified as being of high ecological value under the EP Act (see **Figure 6** and Error! Reference source not found.)	No[2]. Existing CBIP approval and offsets for wetland vegetation.
Protected wildlife habitat	Core habitats conservation	An area of habitat (foraging, roosting, nesting or breeding habitat) for an animal that is Endangered, Vulnerable or Special Least Concern (DEHP, 2014; DSDIP, 2014) (see **Figure 8**)	No areas of core habitat intersect the Project footprint, and none occur in the nearby receiving environment.
Declared Fish Habitat Areas (FHA)	Important and mapped fish habitats	A declared FHA is an area protected against physical disturbance from coastal development, while still allowing legal fishing. The project is on the periphery of the Burdekin–Townsville Coastal Aggregation Nationally Important Wetland (DCCEEW, 2019) (see Error! Reference source not found.).	No. The mapped fish habitat area is in the distal receiving environment, where no works are planned in this area.
Waterway providing fish passage	Waterway for waterway barrier works (DAF 2023)	A dam, weir or other barrier across a waterway if the barrier limits fish stock access and movement along a waterway under the Fisheries Act.	No. The Order 1 watercourse that intercepts the project site, however mapped as of moderate risk is unlikely to provide fish passage due the artificial stock dam stopping connectivity of the watercourse. Existing CBIP approval has conditions for fish passage works[3].
Marine plants	Marine plants as defined in the Fisheries Act.	Some marine plants (e.g. mangroves, seagrass, samphires, saltcouch and saltmarsh plants) are protected regardless of their location on or above tidal land. Marine plants that grow adjacent to tidal land provide valuable habitat to fish when hydrologically connected to the marine environment.	Yes. Above HAT (small portion on extent North of project site, approximately 2,480.5 m²)[4]. Existing approval and offsets for marine plants are conditioned under OPW24/0107 for CBIP developer

MSES	Relevant values	Description of value	Relevant to Project Site?
Legally secured offset areas	Offsets gained under EO Act	A legally secured offset area is a MSES.	No legally secured offset areas intersect the Project area and therefore the proposed activity does not trigger the MSES – legally secured offset areas. Previously secured offset exists north of road access for wetland Essential Habitat buffer area (see **Figure 7**)

Notes: *[1] Access road intersects mapped and field-verified remnant vegetation within the defined distance of a wetland. This vegetation clearing approval is including in CBIP Operational Works.*

*[2] Access road intercepts a HES wetland (DES, 2022b) which is located to its north (see **Figure 7**), vegetation clearing approval is included in CBIP Operational Works.*

*[3] See **Section 4.1.7** The importance of the tidal area (below HAT, mapped as a major risk waterway). This area, however, is not part of the Project development.*

[4] Above and below HAT (access road).

Figure 5: Matters of National and State Significance Conservation Areas

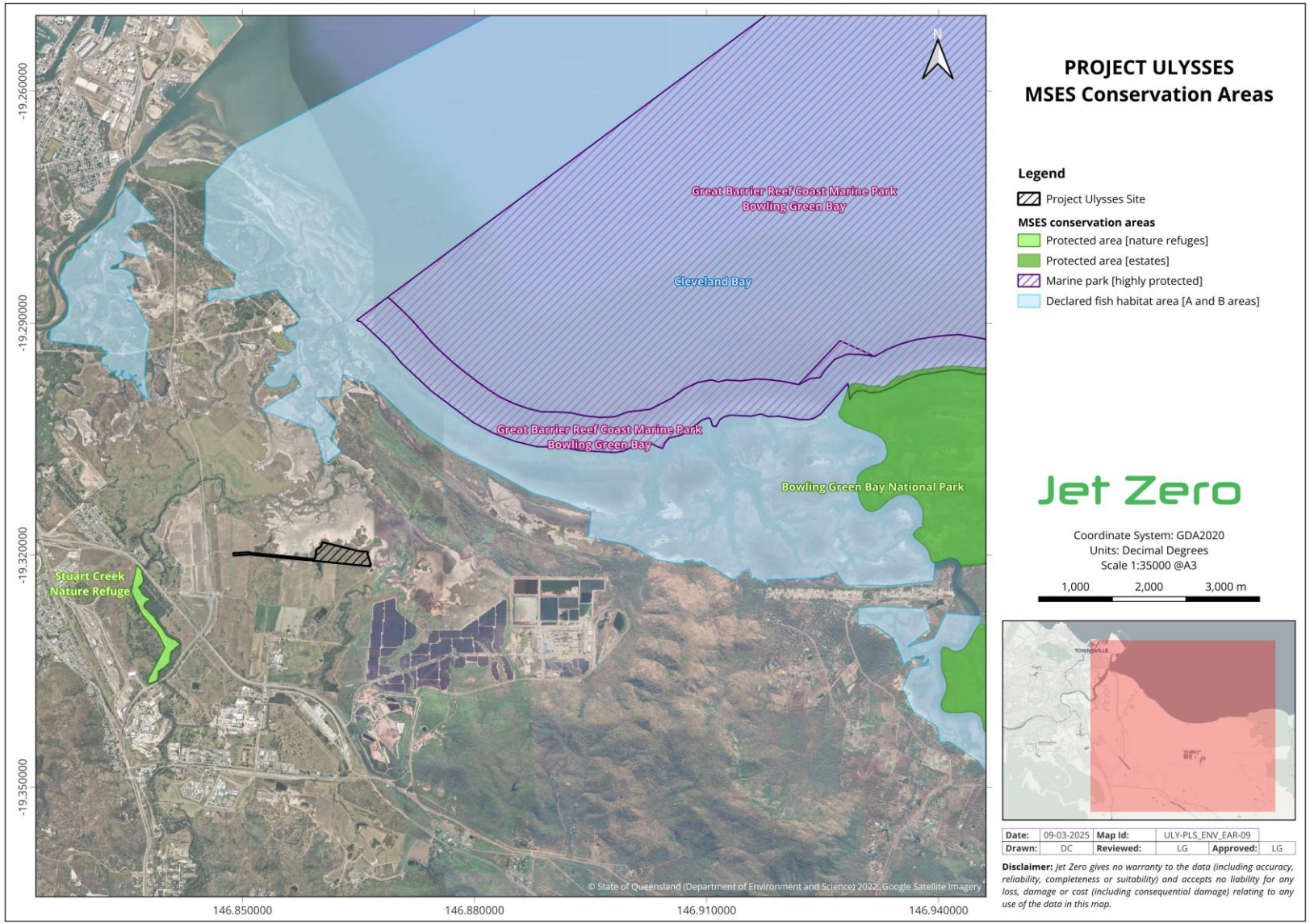


Figure 6: Matters of State Environmental Significance Vegetation and Wetlands

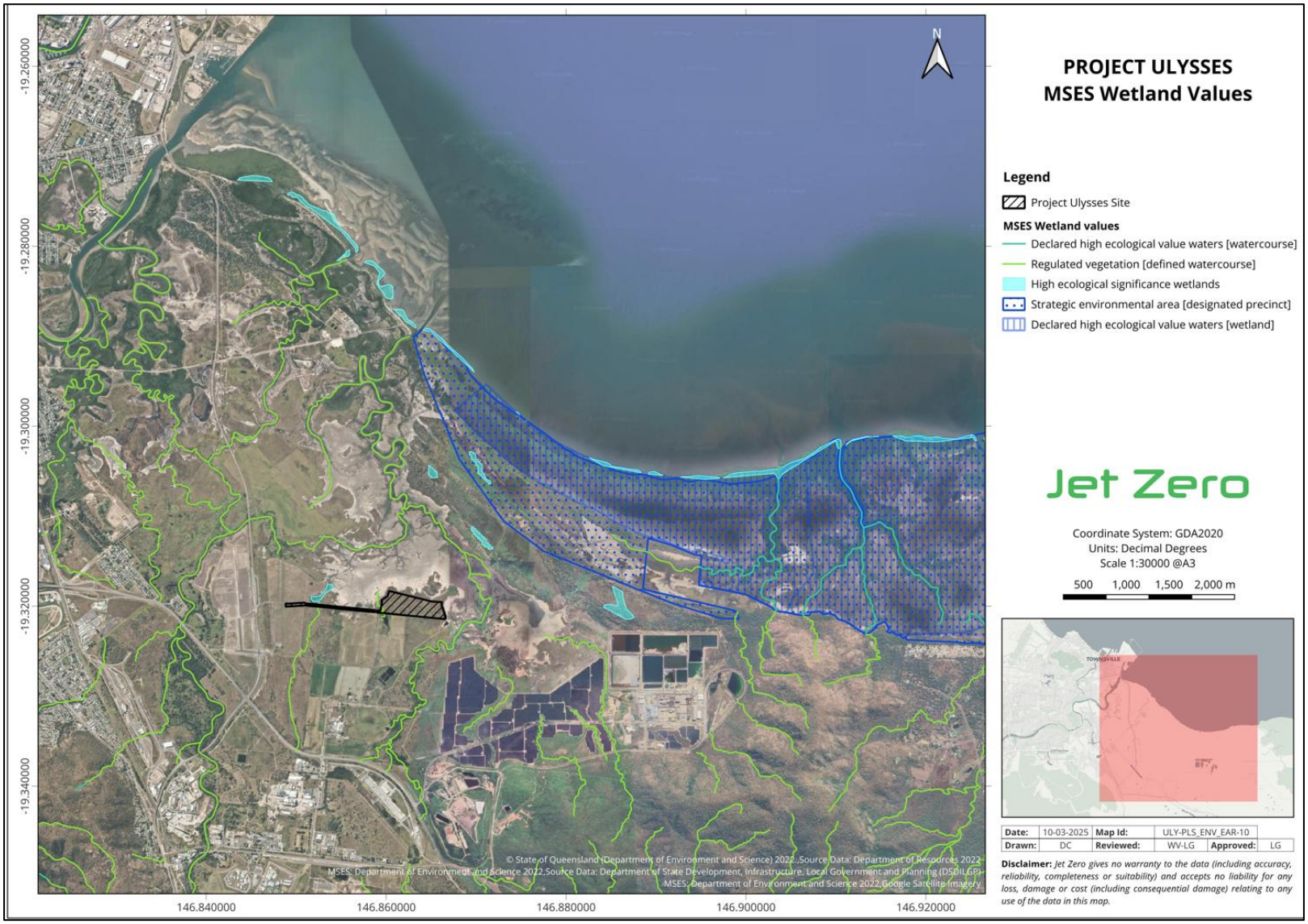


Figure 7: High Ecological Significance and Vegetation Management Wetlands

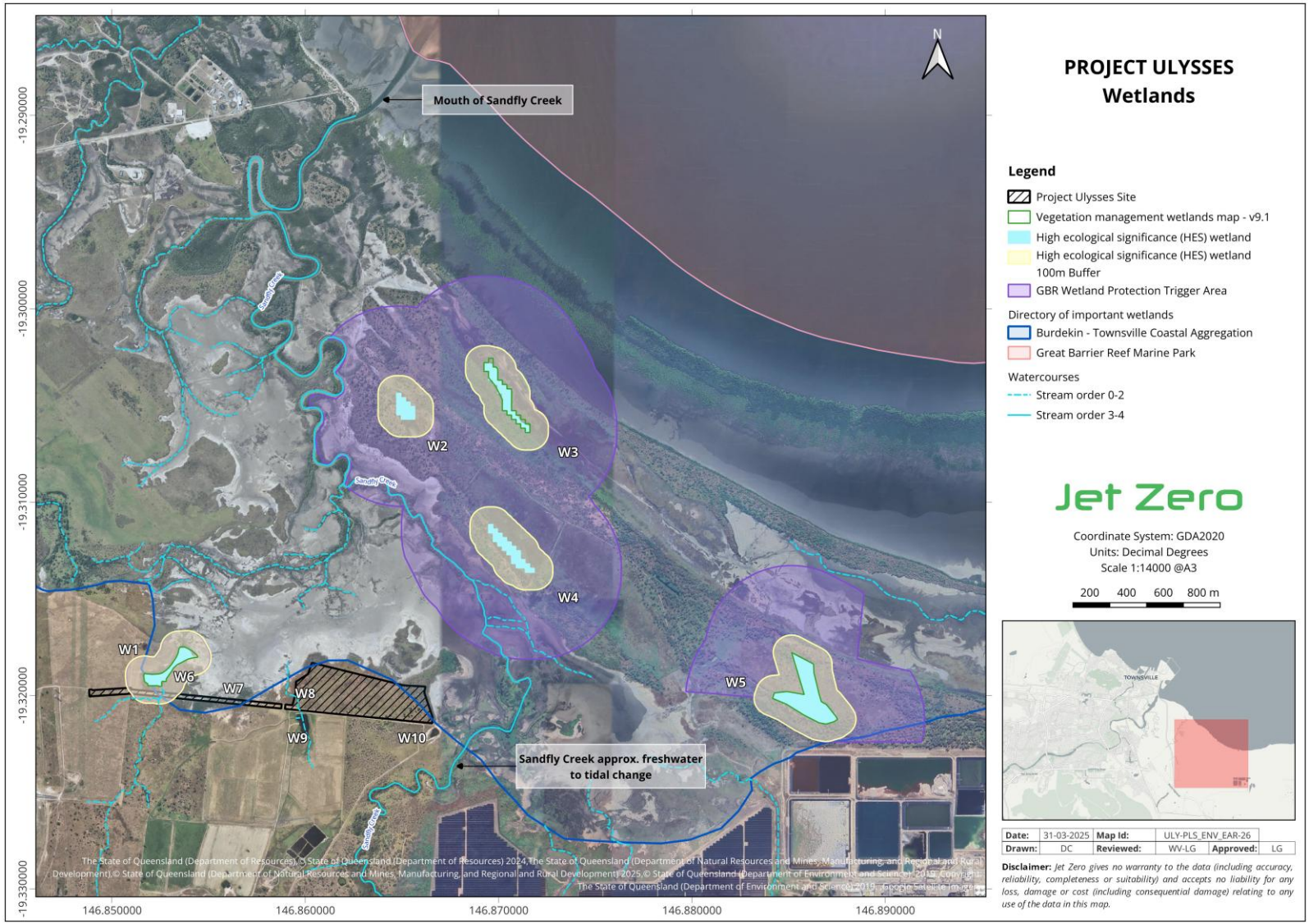
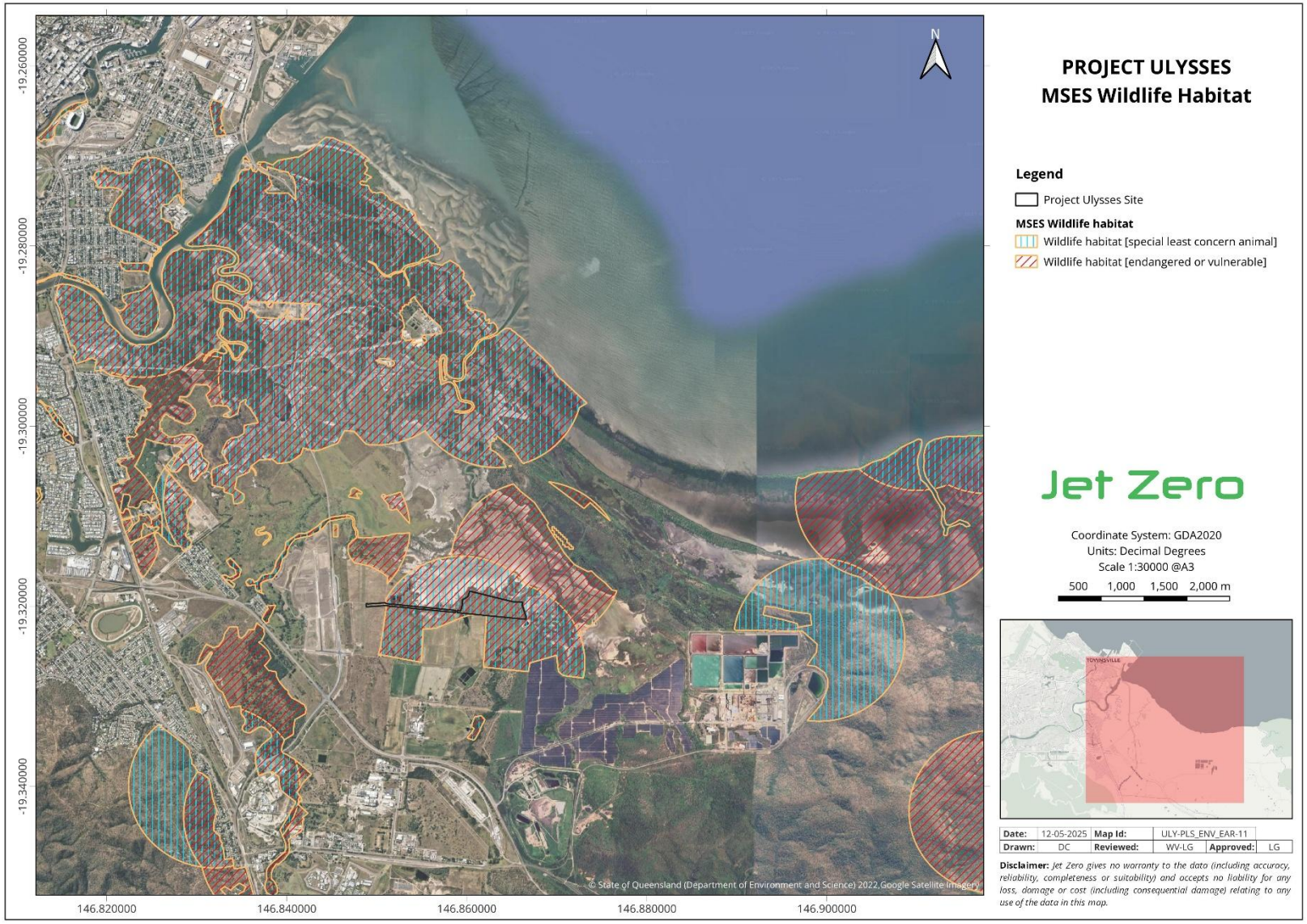


Figure 8: Matters of State Environmental Significance Wildlife Habitat



3.3. Wetlands and Waterbodies

A baseline assessment of the wetlands and waterbodies surface water quality was conducted by Terra Solutions (2025), where results are summarised in the below section.

The project area is located in the Sandfly Creek catchment of the Ross River basin, approximately 2 km from the coastline. Any stormwater releases from the project will discharge into the lower reaches of Sandfly Creek, a tributary of the Ross River Basin (Basin 118). Sandfly Creek arises from ranges approximately 5 km south of the site and flows in a northerly direction before entering Cleveland Bay (which is included in the GBRWHA and GBRMP).

A stream order 1 tributary of Stuart Creek is located 1.4 km north-east of the site. This area is the divide between the Stuart Creek and Sandfly Creek catchments. The Stuart Creek tributary flows northwest under Ron McLean Drive before heading north, while Sandfly Creek flows east and serves as the receiving environment for the project. Stuart Creek tributary is not within the same catchment as the project site.

The immediate receiving environment of the project includes upper tidal limits of Sandfly Creek, which is classified as middle estuary (WQ1181) (DETSI, 2020), including a stream order 3 which is located northeast of the site which flows in a northerly direction. A stream order 1, also classified as middle estuary, is located north of the site and flows in an easterly and then northerly direction before its confluence with the stream order 3 watercourse. From its confluence Sandfly Creek flows for 5 km before entering Cleveland Bay. Upstream of the site, Sandfly Creek is classified as lowland freshwaters (WQ1181), where an ephemeral stream order 3 watercourse arises to the south of the site and flows in a northerly direction, bounding the site to the east.

Other watercourse features associated with the access road, includes a stream order 1 watercourse which arises from the Bruce Highway in the south, flowing in a northerly direction before terminating at a palustrine wetland 700 m west of the project area. A small palustrine wetland associated with JBS water infrastructure is located immediately south of the site. The wetland flows into a stream order 1 watercourse which intersects the south-east corner of the project area, before sheet flowing into the Sandfly Creek tidal flats.

There are no wetlands mapped under the Vegetation Management Act (VM Act) within the project site area. **Table 9** and **Figure 7** present the waterbodies, including wetlands and streams, and whether they intersect the project footprint and the project location in relation to the Sandfly Creek catchment. This includes the approximate location of the freshwater to tidal change. The project site is approximately 3.1 km from the mouth of Sandfly Creek.

Table 9: Relevant Wetlands and Surface Water Values Identified Within a 10 km Radius of the Project Site

Figure Tag	Relevant Value	Description	Intersects Project Footprint?
W1	High Ecological Significance (HES) and High Ecological Value Wetlands (MNES)	This area is mapped as an estuarine wetland and described as having tidal influence, containing salt flats and saltmarshes.	No[1]
W2 – W5	GBR HES wetlands (MSES)	Four were identified: Wetland B (1.1 ha); Wetland C – 1.9 ha; Wetland D (1.7 Ha) and Wetland E (5.1 Ha) within two kilometres radius of the site. The GBR HES Wetlands are mapped as palustrine wetlands by DETSI Wetland Mapping (Version 6) and described as coastal/sub coastal floodplain tree swamps (Melaleuca and Eucalypt).	No. Occurs downstream north/NE of project site.

Figure Tag	Relevant Value	Description	Intersects Project Footprint?
(area)	Burdekin-Townsville Coastal Aggregation - DIWA[1] wetland (DIWA QLD 005)	Bounds the northern, eastern and western extent of the area, with approximately 1.1 ha of the northern extent of the site mapped as the DIWA. The wetland occurs on large low gradient coastal floodplain, divided by inconsistent depressions, continuing onto a shallow water embayment. It forms a collection of shallow marine waters from the coastal zone to permanent and seasonal freshwater lakes inland, on the adjacent coastal plain (DCCEEW, 2004).	No. However, occurs adjacent of the project area.
W6	Modified palustrine wetland	Field-verified modified palustrine wetland mapped as of high ecological significance (HES wetland), hydrologically modified habitat through bunding of a natural channel (DES, 2022a,b; DESI, 2024a), identified as an aquatic GDE. An existing stormwater structure south-west of the wetland reports to the wetland. There is a 2-m wide swale depression intersecting the access road, which waters discharge to the palustrine wetland, likely to be of low value for fish passage.	No. Occurs 700 m west of project site[2].
W7	Swale depression	Field-verified and characterised as an ephemeral waterbody (periodic inundation during king tides) within the access road. Potentially provide fish passage, as represented by waterways for waterway barrier works mapping (DAF, 2023).	No[2].
W8	Watercourse	A field-verified first-order stream, intersecting the south-western extent of the project site was identified. Its upstream connectivity is interrupted by a stock dam wall. As verified by Terra Solutions (2024), this watercourse lacks significant fish habitat and whilst it generally meets the criteria of a waterway there is no upstream connectivity due to the upstream dam wall (W8).	Yes, occurs within southwestern portion of project site.
W9 – W10	Artificial wetlands (JBS stock dam)	Two artificial stock dams were identified during field survey, to occur just south of the project site, within JBS land. One constructed circa 1991 (W8) stops the connectivity of the watercourse (W7). The other dam was constructed circa 1980 (W9). Both waterbodies are likely to be of low value as fish habitat and were not considered sensitive receptors.	No However, the dam wall (W7) was observed seeping towards the extension of the access road in several occasions.

[1] Directory of Important Wetlands in Australia (DIWA), list of wetlands of national importance published by DCCEEW (update October 2021). Nationally important wetlands are not MNES.

[2] Access road intersects this area.

3.4. Vegetation

3.4.1. Regional Ecosystems and Threatened Ecological Communities

Vegetation communities observed within the survey area were not consistent with Queensland Government regulated vegetation mapping. Field-verified REs was also found to be different from the VM Act (see **Figure 9**):

- All vegetation in the Project site was found to be non-remnant, apart from a small area in the north-east, samphire forb land on marine mudflats (RE 11.1.2b).

- The area mapped as a Vegetation Management Wetland (**Figure 7**) was confirmed to be a palustrine wetland containing remnant vegetation (see **Figure 9**).
- The presence of all mapped watercourses was confirmed (see **Figure 9**). Each of the watercourses was found to be bordered by non-remnant vegetation.

No potential presence of any Threatened Ecological Communities (TECs) was identified. None of the vegetation communities observed within the survey area are listed as TECs under the EPBC Act and TECs are not likely to occur. Hence, no T/NT plants were present in the Project footprint[2], and none are predicted to occur.

Marine plants under the *Queensland Fisheries Act 1994* (Fisheries Act) were observed above the Highest Astronomical Tide (HAT) within the Project site and access road. Marine plants within the facility site cover only a small portion within northern boundary within corresponding transect, with approximately 2,480.5 m^2, whereas 82 % correspond to marine plants and 17 % to leaf litter (see **Figure 10**). Species within Project site are:

- *Fimbristylis polytrichoides*
- Beadweed (*Salicornia quinqueflora* subsp. *auinqueflora*)
- Sea Purslane (*Sesuvium portulacastrum*)
- Sand Couch (*Sporobolus virginicus*)
- *Vincetoxicum carnosum*.

[2] Regarding the access road (CBIP development), most REs vegetation along was identified to be remnant (RE 11.1.2b and 11.3.27x1a) and marine plants above and below HAT along access road, covering an area of approximately 24,879.8 m^2.

Figure 9: Mapped Versus Field-Verified Regional Ecosystems

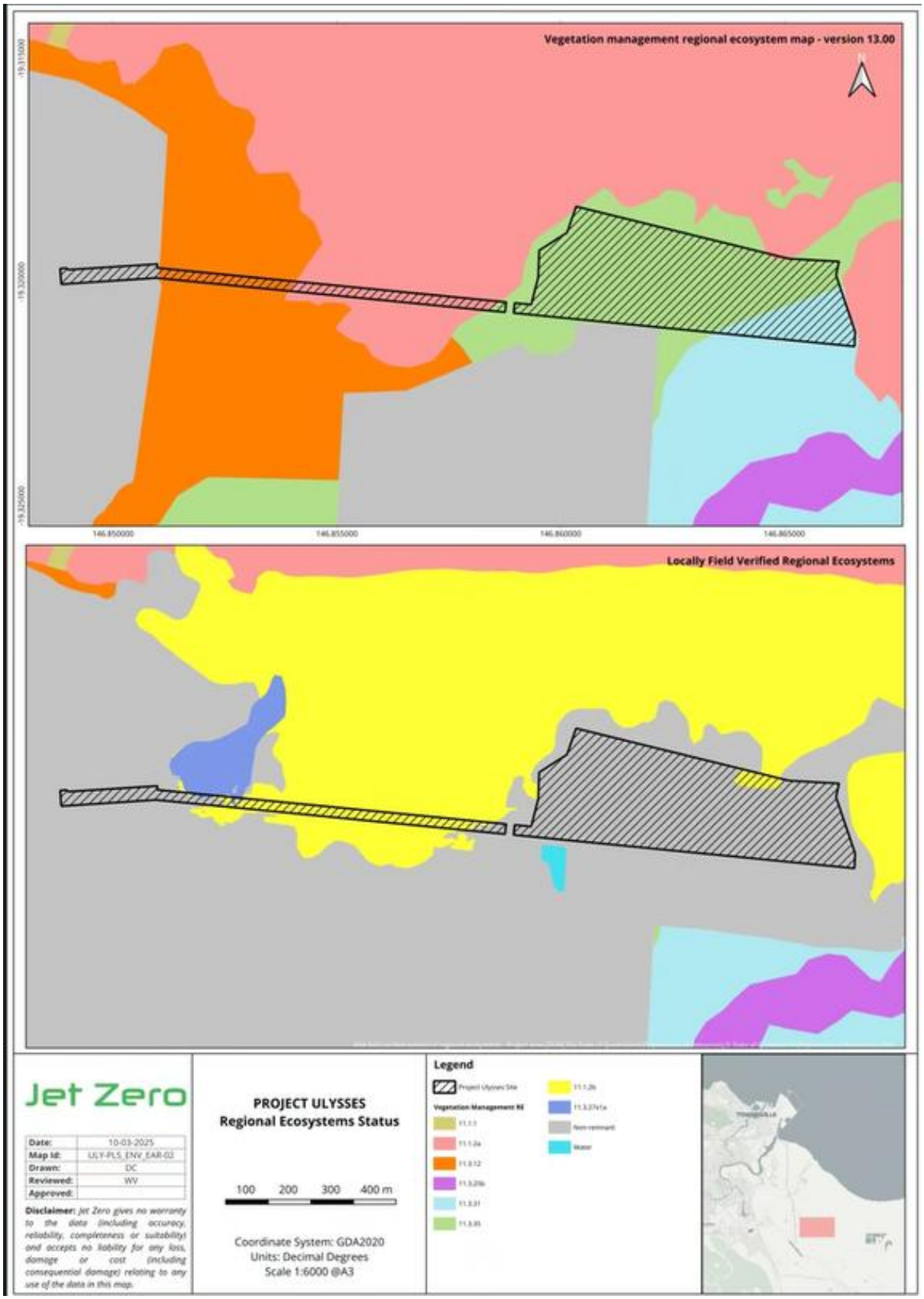
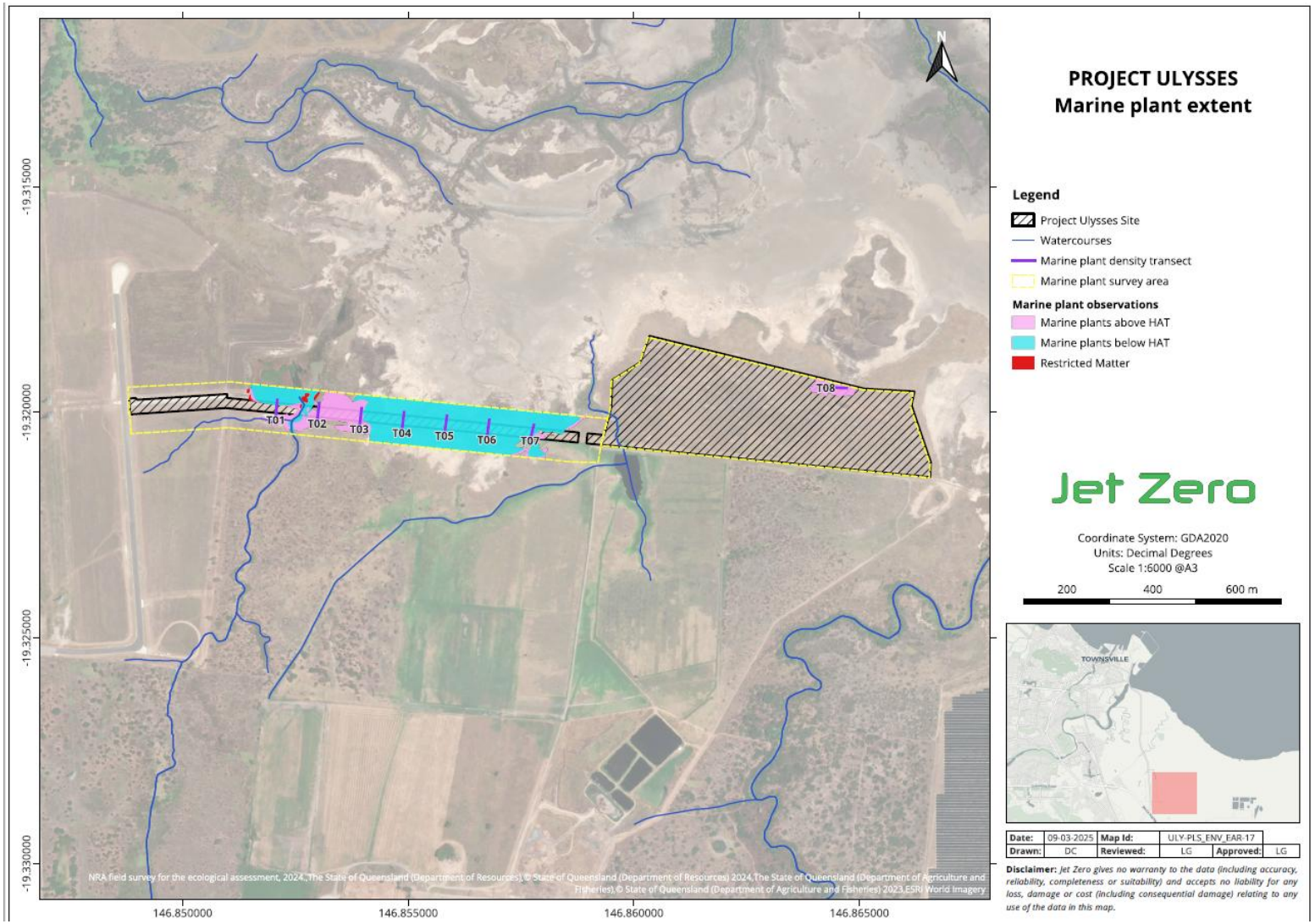


Figure 10: Mapped Versus Field-Verified Marine Plants



3.4.2. Vegetation Providing Habitat

No areas of core habitat intersect the project footprint, and none occur in the nearby receiving environment. Near the project footprint, field verified important habitats comprising saltmarsh (below HAT), mangroves and freshwater wetlands (excluding the dam southwest of the facility site).

Habitats that intersect the project footprint are considered auxiliary (poor quality and/or with limited resources).

3.5. Fauna

The presence of T/NT and Migratory fauna was confirmed in the project receiving environment during the field surveys and other T/NT, Migratory and/or Special Least Concern species may occur.

The project occurs on the southern margin of the 'Cleveland Bay' important Migratory shorebird habitat as defined by Weller et al. (2020). The results from the shorebird surveys indicate that inland areas, including habitats to the west, north and east of the facility site are visited by certain Threatened and migratory shorebird species when conditions are suitable, primarily in association with spring tide events and following substantial rainfall. Observed abundances of all migratory shorebird species in the Project receiving environment were below the thresholds for national significance. The area within 500 m of the core infrastructure footprint does not contain core habitat for Threatened and/or migratory shorebird species.

Field habitats observed during field surveys are presented in **Figure 11**. Habitats that intersect the core infrastructure footprint are considered auxiliary for MNES and MSES fauna[3]; no areas of core habitat intersect the Project, and none occur in the nearby receiving environment.

Table 10 presents the fauna expected to have a presence within the project receiving environment, while **Figure 12** presents those with presence observed during field survey.

Table 10: Fauna Observed within Project Receiving Environment

Species		EPBC Act	NC Act	Expected Presence
Common Name	Scientific Name			
Microbats				
Bare-rumped Sheathtail Bat	*Saccolaimus saccolaimus nudicluniatus*	Vulnerable	Endangered	Regular presence (foraging)
Coastal Sheathtail Bat	*Taphozous australis*	Not listed	Near Threatened	Uncertain
Migratory Shorebirds				
Eastern Curlew	*Numenius madagascariensis*	Critically Endangered and Migratory	Critically Endangered	Intermittent (foraging and/or roosting)
Black-tailed Godwit	*Limosa limosa*	Endangered and Migratory	Endangered	Incidental observation, exceptionally rare
Sharp-tailed Sandpiper	*Calidris acuminata*	Vulnerable and Migratory	Vulnerable	Intermittent (foraging and/or roosting)
Latham's Snipe	*Gallinago hardwickii*	Vulnerable and Migratory	Vulnerable	Intermittent (foraging and/or resting)

[3] Listed under the EPBC Act and/or Queensland *Nature Conservation Act 1992* (NC Act). List excludes 'exceptionally rare' fauna.

Species		EPBC Act	NC Act	Expected Presence
Common Name	Scientific Name			
Red-necked Stint	*Calidris ruficollis*	Migratory	Special Least Concern	Intermittent (foraging and/or resting)
Whimbrel	*Numenius phaeopus*	Migratory	Special Least Concern	Intermittent (resting and/or foraging)
Common Sandpiper	*Actitis hypoleucos*	Migratory	Special Least Concern	Intermittent (roosting and/or foraging)
Pacific Golden Plover	*Pluvialis fulva*	Migratory	Special Least Concern	Intermittent (roosting and/or foraging)
Fork-tailed Swift	*Apus pacificus*	Migratory	Special Least Concern	Intermittent presence (foraging)
Caspian Tern	*Hydroprogne caspia*	Migratory	Special Least Concern	Intermittent presence (flying over)
Glossy Ibis	*Plegadis falcinellus*	Migratory	Special Least Concern	Intermittent presence (foraging)
Eastern Osprey	*Pandion haliaetus cristatus*	Migratory	Special Least Concern	Intermittent presence (foraging and potentially nesting)
Migratory reptiles				
Estuarine Crocodile	*Crocodylus porosus*	Migratory	Vulnerable	Intermittent presence (foraging)
Mammals				
Short-beaked Echidna	*Tachyglossus aculeatus*	Not listed	Special Least Concern	Intermittent presence

Figure 11: Field-Verified Wildlife Habitat

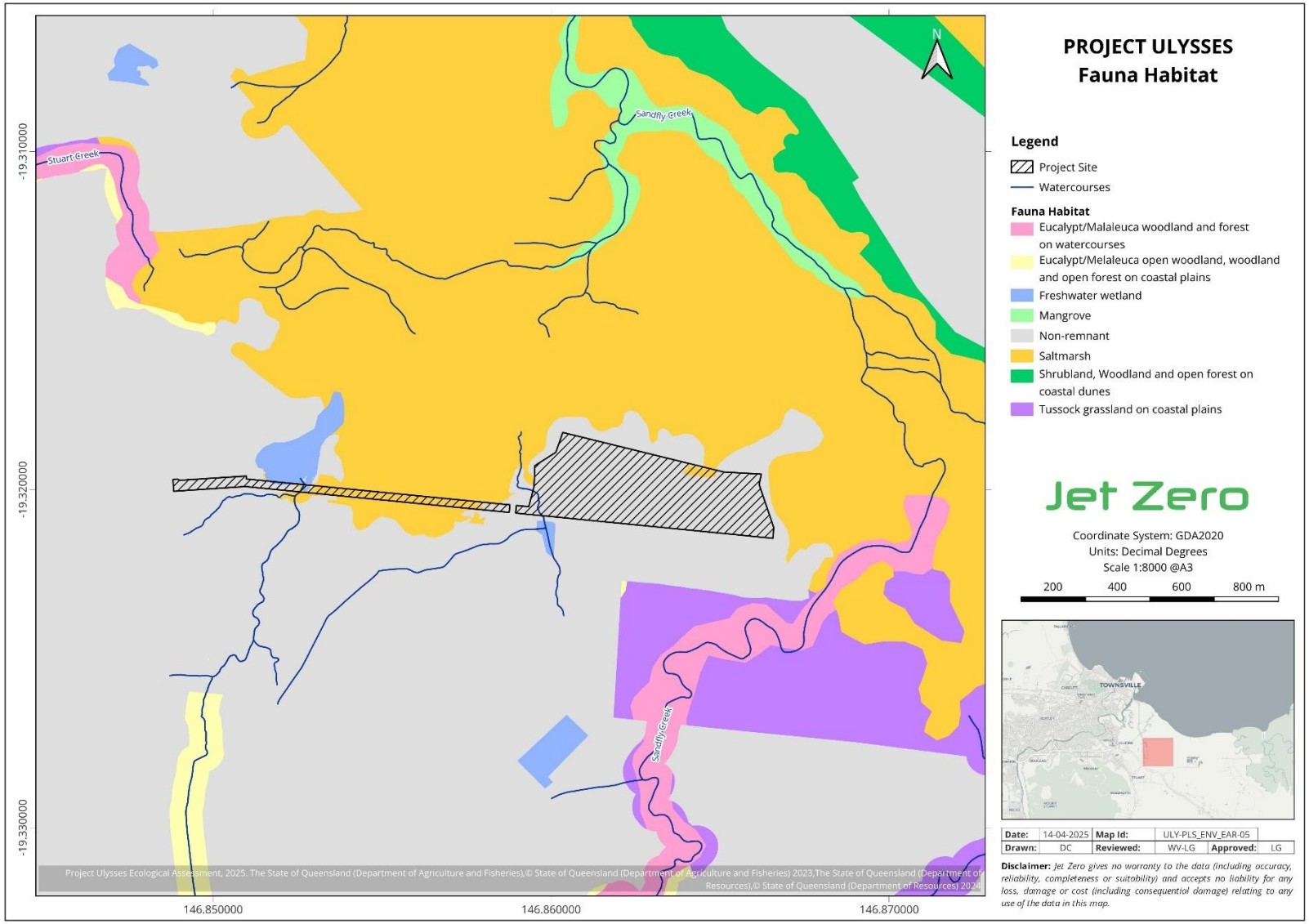
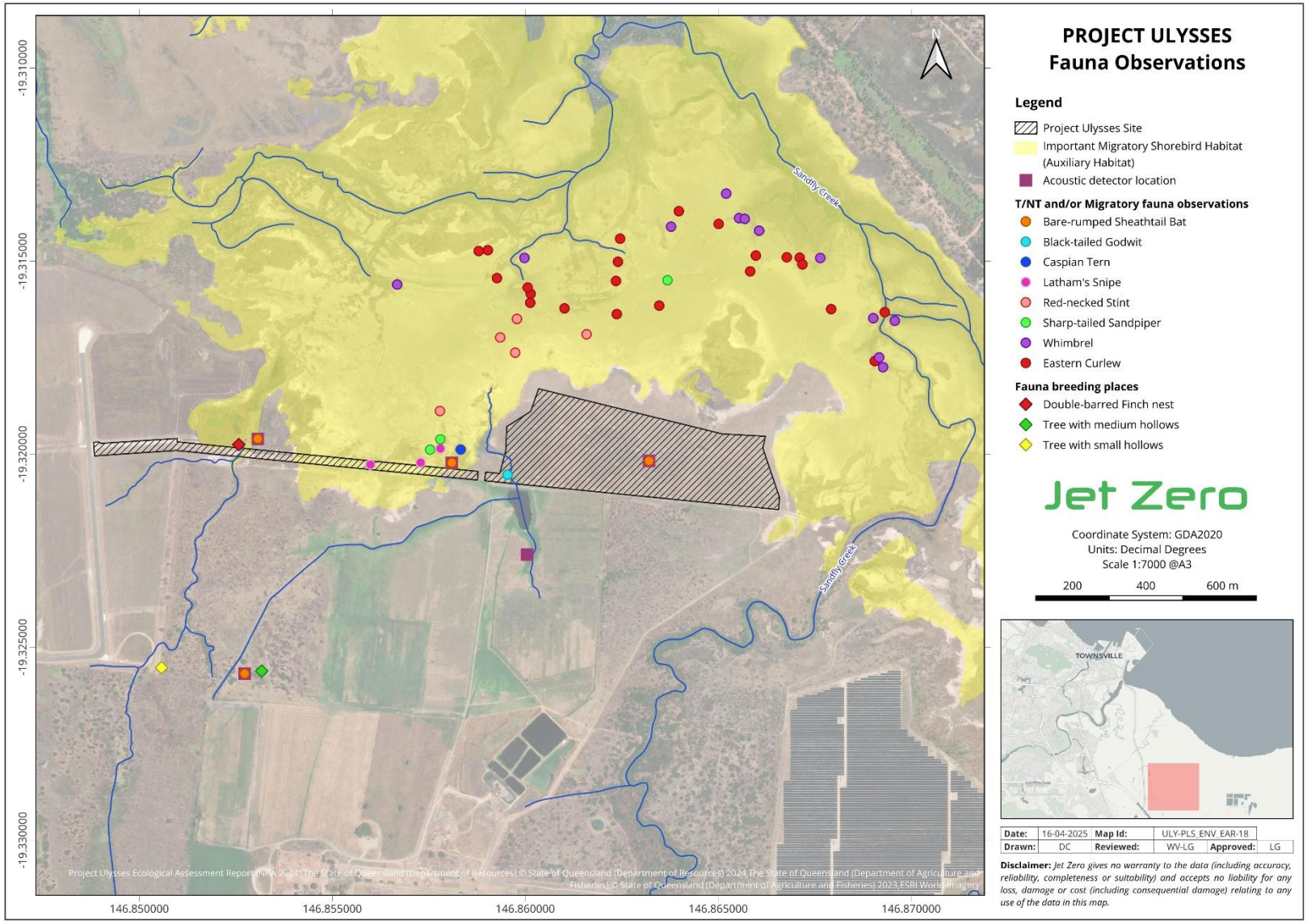


Figure 12: Field-Verified Fauna Observations



3.6. Biosecurity

Significant weeds were observed widely over the core infrastructure footprint. Pest fauna were observed and evidence of their activity was widespread in the project footprint. Significant weeds and pest fauna included the following species listed as Restricted Matter under the Queensland *Biosecurity Act 2014* as presented in **Figure 13**:

- Rubber Vine (*Cryptostegia grandiflora*)
- Chinee Apple (*Ziziphus mauritiana*)
- Parkinsonia (*Parkinsonia aculeata*)
- Prickly Acacia (*Acacia nilotica*)
- Pig (*Sus scrofa*)
- Dingo/Dig (*Canis familiaris*)

3.7. Ecology Sensitivity of Values

The ecology sensitivity receptors and their environmental values are presented in **Table 11**.

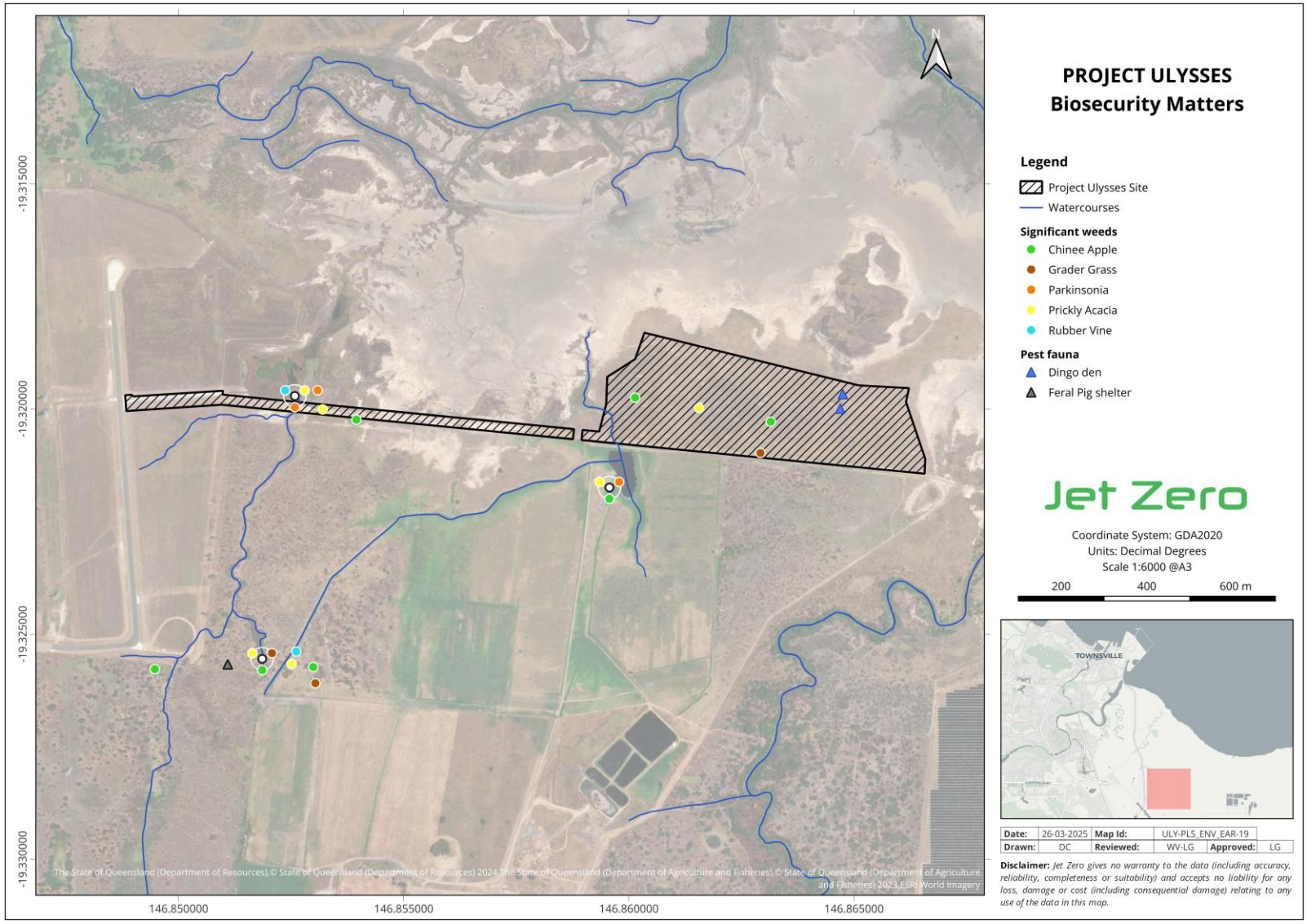
Table 11: Sensitive Receptors - Ecology

Sensitive receptor	Environmentally significant resource and context	Sensitivity of value
Cleveland Bay Tidal areas associated with Sandfly Creek (receiving environment)	The project is located within the mid-to-lower reaches of the Sandfly Creek catchment in Cleveland Bay. Cleveland Bay is a significant fish habitat and supports migratory shorebirds, including 10 field-observed internationally and nationally recognised species. The site is on the southern margin of this important habitat, with Sharp-tailed Sandpiper, Eastern Curlew, and Whimbrel likely to occur within 500 m of the project footprint. The Sandfly Creek Reserve, managed by DETSI, is situated immediately south of the project site and includes the Sandfly Creek catchment.	Extreme to High
Vegetation within project site	Mostly non-remnant within project site. A few MSES marine plants identified above HAT (small portion on extent North of project site)[1].	Moderate (marine) Low (REs)
Fauna – Protected Species (MNES / MSES)	The project occurs on the southern margin of the 'Cleveland Bay' important migratory shorebird habitat. The species Eastern Curlew, Whimbrel and Caspian Tern was observed intersecting project area. The Bare-rumped Sheathtail Bat is likely to maintain a regular presence (foraging) over the project footprint. Other species observed in the receiving environment north of the project site.	Extreme
Fish habitat areas	The mapped fish habitat area is in the distal receiving environment, where no works are planned in this area.	Low
Stuart Creek Nature Refuge	Stuart Creek Nature Refugee It is located 2.2 km, south-west upstream of the project site. A 9-ha area, with most of its area a managed resource protection, with estuarine wetland vegetation (riverine). Identified terrestrial GDE, whereas no habitats were identified to occur in this region (Queensland Government, 2013)	Moderate
Wildlife essential habitat (MSES)	Located approximately 750 m north-west of the project site. MSES wildlife essential habitat.	High

Sensitive receptor	Environmentally significant resource and context	Sensitivity of value
GBRWHA / GBRNHP / GBRMP	2.5 km (GBRWHA/GBRNHP) and 6.3 km (GBRMP) downstream of project site. Site is in the Ross River catchment on the coastal plain, approximately 2 km from the coastline. Site surface waters report to Sandfly Creek and discharge to Cleveland Bay, which is part of the GBRWHA / GBRNHP. Sandfly Creek is also identified as an aquatic GDE.	Extreme
Bowling Green Bay National Park and Cleveland Bay – Magnetic Island	Of international (Ramsar), MNES and MSES relevance. Occurs on the distal area of project site.	Extreme

[1] *The Great Barrier Reef Marine Park (GBRMP) is part of the Great Barrier Reef World Heritage Area (GBRWHA), co-located with the Great Barrier Reef National Heritage Estate (GBRNHP).*

Figure 13: Biosecurity Matters



4. POTENTIAL IMPACTS OF DEVELOPMENT

This section provides a discussion of the potential impacts to ecological values as a result of construction, operation and decommissioning of the Project site, and potential interactions with environmental values. NRA (2025a) assessed the ecological values, Terra Solutions (2025) the surface water values, and the relevant ecology values are presented in **Section 3** with the impact assessment presented below.

4.1. Potential Impacts to Ecological Values

The following Project-related threads to ecological values in the receiving environment were identified:

- Air pollution
- Sensory disturbance (noise and light)
- Soil loss and degradation
- Water pollution
- Habitat loss and degradation
- Direct mortality or harm to fauna
- Altered hydrological regimes
- Ingress and proliferation of biosecurity matters
- Traffic / vehicles movement.

The potential impacts to ecology, including waterways supporting fish habitats, migratory shorebirds, and environmentally sensitive areas are discussed individually in the assessment below.

4.1.1. Air Pollution

Air emissions and dust created from construction activities can affect habitat quantity and quality. Air emissions and dust sources include site clearing, preparation, and vehicle traffic. Dust deposition on vegetation, or in water, can reduce the quality of habitat, plant photosynthetic capacity, and food source availability and, in some cases, may degrade it to a point where the vegetation is no longer used as habitat by dependent species (Gleeson and Gleeson, 2012).

Although the Project site is surrounded by ecologically sensitive areas, direct impacts to flora and fauna (for closer receptors) are not expected to cause lasting harm and only short-term disturbance, as activities will be temporary. Indirect impacts (for farther) receptors are not expected to reach these areas due to their significant distance (> 2.5 km) and the nature of the construction activities of the Project.

During operational phase, the release of nitrous oxide can have an impact on the broader environment through air pollution, with other sources are from the combustion of natural gas and flaring hydrocarbons during routine and non-routine operations.

The key air pollutants of concern include NOx and some non-combusted hydrocarbons and VOCs. According to Vipac (2025), air emissions from the operational vent releases, fugitive sources are expected to be minor. There is also potential for traces of particulate matter and sulphur dioxide (SO_2) from the flaring operations, however, these are negligible (USDoE, 2021; USDoA, 2021; Georgia DNR, 2022). Air emissions during operations are expected to have a minor impact to ecological values.

4.1.2. Sensory Disturbance

Sensory disturbances such as noise, vibration, light, and odour, have the potential to affect various species. Sensory disturbances can result in reduced use, or complete avoidance, of affected areas by some species, or, in the case of artificial lighting at night, may attract and increase use of an area by some species. The reduced use or complete avoidance of affected areas can create movement

barriers, or adverse effects to reproductive success, or increase stress, leading to increased predator-prey interactions (Gleeson and Gleeson, 2012). It was identified that:

- Light pollution can alter the physiology and behaviour of many fauna species. With respect to behavioural changes, some species may avoid, while others may be attracted to (and benefit from), the artificially illuminated space. The physiological response of most Australian fauna to light pollution is poorly known. Nocturnal species are probably most sensitive, with impacts ranging from short-term (e.g. where lighting reduces the dark-adapted state of their sight) to longer-term and more complex changes (e.g. altered reproductive cycles). The influence of ambient light in the landscape from existing sources (e.g. Sun Metals refinery and Ark Energy solar farm to the east and JBS Abattoir to the south), are relevant considerations.
- The threat of noise exposure varies according to species and noise characteristics. For susceptible fauna, anthropogenic noise may reduce their ability to hear predators (and alarm calls) and reduce their ability to communicate with members of the same species. These conditions can make individuals vulnerable to predation, increase their stress levels and reduce their fitness. Animals may either vacate an area or enter a state of vigilance in response to a disturbance source. Both responses reduce the time an animal devotes to life-sustaining behaviours such as feeding, resting and social interactions.

Light disturbances will result from most Project infrastructure because facilities and other infrastructure must be lit at night to ensure minimum health and safety standards compliance. Interactions between nocturnal species, such as terrestrial invertebrates, birds and bats, and light disturbances are predicted to be most important at the perimeter of the footprint in the receiving environment where listed threatened and migratory species occur.

Likewise, the baseline noise measurements for the site are typical of an industrial area adjacent to an area of natural environment with low background levels. The highest levels of noise predicted to occur during construction and operation will occur within, and immediately adjacent to, the actual footprint of the Project site, in the receiving environment, allowing a buffer distance to habitat to the north.

A ground vibration prediction during construction was calculated for the project site. Based on experience from similar projects, ground-based vibration levels during construction and operation are predicted to be low/negligible. Ground vibration from heavy machinery during earthworks is not predicted to travel more than 100 m from the source (Chen et al., 2013).

4.1.3. Soil Loss and Degradation

The loss and/or degradation of soil resources may occur through various mechanisms, including accelerated erosion (caused by water and wind), contamination, physical impacts on soil structure (such as compaction), alteration of hydrological regimes (e.g., changes in chemical properties like salinity), and alteration of organic matter input into soils (resulting from vegetation loss). These soil changes can negatively affect biota that depend on pre-impact soil conditions and may lead to secondary impacts, such as sedimentation affecting water quality.

4.1.4. Water Pollution

Sedimentation, contamination or litter can result in reduced quality of receiving water. Contamination may occur when chemicals or hydrocarbons are released to the environment; sources include spills, machinery/equipment failure, and vehicle collisions. It may also occur via the exposure (e.g. during ground disturbance or due to erosion) of acid sulfate soils or contaminants associated with prior land use. Sedimentation may occur when land surface disturbance and/or the concentration of water flows causes accelerated erosion. Littering occurs when appropriate waste management practices are not implemented.

4.1.5. Habitat Loss or Degradation

Habitat loss and/or degradation can occur as a direct consequence of vegetation clearing and earthworks, and as an indirect consequence of accelerated erosion, pollution, wildfire, biosecurity incursions, fugitive dust and habitat fragmentation (caused by physical breaks in habitat continuity or fauna avoidance of areas due to human activity). Loss of core habitat poses the greatest direct threat to MSES.

Vegetation within the Project site is identified to be non-remnant. A small portion of marine plants of approximately 2,480.5 m² within north-east of plant site were identified above HAT and is included as part of the CBIP Operational Works approval (see **Table 2**).

As observed by NRA (2025a), habitat loss/degradation will primarily occur along the margins of remnant habitat that is generally in poor condition and mapped as auxiliary for some MSES. There will be no direct habitat loss or degradation due to the Project, therefore is a minor/inconsequential threat.

4.1.6. Direct Mortality or Harm to Fauna

Vegetation clearing, excavation works or machinery or object strike during vehicle operation and movements can cause direct mortality or harm to fauna. Construction will have an increased movement of vehicles and machinery at the plant site.

As observed by NRA (2025a), most habitats in the Project site area are non-remnant and of low value to fauna. The likelihood of mortality to MSES during vegetation clearing is negligible. The likelihood of mortality to MSES due to vehicle strike is low.

4.1.7. Altered Hydrological Regimes and Potential Impact to Waterways Providing for Fish Habitat

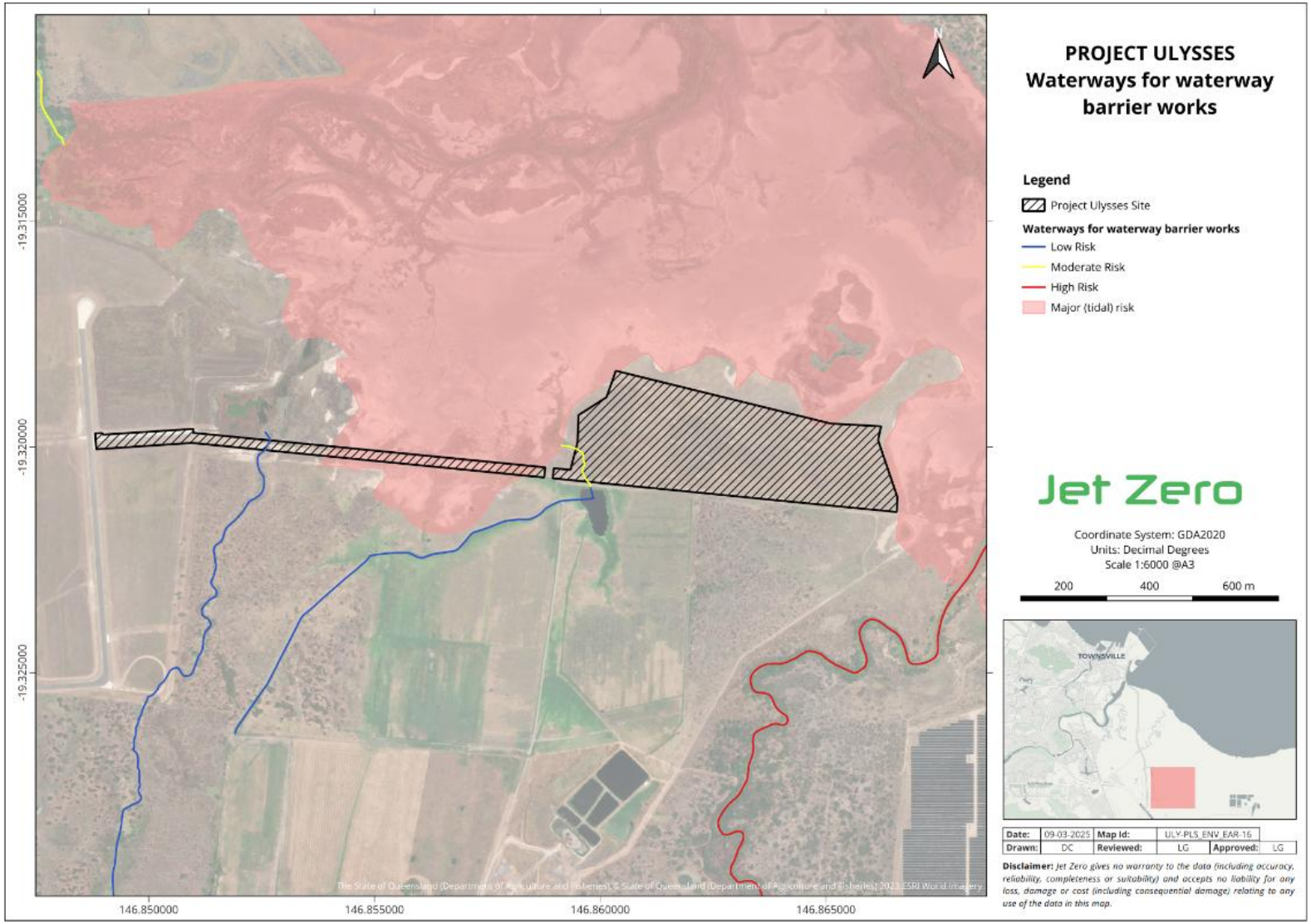
The construction of physical structures (e.g. roads, hardstand areas) may alter (block, restrict and/or concentrate) the flow of water across the land surface and in waterways. These changes may impact the biota reliant on the pre-impact hydrological regimes and increase the possibility of secondary impact (e.g. accelerated erosion causing soil loss/degradation and sedimentation). Habitats in the project receiving environment occur in an interface zone between fresh and saline conditions.

These habitats are sensitive to changes in hydrological regimes. Water flow regimes in waterways directly influence the plant and animal assemblages that use an area (e.g. fish passage).

The Order 1 watercourse that intercepts the Project site (**Figure 14**), however mapped as of moderate risk is unlikely to provide fish passage due the artificial stock dam stopping connectivity of the watercourse. As observed by Terra Solutions (2023), immediately upstream of the development footprint [access road], fish passage is inhibited by a small dam and therefore the proposed driveway is unlikely to interrupt fish passage. This watercourse terminates a short distance downstream of the Project area where the channel disappears onto the salt flat. This watercourse lacks significant fish habitat and whilst it generally meets the criteria of a waterway there is no upstream connectivity due to the upstream dam wall.

The Project is on the periphery of the Burdekin–Townsville Coastal Aggregation Nationally Important Wetland (DCCEEW, 2019). The declared FHA is in the distal receiving environment, where no works are planned in this area.

Figure 14: Waterway for Waterway Barrier Works



4.1.8. Ingress and Proliferation of Biosecurity Matters

The presence of waste may attract pest fauna species. Invasive and pest species can rapidly establish in disturbed areas, posing a threat to native flora and fauna by competing for resources and disrupting ecosystems.

Vegetation clearing has the potential to introduce or spread species through mobilisation of equipment, which has not been properly cleaned, and by creating soil disturbance, including:

- Reduction in extent of habitat for threatened fauna species.
- Fragmentation of habitats, and reduction of connectivity in remnant vegetation patches.
- Reduction in habitat quality associated with impacts from dust, erosion, changes to habitat suitability and quality, etc.
- Direct mortality of threatened fauna and flora.

Introduction or proliferation of biosecurity items (weeds, pest fauna and pathogens) can cause habitat degradation and/or directly impact the health of biota (e.g. pathogens reducing animal or plant health, or tramp ants harming fauna).

The spread and proliferation of weeds and pest species are more likely during construction due to vegetation clearing, soil exposure and disturbance if not properly managed. During operations, appropriate controls should be implemented to prevent the ingress of biosecurity risks, including pest fauna, from the surrounding environment to the Project site.

4.1.9. Traffic Movements Impact to Fauna

The traffic movements on site will increase during construction with heavy and light vehicle traffic to and from the site causing some disturbance. During the construction phase, object strikes during vehicle operation and movements can cause direct mortality or harm to fauna. However, as most habitats in the Project area are non-remnant and of low value to fauna, the likelihood of mortality due to vehicle strikes is low.

The traffic movements during operation will be significantly lower than during construction and so impacts are expected to be minor.

4.1.10. Avoidance, Mitigation and Management Measures

A Construction and Operations Management Plan (CEMP and OEMP) will be developed to address the potential harms to ecology. The subsections below identify the proposed mitigation and management measures associated with ecological features.

4.1.10.1. Environmental Offsets

Mostly vegetation within Project site were identified to be non-remnant. Small areas of MSES marine plants identified above HAT with an area of approximately 2,480.5 m^2 (portion on extent north of Project site) were identified and is included as part of the CBIP Operational Works approval (see **Table 2**).

4.1.10.2. Air Quality Mitigation Controls

The following practices were suggested by NRA (2025a) and will be implemented to control potential air pollution in relation to ecological values, with controls including:

- Apply water to exposed earth, including unsealed access, during construction.
- Achieve the air quality objectives of the Queensland Environmental Protection (Air) Policy 2008.
- Ensure equipment is appropriately maintained and serviced according to specifications.
- Ensure facility site and roads used for site access and egress are sealed and maintained.

- Obtain specialist advice at the design phase to ensure generation of nitrous oxide due to combustion of hydrogen is avoided or appropriately mitigated.

4.1.10.3. Sensory Disturbance Mitigation Controls

The following practices were suggested by NRA (2025a) and will be implemented to control potential light, noise and vibration pollution in relation to ecological values, with controls including:

- Is in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023).
- Makes buildings visible; however, lighting that reflects on shiny surfaces should be avoided as this may attract or disorientate fauna and lead to injury or death (building strike).
- Minimises light proliferation into the surrounding environment.
- Achieve the acoustic objectives of the Queensland Environmental Protection (Noise) Policy 2008.
- Ensure plant and equipment is adequately maintained and serviced according to specifications.

4.1.10.4. Hazardous Materials, Substances and Dangerous Goods Mitigation Controls

The following practices were suggested by NRA (2025a) and will be implemented to manage hazardous materials potentially posing hazards in relation to ecological values:

- Ensure a risk assessment for each hazardous substance is periodically reviewed and appropriate controls implemented into the relevant Project HSE Plan.
- Dispose of hazardous materials at a licenced facility with full chain-of-custody documentation.
- Minimise hazardous substances stored on site.
- Ensure all Safety Data Sheets are checked and hazardous substances identified and entered into hazardous substance register prior to substance arriving at site.
- Ensure all permits are in place for storing and handling hazardous substances.
- Ensure personnel have appropriate training for handling, storage and transport of hazardous substances.
- Retain all licences, permits and approvals on site as required by statutory authorities.
- Ensure any hazardous substances such as hydrocarbons are stored under roof and on a surface of concrete, asphalt or similar imperious substance, and bunded.
- Ensure all flammable and combustible liquids (including hazardous waste materials):
- have the contents and volume clearly identified be numbered for identification
- are contained within an on-site containment system within the facility site
- are controlled in a manner that prevents environmental harm and maintained in accordance with appropriate standards, with Hazchem signs displayed.
- Ensure a spill kit is available to clean up potential spills.

4.1.10.5. Biosecurity Mitigation Controls

The following practices were suggested by NRA (2025a) and will be implemented to control biosecurity matters in relation to ecological values:

- Undertake works in accordance with the General Biosecurity Obligation under the Biosecurity Act 2014 and Queensland Biosecurity Regulation 2016.
- Ensure equipment and vehicles are washed down and be free of weed, seed, soil, pests and pathogens prior to being brought to site.

4.1.10.6. Fauna and Flora Mitigation Controls

The following practices were suggested by NRA (2025a) relevant to fauna and flora will be implemented:

- Ensure vegetation clearing and disturbance is contained with the Project site. Ensure relevant statutory approvals are in place prior to clearing.
- Avoid interference/handling of native fauna. If an injured animal is found, a licenced wildlife carer should be contacted and the injured animal taken into care.
- Place food waste into lined bins and cover to prevent attracting fauna to the site.

The clearing of vegetation in within 100 m of mapped HES wetland, regulated vegetation that is MSES and of remnant habitats are not planned to occur.

4.1.10.7. Waste Management Mitigation Controls

The following practices were suggested by NRA (2025a) and will be implemented waste management practices in relation to ecological values:

- Ensure procurement procedure includes waste avoidance as a key criterion for the selection of goods and services.
- Contain construction materials in containers where possible.
- Segregate and recycle solid wastes generated by work activities, offices and mess-rooms or engage contractor to recycle waste off site.
- Ensure that materials are not left in exposed situations where they can be washed or blown away to become litter.
- Provide bins for construction workers and staff at indoor locations where food is consumed.
- Maintain awareness with personnel of the need to avoid littering.
- Dispose of waste material at an appropriately licenced waste facility.

4.1.10.8. Soil Management Mitigation Controls

The following practices were suggested by NRA (2025a) and will be implemented to control soil potential harms to ecological values:

- Ensure studies are conducted prior to undertaking earthworks. These studies should consider salinity and acid sulfate soils. Should investigations reveal the presence (or potential presence) of acid sulfate soils, preparation of an Acid Sulfate Soils Management Plan will be required. Disturbance of acid sulfate soils should be avoided or managed to minimise the mobilisation and release of acid and metal contaminants.
- Ensure erosion and sediment control measures are identified in Erosion and Sediment Control Plans (separate plans for construction, operation and decommissioning), and implemented. The measures should be prepared in accordance with IECA (2008).
- Prepare a Rehabilitation Plan for the decommissioning phase.
- Ensure tidal work is designed and located in accordance with the Guideline: Building and engineering standards for tidal works, Department of Environment and Heritage Protection, 2017 (in DES, 2022c).

4.1.10.9. Water Management Mitigation Controls

The following practices were suggested by NRA (2025a) and will be implemented to control water potential harms to ecological values:

- During construction, ensure surface runoff management measures include:
- Timing of construction to avoid wet season rainfall
- Limiting the extent and duration of exposed soils within the construction area. Where rainfall events of >20 mm are forecast, cover stockpiles with tarps/plastic to minimise infiltration and runoff
- Appropriate disposal of trade waste (and wastewater) generated during construction
- Use of bunds or spoon drains to direct surface water sheet flow away from construction areas and stockpiles.

- Undertake waterway barrier works (where required) in accordance with accepted development requirements (DAF, 2018). Works not able to comply with DAF (2018) will require statutory approval before proceeding.
- Manage runoff to minimise the release of pollutants to waterways and achieve relevant State policy water quality objectives (Queensland Environmental Protection (Water and Wetland Biodiversity) Policy 2019).

4.1.11. Residual Impact

With the implementation of the management and mitigation controls described in this section, overall impact significance is expected to be reduced to acceptable with all residual impacts either a 'Medium' or 'Minor' impact, thus controllable and manageable levels, as indicated in **Table 12**.

Table 12: Residual Impacts to Ecological Values

Potential Impact	Project Phase	Prior to mitigation			Residual		
		Sensitivity	Intensity / Magnitude	Impact	Sensitivity	Intensity / Magnitude	Impact
Air pollution to flora and fauna	C, O	Significant	Low	Minor	Significant	Low	**Minor**
Sensory disturbance (noise, light) to fauna protected species: listed threatened species, ecological communities and migratory species	C, O	High	Significant	Major	High	Moderate	**Medium**
Soil loss and degradation, water pollution	C, O	High	Significant	Major	High	Moderate	**Medium**
Direct loss or degradation of fauna core habitat by vegetation clearing	C	High	Moderate	Medium	High	Low	**Medium**
Direct loss of conservation value (Cleveland Bay, GBR broader area)	C, O	Extreme	Moderate	Major	Extreme	Low	**Medium**
Altered hydrological regimes	C, O	Significant	Significant	Major	Significant	Low	**Minor**
Proliferation of invasive and pest species	C, O	Significant	Significant	Major	Significant	Moderate	**Medium**
Traffic movements impact to fauna	C, O	Significant	Moderate	Medium	High	Low	**Medium**

C – Construction; O – Operation

5. CONCLUSION

The ecological assessment indicates that the proposed project is positioned within a landscape where anthropic activities already occur (i.e. within TSDA), with limited ecological values likely to be significantly impacted. While some MNES were identified in the broader area, including the receiving environment (such as migratory shorebirds) and the Bare-rumped Sheathtail Bat, no critical habitat was found within the immediate Project site. No significant threatened flora species or essential fauna habitats were identified within the Project site, and all observed vegetation clearing activities are expected to comply within accepted development guidelines.

The nearest ecologically significant areas, including the GBR World Heritage and National Heritage Areas, are located at a sufficient distance (2.5 km or more) where direct impacts are unlikely to occur.

Additionally, aquatic ecosystems within the study area are modified and of low ecological value, with minimal risk posed to fish passage or wetland integrity. Overall, the findings suggest that the project can proceed with minimal residual ecological impact, provided that the existing environmental management mitigation controls are adhered.

A summary of the ecological assessment is shown in **Table 13**.

Table 13: Summary of Ecological Assessment

Ecological Aspect	Summary
Matters of National Environmental Significance Migratory species	• Listed Threatened Ecological Communities or migratory bird species not found within Project site. • Field survey confirmed the presence of potential marginal foraging habitat for threatened migratory shorebirds. Listed Threated Species of shorebirds detected within 300 m north of plant site (listed species in **Table 7**) • EPBC Approval Conditions for Bare-rumped Sheathtail Bat confirmed with presence located within study area across a wide foraging area. • GBR World Heritage Area, GBR Marine Park and GBR National Heritage Areas at least 2.5 km from Project site with no direct impacts.
Significant flora	• No significant residual impact assessment for threatened flora is required due to the absence of species or habitat within the Project Area. • No T/NT flora species listed under the Queensland *Nature Conservation Act 1992* (NC Act) or the EPBC Act were observed within the survey area, and none are likely to occur
Remnant vegetation	• Marine plants within the survey area cover approximately 2,480.5 m^2 in the north-east of the plant site (RE 11.1.2b) (NRA, 2025a). The removal, destruction, or damage of marine plants within the footprint of the proposed vegetation clearing works can be undertaken as accepted development in accordance with the Accepted Development Requirements for Operational Work that is the Removal, Destruction, or Damage of Marine Plants (DAF, 2017).
Significant fauna	• No areas of essential habitat for protected fauna intersect the core infrastructure footprint. • T/NT and Migratory fauna species recorded in the Project site include the Black-tailed Godwit and Bare-Rumped Sheathtail Bat.
Aquatic ecosystems and wetland	• All watercourses within the study area are likely to have a low risk for impacts for fish passage, including the section of watercourse mapped by DAF (2023) as having a 'moderate' risk. • The major risk tidal waterway consists of the highly degraded development footprint and the Project Area upgradient of the development footprint. The condition of the waterway (west of site entrance) is very poor within the Development Footprint, having been graded and poor-quality saltmarsh habitat upgradient of the development footprint where it is used for cattle grazing purposes.

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APPENDIX A

Natural Resource Assessments (NRA) 2025a, *Project Ulysses Ecological Assessment Report, R02 (February 27, 2025)*, Prepared by NRA Environmental Consultants for Jet Zero Australia Pty Ltd.

Environmental Approval & Compliance Solutions

Project Ulysses Ecological Assessment Report

Jet Zero Australia Pty Ltd

Document Control Summary

NRA Environmental Consultants

NRA Filepath:	F:\AAA\485_JET\485001 - Ulysses Project\485001.01 Baseline F&F\Rpt\R02\Ulysses_ecol_values_EAR_R02.docx		
Status:	R02	**Date of Issue:**	27 February 2025
Project Manager:	Peter Buosi		
Title:	Project Ulysses Ecological Assessment Report		
Client:	Jet Zero Australia Pty Ltd		
Client Contact:	Lochlan Gibson, Approvals & Environmental Manager		
Copies Dispatched:	1 PDF		
Other Info or Requirements:	-		

Report Summary	
Key Words	Project Ulysses Ecological Assessment Report
Abstract	The proposed Project Ulysses comprises a sustainable aviation fuel production facility and associated infrastructure within a portion of the Townsville State Development Area. This report documents the ecological values, assesses potential threats, and provides recommendations for impact avoidance and mitigation.

Citation
This report should be cited as: NRA 2025, *Project Ulysses Ecological Assessment Report*, R02, prepared by NRA Environmental Consultants for Jet Zero Australia Pty Ltd, 27 February 2025.

Quality Assurance					
Author	**Technical Review**	**Editor**	**Document Version**	**Approved for Issue by QA Manager**	
				Date	**Signature**
Lindsay Popple PhD, BSc(Hons), CEnvP (#803) Megan Grixti BSc	Peter Buosi BAppSc(Hons)	Nadine Hunt BA,GDipEd, AE	R01	31/10/24	NHunt
			R02	27/2/25	NHunt

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Appendix H: Fauna Species List

Executive Summary

Context and scope

Jet Zero Australia Pty Ltd (Jet Zero) are delivering the proposed Project Ulysses (the project), which comprises the construction and operation of a sustainable jet aviation fuel production facility and associated infrastructure. The project is located within the Townsville State Development Area. The ócore infrastructure footprintô (**Figure 1**) includes:

- facility site
- access road (linking the facility site to existing roads):
  - option 1 (following North Road; preferred route)
  - option 2 (following Zinc Road; alternative route)
- wastewater pipeline
- water supply pipeline.

NRA Environmental Consultants was commissioned by Jet Zero to identify and assess ecological values relevant to the proposed construction, operation and decommissioning of the core infrastructure of the project. The assessment was informed by the *Project Ulysses Environmental Planning Assessment* report (NRA 2024a). The scope of this commission involved:

- a terrestrial ecology field survey to:
  - assess watercourses and wetlands in the core infrastructure footprint
  - improve the accuracy of regional ecosystem mapping and fauna habitat mapping via quaternary vegetation assessments and habitat observations over the core infrastructure area and within 50 m of proposed linear infrastructure
  - map the extent and density of marine plants over the core infrastructure footprint
  - conduct targeted searches for Threatened, Near Threatened (T/NT) and/or Migratory species (and their habitat) identified in NRA (2024a) as potentially present
  - map the locations of Commonwealth and State listed weed species and pest fauna
- Migratory shorebird surveys within 300 m of the northern, western and eastern boundaries of the facility site[1]
- documentation of key findings and potential project-related threats to Matters of National Environmental Significance (MNES)[2] and Matters of State Environmental Significance (MSES)[3]
- recommendation of options for impact avoidance and mitigation.

The scope excludes assessment of residual impacts and significant residual impact assessment.

[1] The area to the north, east and west of the facility site was identified by inspection of aerial imagery as the area most likely to support Migratory shorebirds. The 300 m buffer reflects the minimum reasonable observation distance for detecting and identifying shorebird at high tide.

[2] As defined under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

[3] As defined under the Queensland *Environmental Offsets Act* 2014.

Key findings

All watercourses were assessed as having low value for fish passage. The importance of the tidal area (below highest astronomical tide (HAT)) mapped as major (tidal) risk along North Road and small areas on the boundary of the facility site (**Figure 6**) may require further assessment by an expert in fish passage.

Vegetation communities observed within the survey area were not consistent with Queensland Government regulated vegetation mapping. Key observations were as follows.

- All vegetation in the facility site was found to be non-remnant, apart from a small area in the north-east.
- All vegetation along Zinc Road was found to be non-remnant.
- Most vegetation along North Road was remnant.
- The area mapped as a Vegetation Management Wetland was confirmed to be a palustrine wetland containing remnant vegetation.
- The presence of all mapped watercourses was confirmed. Each of the watercourses was found to be bordered by non-remnant vegetation.

No T/NT plants were present in the core infrastructure footprint and none are predicted to occur.

The presence of T/NT and Migratory fauna was confirmed in the project receiving environment during the field surveys and other T/NT, Migratory and/or Special Least Concern species may occur. The project occurs on the southern margin of the óCleveland Bayô important Migratory shorebird habitat as defined by Weller *et al.* (2020). Near the core infrastructure footprint, field verified *important habitat* comprises saltmarsh (below HAT), mangroves and freshwater wetlands (excluding the dam south-west of the facility site). Habitats that intersect the core infrastructure footprint are considered auxiliary for the following T/NT, Migratory and Special Least Concern fauna[4,5] (no areas of core habitat intersect the project and none occur in the nearby receiving environment).

- Eastern Curlew (*Numenius madagascariensis*) ð Critically Endangered and Migratory, EPBC Act; Critically Endangered, NC Act.
- Bare-rumped Sheathtail Bat (*Saccolaimus saccolaimus nudicluniatus*) ð Vulnerable, EPBC Act; Endangered, NC Act.
- Sharp-tailed Sandpiper (*Calidris acuminata*) ð Vulnerable and Migratory, EPBC Act; Vulnerable, NC Act.
- Lathamôs Snipe (*Gallinago hardwickii*) ð Vulnerable and Migratory, EPBC Act; Vulnerable, NC Act.
- Estuarine Crocodile (*Crocodylus porosus*) ð Migratory, EPBC Act; Vulnerable, NC Act.
- Coastal Sheathtail Bat (*Taphozous australis*) ð Near Threatened, NC Act (not listed, EPBC Act).
- Common Sandpiper (*Actitis hypoleucos*) ð Migratory, EPBC Act; Special Least Concern, NC Act.
- Fork-tailed Swift (*Apus pacificus*) ð Migratory, EPBC Act; Special Least Concern, NC Act.

[4] Listed under the EPBC Act and/or Queensland *Nature Conservation Act* 1992 (NC Act).

[5] List excludes fauna listed as óexceptionally rareô in **Table 8**.

- Caspian Tern (*Hydroprogne caspia*) ð Migratory, EPBC Act; Special Least Concern, NC Act.
- Whimbrel (*Numenius phaeopus*) ð Migratory, EPBC Act; Special Least Concern, NC Act.
- Eastern Osprey (*Pandion haliaetus cristatus*) ð Migratory, EPBC Act; Special Least Concern, NC Act.
- Glossy Ibis (*Plegadis falcinellus*) ð Migratory, EPBC Act; Special Least Concern, NC Act.
- Pacific Golden Plover (*Pluvialis fulva*) ð Migratory, EPBC Act; Special Least Concern, NC Act.
- Short-beaked Echidna (*Tachyglossus aculeatus*) ð Special Least Concern, NC Act (not listed, EPBC Act).

Significant weeds were observed widely over the core infrastructure footprint. Pest fauna were observed and evidence of their activity was widespread in the core infrastructure footprint. Significant weeds and pest fauna included the following species listed as *Restricted Matter* under the Queensland *Biosecurity Act* 2014.

- Rubber Vine (*Cryptostegia grandiflora*).
- Chinee Apple (*Ziziphus mauritiana*).
- Parkinsonia (*Parkinsonia aculeata*).
- Prickly Acacia (*Acacia nilotica*).
- Pig (*Sus scrofa*).
- Dingo/Dog (*Canis familiaris*).

Potential project-related threats to MNES and MSES in the receiving environment comprise:

- air pollution
- noise pollution
- water pollution
- soil loss/degradation
- altered hydrological regimes
- direct mortality or harm to fauna
- biosecurity ingress/proliferation
- altered fire regimes
- habitat loss/degradation.

Recommended control measures to avoid and mitigate threats to environmental values associated with the development of the project are presented in **Table 14**.

1. Introduction

1.1 Background

Jet Zero Australia Pty Ltd (Jet Zero) is delivering Project Ulysses (the project), which comprises a jet aviation fuel production facility and associated infrastructure. The ócore infrastructure footprintô (**Figure 1**) includes:

- facility site
- access road (linking the facility site to existing roads):
  - option 1 (following North Road; preferred route)
  - option 2 (following Zinc Road; alternative route)
- wastewater pipeline
- water supply pipeline.

The North Road access connection (**Figure 1**) is being developed by Cleveland Bay Industrial Park Pty Ltd and is not considered further in this report. It is included on report mapping for completeness. North Road is still considered in this report as other linear infrastructure (wastewater pipeline and water supply pipeline) along North Road requires assessment as part of the project.

The core infrastructure footprint is within the Townsville State Development Area (TSDA), intersecting areas zoned as ôEnvironmental Management Precinctô, ôMedium Impact Industry Precinctô and ôHigh Impact Industry Precinctô (DSDMIP 2019) (**Figure 2**)[6].

[6] The portion of connecting infrastructure within the Infrastructure Corridors Precinct has already been developed.

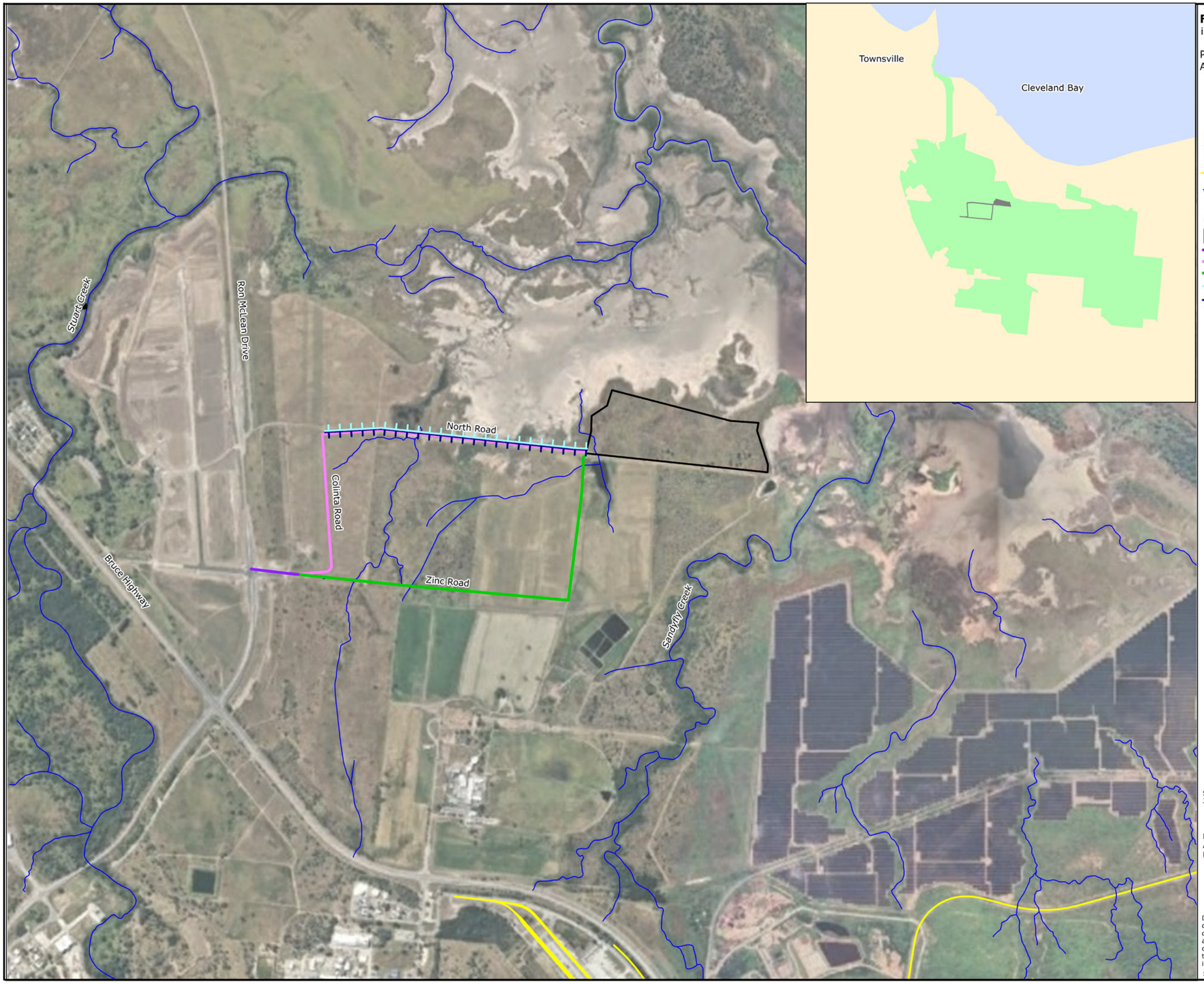


Figure 1: Project location and core infrastructure footprint

Project: Project Ulysses Ecological Assessment Report

TSDA
Core infrastructure footprint
North Coast Line rail corridor
Drainage

Core infrastructure
Facility site
Access road connection
Access road option 1
Access road option 2
Wastewater pipeline
Water supply pipeline

N

0 500
Metres

Source: DoR 2022, 2023, DSDMIP 2019, Google Earth 2024, Jet Zero 2024.

NRA Ref: 485001.01
Author: Thomas Munro
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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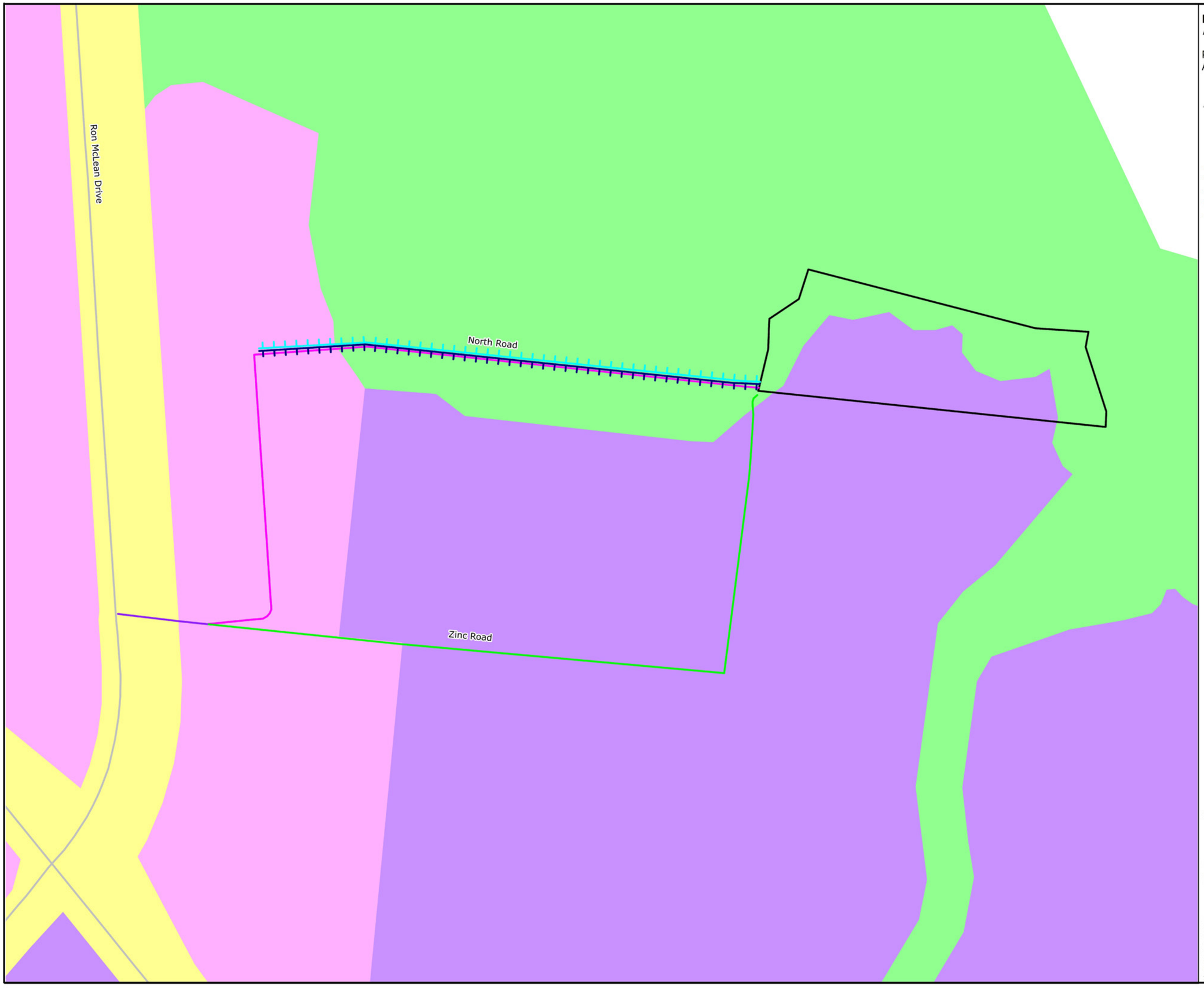


Figure 2: Townsville State Development Area zoning

Project: Project Ulysses Ecological Assessment Report

Major road

Core infrastructure
- Facility site
- Access road connection
- Access road option 1
- Access road option 2
- Wastewater pipeline
- Water supply pipeline

TSDA Development Scheme Precinct
- Environmental Management Precinct
- Medium Impact Industry Precinct
- High Impact Industry Precinct
- Infrastructure Corridors Precinct

N

0 200
Metres

Source: DoR 2023, DSDMIP 2019, Jet Zero 2024.

NRA Ref: 485001.01
Author: Thomas Munro
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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1.2 Scope

NRA Environmental Consultants (NRA) was commissioned by Jet Zero to identify and assess ecological values relevant to the proposed construction, operation and decommissioning of the core infrastructure. The assessment was informed by the *Project Ulysses Environmental Planning Assessment* report (NRA 2024a). The scope of this report is as follows.

- Undertake a terrestrial ecology field survey to:
  - assess watercourses and wetlands in the core infrastructure footprint
  - improve the accuracy of regional ecosystem (RE) mapping and fauna habitat mapping via quaternary vegetation assessments and habitat observations over the core infrastructure area and within 50 m of proposed linear infrastructure
  - map the extent and density of marine plants over the core infrastructure footprint
  - conduct targeted searches for Threatened, Near Threatened (T/NT) and/or Migratory species (and their habitat) identified in NRA (2024a) as potentially present
  - map the locations of Commonwealth and State listed weed species and pest fauna.
- Undertake Migratory shorebird surveys within 300 m of the northern, western and eastern boundaries of the facility site[7].
- Discuss key findings and potential project-related threats to Matters of National Environmental Significance (MNES)[8] and Matters of State Environmental Significance (MSES)[9].
- Recommend options for impact avoidance and mitigation.

1.3 Geographic context

The project site is located approximately 8 km south-east of the Townsville Central Business District and east of Ron McLean Drive (formerly the Port Access Road) (**Figure 1**). The site was formerly used for rangeland cattle grazing (SHG 2012, SHG 2011, Murtha 1982)[10]. Areas not typically subject to flooding were heavily cleared and over-sown with non-native pasture species. Lower profile parts of the landscape areas mostly support riverine, saltmarsh and coastal grass-sedge wetlands.

The site is in the Ross River catchment on the coastal plain, approximately 2 km from the coastline. Site surface waters report to Sandfly Creek (**Figure 1**) and discharge to Cleveland Bay. Cleveland Bay is part of the Great Barrier Reef World Heritage Area (GBRWHA), which is co-located with the Great Barrier Reef National Heritage Place (GBRNHP).

1.4 Project description

1.4.1 Overview

The project is in the engineering design and approvals phase. Preliminary design and construction information is described in the *Ulysses Project Approvals and Stakeholder Strategy (REV 2)* (Jet Zero 2024). A conceptual site layout for the facility is in **Appendix A**.

[7] The area to the north, east and west of the facility site was identified by inspection of aerial imagery as the area most likely to support Migratory shorebirds. The 300 m buffer reflects the minimum reasonable observation distance for detecting and identifying shorebird at high tide.

[8] As defined under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

[9] As defined under the Queensland *Environmental Offsets Act* 2014.

[10] Evidence of more recent cattle grazing was reported in the north of the TSDA by SHG (2012).

The following project description is primarily based on information presented in the approvals strategy and **Appendix A**.

1.4.2 Project description and activities

The facility site (**Figure 1**) will support a fuels plant with a production capacity of 113 ML/year. Fuel production is anticipated to comprise:

- 102.7ï 103.1 ML/year of sustainable aviation fuel (SAF)
- 10 ML/year of renewable diesel (RD).

The facility site was chosen due to:

- its proximity to a large port, rail and road network
- its zoning, primarily within the High Impact Industry precinct within the TSDA
- the availability of renewable energy
- its location relative to anticipated sources of required raw materials for SAF.

The project plant will receive bioethanol through the Port of Townsville (PoT) and deliver SAF and RD to local markets such as airports. PoT will have associated tank storage and road transport located at the port.

To facilitate the production of SAF, ethanol product will be received via ship at PoT and transported to site via B-double trucks. SAF will be transported from site via B-double trucks to local airports or PoT for export. Transport will use established road infrastructure suitable for B-double trucks along Ron McLean Drive. Access to the facility from Ron McLean Drive will be via the North Road access road option (preferred) shown on **Figure 1**[11].

According to the conceptual site layout (**Appendix A**), the facility site will incorporate the following key infrastructure.

- Eastern portion:
  - laydown area.
- Central portion:
  - process unit and flare
  - utility unit (storage tanks, pumps and boilers)
  - storage unit (ethanol, paraffin and SAF bulk)
  - administration unit (laboratory, process control room, warehouse workshop, security gatehouse, administration building and parking area)
  - industrial and general site entrances (from south)
  - two emergency exists (to south).
- Western portion:
  - Hydrogen unit and caustic basin
  - truck loading unit
  - substation and electrical cable trench
  - clean wastewater channel
  - contaminated water basin
  - one emergency exit/fire control access (to south).

[11] Access Road Option 1 along North Road (**Figure 1**) is the preferred option.

2. Methods

2.1 Review of existing information

The *Project Ulysses Environmental Planning Assessment* report (NRA 2024a) was informed by the following Queensland Government mapping and searches of publicly available databases. The same information informs the current study and was checked to ensure currency.

- Queensland Government mapping.
  - *Queensland waterways for waterway barrier works* (DAF 2023)
  - *Storm tide Queensland series* (DES 2020)
  - *Coastal plan coastal management district* (DESI 2024b)
  - *Biodiversity status of remnant regional ecosystems – version 13.1* (DESI 2024a)
  - *Erosion prone area series* (DES 2016)
  - *Fish habitat areas* (DESI 2024c)
  - *Matters of state environmental significance – Queensland series* (DES 2023a)
  - *Wetland protection area – GBR high ecological significance wetland* (DES 2022b)
  - *Highest astronomical tide – Queensland* (DNRME 2013)
  - *Contours – 1 metre – Queensland – by area of interest* (DNRME 2018)
  - *Vegetation management regional ecosystem map – version 13.0* (DoR 2024a)
  - *Vegetation management essential habitat map no attribute – version 12.05* (DoR 2024b)
  - *Vegetation management wetlands map – version 9.06* (DoR 2024c)
  - *Vegetation management watercourse and drainage feature map (1:100,000 and 1:250,000) – version 7.00* (DoR 2023)
  - *Watercourse identification map – Queensland series* (DoR 2024d).
- Publicly available databases (a 5 km buffer around the core infrastructure footprint was applied to the search area).
  - Protected Matters Search Tool (DCCEEW 2024)
  - *WildNet Database* (DESI 2024e)[12]
  - *Atlas of Living Australia* (ALA 2024)[12].

The results of a recently completed baseline soil investigation (C & R Consulting 2024) was also reviewed.

2.2 Field surveys

Field surveys were informed by the review of existing information (**Section 2.1**), including the likelihood of occurrence assessment for T/NT and/or Migratory species and communities presented in NRA (2024a)[13].

[12] The search was limited to records since 1980.

[13] A revised likelihood assessment following the field surveys is presented in this report (Section 3).

The baseline field survey was led by Principal Scientist Lindsay Popple with support from Senior Botanist Megan Grixti on 19ï 23 August 2024. Follow-up surveys targeting Migratory shorebirds were undertaken by Lindsay Popple with assistance from Graduate Environmental Scientist Sophie van Vliet on 18ï 19 September 2024 and on 2ï 3 October 2024. The timing of the surveys was suitable for detection of relevant T/NT flora and fauna and Migratory fauna.

The survey area for all values apart from Migratory shorebirds included the core infrastructure footprint and areas within 50 m of linear infrastructure. The survey area for Migratory shorebirds focused on areas with potentially suitable habitat under highest astronomical tide (HAT) within 300 m of the facility site (suitable habitat is present north, west and east of the site). Survey tracks are shown on **Figure 3.** Further details are provided in the subsections below.

2.2.1 Surface water values

Observations were made on surface water values, including wetlands and watercourses, to verify features shown on Queensland Government mapping within the survey area, and to assess suitability of waterways to provide for fish passage.

2.2.2 Vegetation

Vegetation communities

To verify the vegetation management regulated vegetation and RE mapping (DoR 2024a, 2024b, 2024c, 2024e, 2023), quaternary vegetation assessments consistent with the method of Neldner *et al.* (2023) were undertaken in representative patches of vegetation throughout the survey area.

Marine plants

The assessment of marine plants was undertaken with reference to the data collection requirements to address State Development Assessment Provisions (SDAP) State Code 11 (DHLGPPW 2024, DAF 2022). The survey area was traversed and the extent of marine plants[14] relative to the mapped HAT line (DNRME 2013) was delineated using a handheld GPS. To quantify the density of marine plants within the project area, seven 50 m transects were undertaken (one every 100 m) across the observed extent of marine plants along the proposed North Road access, and one 50 m transect was undertaken within a separate patch of marine plants at the facility site (**Figure 4**). For each 50 m transect, observations were made using 1 x 1 m quadrats, spaced at 5 m intervals, recording:

- quadrat location above or below HAT
- species present
- percent cover of:
  - marine plants
  - marine plant material (below HAT) or leaf litter (above HAT)
  - *Restricted Matter* listed under the Queensland *Biosecurity Act* 2014 (Biosecurity Act)
  - bare soil
  - rock
  - cryptogams
  - water.

[14] Marine plants are defined under the Queensland *Fisheries Act* 1992. Further details are in **Section 3.4.2**.

Figure 3: Survey coverage

Project:Project Ulysses Ecological Assessment Report

Core infrastructure
Survey area
Drainage

NRA survey tracks
August 2024
September 2024
October 2024

NRA assessment site
Water values observation
RE quaternary assessment
Acoustic detector
Timed bird survey

Sandfly Creek

N

0 200
Metres

Source: DoR 2022, 2023, Jet Zero 2024, QGlobe 2024.

NRA Ref: 485001.01
Author: Megan Grixti
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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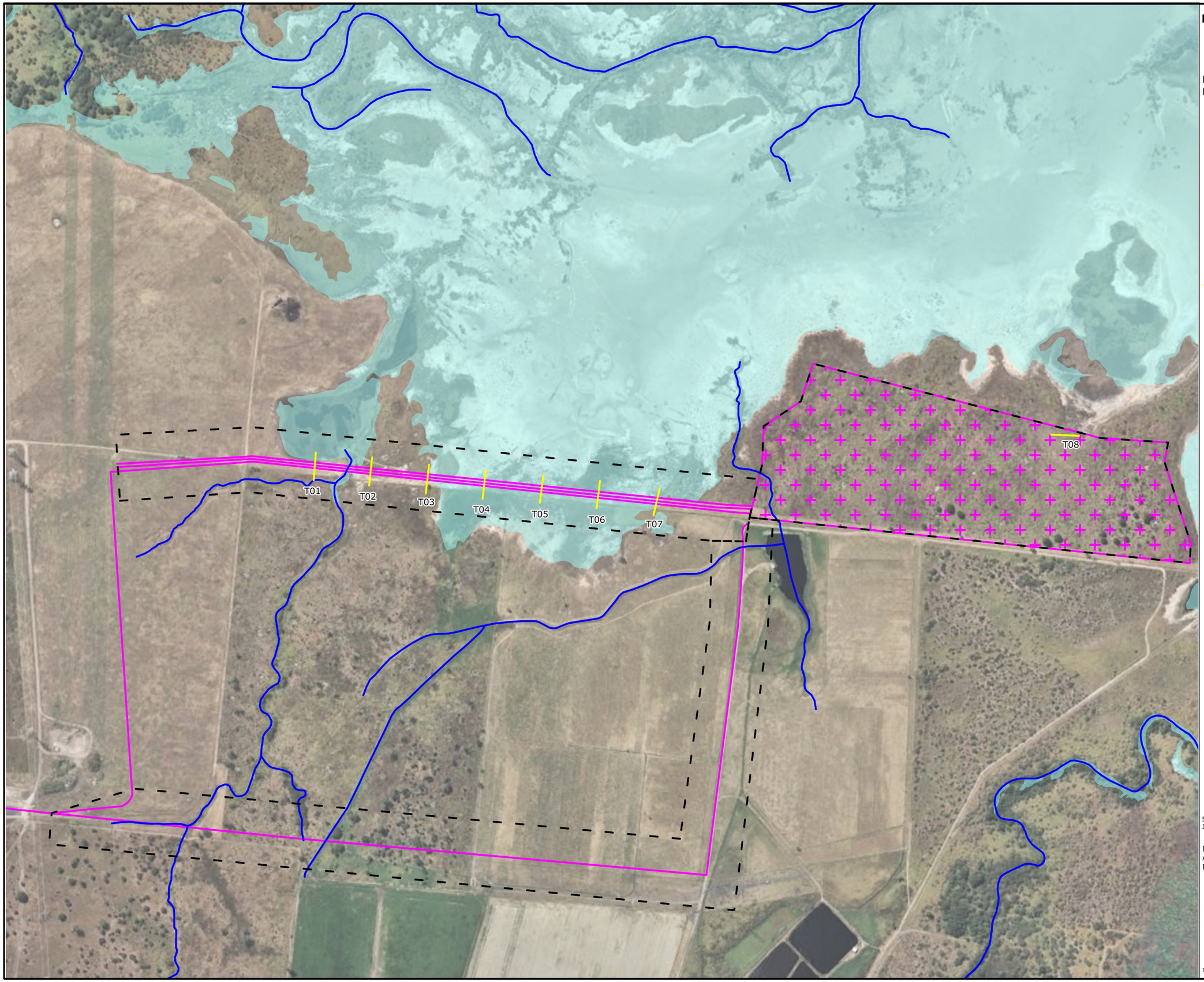


Figure 4: Project area relative to HAT and locations of marine plant density transects

Project: Project Ulysses Ecological Assessment Report

Core infrastructure
Drainage
Area below HAT
Marine plant survey area
Marine plant density transect

N

0 200
Metres

Source: DNRME 2013, DoR 2022, 2023, Google Earth 2024, Jet Zero 2024.

NRA Ref: 485001.01
Author: Megan Grixti
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Other flora

An inventory of flora species was maintained throughout the survey. The locations and abundances of significant weed species (*ie* those listed under National, State and/or Local biosecurity frameworks) were recorded.

2.2.3 Fauna

Migratory shorebirds

Survey guidelines

The recommended minimum survey effort for shorebirds as described in *EPBC Act Policy Statement 3.21* (DoEE 2017)[15] is summarised as follows. The information is provided as a guide, and DoEE (2017) recommends that local knowledge be considered when designing survey programs.

- Four surveys for roosting shorebirds during the period when the majority of shorebirds are present in the area.
  - Surveys for roosting shorebirds should be conducted as close to high tide as practicable and at a maximum of no more than 2 hours either side of high tide.
  - Replicate surveys over this period will help measure and account for population variability. In most cases, one survey in December, two in January, and one in February will be adequate.
- Four surveys for foraging shorebirds, including two surveys at spring low tide and two at neap low tide.
  - Surveys for foraging shorebirds should be conducted as close to low tide as practicable and at a maximum of no more than 2 hours either side of low tide.
- One survey during the northern hemisphere breeding season to capture data on:
  - birds that remain in Australia during that time
  - the Double-banded Plover (*Charadrius bicinctus*)[16] (March to August).

Based on NRA local knowledge, the majority of shorebirds are present in the local area between September and February. The September and October 2024 surveys were timed to coincide with this period. Further surveys were completed in January and February 2025. The August 2024 survey was conducted to address the guideline requirement for one survey in the northern hemisphere breeding season. The results of the August, September and October 2024 surveys are included in this report. The results of all five surveys will be presented in a separate technical report. The combined effort addresses the minimum survey requirements described in DoEE (2017).

Survey method

Surveys were undertaken using binoculars (10 x 50) and, when necessary, a spotting scope (Vortex Viper 65). Survey transects are shown on **Figure 3**. Survey dates, locations and tides are presented in **Table 1**. During the September and October 2024 surveys, a separate count was undertaken on either side of the high and low tides.

[15] There are also State guidelines for fauna surveys in Queensland (Eyre *et al.* 2022). However, these guidelines do not include survey methods that are applicable to shorebird studies.

[16] Double-banded Plover is listed as Migratory under the EPBC Act.

Table 1: Survey dates, locations and tides in 2024

Date	Area[A]	Survey		Tide (BoM 2024a)	
		High tide	Low tide	Time	Height (m)
20 August 2024	Saltmarsh		✓	1501	0.23
21 August 2024	Saltmarsh	✓		0944	3.03
18 September 2024	Saltmarsh		✓	1443	0.35
19 September 2024	Saltmarsh	✓		0926	3.32
2 October 2024	Saltmarsh		✓	1427	1.07
3 October 2024	Saltmarsh	✓		0854	2.79

[A] The shorebird survey area was in the saltmarsh habitat within 300 m of the western, northern and eastern boundaries of the facility site.

Other fauna

The survey design was prepared with reference to relevant survey guidelines (Eyre *et al*. 2022, Hourigan 2011, DEWHA 2010).

The survey program was designed to maximise opportunity for the detection of Bare-rumped Sheathtail Bat (*Saccolaimus saccolaims nudicluniatus*), which was identified by NRA (2024a) as likely to occur. Full spectrum Anabat Swift and Songmeter devices were deployed at five sites to achieve survey coverage (**Figure 3**) and a minimum sample of 16 detector nights[17], as summarised in **Table 2**. Microbat call analysis was undertaken by Greg Ford of Balance Environmental.

Timed searches for birds and assessments of habitat for T/NT and/or Migratory fauna were undertaken in representative habitats throughout the survey area and at each wetland. Bird survey locations are shown on **Figure 3**. Effort is described in **Table 2**. An inventory of incidental sightings was maintained throughout the surveys.

Table 2: Targeted survey effort for fauna (birds and bats)

Survey method	Survey effort	Description
Bat detector	17 detector nights	Passive detection only; sites shown on **Figure 3**
Timed bird survey	380 person minutes	Targeted sample sites shown on **Figure 3**

[17] DEWHA (2010) recommends 16 detector nights of survey effort between August and April for Bare-rumped Sheathtail Bat. There are no State guidelines specific to this species.

3. Results

3.1 Weather

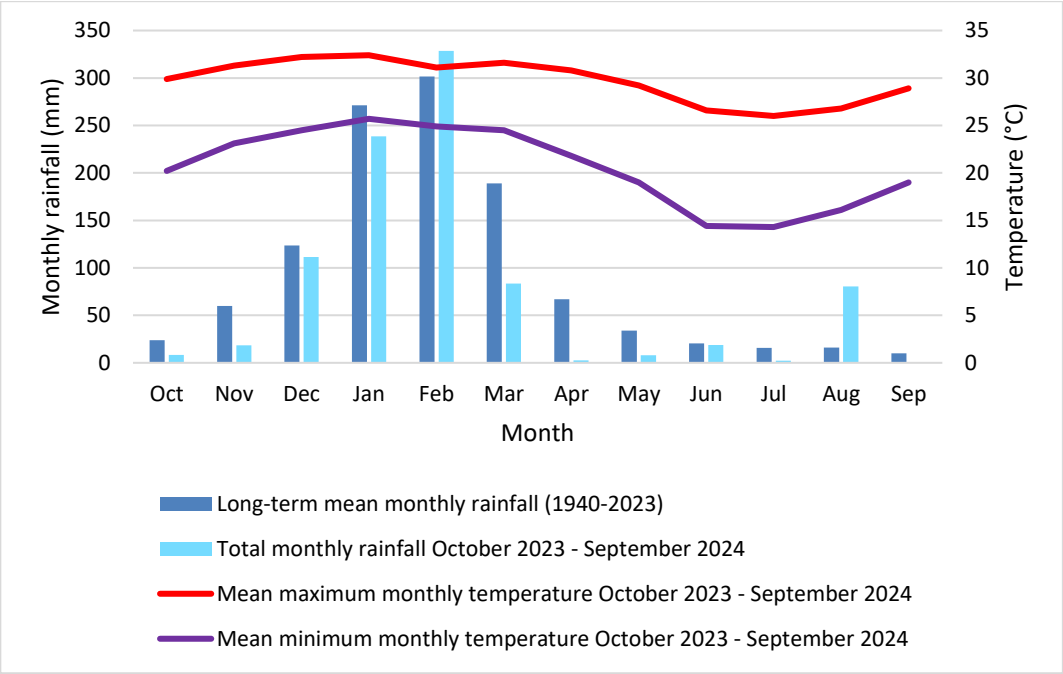
The Bureau of Meteorology operates a weather station at Townsville Aero (station 32040) approximately 10 km north-west of the project site. This station provides monthly and long-term rainfall and temperature data, starting from 1940. Total monthly rainfall and monthly temperature ranges, preceding and during the survey, and long-term mean monthly rainfall data are shown on **Graph 1**.

Augustï October is generally regarded as the late dry season in the region, and most rainfall occurs during Decemberï March. Below average rainfall was experienced in Townsville in the 5 months prior to the August 2024 survey (Marchï July 2024); however, 79.8 mm of rainfall was recorded in the week preceding the August survey period (BoM 2024b). This was above average for August.

Rainfall experienced in Townsville during the survey period was as follows (BoM 2024b).

- 0.2 mm during 19ï 23 August 2024.
- 0.0 mm during 18ï 19 September 2024.
- 0.6 mm during 2ï 3 October 2024.

Conditions were suitable for the surveys conducted.



Source: BoM 2024b

Graph 1: Total monthly rainfall, long-term mean monthly rainfall and mean temperature ranges

3.2 Soils and topography

The site is generally flat and low-lying. The core infrastructure footprint occurs between approximately 1 m and 6 m AHD[18], and the facility site is primarily between 3 m and 5 m AHD (DNRME 2018).

DES (2016) mapping (**Figure 3**) shows ‘erosion prone’ areas are intersected by:

- the western, north-eastern and eastern boundaries of the facility footprint
- wastewater and water supply pipelines, and the proposed access road along these pipelines.

Mapping by Murtha (1982) indicates that the areas of development interest intersect ‘Gilgai Complex’ soils, which are dark grey heavy clay soils that have a moderate to strong fine angular blocky structure. A site-specific soil study confirmed the presence of sodosol soils in the facility site (C & R Consulting 2024). These soils are prone to waterlogging and ‘have substantial engineering constraints, if not appropriately managed’ (C & R Consulting 2024). The study also identified the likely widespread occurrence of acid sulfate soils and the need for implementing effective management for both erosion and acid sulfate soils.

3.3 Surface water values

3.3.1 Water values field observations

Surface water features and observation sites are shown on **Figure 5**. The presence of watercourses (first-order streams), freshwater wetlands and intertidal wetlands mapped by the Queensland Government (DoR 2024d, 2022, DES 2022b, DNRME 2013) was confirmed within and adjacent to the survey area (**Figure 5**).

The proposed core linear infrastructure (*ie* road, water supply and wastewater pipelines) within the North Road access survey area passes though the southern extent of a wetland protection area, and through intertidal wetlands (DES 2022a, 2022b, DNRME 2013) (**Figure 5**). The trigger area comprises the Great Barrier Reef (GBR) wetland of high ecological significance (HES wetland) and a 100 m buffer around the HES wetland. North Road and associated infrastructure intersect the buffer. The intertidal wetlands are in areas below HAT.

A stock dam wall on the boundary of the neighbouring property (owned by JBS Australia Pty Ltd (JBS)) impedes water flow along a minor watercourse in the south-west of the facility site (**Figure 4**). The dam wall is an earth and rock bund (**Plate 1**). Observations made during the survey indicated that the dam wall is seeping.

Characteristics of water values observed during the field survey are described in **Table 3**.

[18] Elevation in metres with respect to the Australian Height Datum.



Plate 1: View of the JBS stock dam wall from the facility site

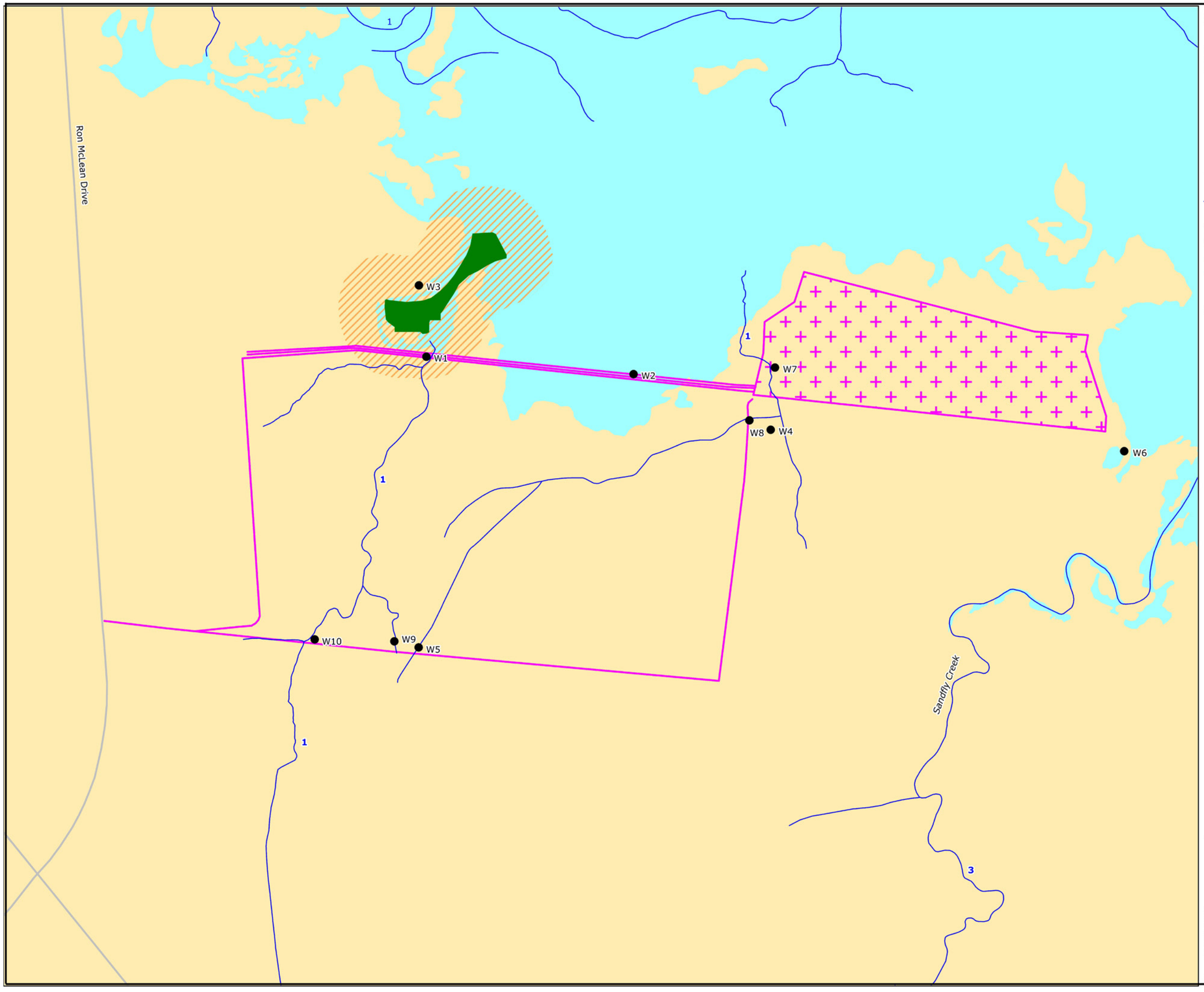


Figure 5: Water values

Project: Project Ulysses Ecological Assessment Report

Major road

Drainage (DoR 2022, 2023) (stream order shown as blue number against stream where available)

Core infrastructure

Area above HAT

Area below HAT

Water value observation site

Wetland Protection Area (DES 2022)

HES wetland

100 m buffer around HES wetland

N

0 200

Metres

Source: DES 2022, DNRME 2013, DoR 2022, 2023, Jet Zero 2024.

NRA Ref: 485001.01
Author: Angelina Bouet
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

Table 3: Water value observation descriptions

Water value type	Observation point	GPS location	Description	Photograph (facing upstream)	Photograph (facing downstream)
Swale depression	W1	-19.3199Á 146.8525Á	• Intersects proposed North Road access core infrastructure alignment (**Figure 5**). • Mapped as first-order stream by DoR (2024d). Observed as a swale depression approximately 2 m wide. • No defined banks. • No water flow observed. A small amount of standing water was observed at vehicle track crossing. • Waters discharge to palustrine wetland (W3). • Extensive weed invasion by Para Grass (*Urochloa mutica*), Sabi Grass (*Urochloa mosambicensis*), Prickly Acacia (*Vachellia nilotica*) and Parkinsonia (*Parkinsonia aculeata*). • Watercourse likely to be of low value for fish passage.		
Swale depression	W2	-19.3203Á 146.8567Á	• Intersects proposed North Road access core infrastructure alignment (**Figure 5**). • Unmapped by DoR (2024d); mapped by DNRME (2013) as below HAT; mapped by DAF (2023) as a major (tidal) waterway. • Observed as a swale depression with the inundation area approximately 120 m x 20 m. • No defined banks. • No water flow observed. Closed waterbody with standing water, likely inundated by recent rainfall. • Water was coloured with tannins. No obvious signs of pollutants such as water odours, oils or foaming. Green algae present on water surface. • Margins of waterbody vegetated with mixed saltmarsh and freshwater wetland species. • Area subject to sporadic freshwater inundation (ephemeral waterbody) and periodic inundation during king tides; consideration of value as fish habitat requires further assessment from an expert in fish passage.		
Modified palustrine wetland	W3	-19.3185Á 146.8523Á	• Located north of North Road adjacent to core infrastructure footprint (**Figure 5**). • An existing stormwater structure south-west of the wetland reports to the wetland. • Mapped as an HES wetland by DES (2022a, 2022b) and identified by DES (2023b) as a hydrologically modified habitat through bunding of a natural channel. Historical aerial imagery (QImagery 1974) indicates the bunding was installed prior to 1975. • Defined banks observed. • No water flow observed. Open waterbody with standing water. • Waters from the mapped first-order stream (W1) discharge into the wetland at the southern extent. Overflow waters from the wetland discharge into the tidal lands at the northern extent. • Water was coloured with tannins. No obvious signs of pollutants such as water odours, oils or foaming. Green algae and biofilm present on water surface.		

Water value type	Observation point	GPS location	Description	Photograph (facing upstream)	Photograph (facing downstream)
			• Waterbody mostly vegetated and dominated by emergent *Typha* sp. with occasional free-floating plants on small areas of open water. Margins dominated by mixed saltmarsh and freshwater wetland species. Some weed invasion on margins. • Waterbody likely to provide value as fish habitat.		
Artificial wetland (JBS stock dam)	W4	-19.3214Á 146.8596Á	• Adjacent to Zinc Road. South of facility site (**Figure 5**). • Artificial stock dam constructed circa 1991 (QImagery 1991). • Defined banks observed. Dam wall at northern extent near property boundary prevents normal surface water flows from south to north through the drainage line at W7. • No water flow observed. Open waterbody with standing water. • Overflow waters from the stock dam discharge into an artificial channel in the north-eastern extent of the dam (W8). • Water was coloured with tannins. No obvious signs of pollutants such as water odours, oils or foaming. Green algae and biofilm present on water surface. • Margins of stock dam vegetated with emergent Para Grass. No native vegetation observed. • Waterbody likely to be of low value as fish habitat.		
Swale depression	W5	-19.3256Á 146.8523Á	• Intersects Zinc Road (**Figure 5**). • Mapped as an artificial first-order stream by DoR (2022). Observed as a swale depression approximately 3 m wide. • No water flow observed. A small amount of standing water was observed. • Water was cloudy. No obvious signs of pollutants such as water odours, oils or foaming. Green algae and biofilm present on water surface. • Extensive Pig (*Sus scrofa*) disturbance. • Extensive weed invasion by Para Grass, Sabi Grass and Prickly Acacia. • Watercourse not likely to provide (or is of low value for) fish passage.		

Water value type	Observation point	GPS location	Description	Photograph (facing upstream)	Photograph (facing downstream)
Artificial wetland (stock dam)	W6	-19.3218Á 146.8669Á	• South-east of the proposed facility site (**Figure 5**). • Artificial stock dam constructed circa 1980 (QImagery 1981). • Defined banks observed. • No water flow observed. Closed waterbody with standing water. • Water was coloured with tannins. No obvious signs of pollutants such as water odours, oils or foaming. Algae present on water surface. • Extensive Pig and livestock (European Cattle) disturbance. • Vegetated with emergent *Typha* sp. Margins of stock dam vegetated with pasture grasses and Salt Couch. • Waterbody likely to be of low value as fish habitat.		
Watercourse (first-order stream)	W7	-19.3202Á 146.8597Á	• Intersects south-western extent of the proposed facility site (**Figure 5**). • Watercourse mapped as first-order stream by DoR (2024d). • Watercourse approximately 10 m wide from defined bank to defined bank. • No water flow observed. Standing water present within channel. • Water was turbid from sedimentation. No obvious signs of pollutants such as water odours, oils or foaming. No algae or biofilm present on water surface. • The wall of the artificial stock dam (W4) stops the upstream connectivity of the watercourse to the stock dam. • Waters from the watercourse discharge into the intertidal wetland adjacent to the proposed facility site. • Disturbance by Pig and livestock (European Cattle). • Extensive infestation of the channel by Para Grass with Chinee Apple (*Ziziphus mauritiana*), Leucaena (*Leucaena leucocephala*) and Prickly Acacia occurring on the downstream banks. • Watercourse likely to be of low value for fish passage; the stock dam wall (described in W4 above; **Plate 1**) inhibits fish movement upstream of the facility site.		
Artificial watercourse (first-order stream)	W8	-19.3212Á 146.8591Á	• Intersects proposed Zinc Road access core infrastructure alignment (**Figure 5**). • Mapped as an artificial first-order stream by DoR (2022). • Watercourse approximately 5 m wide from defined bank to defined bank. • No water flow observed. Standing water present within the channel. • Water was coloured with tannins. Some surface foaming observed upstream of the culvert crossing. Algae present on water surface. • Waters discharge into the artificial stock dam at W4. • Disturbance to the channel and banks by livestock (European Cattle) observed. • Extensive weed invasion by Para Grass. • Watercourse likely to be of low value for fish passage.		

Water value type	Observation point	GPS location	Description	Photograph (facing upstream)	Photograph (facing downstream)
Watercourse (first-order stream)	W9	-19.3255Á 146.8518Á	• Intersects proposed Zinc Road (**Figure 5**). • Mapped as a first-order stream by DoR (2024d). • Watercourse approximately 1.5 m wide from defined bank to defined bank. • No water observed in channel. • Headwaters of the watercourse that discharge to palustrine wetland (W3). • Disturbance by Pig and livestock (European Cattle). • Extensive weed invasion with riparian vegetation dominated by Prickly Acacia and Leucaena. • Watercourse not likely to provide (or is of low value for) fish passage.		
Watercourse (first-order stream)	W10	-19.3255Á 146.8501Á	• Intersects proposed Zinc Road access core infrastructure alignment (**Figure 5**). • Mapped as a first-order stream by DoR (2024d). • Watercourse approximately 15 m wide from defined bank to defined bank. • No water flow observed. Standing water present within the channel. • Water was turbid with sedimentation. No obvious signs of pollutants such as water odours, oils or foaming. No algae or biofilm present on water surface. • Headwaters of the watercourse that discharge to palustrine wetland (W3). • Minor erosion of upper bank observed. • Approximately 2 m of rock fill has been placed at the headwater. • Disturbance by Pig and livestock (European Cattle). • Extensive weed invasion by non-native pasture grasses. • Watercourse not likely to provide (or is of low value for) fish passage.		

3.3.2 Waterways for waterway barrier works

Watercourses that potentially provide fish passage, as represented by waterways for waterway barrier works mapping (DAF 2023), show areas with ómoderateô and ólowô risk levels[19] in the survey area (**Figure 6**).

The suitability of watercourses within the survey area to provide for fish habitat and/or fish passage was field verified (**Table 3)**. All watercourses observed within the survey area are likely to have a low risk level for impacts to fish passage, including the section of watercourse mapped by DAF (2023) as having a ómoderateô risk. The wall of the artificial stock dam at site W4 (**Figure 5**) would act as a barrier to upstream connectivity of the ómoderateô risk watercourse to the stock dam; therefore, the watercourse does not provide fish passage south of the facility site.

The tidal waterway shown on **Figure 6** intersects with North Road and associated infrastructure. This area is under the HAT boundary and is mapped as a major (tidal) risk waterway. As noted by NRA (2024a), further assessment of this area from an expert in fish passage may be required to support a development approval application.

3.3.3 Environmentally significant surface water resources

Surface waters leaving the survey area report to Sandfly Creek and discharge to Cleveland Bay. The project is on the periphery of the Burdekinï Townsville Coastal Aggregation Nationally Important Wetland (DCCEEW 2019)[20] (**Figure 7**). The following features occur downstream, in the distal receiving environment:

- fish habitat area (DESI 2024c) (**Figure 7**)
- GBR Marine Park (GBRMP) (DCCEEW 2024), which is part of the GBRWHA and GBRNHP (**Figure 8**).

The GBRMP is located approximately 6.3 km downstream of the facility site. The GBRWHA and GBRNHP are located approximately 2.5 km downstream of the facility site. All GBR features are MNES.

[19] Risk of impacts to fish life cycles due to works creating a barrier to fish movement.

[20] Nationally Important Wetlands are not MNES.

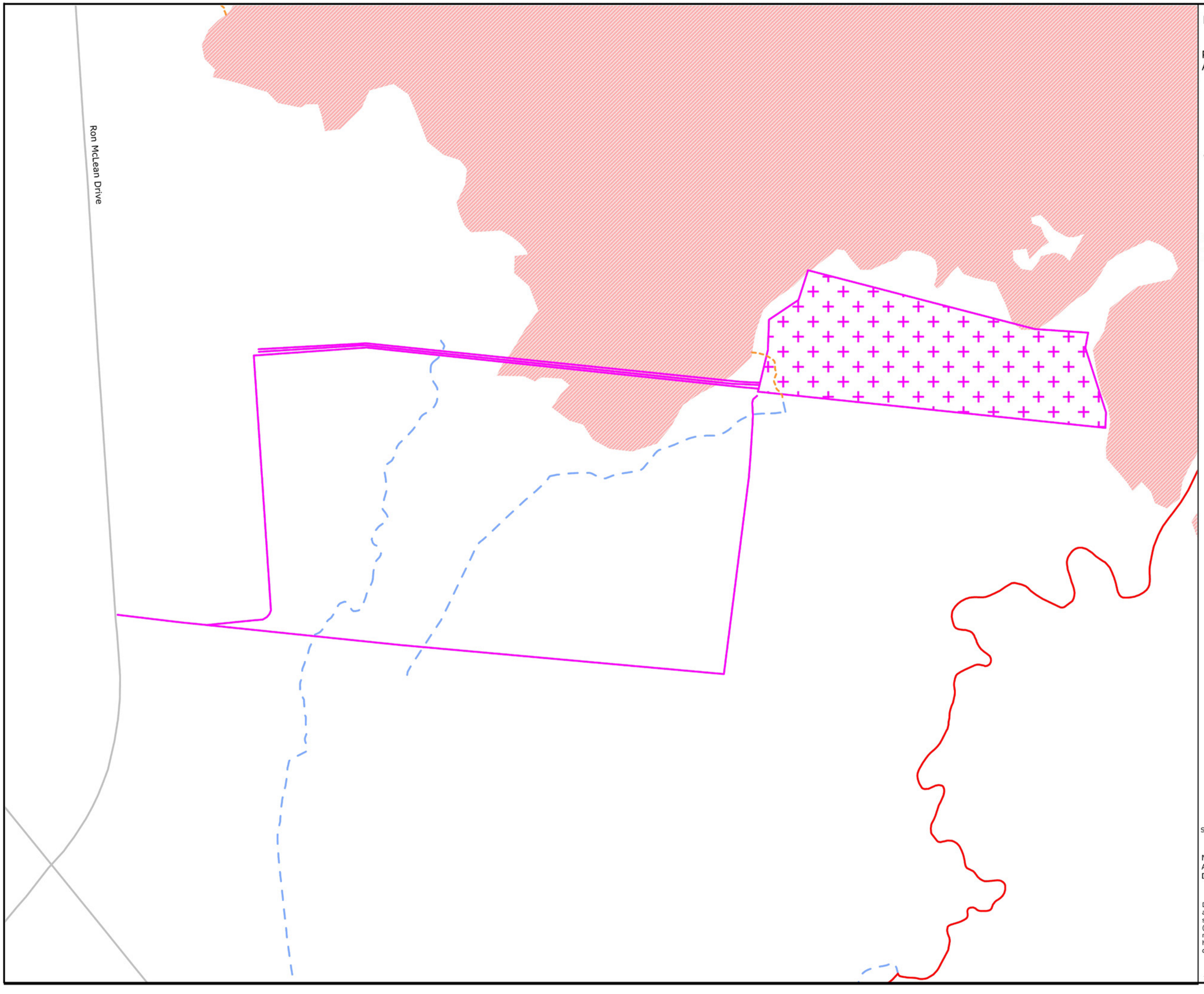


Figure 6: Waterways for waterway barrier works

Project: Project Ulysses Ecological Assessment Report

Major road

Core infrastructure

Waterway for waterway barrier works (DAF 2023)

Major (tidal) risk

High risk

Moderate risk

Low risk

N

0 200

Metres

Source: DAF 2023, DoR 2023, Jet Zero 2024.

NRA Ref: 485001.01
Author: Thomas Munro
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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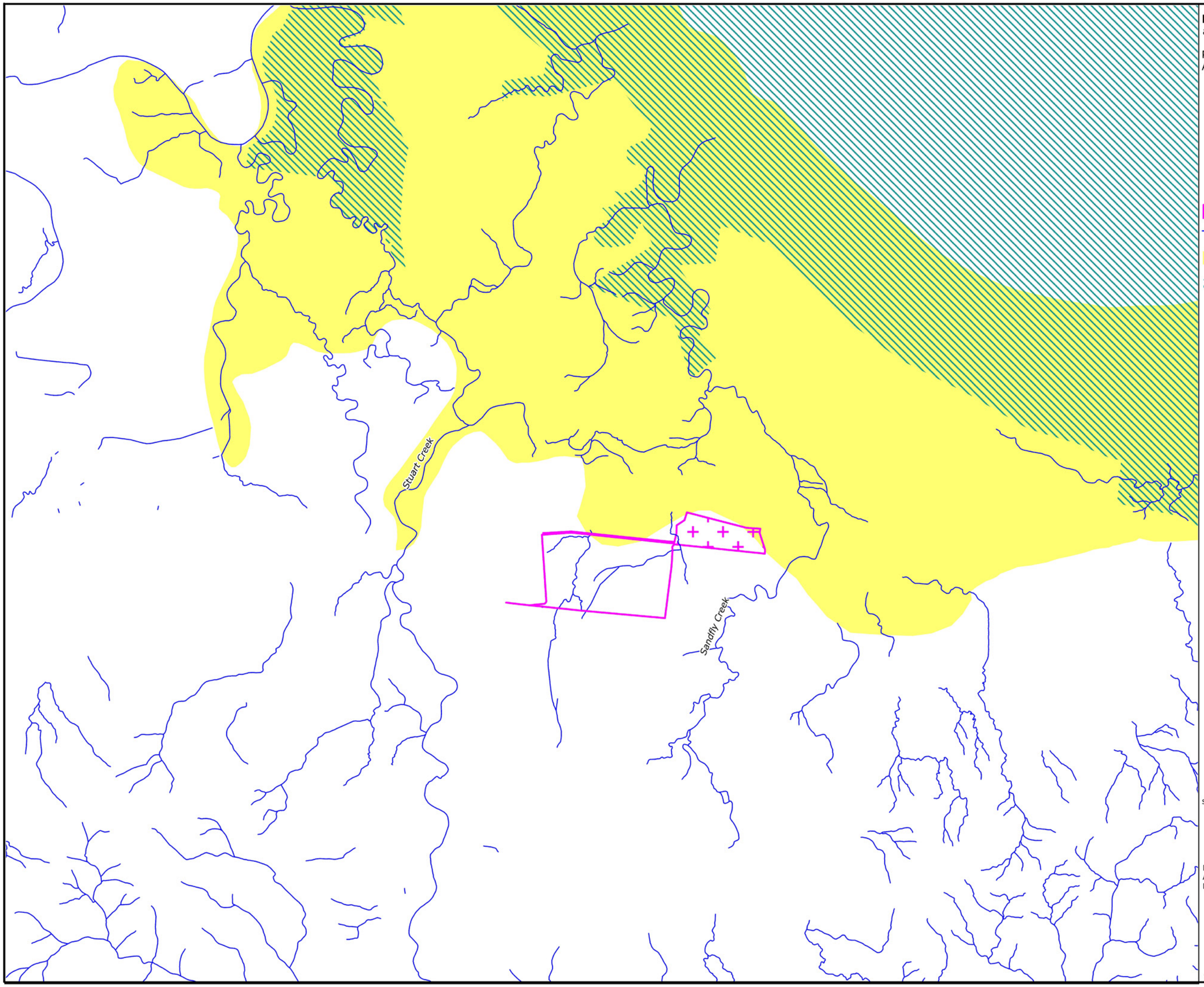


Figure 7: Nationally important wetlands and fish habitat areas

Project: Project Ulysses Ecological Assessment Report

Core infrastructure

Drainage

Burdekin-Townsville Coastal Aggregation Nationally Important Wetland

Fish habitat area

N

0 1

Kilometres

Source: DESI 2024, DEWHA 2008, DoR 2022, 2023, Jet Zero 2024.

NRA Ref: 485001.01
Author: Thomas Munro
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

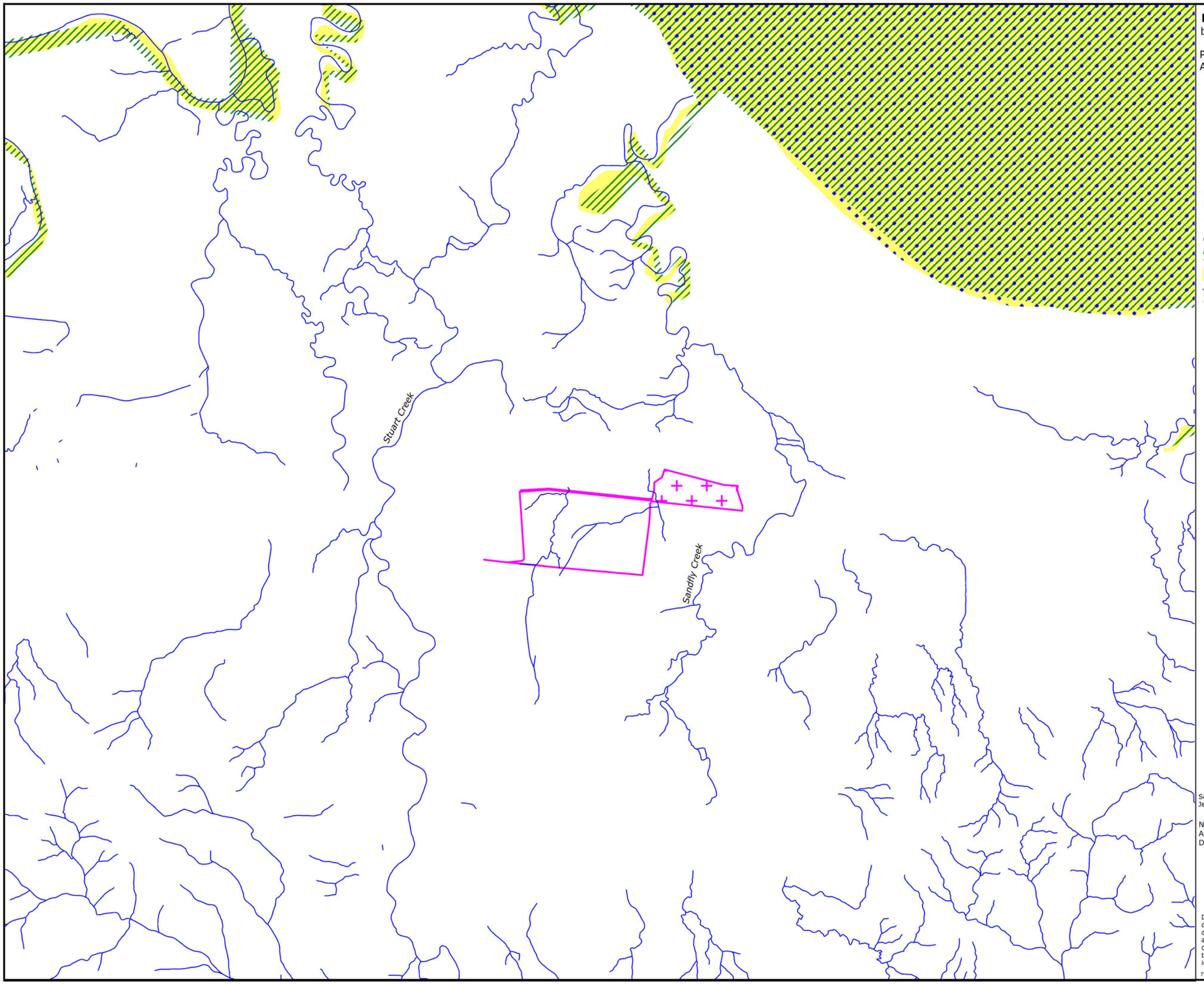


Figure 8: Great Barrier Reef administrative boundaries

Project: Project Ulysses Ecological Assessment Report

Core infrastructure
Drainage
GBR administrative area
GBRWHA
GBRNHP
GBRMP

N

0 1
Kilometres

Source: DCCEEW 2019, 2024, DoR 2022, 2023, GBRMPA 2023, Jet Zero 2024.

NRA Ref: 485001.01
Author: Angelina Bouet
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

3.4 Vegetation

3.4.1 Vegetation communities

The legislative and conservation status of each vegetation community, current as at 8 October 2024, is provided with reference to the following.

- The EPBC Act, which lists threatened ecological communities (TECs) as Vulnerable, Endangered or Critically Endangered.
- The RE framework, which classifies vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil (Sattler & Williams 1999).
  - The Queensland *Vegetation Management Act* 1999 (VM Act), which categorises REs based on the remaining extent of the RE in the bioregion. REs are listed as Endangered, Of Concern or Least Concern.
  - The Biodiversity Status (BD Status) of the REs according to the Queensland Department of Environment, Science and Innovation. The BD Status is based on the extent of the REs in the bioregion, their condition, and the presence of threatening processes. REs are listed as Endangered, Of Concern or No Concern at Present.
- VM Act vegetation management framework, which regulates vegetation clearing with reference to the following maps.
  - The regulated vegetation management map[21], which shows vegetation categories that determine what can be cleared and how the clearing activity can be undertaken. Vegetation is categorised as A (regulated compliance areas), B (remnant vegetation), C (high-value regrowth vegetation), R (regrowth vegetation associated with a GBR watercourse) or X (vegetation that is not category A, B, C or R).
  - The vegetation supporting map, which displays the RE mapping, the location of vegetation associated with mapped wetlands, watercourses and drainage features, and essential habitat mapping[22].

TECs

The EPBC Act Protected Matters Search Tool (DCCEEW 2024a) did not identify the potential presence of any TECs in the search area (**Appendix B**). None of the vegetation communities observed within the survey area are listed as TECs under the EPBC Act and TECs are not likely to occur.

REs

The REs mapped by DESI (2024a) and DoR (2024a) as present within the core infrastructure footprint have a ólLeast Concernô VM Act status and a ôNo Concern at Presentô BD Status, with the exception of RE 11.3.31, which has an ólOf Concernô BD status; these REs are described in **Table 4**.

[21] The regulated vegetation management map is based on the DoR (2024e) mapping layer.

[22] The vegetation supporting map is based on a combination of DoR (2024a, 2024b, 2024c, 2024d) mapping layers.

Table 4: Queensland Government mapped REs[1] within the core infrastructure footprint

RE code	RE description[2]	Status[3]		
		EPBC Act	VM Act	BD Status
11.1.2a	Bare mud flats on Quaternary estuarine deposits, with very isolated individual stunted mangroves such as *Avicennia marina* and/or *Ceriops australis*. May have obvious salt crusts on the soil surface. Geologies mapped include Qhcm (Holocene mud and sandy mud), Qm (Quaternary coastal mud, silt and minor evaporites), Qhe/m (Holocene mud, sandy mud, muddy sand and minor gravel), Qhct (Holocene silt, mud and sand and minor salt) and Qpe (Pleistocene estuarine mud, sand). Intertidal.	-	LC	NC
11.3.12	*Melaleuca viridiflora* woodland to open woodland, occasionally with *M. argentea* and *M. dealbata*. Occasional midstratum of *Grevillea pteridifolia* and *Acacia leptocarpa*. Ground layer of perennial grasses such as *Themeda triandra, Elionurus citreus, Ectrosia leporina, Eriachne rara, Eremochloa bimaculata, Thaumastochloa pubescens, Eragrostis brownii* and *Ischaemum australe*. Occurs on alluvial plains on strongly duplex clay soils with restricted drainage. Contains Palustrine.	-	LC	NC
11.3.31	*Ophiuros exaltatus* and/or *Dichanthium* spp. tussock grassland. The ground layer has a variable composition, with drier areas dominated by *Ophiuros exaltatus, Iseilema membranaceum* or *Dichanthium* spp. or *Brachyachne tenella*. Other common and sometimes dominant grasses include *Themeda triandra, Heteropogon contortus, Eulalia aurea, Imperata cylindrica, Eriochloa pseudoacrotricha, Bothriochloa* spp., *Panicum decompositum* and *Sporobolus* spp. Other species include *Neptunia* spp., *Rhynchosia minima, Crotalaria* spp., *Euphorbia* spp., *Aristida latifolia, Sida* spp. and *Desmodium* spp. Trees such as *Eucalyptus platyphylla, Grevillea striata, Corymbia dallachiana* or *C. erythrophloia* may occur as emergent isolated trees or tall shrubs. Occurs on older floodplain complexes on Cainozoic alluvial plains. Black or dark grey earths or brown clays, in some areas with strong gilgai or debil debil microrelief. Often with self-mulching surface, and alkaline subsoil. Not a Wetland.	-	LC	OC
11.3.35	*Eucalyptus platyphylla, Corymbia clarksoniana* woodland, occasionally with *Corymbia tessellaris*. A secondary tree layer commonly occurs, including *Planchonia careya, Pandanus spiralis, Melaleuca viridiflora* or *M. nervosa* and *Petalostigma pubescens*. The ground layer is usually tussock grasses, including *Themeda triandra, Heteropogon contortus, Mnesithea rottboellioides* and *Bothriochloa decipiens*, together with herbs or forbs such as *Glycine tabacina, Galactia tenuiflora* or *Sida hackettiana*. Occurs on Cainozoic alluvial plains. Older floodplain complexes, major stream levees and lighter deltaic deposits. Not a Wetland.	-	LC	NC

[1] DESI (2024a) and DoR (2024a).

[2] DESI (2024d).

[3] Status as of 8 October 2024 under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), Queensland *Vegetation Management Act* 1999 (VM Act) and Biodiversity Status. Categories include: Critically Endangered (CE), Endangered (E), Vulnerable (V), Of Concern (OC), Least Concern (LC), No Concern at Present (NC) and not listed (-).

REs were verified during the field survey (quaternary assessment sites are shown on **Figure 9**). Vegetation communities observed within the survey area were not consistent with DoR (2024a) mapping. None of the DoR (2024a) mapped REs were observed within the survey area.

The field verified RE extents within the survey area, as compared with the DoR (2024a) mapping are shown on **Figure 9**. Detailed results from the quaternary assessments are provided in **Appendix C** and summarised as follows.

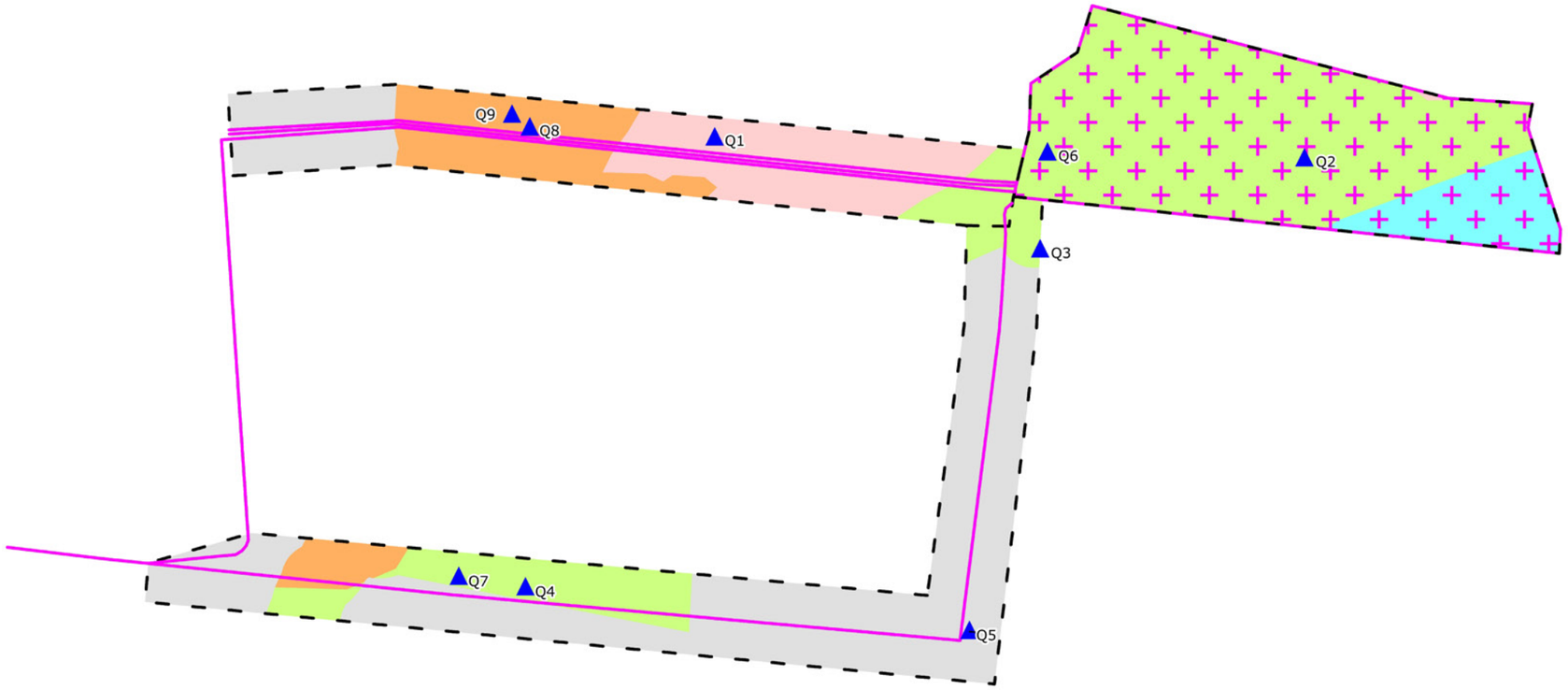
- Site Q1: samphire forb land on marine mudflats (RE 11.1.2b[23]) within the North Road access corridor. Community extends over area mapped by DoR (2024a) as RE 11.1.2a and a portion of the area mapped by DoR (2024a) as RE 11.3.12.
- Site Q2: non-remnant vegetation with recent clearing disturbance across most of the facility site extent. Vegetation dominated by weeds including Chinee Apple, Prickly Acacia, Rhodes Grass (*Chloris gayana*) and Stinking Passionflower (*Passiflora foetida*).
- Site Q3: artificial stock dam within the Zinc Road access corridor, with non-remnant fringing vegetation dominated by pasture grasses such as Para Grass, Sabi Grass and Rhodes Grass.
- Site Q4: non-remnant vegetation within the Zinc Road access corridor, dominated by Prickly Acacia, Chinee Apple and non-native pasture grasses.
- Site Q5: cattle yard within the Zinc Road access corridor, with non-remnant vegetation dominated by non-native pasture grasses.
- Site Q6: ephemeral watercourse within the facility site, with non-remnant vegetation dominated by pasture grasses and a sparse shrub layer of Chinee Apple, Prickly Acacia and Leucaena.
- Site Q7: ephemeral watercourse within the Zinc Road access corridor, with non-remnant vegetation dominated by Prickly Acacia, Chinee Apple, Leucaena and Grader Grass (*Themeda quadrivalvis*).
- Site Q8: non-remnant ecotone between freshwater HES wetland and samphire mudflats within the North Road access corridor. Canopy dominated by Prickly Acacia and Parkinsonia with Rubber Vine (*Cryptostegia grandiflora*). Ground layer includes Para Grass, Salt Couch (*Sporobolus virginicus*) and *Portulaca bicolour.*
- Site Q9: palustrine wetland adjacent to the North Road access corridor, dominated by *Typha* sp. (RE 11.3.27x1a[24]). Community extends over a portion of the area mapped by DoR (2024a) as RE 11.3.12.

[23] RE 11.1.2b has a ôLeast Concernô VM Act status and a ôNo Concern at Presentô BD Status. It is not listed under the EPBC Act.

[24] RE 11.3.27x1a has a ôLeast Concernô VM Act status and an ôOf Concernô BD Status. It is not listed under the EPBC Act.

Figure 9: Queensland Government mapped and NRA field verified REs

Project: Project Ulysses Ecological Assessment Report



Core infrastructure

Vegetation survey extent

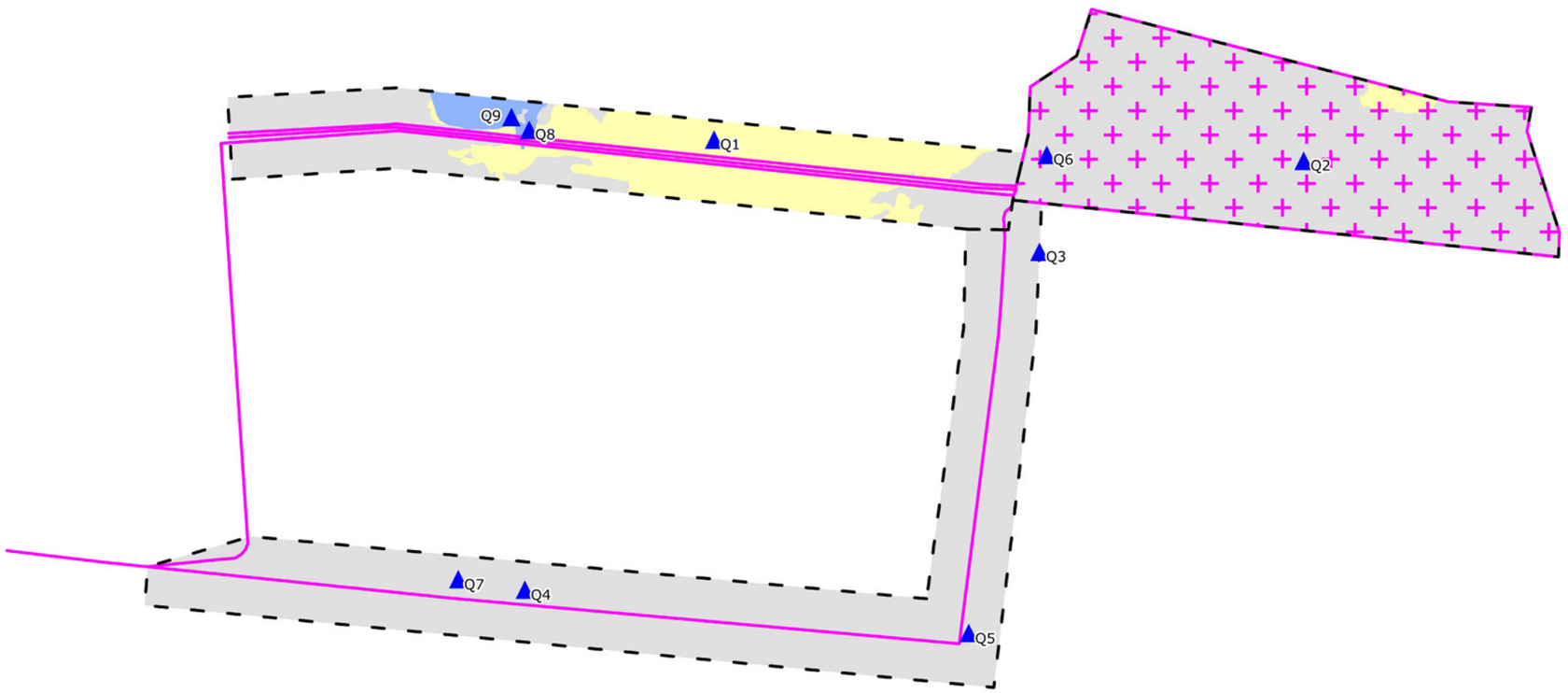
RE quaternary assessment site

VM Act RE (v13.0)

- 11.1.2a
- 11.3.12
- 11.3.31
- 11.3.35
- Non-remnant

NRA field verified RE

- 11.1.2b
- 11.3.27x1a
- Non-remnant



N

0 200

Metres

Source: DoR 2024, Jet Zero 2024.

NRA Ref: 485001.01
Author: Megan Grixti
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

Vegetation management regulated vegetation

The survey area is mapped by DoR (2024b, 2024c, 2024e, 2023) to contain the following VM Act regulated vegetation values (**Figure 10**).

- Regulated vegetation 100 m from a wetland.
- Regulated vegetation intersecting a watercourse (first-order streams).
- Vegetation management regulated vegetation categories:
  - B (remnant vegetation)
  - R (regulated regrowth vegetation associated with a GBR watercourse)
  - X (vegetation that is not category A, B, C or R).

Field verification of VM Act regulated vegetation values observed within the survey area is summarised as follows.

- North Road intersects an area that was verified as RE 11.3.27x1a and RE 11.1.2b remnant vegetation (**Figure 9**) and mapped by DoR (2024c) as 100 m from a wetland (**Figure 10**). A small portion of the area within the North Road access mapped as 100 m from a wetland was verified as non-remnant vegetation.
- The vegetation within the survey area mapped by DoR (2023) as regulated vegetation intersecting a watercourse (*ie* vegetation within 50 m of the defining banks) (**Figure 10**) was verified as non-remnant vegetation (**Figure 9**).
- The verified extents of vegetation management regulated vegetation categories within the survey area were not consistent with DoR (2024a) mapping (**Figure 10**). The verified extents are as follows[25].
  - Category B remnant vegetation was confirmed at the North Road access and the facility site. The category B remnant vegetation is located within the NRA field verified RE extents mapped on **Figure 9** as RE 11.3.27x1a and RE 11.1.2b. No other areas of category B remnant vegetation were observed within the survey area.
  - The category B remnant vegetation mapped by DoR (2024a) as intersecting watercourses (first-order streams) within the facility site and the Zinc Road access was verified as non-remnant vegetation. Non-remnant vegetation that is located within 50 m of a watercourse in the GBR catchment would equate to a category R area according to DoR (2024f).
  - The category R areas mapped by DoR (2024a) within the survey area along Zinc Road were verified as non-remnant vegetation that meets the definition of a Category R area. This includes the JBS stock dam along Zinc Road, which, under existing management, would be unlikely to support regrowth vegetation.
  - With exception of the areas that meet the definition of a category R area, all other NRA field verified non-remnant vegetation within the survey area (**Figure 9**) meet the requirements for category X.

[25] The observations presented in the report provide an indication of conditions at the time of the survey. Field observations that differ from the DoR (2024a) mapping in **Figure 10** do not result in change to the regulated vegetation mapping. Formal changes to regulated vegetation mapping are administered through an application for a Property Map of Assessable Vegetation (PMAV).

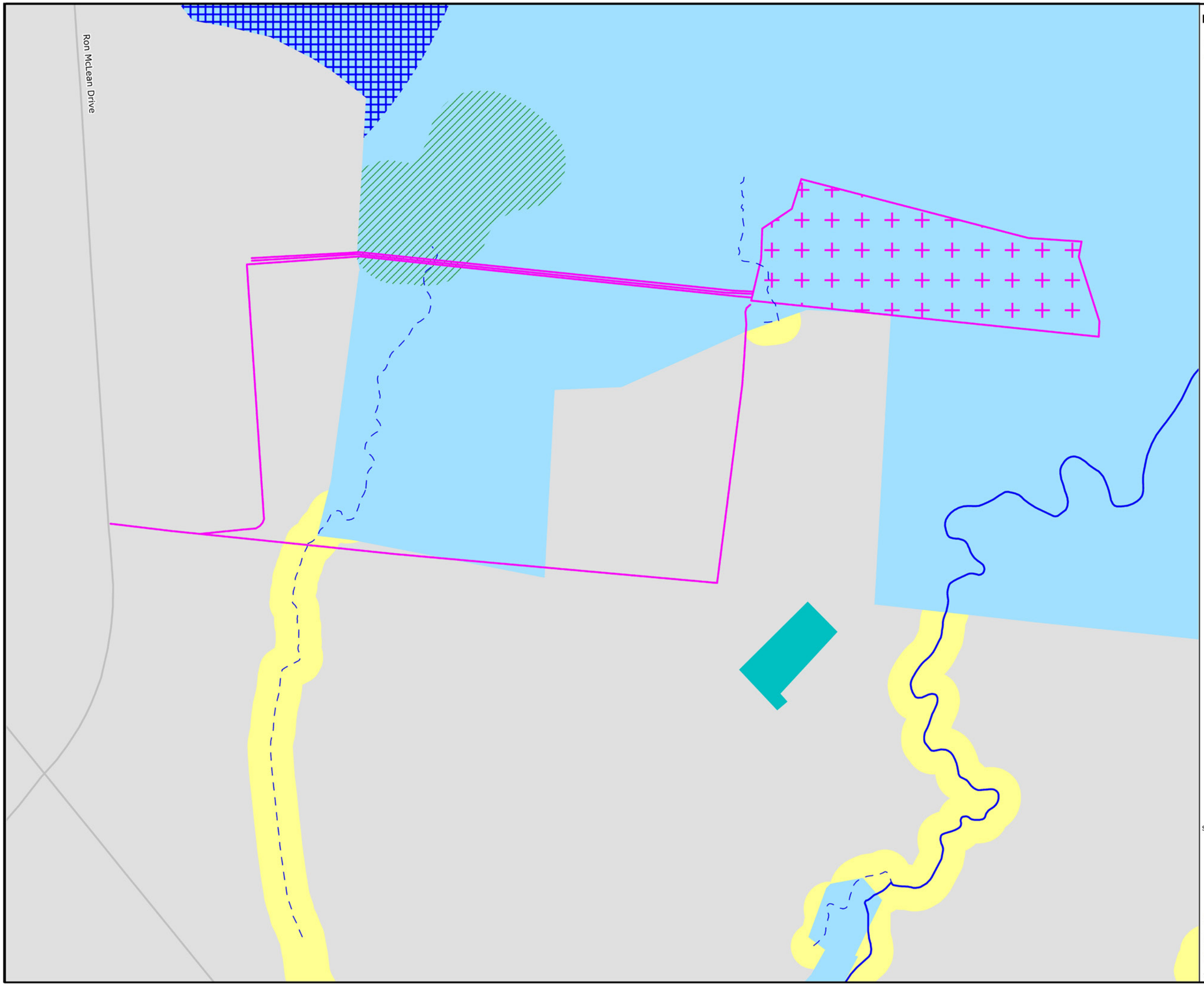


Figure 10: Regulated vegetation

Project: Project Ulysses Ecological Assessment Report

Major road

Core infrastructure

Regulated vegetation (VM Act)

100 m from a wetland

Essential habitat

Intersecting a watercourse

Stream order 1

Stream order 3

Water

Regulated vegetation category

B

R

X

N

0 200

Metres

Source: DES 2023, DoR 2023, 2024, Jet Zero 2024.

NRA Ref: 485001.01
Author: Thomas Munro
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

3.4.2 Marine plants

A marine plant is defined in the Queensland *Fisheries Act* 1994 (Fisheries Act) as:

- a plant (a ótidal plantô) that usually grows on, or adjacent to, tidal land whether it is living or dead, standing or fallen
- the material of a tidal plant, or other plant material on tidal land
- a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.

óMarine plantsô do not include declared pest plants (*ie* Restricted or Prohibited Matter) listed under the Biosecurity Act.

Some marine plants (*eg* mangroves, seagrass, samphires, saltcouch and saltmarsh plants) are protected regardless of their location on or above tidal land. Marine plants that grow adjacent to tidal land provide valuable habitat to fish when hydrologically connected to the marine environment (DAF 2022, Couchman & Beumer 2007).

Marine plants were observed above highest astronomical tide (HAT) within the facility site (**Plate 2**) and above and below HAT along North Road (**Plate 3**). The extent of marine plants within the survey area is shown on **Figure 11**. An inventory of marine plants observed within the survey area, and an indication of whether they were observed below or above HAT, is provided in **Table 5**. The quadrat data for each population density transect is provided in **Appendix D**.

Areas where the vegetation cover comprised Prickly Acacia, Parkinsonia, Chinee Apple and Rubber Vine were excluded from the marine plant cover estimates (**Figure 11**). These species are listed as Restricted Matter under the Biosecurity Act and therefore are not considered marine plants. Further information on Restricted Matter is provided in **Section 3.6.1**.

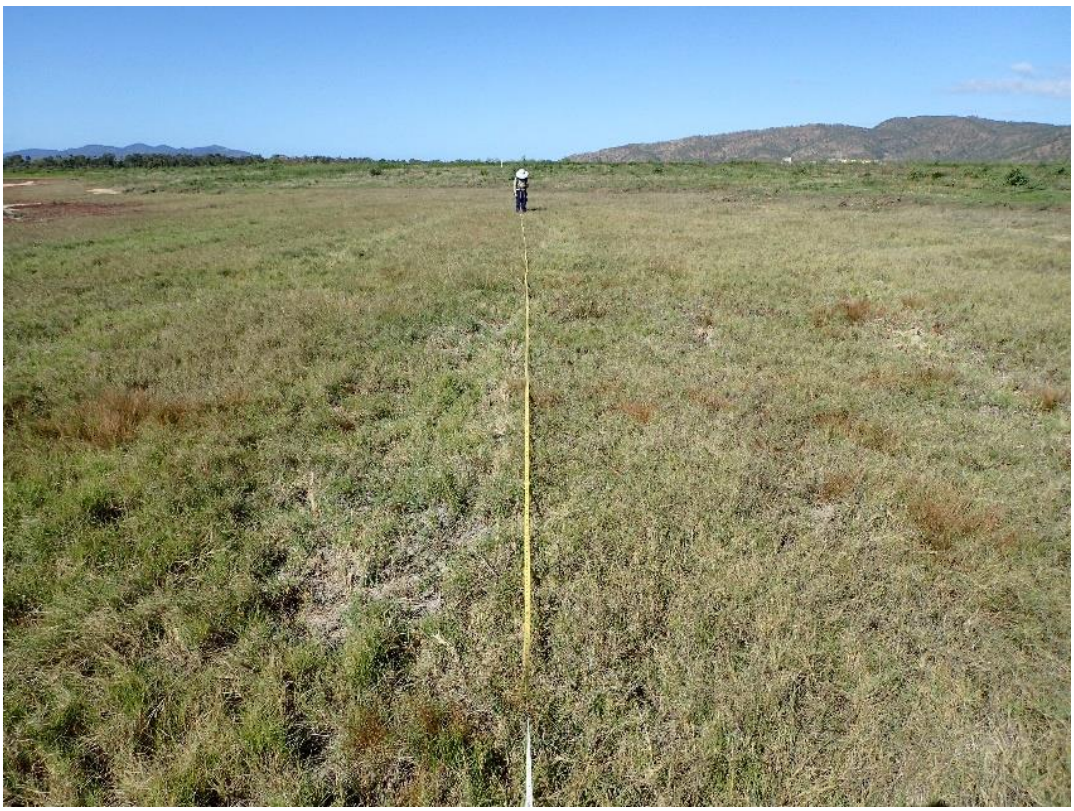


Plate 2: Marine plants above HAT within the facility site



Plate 3: Marine plants below HAT within the North Road access

Table 5: Marine plant species recorded within the survey area

Marine plant species		Survey area		Marine plant location relative to HAT[A]	
Scientific name	Common name	Facility site	North Road access	Below HAT	Above HAT
Alternanthera ficoidea[B]	-	-	✓	✓	-
Bothriochloa decipiens	-	-	✓	✓	-
Bothriochloa pertusa [B]	-	-	✓	✓	-
Bothriochloa sp.	-	-	✓	✓	-
Chloris inflata[B]	Purpletop Chloris	-	✓	✓	-
Cyanthillium cinereum	-	-	✓	✓	-
Cyperus sp.	-	-	✓	✓	-
Diplachne fusca var. *fusca*	-	-	✓	✓	-
Echinochloa colona [B]	Awnless Barnyard Grass	-	✓	✓	-
Fimbristylis ferruginea	-	-	✓	✓	-
Fimbristylis polytrichoides	-	✓	✓	✓	✓
Leucaena leucocephala[B]	Leucaena	-	✓	✓	-
Ludwigia hyssopifolia[B]	-	-	✓	✓	-
Megathyrsus maximus[B]	Guinea Grass	-	✓	✓	-
Passiflora foetida[B]	Stinking Passionflower	-	✓	✓	-
Portulaca bicolor	-	-	✓	✓	✓
Salicornia quinqueflora subsp. *quinqueflora*	Beadweed	✓	✓	✓	✓
Sesuvium portulacastrum	Sea Purslane	✓	✓	✓	✓
Sporobolus virginicus	Sand Couch	✓	✓	✓	✓

Marine plant species		Survey area		Marine plant location relative to HAT[A]	
Scientific name	Common name	Facility site	North Road access	Below HAT	Above HAT
Stachytarpheta jamaicensis[B]	Jamaica Snakeweed	-	✓	✓	-
Tecticornia australasica	-	-	✓	✓	-
Tecticornia pergranulata	-	-	✓	✓	-
Typha sp.	-	-	✓	✓	-
Urochloa mosambicensis[B]	Sabi Grass	-	✓	✓	-
Urochloa mutica[B]	Para Grass	-	✓	✓	-
Vincetoxicum carnosum	-	✓	✓	✓	✓

[A] Below HAT, all plants that are not Prohibited or Restricted Matter are considered marine plants. Above HAT, only plants that meet the definition of ‘adjacent’ according to Couchman & Beumer (2007) are marine plants.

[B] Non-native species.

Marine plants within the survey area cover approximately 2,480.5 m^2 at the facility site, and approximately 24,879.8 m^2 along the North Road access (**Figure 11**). The average foliage cover of marine plants for each transect is provided in **Table 6** and summarised as follows.

- Within the facility site, across all quadrats, marine plants had an average cover of 82.0%.
- Within the North Road access:
  - across all quadrats, marine plants had a total average cover of 35.9%
  - of the quadrats located below HAT, marine plants had an average cover of 49.8% and marine plant material has an average cover of 12.3%
  - of the quadrats located above HAT, marine plants had an average cover of 35.0%.

Table 6: Average cover within the survey area

Transect[1]	Average cover (%)							
	Marine plants[2]	Other plants[3]	Restricted Matter[4]	Leaf litter	Cryptogam	Rock	Bare earth	Water
North road access								
T01	21.5	0.0	0.0	5.5	0.0	0.5	72.5	0.0
T02	36.0	14.0	3.5	5.0	0.0	0.0	41.5	0.0
T03	15.0	29.5	0.0	2.5	0.0	0.0	53.0	0.0
T04	32.0	0.0	0.0	23.0	0.5	0.0	44.5	0.0
T05	48.0	0.0	0.0	14.0	6.0	0.0	32.0	0.0
T06	50.5	0.0	0.0	2.0	12.5	0.0	11.0	24.0
T07	48.5	0.0	0.0	5.0	15.0	0.0	31.5	0.0
T01–T07 total average cover (%)	**35.9**	**6.2**	**0.5**	**8.1**	**4.9**	**0.1**	**40.9**	**3.4**
Facility site								
T08 total average cover (%)	**82.0**	**1.0**	**0.0**	**17.0**	**0.0**	**0.0**	**0.0**	**0.0**

[1] As shown on **Figure 11**. Raw transect data is provided in **Appendix D**.

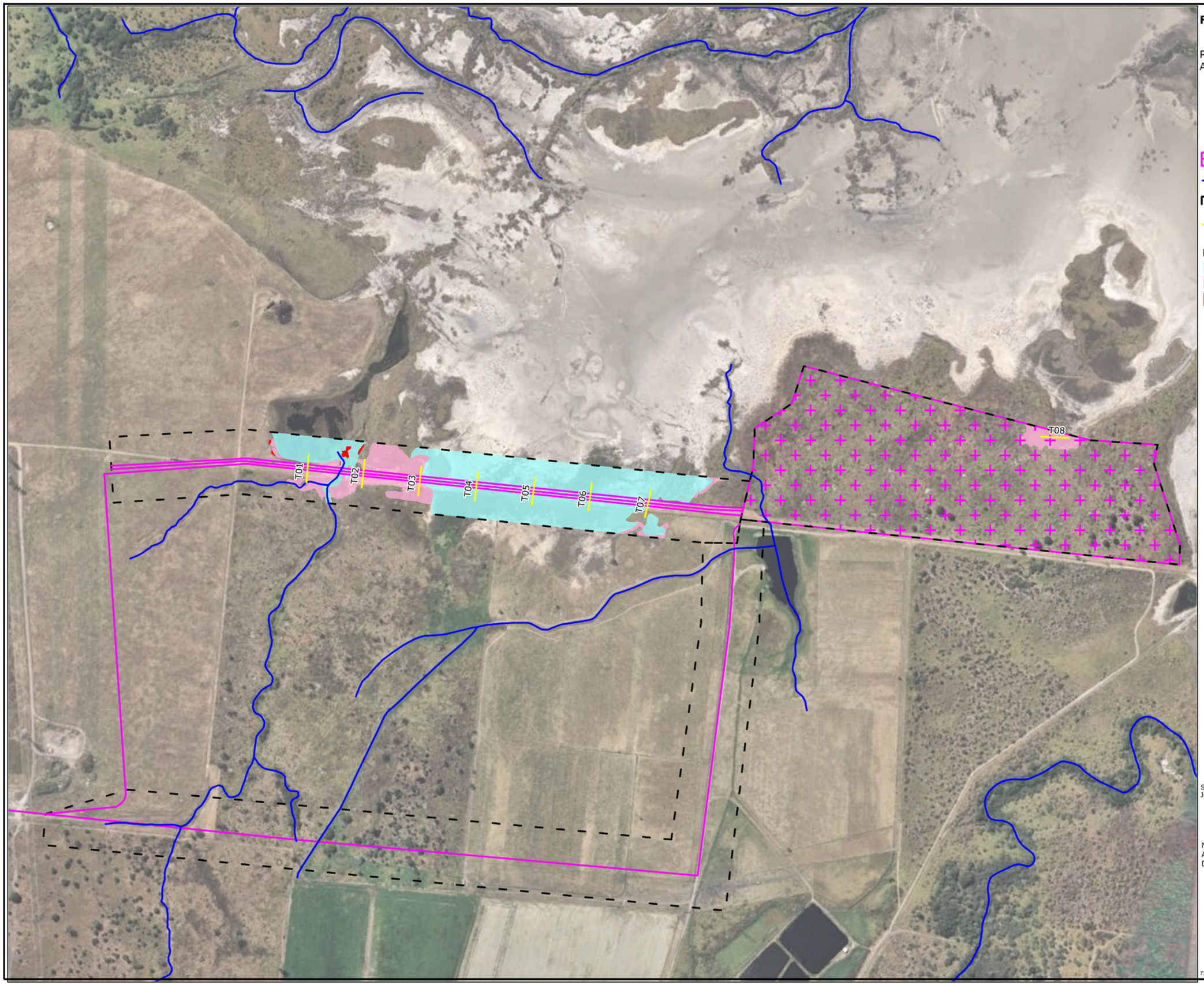
[2] Below HAT, all plants that are not Prohibited or Restricted Matter are considered marine plants. Above HAT, only plants that meet the definition of ‘adjacent’ according to Couchman & Beumer (2007) are marine plants.

[3] Plants that were observed within quadrats above HAT that did not meet the definition of ‘adjacent’ according to Couchman & Beumer (2007) were recorded as ‘other plants’.

[4] Plants listed as Restricted Matter under the Queensland *Biosecurity Act* 2014.

Figure 11: Marine plant extent

Project: Project Ulysses Ecological Assessment Report



Core infrastructure
Drainage
Marine plant survey area
Marine plant density transect

Marine plant observation
Marine plants below HAT
Marine plants above HAT
Restricted Matter

N

0 200
Metres

Source: DNRME 2013, DoR 2022, 2023, 2024, Google Earth 2024, Jet Zero 2024.

NRA Ref: 485001.01
Author: Angelina Bouet
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

3.4.3 T/NT flora

The results of database searches for T/NT flora species are included in **Appendix B**. An inventory of flora species observed within the core infrastructure footprint survey area is provided in **Appendix E**. No T/NT flora species listed under the Queensland *Nature Conservation Act* 1992 (NC Act) or the EPBC Act were observed within the survey area, and none are likely to occur. The likelihood of occurrence assessment for T/NT flora species based on those identified in the database searches is provided in **Appendix F**.

3.5 Fauna

Preliminary habitat mapping by NRA (2024a), which was based on DoR (2024a) RE mapping and NRA (2020) field verified vegetation mapping[26], was modified to reflect contemporary conditions, based on observations during the August 2024 field survey; the revised habitat mapping is shown on **Figure 13**.

Records of T/NT and/or Migratory fauna species obtained during the 2024 surveys are shown on **Figure 14**. A report on the analysis of data from the acoustic detectors (microbats) is in **Appendix G**. An inventory of fauna species observed during the surveys, along with the habitats where observations were made, is in **Appendix H**. Further information on the results from the surveys concerning fauna habitats, T/NT and/or Migratory fauna (including shorebirds) and breeding place observations are presented in the sections below.

3.5.1 Fauna habitat

DESI (2024f, 2024g) identifies ôMSES wildlife habitatô for Endangered, Vulnerable and Special Least Concern[27] shorebirds in and near the core infrastructure footprint (**Figure 12**). The mapping is based on a combination of nearby species records and DoR (2024a) mapping of REs and gives a broad indicator of potential species presence. No areas of essential habitat for protected fauna intersect the core infrastructure footprint **(Figure 10**). The area of essential habitat outside the project footprint shown on **Figure 10** is based on records of Australian Painted Snipe (*Rostratula australis*) (DoR 2024e).

Habitats in and surrounding the core infrastructure area are described in **Table 7**.

[26] NRA (2020) vegetation mapping coincides with the facility site, the wastewater and water supply pipelines and the portion of access road option 1 that is adjacent to these pipelines.

[27] MSES includes fauna species listed as Special least Concern under the NC Act and comprises Echidna (*Tachyglossus aculeatus*), Platypus (*Ornithorhynchus anatinus*) and Migratory species listed in international agreements that Australia is party to.

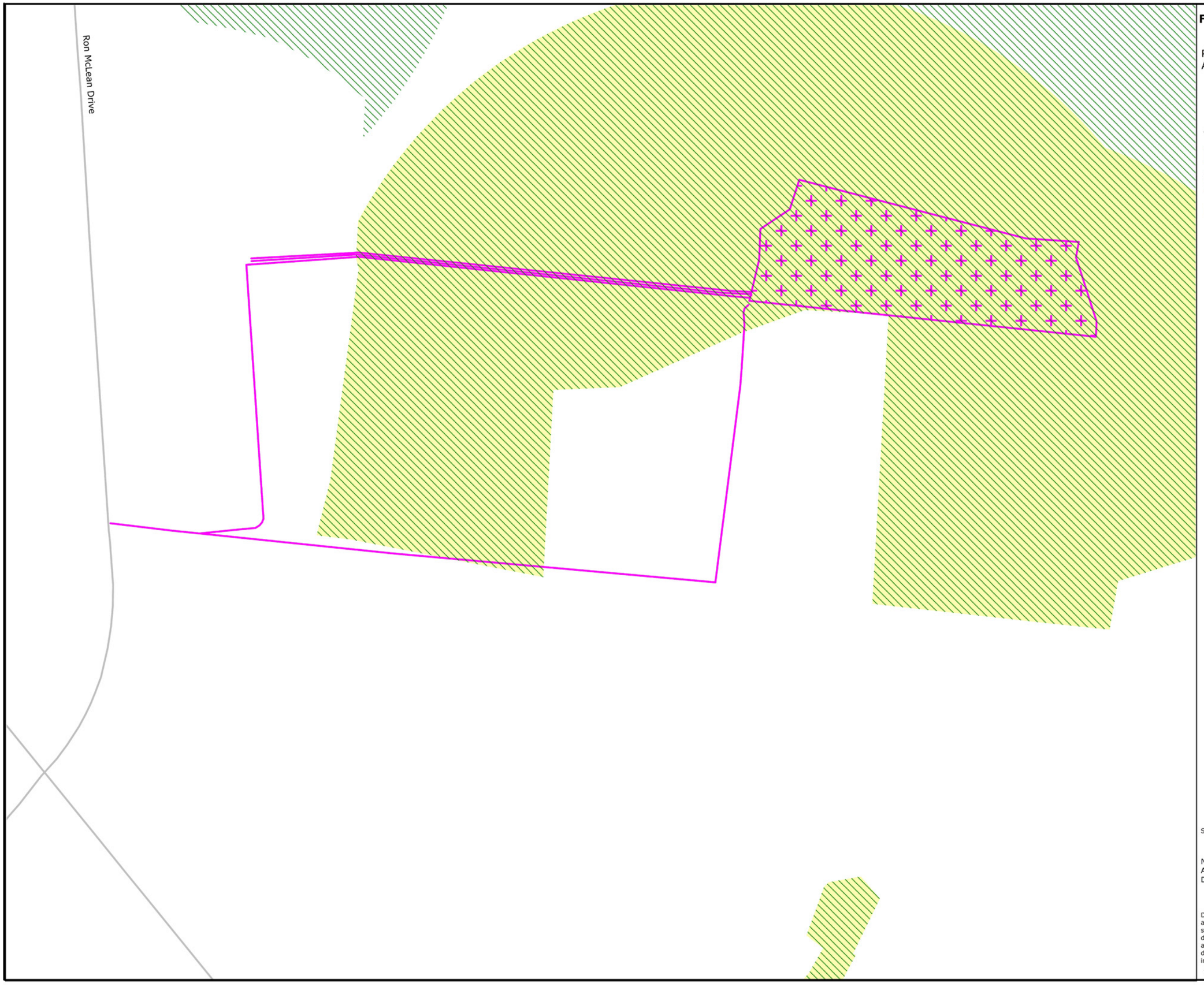


Figure 12: MSES wildlife habitat

Project: Project Ulysses Ecological Assessment Report

Major road

Core infrastructure

MSES wildlife habitat

Endangered or Vulnerable wildlife

Special Least Concern wildlife

N

0 200

Metres

Source: DESI 2024, DoR 2023, Jet Zero 2024.

NRA Ref: 485001.01
Author: Thomas Munro
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

Figure 13: Fauna habitat

Project: Project Ulysses Ecological Assessment Report

Core infrastructure

Drainage

Fauna habitat

- Mangrove
- Saltmarsh
- Shrubland, woodland and open forest on coastal dunes
- Tussock grassland on coastal plains
- Eucalypt/Melaleuca open woodland, woodland and open forest on coastal plains
- Eucalypt/Melaleuca woodland and forest on watercourses
- Freshwater wetland
- Non-remnant

N

0 200

Metres

Source: DoR 2022, 2023, 2024 Jet Zero 2024, NRA 2020.

NRA Ref: 485001.01
Author: Megan Grixti
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Recommended print size: A3

Figure 14: Fauna observations

Project:Project Ulysses Ecological Assessment Report

SWIFT A
SMA
SWIFT B
SMB
SWIFT C
Sandfly Creek

Core infrastructure
Drainage
Acoustic detector location

T/NT and/or Migratory fauna observation
- Bare-rumped Sheathtail Bat
- Black-tailed Godwit
- Caspian Tern
- Eastern Curlew
- Whimbrel

Fauna breeding place
- Double-barred Finch nest (active)
- Tree with small hollows
- Tree with medium hollows

N

0 200
Metres

Source: DoR 2022, 2023, Jet Zero 2024, QGlobe 2024.

NRA Ref: 485001.01
Author: Megan Grixti
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

T:_AAA\485\WOR\485001_01\R02\485001.01_FaunaObs_250225.WOR

Recommended print size: A3

Table 7: Habitat descriptions

Habitat type	Location	Description	Example photographs
Mangrove	Mapped >500 m north of core infrastructure (**Figure 13**).	• Viewed from a distance during the shorebird surveys. Mapping verified as correct.	
Saltmarsh	Facility site	• Habitat assessment informed by marine plant transect T08 (**Table 6**; **Appendix D**) and general observations during the August 2024 survey. • Found in north-east of facility site above HAT. • Dominated by *Sporobolus virginicus* with patches of samphire. • Dingo/Dog den immediately to the south (further details in **Section 3.6.2**). • Habitat generally in good condition.	 
	North Road	• Habitat assessment informed by water values observation W2 vegetation assessment site Q1 (**Appendix C**) and marine plant transects T01ï T07 (**Table 6**; **Appendix D**), and general observations during the August 2024 survey. • Vegetation alternates between patches dominated by *Sporobolus virginicus*, patches of samphire and disturbed areas. • Dingo/Dog and Pig tracks present. • Evidence of vehicle damage, existing vehicle track and refuse. • A large patch of significant weeds observed in the west (refer to **Section 3.6.1**). • Habitat generally in poor condition. • Bat detectors Swift A and SMA sampled this area (**Figure 14**).	 

Habitat type	Location	Description	Example photographs
Saltmarsh	North of facility site	• Habitat assessment informed by general observations during shorebird surveys. • Extensive open mudflats, with sparse patches of low vegetation (mangroves/samphire) occur in the intertidal area north of the facility site (**Figure 13**), with narrow lines of mangroves extending along drainage lines. • This area was visited during the shorebird surveys. Threatened and Migratory shorebirds were observed (see **Section 3.5.2**). • Extensive Dingo/Wild Dog tracks and some Pig tracks were observed. • Some offroad vehicle tracks observed. • Habitat in moderate to good condition.	   
	East of facility site	• Habitat assessment informed by general observations during shorebird surveys. • Sandfly Creek and its minor tributaries intersect this area. • Extensive patches of *Sporobolus virginicus* occupy the area, interspersed with bare mudflats and lines of mangroves along swales. • Lower lying portions near Sandfly Creek are dominated by *Phragmites australis*. • Isolated signs of vehicle disturbance. • Habitat generally in good condition.	 
Shrubland, woodland and open forest on coastal dunes	Mapped in receiving environment >500 m northeast of core infrastructure (**Figure 13**).	• Not visited during field surveys.	None taken (outside of survey coverage).

Habitat type	Location	Description	Example photographs
Tussock grassland on coastal plains	Mapped approximately 200 m south-east of core infrastructure (**Figure 13**).	• Not visited during field surveys.	None taken (outside of survey coverage).
Eucalypt/Melaleuca open woodland, woodland and open forest on coastal plains	Mapped in various locations outside of the core infrastructure footprint (**Figure 13**).	• Areas mapped by NRA (2024a) as Eucalypt/Melaleuca open woodland, woodland and open forest on coastal plains on and adjacent to Zinc Road were visited during the August 2024 survey and confirmed to be non-remnant. • Areas mapped south of Zinc Road (along the watercourse) were not visited during field surveys.	None taken (outside of survey coverage).
Eucalypt/Melaleuca woodland and forest on watercourses	Mapped along Sandfly Creek approximately 200 m south-east of core infrastructure (**Figure 13**).	• Habitat assessment informed by general observations during shorebird surveys. The area assessed (directly east of the facility site) is on the margins of the mapped habitat. • An upstream portion of Sandfly Creek intersects this area. • The area is dominated by Common Reed (*Phragmites australis*) and contains patches of mangrove shrubland. • Neither eucalypts nor melaleuca were observed in this area; however, further observations beyond the periphery of this mapped habitat would be required to refine the accuracy of the mapping.	 
Freshwater wetland	Three areas of habitat adjacent to core infrastructure, comprising two artificial wetlands south of the facility site and one modified wetland north of North Road (**Figure 13**).	• Habitat assessment informed by water values observations W3, W4 and W6 (**Table 3**), vegetation assessment sites Q3 and Q9 (**Appendix C**), and general observations during the August 2024 survey. • Modified wetland north of North Road mapped as an HES wetland (**Section 3.3.1**). • Habitat attractive to birds associated with wetlands. • Both wetlands south of the facility site are affected by livestock (European Cattle) and in poor condition. • HES wetland near North Road in good condition.	 

Habitat type	Location	Description	Example photographs
Non-remnant	Facility site	• Habitat assessment informed by water values observation W7 (**Table 3**), vegetation assessment sites Q2 and Q6, and general observations during the August 2024 survey. • The proposed facility site is on a modified landform dominated by non-remnant vegetation. • Vegetation is characterised by vegetation assessment sites Q3 and Q9 (**Appendix C**) exotic grasses with scattered significant weeds. • Dingo/Wild Dog den present in north-east of facility site (**Section 3.6.2**). • Habitat in poor condition. • Acoustic detector Swift B sampled this area (**Figure 14**).	 
	Zinc Road	• Habitat assessment informed by water values observation W5, W8, W9 and W10 (**Table 3**), vegetation assessment sites Q4, Q5 and Q7, and general observations during the August 2024 survey. • All habitat along Zinc Road was found to be non-remnant. • Some *Eucalyptus platyphylla* were observed north of Zinc Road, otherwise almost all vegetation in this area was non-native, including patches of significant weeds (see **Section 3.6.1**). • Pig observed in the west. • Habitat in poor condition. • Acoustic detectors Swift C and SMB sampled this area (**Figure 14**).	 
	North Road	• Habitat assessment informed by water values observation W1 (**Table 3**), vegetation assessment site Q8, and general observations during the August 2024 survey. • Occurs in eastern and western portions of North Road (**Figure 13**). • Vegetation almost entirely non-native. • Habitat in poor condition.	

3.5.2 T/NT and/or Migratory Fauna

T/NT and Migratory fauna species recorded in the core infrastructure footprint during the surveys were as follows.

- Black-tailed Godwit (*Limosa limosa*) ð Endangered and Migratory, EPBC Act; Endangered, NC Act. A non-breeding visitor to Australia, primarily in coastal habitats, including sheltered bays, estuaries and lagoons with large intertidal flats or banks and sometimes in shallow and sparsely vegetated, near-coastal, wetlands such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains; they also visit sewage farms and saltworks. An individual was observed near the western edge of the facility site (**Figure 14**) at the beginning the October 2024 high tide survey. The bird was flushed from the vegetated edge of a non-remnant watercourse (refer to description in **Table 3** for observation point W7) by a passing raptor; the godwit circled twice before flying in an easterly direction away from the area. The site was revisited by the survey team on the same day at the end of the survey; however, the godwit was not resighted. The observation in this habitat was assessed as being incidental and the habitat value is marginal.
- Bare-rumped Sheathtail Bat ð Vulnerable EPBC Act; Endangered, NC Act. Species ecology is poorly known. In north Queensland, the species is known from coastal and near-coastal woodlands and forests. NRA has also recorded the species in urban areas of Townsville. In Australia, the species has been recorded roosting in large tree hollows. Ultrasonic calls characteristic for this species were confirmed at four of five acoustic detector locations as shown on **Figure 14**. Possible detections were made at SMB (**Figure 14**); however, these were not definitive. The species is likely to forage above all habitats in the core infrastructure footprint. No suitable hollow-bearing trees were observed in or near the core infrastructure footprint; therefore, potential roosting habitat is not present. This species is likely to maintain a regular presence (foraging) over the project footprint.

One other T/NT fauna species was potentially detected in the core infrastructure footprint though unconfirmed, namely:

- Coastal Sheathtail Bat (*Taphozous australis*) ð Near Threatened, NC Act (not listed in EPBC Act). This species roosts in sea caves, fissures, bunkers, mines or buildings along the foreshore. It generally forages up to 3 km inland but will travel a greater distance from the roost along the coast. Ultrasonic calls attributable to either Coastal Sheathtail Bat, Troughtonôs Sheathtail Bat (*Taphozous troughtoni*)[28], or Bare-rumped Sheathtail Bat were detected at two locations in the core infrastructure footprint (Swift A and Swift C; **Figure 14**).

The following T/NT fauna species were detected in saltmarsh habitat within 300 metres north of the core infrastructure footprint during the shorebird surveys.

- Eastern Curlew (*Numenius madagascariensis*) ð Critically Endangered and Migratory, EPBC Act; Critically Endangered, NC Act. A non-breeding visitor to Australia, Eastern Curlew forages on open intertidal flats that are largely devoid of vegetation, near mangroves, on saltflats or saltmarsh, around rockpools, amongst rubble on coral reefs, and on ocean beaches. It roosts during high tide on sandy spits and islets near the high-water mark and amongst coastal vegetation, including low saltmarsh or mangroves and occasionally on other near-coastal wetlands. Eastern Curlew was observed during the

[28] Troughtonôs Sheathtail Bat, which is listed as Least Concern under the NC Act (and not listed under the EPBC Act) is also known from the Townsville region (Churchill 2008).

spring tide surveys in August 2024 (one individual) and September 2024 (highest count eight individuals) on the saltmarsh north of the facility site (**Plate 4**). Birds were observed foraging or loafing.

- Whimbrel (*Numenius phaeopus*) ð Migratory, EPBC Act; Special Least Concern, NC Act. A non-breeding visitor to Australia that uses (foraging and roosting) intertidal mudflats of sheltered coasts, as well as harbours, lagoons, estuaries and river deltas, often in areas with mangroves, but also open, unvegetated mudflats. They often roost in the branches of mangroves around mudflats and in estuaries and occasionally in taller trees or on the ground. Whimbrel was observed at both high and low tide during the September 2024 spring tide survey (highest count four individuals) on saltmarsh near mangroves at multiple sites >300 m north or north-east of the core infrastructure (**Figure 13**). One individual was flushed during the low tide neap survey in October 2024 near a tidal channel. Otherwise, birds were observed foraging or loafing.
- Caspian Tern (*Hydroprogne caspia*) ð Migratory, EPBC Act and Special Least Concern, NC Act. It is found near saltwater and freshwater wetlands. An individual was observed flying over saltmarsh north of the North Road proposed access and west of the facility site (**Figure 14**). The species is likely to fly over the area on occasion; however, no suitable breeding habitat or resources of particular importance for this species are available in or near the core infrastructure footprint.



Plate 4: Eastern Curlew foraging (left) and loafing (right) at high tide in the receiving environment north of the facility site during the September 2024 shorebird survey.

No other T/NT and/or Migratory fauna were detected in or near the core infrastructure footprint. T/NT and/or Migratory fauna that may occur in the core infrastructure footprint and its receiving environment, along with their habitat associations, are summarised in **Table 8**. A complete likelihood of occurrence assessment for fauna identified in database searches is provided in **Appendix F**.

Table 8: T/NT, Migratory and Special Least Concern fauna species that may occur within 500 m of the core infrastructure footprint and their habitat associations

Scientific name	Common name	Status[A]		Likelihood of occurrence[B]		Interaction with project	Habitat[D]	
		EPBC Act	NC Act	Core infrastructure footprint	Adjacent[C]		Core	Auxiliary
Actitis hypoleucos	Common Sandpiper	M	SLC	Possible	Probable	Intermittent (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (exclude wetland south-west of facility site)
Apus pacificus	Fork-tailed Swift	M	SLC	Probable	Probable	Intermittent (forage above)	Absent	All remnant habitats
Calidris acuminata	Sharp-tailed Sandpiper	V, M	V	Probable	Probable	Intermittent (forage)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (exclude wetland south-west of facility site)
Calidris ferruginea	Curlew Sandpiper	CE, M	CE	Unlikely	Possible	Exceptionally rare (forage/roost nearby)	Absent	Mangroves, saltmarsh (below HAT)
Calidris melanotos	Pectoral Sandpiper	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (excluding wetland south-west of facility site)
Calidris (syn. *Philomachus*) *pugnax*	Ruff	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (excluding wetland south-west of facility site)
Calidris ruficollis	Red-necked Stint	M	SLC	Unlikely	Probable	Intermittent (forage/roost nearby)	Absent	Mangroves, saltmarsh (below HAT)
Charadrius veredus	Oriental Plover	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Saltmarsh (below HAT), tussock grassland on coastal plains
Chlidonias leucopterus	White-winged Black Tern	M	SLC	Possible	Possible	Exceptionally rare (fly over)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland
Cuculus optatus	Oriental Cuckoo	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	All remnant habitats except saltmarsh, and freshwater wetland
Gallinago hardwickii	Lathamôs Snipe	V, M	V	Probable	Possible	Intermittent (forage/roost)	Absent	Freshwater wetland
Hirundapus caudacutus	White-throated Needletail	V, M	V	Probable	Probable	Exceptionally rare (forage above)	Absent	All remnant habitats
Hydroprogne caspia	Caspian Tern	M	SLC	Probable	Present	Intermittent (fly over)	Absent	Freshwater wetland, saltmarsh (below HAT), mangrove, Eucalypt/Melaleuca woodland and forest on watercourses
Limosa lapponica baueri	Western Alaskan Bar-tailed Godwit	E, M	E	Unlikely	Possible	Exceptionally rare (forage/roost nearby)	Absent	Mangroves, saltmarsh (below HAT)
Limosa limosa	Black-tailed Godwit	E, M	E	Present	Possible	Exceptionally rare (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (excluding wetland south-west of facility site)
Motacilla flava syn. *tschutschensis*	Yellow Wagtail	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (excluding HES wetland and wetland south-west of facility site)
Numenius madagascariensis	Eastern Curlew	CE, M	CE	Possible	Present	Intermittent (forage/roost)	Absent	Mangroves, saltmarsh (below HAT)
Numenius minutus	Little Curlew	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Saltmarsh (below HAT), tussock grassland on coastal plains
Numenius phaeopus	Whimbrel	M	SLC	Possible	Present	Intermittent (forage/roost nearby)	Absent	Mangroves, saltmarsh (below HAT)
Pandion haliaetus cristatus	Eastern Osprey	M	SLC	Probable	Probable	Intermittent (forage/breed)	Eucalypt/Melaleuca woodland and forest on watercourses	Freshwater wetland, mangrove
Plegadis falcinellus	Glossy Ibis	M	SLC	Probable	Possible	Intermittent (forage)	Absent	Freshwater wetland

Scientific name	Common name	Status[A]		Likelihood of occurrence[B]		Interaction with project	Habitat[D]	
		EPBC Act	NC Act	Core infrastructure footprint	Adjacent[C]		Core	Auxiliary
Pluvialis fulva	Pacific Golden Plover	M	SLC	Probable	Probable	Intermittent (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (excluding wetland south-west of facility site)
Rostratula australis	Australian Painted Snipe	E	E	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Saltmarsh (below HAT), freshwater wetland (excluding HES wetland and wetland south-west of facility site)
Tringa brevipes	Grey-tailed Tattler	M	SLC	Unlikely	Possible	Exceptionally rare (forage/roost nearby)	Absent	Mangroves, Saltmarsh (below HAT)
Tringa glareola	Wood Sandpiper	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Saltmarsh (below HAT), freshwater wetland (excluding wetland south-west of facility site)
Tringa nebularia	Common Greenshank	E, M	E	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (excluding wetland south-west of facility site)
Tringa stagnatilis	Marsh Sandpiper	M	SLC	Possible	Possible	Exceptionally rare (forage/roost)	Absent	Mangroves, saltmarsh (below HAT), freshwater wetland (excluding wetland south-west of facility site)
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheathtail Bat	V	E	Present	Probable	Regular (forage above)	Shrubland, woodland and open forest on coastal dunes, Eucalypt/Melaleuca open woodland, woodland and open forest on coastal plains, Eucalypt/Melaleuca woodland and forest on watercourses	Saltmarsh, mangrove, freshwater wetland, tussock grassland on coastal plains
Tachyglossus aculeatus	Short-beaked Echidna	-	SLC	Possible	Possible	Intermittent (forage)	Shrubland, woodland and open forest on coastal dunes, Eucalypt/Melaleuca open woodland, woodland and open forest on coastal plains, Eucalypt/Melaleuca woodland and forest on watercourses	Saltmarsh, freshwater wetland, tussock grassland on coastal plains
Taphozous australis	Coastal Sheathtail Bat	-	NT	Possible (unconfirmed presence)	Possible	Intermittent (forage)	Absent	All remnant habitats
Crocodylus porosus	Estuarine Crocodile	M	V	Possible	Possible	Intermittent (forage)	Absent	Saltmarsh (below HAT), mangrove, Eucalypt/Melaleuca woodland and forest on watercourses, freshwater wetland

[A] Status as of 8 October 2024. Listed as Critically Endangered (CE), Endangered (E), Vulnerable (V), Migratory (M), Near Threatened (NT), Conservation Dependent (CD), Special Least Concern (SLC) or Least Concern (LC) under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and/or Queensland *Nature Conservation Act* 1992 (NC Act).

ó-ô = no status.

[B] Likelihood of occurrence assessment considers known species distribution, species ecology and NRAôs knowledge of the landscape surrounding the core infrastructure footprint. The categories are present, probable, possible or unlikely. Decision rules are provided in **Appendix F**.

[C] Adjacent refers to areas within 500 m of the core infrastructure footprint.

[D] Core habitat is defined as habitat used for breeding and/or of primary focus for foraging. Auxiliary habitat is used incidentally, for foraging.

3.5.3 Fauna breeding and shelter site observations

The following observations of confirmed and/or potential fauna breeding places were made during the August 2024 survey (**Figure 14**).

- An active Double-barred Finch (*Taeniopygia bichenovii*) nest was observed in a Prickly Acacia (**Plate 5**).
- A *Eucalyptus platyphylla* with medium-sized hollows (up to 12 cm, **Plate 6**) and another *E. platyphylla* with small hollows (<10 cm) were observed north of Zinc Road.

Two Dingo/Wild Dog dens were observed during the August 2024 survey. These are discussed in **Section 3.6.2**.



Plate 5: Active Double-barred Finch nest observed near North Road



Plate 6: Medium-sized hollow in *Eucalyptus platyphylla* north of Zinc Road

3.6 Biosecurity

The National, State, and Local regulatory frameworks, relevant to pest management (*ie* weeds and pest fauna) within the survey area, are described as follows.

- Weed of National Significance (WoNS) (EIC 2020).
  - Nationally significant weed species have been identified by the Commonwealth Environment and Invasives Committee (EIC) and prioritised based on their invasiveness, potential for spread, and environmental, social and economic impacts.
  - Management of WoNS species occurs at the state level. In Queensland, the Biosecurity Act is the main legislative instrument used to control WoNS species.
- State significant biosecurity matter listed as *Prohibited Matter* or *Restricted Matter* under the Biosecurity Act.
  - Control provisions are identified under the Biosecurity Act in addition to the general biosecurity obligation under which all reasonable and practical steps must be taken to minimise the risks associated with invasive plants.
  - *Prohibited Matter* is biosecurity matter that is not found in Queensland, but would have a significant adverse impact on our health, way of life, the economy or the environment if it entered the state.
  - *Restricted Matter* is biosecurity matter that is currently found in Queensland. Categories are as follows.
    - *Categories 1 and 2: a person must report the invasive plant within 24 hours to 13 25 23. The general biosecurity obligation requires a person to take all reasonable and practical steps to minimise the risk of the plant spreading until they receive advice from an authorised officer.*
    - *Category 3: a person who has Category 3 Restricted Matter in the person's possession or under the person's control must not distribute or dispose of the Restricted Matter unless the distribution or disposal meets the requirements of the Act.*
    - *Category 4: a person must not move, or cause or allow to be moved, Category 4 Restricted Matter, unless the moving is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.*
    - *Category 5: a person must not keep in the person's possession or under the person's control Category 5 Restricted Matter, unless the keeping is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.*
    - *Category 6: a person must not give food to a Category 6 Restricted Matter unless the feeding is carried out in preparation for, or in the course of, lawfully baiting, trapping or shooting the Category 6 Restricted Matter.*
- Locally significant weeds listed under the *Townsville City Biosecurity Plan (2020–2024)* (TCC 2020).

3.6.1 Weeds

A total of 31 weed species were recorded within the survey area during the field survey (**Appendix E**). The locations of significant weed species are shown on **Figure 15**. General observations of significant weed species are provided in **Table 9**.

Figure 15: Biosecurity matters

Project: Project Ulysses Ecological Assessment Report

Core infrastructure

Drainage

Significant weed

- Rubber Vine
- Chinee Apple
- Grader Grass
- Parkinsonia
- Prickly Acacia

Pest fauna

- Pig shelter
- Dog/Dingo den

Sandfly Creek

N

0 200

Metres

Source: DoR 2022, 2023, Jet Zero 2024, QGlobe 2024.

NRA Ref: 485001.01
Author: Megan Grixti
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Table 9: Significant weed observations

Scientific name	Common name	Weed status			Observations
		WoNS[A]	Biosecurity Act[B]	TCBP[C]	
Cryptostegia grandiflora	Rubber Vine	✓	Category 3	✓	• Observed within the North Road access and Zinc Road access. • Small infestations were localised and adjacent to swale depressions.
Ziziphus mauritiana	Chinee Apple	-	Category 3	✓	• Observed within the facility site, North Road access and Zinc Road access. • Widespread across the site facility extent as low woody regrowth. • A small and localised infestation occurs in the North Road access. • A small and localised infestation occurs at the eastern Zinc Road access stock dam, and moderate infestations occur along the southern Zinc Road access.
Themeda quadrivalvis	Grader Grass	-	-	✓	• Observed within the facility site and the Zinc Road access. • A small and localised infestation occurs in the North Road access. • Dense infestations occur along the southern Zinc Road access.
Parkinsonia aculeata	Parkinsonia	✓	Category 3	✓	• Observed within the North Road access and Zinc Road access. • A small and localised infestation occurs at the eastern Zinc Road access stock dam. • Localised moderate to dense infestations occur within the North Road access adjacent to the freshwater wetland and swale depression.
Acacia nilotica	Prickly Acacia	✓	Category 3	✓	• Observed within the facility site, North Road access and Zinc Road access. • Infestations are widespread across the survey area; abundance ranges from individual isolated plants to dense mature canopy cover.

[A] A species listed under the National biosecurity framework as a Weed of National Significance (WoNS).

[B] A species listed under the Queensland *Biosecurity Act* 2014 as Restricted or Prohibited Matter.

[C] A species listed under the Townsville City Biosecurity Plan (2020ï 2024) (TCBP) as a priority weed.

3.6.2 Pest fauna

Pig (*Sus scrofa*) and Dingo/Dog (*Canis familiaris*) were observed during the August 2024 survey. Pig and Dog are categories 3, 4 and 6 Restricted Matter under the Biosecurity Act, and Dingo are categories 3, 4, 5 and 6.

At least 10 Dingo/Dog were observed during the August 2024 survey, comprising five adults and five pups. Two dens were found (**Figure 15)**, one in an earthen mound/felled timber pile on the facility site (**Plate 7**) and another in an earthen bank north-east of the facility site at Sandfly Creek Reserve (**Plate 8**). Smaller numbers of Dingo/Dog were observed subsequently during September 2024 (six individuals) and October (one individual). The identity of the animals observed during the surveys (*ie* Dog, Dingo or hybrid) remains unresolved. Dog (*Canis familiaris*) is not considered native fauna, whereas Dingo (*C. familiaris (dingo)*) is considered native fauna under the NC Act. Therefore, all observations have been referred to as Dingo/Dog.



Plate 7: Dingo/Dog den in the facility site



Plate 8: Dingo/Dog den north-east of the facility site

Evidence of Pig activity was widely observed; low-lying areas subject to inundation provide ideal habitat for this species. A Pig herd was disturbed from a vegetated thicket (shelter) on the western part of the Zinc Road corridor (**Plate 9; Figure 15**).



Plate 9: Pig shelter on western part of Zinc Road corridor

4. Discussion

4.1 Key findings from the field surveys

4.1.1 Surface water

Field surveys confirmed the following surface water values in and near the core infrastructure footprint (**Figure 5**).

- Facility site.
  - Two artificial impoundments (stock dams) adjacent to facility site.
  - Watercourse (first order stream) with existing upstream barrier (stock dam wall) intersecting facility site.
- North Road.
  - 100 m buffer around HES wetland intersecting North Road.
  - Watercourse (discharges to HES wetland) intersecting North Road.
  - Unmapped waterbody showing features consistent with an ephemeral wetland (below the HAT) intersecting North Road.
- Zinc Road.
  - Four watercourses (two discharge to HES wetland; two discharge to a stock dam) intersecting North Road.

All watercourses were assessed as having low value for fish passage. The importance of the tidal area (below HAT, mapped as a major risk waterway) along North Road srequire further assessment by an expert in fish passage if development of core infrastructure is not covered under separate approvals.

4.1.2 Vegetation

Vegetation communities observed within the survey area were not consistent with DoR (2024a) mapping. The following key observations were made (**Figures 9** and **10**).

- All vegetation in the facility site was found to be non-remnant, apart from a small area in the north-east, which was remnant and consistent with RE 11.1.2b.
- All vegetation along Zinc Road was found to be non-remnant.
- Most vegetation along North Road was remnant and consistent with RE 11.1.2b.
- The area mapped as a Vegetation Management Wetland was confirmed to be a palustrine wetland containing remnant vegetation.
- The presence of all mapped watercourses was confirmed. Each of the watercourses was found to be bordered by non-remnant vegetation.

4.1.3 Fauna

T/NT and Migratory fauna confirmed in the project receiving environment during the field surveys comprised:

- Bare-rumped Sheathtail Bat (Vulnerable EPBC Act; Endangered, NC Act)
- Eastern Curlew (Critically Endangered and Migratory, EPBC Act; Critically Endangered, NC Act)
- Black-tailed Godwit (Endangered and Migratory, EPBC Act; Endangered, NC Act)

- Whimbrel (Migratory, EPBC Act; Special Least Concern, NC Act)
- Caspian Tern (Migratory, EPBC Act; Special Least Concern, NC Act).

Ultrasonic calls possibly attributable to Coastal Sheathtail Bat were detected (unconfirmed). Other T/NT, Migratory and/or Special Least Concern species may occur (**Table 10**). Fauna listed as exceptionally rare in **Table 10** are not considered further in this report (this includes Black-tailed Godwit). Fauna that are MNES and relevant to Commonwealth approvals are listed in **Section 4.10**. Fauna that are MSES and potentially relevant to State approvals are listed in **Section 4.11**. Habitats that intersect the core infrastructure footprint are considered auxiliary for MNES and MSES fauna; no areas of core habitat intersect the project and none occur in the nearby receiving environment.

4.1.4 Biosecurity

Significant weeds were observed widely over the core infrastructure footprint. This includes Rubber Vine, Chinee Apple, Grader Grass, Parkinsonia and Prickly Acacia. Pest fauna including Dingo/Dog and Pig were observed and evidence of their activity was widespread in the core infrastructure footprint. Two Dingo/Dog dens and one Pig shelter were encountered (**Figure 15**). Site environmental management must take all reasonable and practical steps to minimise the risks associated with weeds and pests that are listed as *Prohibited Matter* and *Restricted Matter* under the Biosecurity Act. This applies to the pest fauna and significant weeds listed above, except Grader Grass, which is not *Prohibited Matter* or *Restricted Matter* under the Biosecurity Act.

4.2 Assessing importance for Commonwealth matters

ó*Important habitat*ô, ó*important population*ô and ó*habitat critical to the survival'* of a species are key terms when assessing the likelihood for significant impact under the EPBC Act. For certain species, or species groups, these terminologies are defined in multiple policies. In the following sections these terms are used to assist in describing habitat for Threatened and/or Migratory fauna.

4.2.1 Threatened species

The presence or absence of *habitat critical to the survival* of a species is a key influential factor in determining the potential for a significant impact to species listed as Threatened. DoE (2013) states that *habitat critical to the survival* of a species refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting, or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *to maintain genetic diversity and long-term evolutionary development, or*
- *for the reintroduction of populations or recovery of the species or ecological community*.

It includes habitat identified as *habitat critical to the survival* in recovery plans and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.

The term *important population* is relevant to assessing the potential presence of *habitat critical to the survival* for EPBC Act-listed Vulnerable species. DoE (2013) defines an *important population* as:

> *a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are*:
>
> - *key source populations either for breeding or dispersal*
> - *populations that are necessary for maintaining genetic diversity, and/or*
> - *populations that are near the limit of the species range.*

For Migratory species, DoE (2013) states that a population means *the entire population or any geographically separate part of the population of any species*. Therefore, defining an *important population* of a Migratory species is ambiguous. For the purposes of this report, the assessment of the presence or absence of an *important population* has been applied only to non-Migratory species that are listed as Vulnerable under the EPBC Act.

4.2.2 Migratory species

Important habitat is a key term for assessing impacts on Migratory species. According to *Significant impact guidelines 1.1* (DoE 2013) an area of *important habitat* for a Migratory species is:

- *habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or*
- *habitat that is of critical importance to the species at particular life-cycle stages, and/or*
- *habitat utilised by a migratory species which is at the limit of the species range, and/or*
- *habitat within an area where the species is declining*.

DoE (2013) defines the following terms to assist with the interpretation of the above guidance.

- *Ecologically significant proportion*:
  - *Listed migratory species cover a broad range of species with different life-cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates).*
- *Population*:
  - *'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.*

For certain Migratory species, alternative definitions of *important habitat* exist in species-specific (*ie* value-specific) policies. The relevant policies are as follows.

- *EPBC Act Policy Statement 3.21 Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoEE 2017).
- *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act* (DoE 2015b).

A national shorebird study by Weller *et al.* (2020) assists in identifying *important habitat* for shorebirds.

4.3 Importance for Threatened and/or Migratory shorebirds

The project occurs on the southern margin of the ócleveland Bayô important migratory shorebird habitat as defined by Weller *et al.* (2020) in the *Australian National Directory of Important Migratory Shorebird Habitat* (**Figure 16**). According to Weller *et al.* (2020) and NRA (2024b), the Cleveland Bay area surpasses thresholds for international and national importance for Migratory shorebird species as follows.

- Internationally important habitat for:
  - Sharp-tailed Sandpiper (*Calidris acuminata*)
  - Red Knot (*Calidris canutus*)
  - Great Knot (*Calidris tenuirostris*)
- Nationally important habitat for:
  - Red-necked Stint (*Calidris ruficollis*)
  - Lesser Sand Plover (*Charadrius mongolus*)
  - Greater Sand Plover (*Charadrius leschenaultii*)
  - Western Alaskan Bar-tailed Godwit (*Limosa lapponica baueri*)
  - Eastern Curlew (*Numenius madagascariensis*)
  - Whimbrel (*Numenius phaeopus*)
  - Grey-tailed Tattler (*Tringa brevipes*).

Of the above species, Sharp-tailed Sandpiper, Eastern Curlew, Red-necked Stint and Whimbrel are likely to occur and/or are known to occur within 500 m of the core infrastructure footprint.

The Weller *et al.* (2020) mapping is done at a broad scale and can be refined using field data. The field surveys (**Section 2.2.3**) and likelihood of occurrence assessment (**Table 8**) identify mangroves, portions of saltmarsh (below HAT) and some freshwater wetlands as the only areas in or near the project that meet the criteria for *important habitat* for Migratory shorebirds as defined by DoE (2013). These field verified areas of important habitat are shown on **Figure 16**.

Migratory shorebird sighting locations are shown on **Figure 16**. Shorebird abundances recorded during the survey are summarised in **Table 10** relative to *ecologically significant* proportion of population thresholds for nationally important habitat. Observed maximum abundances were below the thresholds for national importance as defined by DoEE (2017)[29] for populations of Migratory shorebird. Observations indicate that the area shown on **Figure 16** periodically supports low numbers of Migratory shorebirds. The field verified portions of Migratory shorebird habitat (**Figure 16**) are auxiliary habitat mainly because the habitat is of marginal suitability for the relevant shorebirds and is on the margins of core areas of shorebird activity. The field verified habitat for Migratory shorebirds does not meet the requirements for *habitat critical to the survival* of the species for Sharp-tailed Sandpiper, or Eastern Curlew as defined by DoE (2013). Further detail on species likely to occur and/or are known to occur within 500 m of the core infrastructure footprint, including Sharp-tailed Sandpiper, Eastern Curlew, Red-necked Stint, Whimbrel, Common Sandpiper and Pacific Golden Plover is provided in the following sections.

[29] DoEE (2017) identifies the threshold for national importance of Migratory shorebird species as a site that regularly supports Ó0.1% of EAA flyway population of a Migratory shorebird species.

Figure 16: Important Migratory shorebird habitat

Project: Project Ulysses Ecological Assessment Report

Core infrastructure

Field verified Migratory shorebird habitat
- Saltmarsh
- Mangrove
- Freshwater wetland

Important Migratory shorebird habitat (Weller et al. 2020)
- Bowling Green Bay
- Cleveland Bay
- Townsville Region

2024 Migratory shorebird observation
- Whimbrel
- Black-tailed Godwit
- Eastern Curlew

N

0 300

Metres

Source: Jet Zero 2024, Weller et al. 2020.

NRA Ref: 485001.01
Author: Angelina Bouet
Date: February 2025

Disclaimer: Varying degrees of error are inherent in spatial mapping and data. Errors may relate to, though are not limited to, raw data (eg scale), data manipulation (eg datum transformations), presentation (eg display) and human (eg digitising, interpretation). All measurements and/or calculations are approximate. The information herein could be different if the information upon which it is based is determined to be inaccurate or incomplete.

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Table 10: Migratory shorebirds recorded within 500 m of core infrastructure and observed maximum species abundance

Common name	Survey month						Threshold for national importance[A]
	August 2024 (spring tide)		September 2024 (spring tide)		October 2024 (neap tide)		
	Low tide	High tide	Low tide	High tide	Low tide	High tide	
Black-tailed Godwit	0	0	0	0	0	1	160
Eastern Curlew	0	1	5	8	0	0	35
Whimbrel	0	0	4	3	1	0	65

[A] Defined by DoEE (2017) as 0.1% of the flyway population of a species; thresholds calculated using East Asian-Australasian Flyway estimates reported in Hansen *et al*. (2022).

The August 2024 survey was conducted outside of the time of year when Migratory shorebirds are most abundant in the local area; therefore, limited inference can be drawn from the results of this survey. Observations during the September 2024 survey demonstrate that water infiltrates the saltmarsh at hide spring tides and waterlogging of the mudflat occurs (**Plate 10**). Regular influxes of water at high spring tide leads to widespread waterlogging and small areas of water pooling that persists at low tide (**Plate 11**). The data in **Table 10** indicates that small numbers of shorebirds visit the project receiving environment during both high and low tide. The spring tide events likely reflects the presence of suitable habitat cues and activation of potential prey resources, making the area attractive to shorebirds that are in the area and exploring potential foraging opportunities. Additional surveys planned in early 2025 are intended provide additional data on shorebird use of the project receiving environment.

Observations during the October 2024 survey indicate much more limited water infiltration in the saltmarsh during neap high tides (**Plates 12** and **13**). During these events the mud dries out and makes the habitat less attractive to shorebirds. The data in **Table 10** supports these observations.



Plate 10: Waterlogged mudflat due to tidal inundation, view north from north of facility site at high tide, September 2024



Plate 11: Persistently waterlogged mudflat due to recent tidal inundation, view east from north of the facility site at low tide, September 2024



Plate 12: Limited water infiltration surrounded by dry open pan, view from mudflat south towards facility site at high tide, October 2024



Plate 13: Dry open pan, view north from north of facility site at low tide, October 2024

4.3.1 Eastern Curlew

Eastern Curlew is listed as Critically Endangered and Migratory under the EPBC Act and Critically Endangered under the NC Act. Cleveland Bay is identified as *important habitat* for Eastern Curlew by Weller *et al.* (2020). The species was observed in small numbers in the receiving environment outside of the core infrastructure footprint during the field surveys (**Figure 14**, **Table 10**). Its presence is expected to be intermittent (foraging and/or roosting), in small numbers, primarily during spring tide events and/or following substantial rainfall. During the largest spring tides, the species may use saltmarsh and mangroves (**Figure 16**) in or near the core infrastructure footprint. Habitats within 500 m of the core infrastructure footprint are auxiliary for this species. Field verified habitat (**Table 8**) does not meet the criteria for *habitat critical to the survival* of the species as defined by DoE (2013).

4.3.2 Sharp-tailed Sandpiper

Sharp-tailed Sandpiper is listed as Vulnerable and Migratory under the EPBC Act and Vulnerable under the NC Act. Cleveland Bay is identified as *important habitat* for Sharp-tailed Sandpiper by Weller *et al.* (2020). It was not observed during the September and October 2024 shorebird surveys. However, the species is expected to have an intermittent presence (foraging) in small numbers in the receiving environment in or near the core infrastructure footprint during spring tide events and/or after inundation with rain. Habitats within 500 m of the core infrastructure footprint are auxiliary for this species. Field verified habitat (**Table 8**; **Figure 16**) does not meet the criteria for *habitat critical to the survival* of the species as defined by DoE (2013).

4.3.3 Whimbrel

Whimbrel is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. Cleveland Bay is identified as *important habitat* for Whimbrel by Weller *et al*. (2020).

The species was observed in small numbers on the periphery of the receiving environment north of the core infrastructure footprint during the field surveys (**Figure 14**, **Table 10**). It is expected have an intermittent presence (roosting and/or foraging) in areas of saltmarsh and mangroves (**Figure 16**) in or near the core infrastructure footprint, in small numbers, primarily during spring tide events and/or following substantial rainfall. Habitats within 500 m of the core infrastructure footprint are auxiliary for this species.

4.3.4 Red-necked Stint

Red-necked Stint is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. Cleveland Bay is identified as *important habitat* for Red-necked Stint by Weller *et al*. (2020). It was not observed during the September and October 2024 shorebird surveys. However, the species is expected have an intermittent presence (roosting and/or foraging) in areas of mangrove and saltmarsh (**Figure 16**) during spring tide events and/or following substantial rainfall. Habitats within 500 m of the core infrastructure footprint are auxiliary for this species.

4.3.5 Common Sandpiper

Common Sandpiper is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. Cleveland Bay is not identified as *important habitat* for Common Sandpiper by Weller *et al*. (2020). It was not observed during the September and October 2024 shorebird surveys. However, the species is expected to have an intermittent presence (roosting and/or foraging) in small numbers in the receiving environment in areas of mangrove, saltmarsh and freshwater wetland (**Figure 16**) during spring tide events and/or following substantial rainfall. Habitats within 500 m of the core infrastructure footprint are auxiliary for this species.

4.3.6 Pacific Golden Plover

Pacific Golden Plover is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. Cleveland Bay is not identified as *important habitat* for Pacific Golden Plover by Weller *et al*. (2020). It was not observed during the September and October 2024 shorebird surveys. However, the species is expected to have an intermittent presence (roosting and/or foraging) in small numbers in areas of mangrove, saltmarsh and freshwater wetland (**Figure 16**), primarily during spring tide events and/or following substantial rainfall. Habitats within 500 m of the core infrastructure footprint are auxiliary for this species.

4.4 Importance for Migratory seabirds

4.4.1 Caspian Tern

Caspian Tern is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. One bird was observed near the core infrastructure footprint during the field surveys (**Figure 14**). The species is expected to have an intermittent presence in the receiving environment (flying over). A threshold to determine an ecologically significant proportion of the population of the species has not been specified in Commonwealth policy documents. The global population is estimated to be 250,000ï 470,000 individuals (IUCN 2024). A nominal threshold of 0.1% of this population (typically taken to represent a national significance threshold for other Migratory species) is 250ï 470 individuals. The receiving environment within 500 m of the core infrastructure footprint is not likely to support:

- an ecologically significant proportion of the population of the species
- habitat of critical importance to the species at particular life-cycle stages
- habitat at the limit of the species range
- habitat within an area where the species is declining.

Therefore, *important habitat* as defined by DoE (2013) is not present. Habitat identified in **Table 8** as suitable for foraging is auxiliary (poor quality and/or with limited resources; no potentially suitable breeding habitat is present).

4.4.2 Eastern Osprey

Eastern Osprey is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. This species was not observed during the 2024 field surveys. However, it is expected to have an intermittent presence (foraging and potentially nesting) in the receiving environment. NRA (2024a) discussed the potential for the species breeding in the local landscape. Despite the presence of suitable artificial structures and observations confirming breeding activity near the Ross River mouth, no evidence of breeding was detected within 500 m of the core infrastructure footprint. It was noted during the field surveys that the distance of the project from reliable food sources makes the area less attractive for breeding compared with locations closer to the shoreline and Ross River. According to DoE (2015b), a significant population of the species is 24 birds (national) or 240 birds (international). The receiving environment within 500 m of the core infrastructure footprint is not likely to support

- an ecologically significant proportion of the population of the species
- habitat of critical importance to the species at particular life-cycle stages
- habitat at the limit of the species range
- habitat within an area where the species is declining.

Therefore, *important habitat* as defined by DoE (2013) is not present. Habitat identified in **Table 8** as suitable for foraging is auxiliary (poor quality and/or with limited resources).

4.5 Importance for Threatened and/or Migratory terrestrial birds

4.5.1 Fork-tailed Swift

Fork-tailed Swift is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. It is expected to have an intermittent presence (foraging above) the core infrastructure footprint and receiving environment.

Field verified habitat (**Table 8**; **Figure 16**) is present in the receiving environment within 500 m of the core infrastructure footprint. DoE (2015b) defines *important habitat* for Fork-tailed Swift as follows.

> *Found across a range of habitats, from inland open plains to wooded areas, where it is exclusively aerial*.

Based on the above definition, all remnant vegetation in the receiving environment of the proposed MOF site qualifies as *important habitat* (foraging and dispersal) for Fork-tailed Swift.

According to DoE (2015b), a significant proportion of the population of the species is 100 birds (national) or 1,000 birds (international). The receiving environment within 500 m of the core infrastructure footprint is not likely to support:

- an ecologically significant proportion of the population of the species
- habitat that is of critical importance to the species at particular life-cycle stages
- habitat at the limit of the species range
- habitat within an area where the species is declining.

Therefore, *important habitat* as defined by DoE (2013) is not present. Habitat identified in **Table 8** as suitable for foraging is auxiliary (poor quality and/or with limited resources; Fork-tailed Swift does not breed in Australia).

4.5.2 Latham's Snipe

Lathamôs Snipe is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. This species was not observed during the 2024 field surveys. However, it is expected to have an intermittent presence (roosting and foraging) at freshwater wetlands in the receiving environment, in small numbers. According to DoEE (2017), a significant proportion of the population of the species is 18 birds. The receiving environment within 500 m of the core infrastructure footprint is not likely to support:

- an ecologically significant proportion of the population of the species
- habitat of critical importance to the species at particular life-cycle stages
- habitat at the limit of the species range
- habitat within an area where the species is declining.

Therefore, *important habitat* as defined by DoE (2013) is not present. Habitat identified in **Table 8** as suitable for foraging is auxiliary (poor quality and/or with limited resources; Lathamôs Snipe does not breed in Australia).

4.5.3 Glossy Ibis

Glossy Ibis is listed as Migratory under the EPBC Act and Special Least Concern under the NC Act. This species was not observed during the 2024 field surveys. However, it is expected to have an intermittent presence (foraging) in freshwater wetlands in the receiving environment, in small numbers. A threshold to determine a significant proportion of the population of the species has not been specified in Commonwealth policy. The global population is estimated to be 230,000ï 2,220,000 individuals (IUCN 2024). A nominal threshold of 0.1% of this population (typically taken to represent a national significance threshold for other Migratory species) is 230ï 2,220 individuals. The receiving environment within 500 m of the core infrastructure footprint is not likely to support:

- an ecologically significant population of the species
- habitat of critical importance to the species at particular life-cycle stages
- habitat at the limit of the species range
- habitat within an area where the species is declining.

Therefore, *important habitat* as defined by DoE (2013) is not present. Habitat identified in **Table 8** as suitable for foraging is auxiliary (poor quality and/or with limited resources; no potentially suitable breeding habitat is present).

4.6 Importance for T/NT microbats

4.6.1 Bare-rumped Sheathtail Bat

Bare-rumped Sheathtail Bat is listed as Vulnerable under the EPBC Act and Endangered under the NC Act. It is expected to have a regular presence (foraging above) the core infrastructure footprint and receiving environment. The presence of this species was confirmed from most acoustic detector locations during the August 2024 survey (**Figure 14**). No potential roosting habitat was detected in or near the core infrastructure footprint during the field surveys. According to the approved Conservation Advice, *habitat critical to the survival* of Bare-rumped Sheathtail Bat has not been identified (TSSC 2016).

The Townsville Bare-rumped Sheathtail Bat population, which includes individuals foraging above the project, is an *important population* as per DoE (2013) guidance (it is near the limit of the species range and may be necessary for maintaining genetic diversity). Habitat identified in **Table 8** within 500 m of the core infrastructure footprint is auxiliary (poor quality and/or with limited resources). The presence of this habitat is not critical for maintaining the Townsville population of this species.

4.6.2 Coastal Sheathtail Bat

Coastal Sheathtail Bat is listed as Near Threatened under the NC Act and not listed under the EPBC Act. Analysis of acoustic data collected during the 2024 surveys identified a call potentially attributable to this species. Its presence in the area is uncertain (further information is in **Section 3.5.2** and **Appendix G**). No potential roosting sites are present in the area. Data on the species is deficient and the size of the population in the Townsville region is unknown. DEHP (2014) and DSDIP (2014) do not provide significant impact criteria for Near Threatened fauna. Habitats identified in **Table 8** as suitable for foraging are auxiliary (poor quality and/or with limited resources) and are not considered important for maintaining a population of this species in the broader landscape.

4.7 Importance for Threatened and Migratory reptiles

4.7.1 Estuarine Crocodile

Estuarine Crocodile is listed as Migratory under the EPBC Act and Vulnerable under the NC Act. The species was not observed during the 2024 field surveys. However, it is expected to have an intermittent presence (foraging) in the receiving environment during spring tide events and/or following substantial rainfall. A threshold to determine a significant proportion of the population of the species has not been specified in Commonwealth policy. The combined populations of Queensland and the Northern Territory (*ie* the Australian population, excluding Western Australia, which is poorly surveyed) is currently estimated at 120,000ï 130,000 individuals (DESI 2024h). A nominal threshold of 0.1% of this population (typically taken to represent a national significance threshold for other Migratory species) is 120ï 130 individuals. The receiving environment within 500 m of the core infrastructure footprint is not likely to support:

- an ecologically significant proportion of the population of the species
- habitat of critical importance to the species at particular life-cycle stages
- habitat at the limit of the species range
- habitat within an area where the species is declining.

Therefore, *important habitat* as defined by DoE (2013) is not present. Habitat identified in **Table 8** as suitable for foraging is auxiliary (poor quality and/or with limited resources). No suitable breeding habitat is present.

4.8 Importance for Special Least Concern mammals

4.8.1 Short-beaked Echidna

Short-beaked Echidna is listed as Special Least Concern under the NC Act and is not listed under the EPBC Act. The species is found in a wide range of habitat types. It was not observed during the 2024 field surveys, but is expected to have an intermittent presence in terrestrial habitats in the core infrastructure footprint and receiving environment. Habitat identified in **Table 8** as suitable for foraging is auxiliary (poor quality and/or with limited resources).

4.9 Project-related threats

The potential project-related threats to MNES and MSES in the receiving environment are described in **Table 11** and comprise the following:

- air pollution
- noise pollution
- water pollution
- soil loss/degradation
- altered hydrological regimes
- direct mortality or harm to fauna
- biosecurity ingress/proliferation
- altered fire regimes
- habitat loss/degradation.

Table 11: Potential threats to MNES and MSES

Threat	Threat description	Phase[A] C	Phase[A] O	Phase[A] D	Comment
Air pollution	The release of nitrous oxide[B] can have an impact on the broader environment through air pollution.		✓		Byproducts of hydrogen combustion require consideration for potential impacts to MNES.
Light pollution	Light pollution can alter the physiology and behaviour of many fauna species. With respect to behavioural changes, some species may avoid, while others may be attracted to (and benefit from), the artificially illuminated space. The physiological response of most Australian fauna to light pollution is poorly known. Nocturnal species are probably most sensitive, with impacts ranging from short-term (*eg* where lighting reduces the dark-adapted state of their sight) to longer-term and more complex changes (*eg* altered reproductive cycles).		✓		Magnitude of impact is influenced by the sensitivity of the receptor (*ie* fauna) to the type of disturbance, and the intensity and duration of the disturbance (at source and point of impact). The influence of ambient light in the landscape from existing sources (*eg* Sun Metals refinery to the east) and the presence of Ark Energy solar farm (a potential source of light reflection) are relevant considerations.
Noise pollution	The threat of noise exposure varies according to species and noise characteristics. For susceptible fauna, anthropogenic noise may reduce their ability to hear predators (and alarm calls) and reduce their ability to communicate with members of the same species. These conditions can make individuals vulnerable to predation, increase their stress levels and reduce their fitness. Animals may either vacate an area or enter a state of vigilance in response to a disturbance source. Both responses reduce the time an animal devotes to life-sustaining behaviours such as feeding, resting and social interactions.	✓	✓	✓	Magnitude of impact is influenced by the sensitivity of the receptor (*ie* fauna) to the type of disturbance, and the intensity and duration of the disturbance (at source and point of impact).
Water pollution	Sedimentation, contamination or litter can result in reduced quality of receiving water. Contamination may occur when chemicals or hydrocarbons are released to the environment; sources include spills, machinery/equipment failure, and vehicle collisions. It may also occur via the exposure (*eg* during ground disturbance or due to erosion) of acid sulfate soils or contaminants associated with prior land use. Sedimentation may occur when land surface disturbance and/or the concentration of water flows causes accelerated erosion. Littering occurs when appropriate waste management practices are not implemented.	✓	✓	✓	Multiple factors influence the magnitude of potential impact, including: • the location of the pollution event relative to the waterway and MNES or MSES of interest • the sensitivity of the MNES or MSES to the direct and or indirect effects of the pollutant • the toxicity, mobility and biodegradability of the pollutant (at source and point of impact) • the timeframe of MNES or MSES exposure to contaminants.
Soil loss/degradation	Loss and/or degradation of soil resources may occur via: • accelerated erosion (water and wind) • contamination (as described above for pollution) • physical impact on soil structure (*eg* compaction) • alteration of hydrological regimes (*eg* altering chemical properties such as salinity), or • alteration of organic matter input into soils (*eg* in response to vegetation loss). These changes may impact the biota reliant on the pre-impact soil conditions and increase the possibility of secondary impact (*eg* sedimentation impacts on water quality).	✓	✓	✓	The properties of individual soils (*ie* soil type), position in the landscape (*eg* slope), land condition (*eg* vegetation cover) and climatic conditions (especially rainfall intensity) influence how soils respond to potential impacts. C & R Consulting (2024) has identified the need to manage threats associated with erosion and acid sulfate soils.
Altered hydrological regimes	The construction of physical structures (*eg* roads, hardstand areas) may alter (block, restrict and/or concentrate) the flow of water across the land surface and in waterways. These changes may impact the biota reliant on the pre-impact hydrological regimes and increase the possibility of secondary impact (*eg* accelerated erosion causing soil loss/degradation and sedimentation).	✓	✓	✓	Habitats in the project receiving environment occur in an interface zone between fresh and saline conditions. These habitats are sensitive to changes in hydrological regimes. Water flow regimes in waterways directly influence the plant and animal assemblages that use an area (*eg* fish passage).
Direct mortality or harm to fauna	Vegetation clearing, excavation works or machinery or object strike during vehicle operation and movements can cause direct mortality or harm to fauna.	✓	✓	✓	Most habitats in the core infrastructure area are non-remnant and of low value to fauna. The likelihood of mortality to MNES or MSES during vegetation clearing is negligible. The likelihood of mortality to MNES or MSES due to vehicle strike is low.
Biosecurity ingress/proliferation	Introduction or proliferation of biosecurity items (weeds, pest fauna and pathogens) can cause habitat degradation and/or directly impact the health of biota (*eg* pathogens reducing animal or plant health, or tramp ants harming fauna).	✓	✓	✓	Weeds can impact vegetation communities directly via competitive displacement and indirectly via alteration of ecological processes (*eg* changing fire and hydrological regimes). As noted in **Section 3.6.1**, the core infrastructure area contains significant weeds. With respect to pest fauna, tramp ants pose the greatest risk. Tramp ants are present in the region and are readily transported between locations on equipment, machinery and building supplies. The risks posed by pathogens are more difficult to assess due to the complex manifestation of their impacts, and a paucity of information; however, pathogens are a known threat to aquatic and terrestrial systems and could be transported to the project receiving environment on equipment, machinery and building supplies.
Unplanned fire (altered fire regimes)	Hot works (*eg* welding and grinding metal) during construction, vehicle collisions, plant/equipment failure and/or human error during operation may ignite unplanned fires (wildfires). Unanticipated ignition sources may also ignite during decommissioning. These events increase the likelihood of ecologically unsuitable fires (*eg* regular late-season fires and/or wide-ranging fires) in the adjacent environment.	✓	✓	✓	Fire poses a risk to human safety, and therefore, standard operating procedures will be required to mitigate the risk of unplanned fire. Procedures for managing combustible material on site and adherence to strict equipment and plant maintenance schedules are important consideration for operation.
Habitat loss/degradation	Loss and/or degradation of habitat can occur as a direct consequence of vegetation clearing and earthworks, and as an indirect consequence of accelerated erosion, pollution, wildfire, biosecurity incursions, fugitive dust and habitat fragmentation (caused by physical breaks in habitat continuity or fauna avoidance of areas due to human activity).	✓	✓		Loss of core habitat poses the greatest direct threat to MNES and MSES. Habitat loss/degradation will primarily occur along the margins of remnant habitat that is generally in poor condition and mapped as auxiliary for some MNES and MSES (**Table 8**); core habitat will not be impacted. Habitat loss is therefore a minor/inconsequential threat.

[A] Project phases comprising construction (C), operation (O) and decommissioning (D).

[B] The threat of nitrous oxide production is dependent on the temperature of the flume. Specialist expertise should be sought to determine its relevance and design considerations (if applicable).

4.10 Information relevant to Commonwealth approvals

The following information is presented to inform future impact assessment and potential approval applications under the EPBC Act. The potential project-related threats to MNES values are listed in **Table 12**, along with the key threats to MNES values as reported in Commonwealth policies, guidelines or plans.

4.11 Information relevant to State approvals

The potential project-related threats to State values are presented in **Table 13** with reference to the relevant State Codes (Queensland *Planning Act* 2016) and assessment guidelines. These requirements will need to be reviewed subject to the outcomes of separate approvals processes.

Table 12: MNES and associated threats of relevance to impact assessment

MNES	Relevant values	Key threats as stated in Commonwealth/State policy or plans[A]	Project threats (Table 11)
World heritage areas	GBRWHA (**Figure 8**)	• Climate change (global scale) • Coastal land use change • Poor water quality from land-based run-off (catchment scale) • Impacts of fishing, including illegal fishing • Severe weather events, including floods and cyclones • Crown-of-thorns starfish outbreaks • Loss of physical and ecological connectivity between habitats • Altered hydrology and salinity • Barrier to hydrological flows • Modification of natural coastal and riverine processes • Habitat degradation and fragmentation • Shipping and boating incidents • Poor water quality and pollution • Marine debris and litter • Introduction of exotic plants and animals • Altered aesthetic environment • Increased human presence • The potential effects of climate change	• Air pollution • Water pollution • Altered hydrological regimes • Soil loss/degradation
National heritage places	GBRNHP (**Figure 8**)		
Listed Threatened species and ecological communities	Sharp-tailed Sandpiper Latham's Snipe Eastern Curlew	Specific to Eastern Curlew: • Coastal development, particularly coastal land reclamation of tidal marshes along the migratory flyway • Loss, fragmentation and degradation of coastal mudflats • Disturbance by recreational coastline users Applicable to all: • Habitat loss • Habitat modification • Anthropogenic disturbance • Climate variability and change • Harvesting of shorebird prey • Fisheries by-catch • Hunting • Threat prioritisation	• Air pollution • Light pollution • Water pollution • Habitat loss/degradation • Biosecurity ingress/proliferation • Unplanned fire (altered fire regimes) • Altered hydrological regimes • Direct mortality or harm to fauna
	Bare-rumped Sheathtail Bat	• Habitat loss	• Habitat loss/degradation • Direct mortality or harm to fauna • Light pollution

MNES	Relevant values	Key threats as stated in Commonwealth/State policy or plans[A]	Project threats (Table 11)
Listed Migratory species	Common Sandpiper Sharp-tailed Sandpiper Lathamôs Snipe Eastern Curlew Whimbrel Pacific Golden Plover	Specific to Eastern Curlew: • Coastal development, particularly coastal land reclamation of tidal marshes along the migratory flyway • Loss, fragmentation and degradation of coastal mudflats • Disturbance by recreational coastline users Applicable to all: • Habitat loss • Habitat modification • Anthropogenic disturbance • Climate variability and change • Harvesting of shorebird prey • Fisheries by-catch • Hunting • Threat prioritisation	• Air pollution • Light pollution • Noise pollution • Habitat loss/degradation • Water pollution • Biosecurity ingress/proliferation • Altered hydrological regimes • Unplanned fire (altered fire regimes) • Direct mortality or harm to fauna
	Caspian Tern Eastern Osprey	• Habitat loss due to coastal development • Habitat modification • Climate variability and change • Geological processes • Invasive species • Native wildlife (*ie* increaser species[B]) • Fisheries interactions and by-catch • Prey depletion • Resource extraction • Marine renewable energy developments • Anthropogenic disturbance • Hunting • Transport • Drones • Pollution (including light and water pollution) • Aquaculture • Disease • Threat prioritisation	• Air pollution • Light pollution • Noise pollution • Habitat loss/degradation • Water pollution • Biosecurity ingress/proliferation • Altered hydrological regimes • Direct mortality or harm to fauna
	Fork-tailed Swift Estuarine Crocodile Glossy Ibis	• Key threats not identified for Australia	• Air pollution • Light pollution • Noise pollution • Habitat loss/degradation • Water pollution • Biosecurity ingress/proliferation • Altered hydrological regimes • Unplanned fire (altered fire regimes) • Direct mortality or harm to fauna
Marine parks	GBRMP	• Climate change (global scale) • Coastal land use change (catchment scale) • Poor water quality from land-based run-off (catchment scale) • Impacts of fishing (Marine Park scale)	• Air pollution • Water pollution • Soil loss/degradation

[A] Key threats sourced from GBRMPA (2018) and DoE (2014) for GBRWHA and GBRNHP; DoE (2015a), DCCEEW (2022), TSSC (2019) and Schulz and Thomson (2007) for listed Threatened species and ecological communities; DoE (2015a), DCCEEW (2022) and DAWE (2020) for listed Migratory species; and GBRMPA (2018) for GBRMP.

[B] Increaser species are native species that benefit from habitat modification to the detriment of other native species (*eg* species that benefit from the introduction of prey sources to islands).

Table 13: Relevant State values, threats and assessment considerations

Prescribed environmental matter	Relevant values	Applicable State codes	Applicable guidelines	Relevant threats (Table 11)	Comments
Regulated vegetation	• Remnant vegetation within the defined distance of a wetland (MSES) (**Figure 10**) • Remnant vegetation intersecting a watercourse (MSES) (**Figure 10**) • Category R (regrowth watercourse) vegetation (**Figure 10**)	• State Code 16 (DHLGPPW 2024d)	• DSDIP (2014) and DEHP (2014) or equivalent updated guideline(s) (for MSES). • DES (2022c).	• Habitat loss and degradation	• Guidance on State Code 16 is provided by NRA (2024a)[A]. • Areas of mapped regulated vegetation requiring vegetation clearing that have not already been cleared under a separate approval will require relevant statutory approvals to be in place prior to clearing. Depending on the extent of clearing required for areas mapped as Category B vegetation along a watercourse or within 100 m of a wetland, offsets may be required.
Connectivity areas	• Mapped remnant REs (**Figure 9**)	• State Code 16 (DHLGPPW 2024d)	• DSDIP (2014) and DEHP (2014) or equivalent, updated guideline(s) (for MSES). • DES (2022c).	• Habitat loss and degradation	• Guidance on State Code 16 is provided by NRA (2024a). • Clearing of connectivity areas requires a spatial assessment to determine if clearing will: - occur in areas of *vegetation* (as defined under the State Code 16[B]) that are less than 10 ha - reduce the extent of *vegetation* to less than 10 ha - occur in areas of *vegetation* less than 100 m wide - reduce the width of *vegetation* to less than 100 m; and - occur where the extent of *vegetation* on the subject lot(s) is reduced to, or less than, 30% of the total area of the lot(s). • Clearing that triggers any of the above criteria will require relevant statutory approvals to be in place prior to clearing. Offsets may be required if any of the criteria listed above apply.
-	• Soils	• State Code 16 (DHLGPPW 2024d)	• IECA (2008). • DES (2022c).	• Water and land pollution • Soil loss/degradation	• Guidance on State Code 16 is provided by NRA (2024a)[A]. • Specific risks to be managed include acid sulfate soils and salinity expression, which will require background studies.
-	• Erosion prone areas	• State Code 8 (DHLGPPW 2024a)	• DES (2022e).	• Water and land pollution • Soil loss/degradation	• Guidance on State Code 8 is provided by NRA (2024a)[A].
Wetlands and watercourses	• Wetland in a wetland protection area (HES wetland; **Figure 5**)	• State Code 9 (DHLGPPW 2024b)	• DSDIP (2014) and DEHP (2014) or equivalent, updated guideline(s) (for MSES). • DES (2022d).	• Water and land pollution • Soil loss/degradation • Altered hydrological regimes • Habitat loss/degradation	• Guidance on State Code 9 is provided by NRA (2024a)[A]. • Design and construction stages and should consider advice provided in *Guideline: State Development Assessment Provisions State Code 9: Great Barrier Reef Wetland Protection Areas* (DES 2022d). • Areas that have not already been cleared under a separate approval will require relevant statutory approvals to be in place prior to clearing. An offset may be required for clearing within 100 m of the wetland.
Protected wildlife habitat	• Common Sandpiper • Fork-tailed Swift • Sharp-tailed Sandpiper • Lathamôs Snipe • Caspian Tern • Eastern Curlew • Whimbrel • Eastern Osprey • Glossy Ibis • Pacific Golden Plover • Bare-rumped Sheathtail Bat • Short-beaked Echidna • Estuarine Crocodile	• Not applicable	• DSDIP (2014) and DEHP (2014) or equivalent, updated guideline(s) (for MSES).	• Air pollution • Light pollution • Noise pollution • Water pollution • Habitat loss/degradation • Biosecurity ingress/proliferation • Unplanned fire (altered fire regimes) • Altered hydrological regimes • Direct mortality or harm to fauna	• All relevant values are MNES and will be subjected to assessment by DCCEEW apart from Short-beaked Echidna. Short-beaked Echidna is applicable for assessment as an MSES (Special Least Concern). As Estuarine Crocodile is a Threatened (Vulnerable) species under the NC Act (*cf.* a non-Threatened, Migratory species under the EPBC Act), it is applicable for separate assessment as an MSES. • Areas that have not already been cleared under a separate approval will require relevant statutory approvals to be in place prior to clearing. An offset may be required for clearing of protected wildlife habitat. • Habitats in the core infrastructure footprint do not contain resources of importance for Short-beaked Echidna or Estuarine Crocodile.

Prescribed environmental matter	Relevant values	Applicable State codes	Applicable guidelines	Relevant threats (Table 11)	Comments
Declared Fish Habitat Areas	• Fish habitat area (**Figure 7**) (MSES)	• Not applicable	• DSDIP (2014) and DEHP (2014) or equivalent, updated guideline(s) (for MSES).	• Water pollution	• The mapped fish habitat area is in the distal receiving environment; no works are planned in this area; therefore, further assessment is not required.
Waterway providing for fish passage	• Major (tidal) waterway (**Figure 6**) (MSES)	• State Code 18 (DHLGPPW 2024e)	• DSDIP (2014) and DEHP (2014) or equivalent, updated guideline(s) (for MSES). • DES (2022g).	• Habitat loss/degradation • Direct mortality or harm to fauna	• Guidance on State Code 18 is provided by NRA (2024a)[A]. • The *Accepted development requirements for operational work that is constructing or raising waterway barrier works* (DAF 2018) are relevant to planning waterway barrier works. • The importance of the tidal area (below HAT, mapped as a major risk waterway) along North Road will require assessment by an expert in fish passage and statutory approval if development is not subject to a separate approval. Offsets are applicable in some circumstances (*eg* if installation of a permanent barrier is required).
Marine plants	• Marine plants above and below HAT (MSES)	• State Code 11 (DHLGPPW 2024c)	• DSDIP (2014) and DEHP (2014) or equivalent, updated guideline(s) (for MSES). • DES (2022f).	• Habitat loss/degradation	• Guidance on State Code 11 is provided by NRA (2024a)[A]. • DSDIP (2014) and DEHP (2014) give different specifications for circumstances in which an offset may be required.

[A] NRA (2024a) provided guidance based on the Queensland *State Development Assessment Provisions Version 3.0*. This has been superseded by Version 3.1; however, the guidance provided in NRA (2024a) remains relevant.

[B] The definition of *vegetation* under State Code 16 defers to the following definition under the VM Act: *vegetation is a native tree or plant other than the following – (a) grass or non-woody herbage; (b) a plant within a grassland regional ecosystem identified in the VM REDD* [Queensland Herbarium vegetation management regional ecosystem description database] *as having a grassland structure; (c) a mangrove.* State Code 16 further states that the definition is *limited to vegetation where it is identified as assessable under the Planning Regulation 2017*.

5. Impact Avoidance and Mitigation Recommendations

Recommended measures to avoid and mitigate threats to environmental values associated with the development of the project are summarised in **Table 14**. Provisions in the TSDA Development Scheme (DSDMIP 2019) assessment criteria that pertain to the environmental matters discussed in this report have been considered and incorporated where relevant. The advice should be reviewed as further detail on the proposed action becomes available.

Table 14: Measures to avoid and mitigate potential impacts

Environmental subject	Management measures	Relevant threat (Table 11)
Air quality	• Apply water to exposed earth, including unsealed access, during construction. • Achieve the air quality objectives of the Queensland *Environmental Protection (Air) Policy* 2008. • Ensure equipment is appropriately maintained and serviced according to specifications. • Ensure facility site and roads used for site access and egress are sealed and maintained. • Obtain specialist advice at the design phase to ensure generation of nitrous oxide due to combustion of hydrogen is avoided or appropriately mitigated.	• Air pollution • Water pollution • Soil loss/degradation
Lighting design	• Ensure lighting design: - is in accordance with the *National Light Pollution Guidelines for Wildlife* (DCCEEW 2023) - makes buildings visible; however, lighting that reflects on shiny surfaces should be avoided as this may attract or disorientate fauna and lead to injury or death (building strike) - minimises light proliferation into the surrounding environment.	• Light pollution • Direct mortality or harm to fauna • Habitat loss/degradation
Hazardous materials, substances and dangerous goods	• Ensure a risk assessment for each hazardous substance is periodically reviewed and appropriate controls implemented into the relevant safety plan. • Dispose of hazardous materials at a licenced facility with full chain-of-custody documentation. • Minimise hazardous substances stored on site. • Ensure all Safety Data Sheets are checked and hazardous substances identified and entered into hazardous substance register prior to substance arriving at site. • Ensure all permits are in place for storing and handling hazardous substances. • Ensure personnel have appropriate training for handling, storage and transport of hazardous substances. • Retain all licences, permits and approvals on site as required by statutory authorities. • Ensure any hazardous substances such as hydrocarbons are stored under roof and on a surface of concrete, asphalt or similar imperious substance, and bunded. • Ensure all flammable and combustible liquids (including hazardous waste materials): - have the contents and volume clearly identified be numbered for identification - are contained within an on-site containment system within the facility site - are controlled in a manner that prevents environmental harm and maintained in accordance with appropriate standards, with Hazchem signs displayed. • Ensure a spill kit is available to clean up potential spills. • For development on land likely to be contaminated or land recorded on the Environmental Management Register or Contaminated Land Register, undertake appropriate management or movement of contaminants to avoid adverse impacts to the environment. Where required, prepare a strategy to manage existing contamination and the potential for additional contamination.	• Water pollution • Direct mortality or harm to fauna • Habitat loss/degradation
Biosecurity	• Undertake works in accordance with the General Biosecurity Obligation under the Biosecurity Act and Queensland *Biosecurity Regulation* 2016. • Ensure equipment and vehicles are washed down and be free of plant, soil, pests and pathogens prior to being brought to site.	• Biosecurity ingress/proliferation • Direct mortality or harm to fauna • Habitat loss/degradation
Flora and fauna	• If tree clearing is required (*eg* along Zinc Road): - obtain an approved low-risk Species Management Program for tampering for known and potential animal breeding places - engage a licenced fauna spotter-catcher to undertake a pre-clearance inspection and to relocate fauna displaced during clearing. • Avoid and/or minimise clearing within 100 m of the mapped HES wetland (**Figure 5**). Ensure relevant statutory approvals are in place prior to clearing. • Avoid and/or minimise clearing of regulated vegetation that is MSES (**Figure 10**). Ensure relevant statutory approvals are in place prior to clearing. • Minimise clearing of marine plants and disturbance to areas under HAT (**Figure 11**). Ensure relevant statutory approvals are in place prior to clearing. • Avoid and/or minimise clearing of remnant habitats (**Figure 13**). Ensure relevant statutory approvals are in place prior to clearing. • Place food waste into lined bins and cover to prevent attracting fauna to the site. • Avoid interference/handling of native fauna. If an injured animal is found, a licenced wildlife carer should be contacted and the injured animal taken into care.	• Direct mortality or harm to fauna • Habitat loss/degradation
Fire	• Ensure personnel are briefed on fire awareness during site induction, including evacuation procedures. • During construction and decommissioning, avoid hot works in outdoor locations on days where fire index is high. • Manage hazardous substances as described above. • Ensure fire extinguishers are serviced and maintained.	• Unplanned fire (altered fire regimes) • Direct mortality or harm to fauna • Habitat loss/degradation
Waste	• Ensure procurement procedure includes waste avoidance as a key criterion for the selection of goods and services. • Contain construction materials in containers where possible. • Segregate and recycle solid wastes generated by work activities, offices and mess-rooms or engage contractor to recycle waste off site. • Ensure that materials are not left in exposed situations where they can be washed or blown away to become litter. • Provide bins for construction workers and staff at indoor locations where food is consumed. • Maintain awareness with personnel of the need to avoid littering. • Dispose of waste material at an appropriately licenced waste facility.	• Water pollution • Soil loss/degradation • Direct mortality or harm to fauna • Habitat loss/degradation

Environmental subject	Management measures	Relevant threat (Table 11)
Noise and vibration	• Achieve the acoustic objectives of the Queensland *Environmental Protection (Noise) Policy* 2008. • Ensure plant and equipment is adequately maintained and serviced according to specifications.	• Noise pollution • Direct mortality or harm to fauna • Habitat loss/degradation
Soil	• Ensure studies are conducted prior to undertaking earthworks. These studies should consider salinity and acid sulfate soils. Should investigations reveal the presence (or potential presence) of acid sulfate soils, preparation of an Acid Sulfate Soils Management Plan will be required. Disturbance of acid sulfate soils should be avoided or managed to minimise the mobilisation and release of acid and metal contaminants. • Ensure erosion and sediment control measures are identified in Erosion and Sediment Control Plans (separate plans for construction, operation and decommissioning), and implemented. The measures should be prepared in accordance with IECA (2008). • Prepare a Rehabilitation Plan for the decommissioning phase. • Ensure tidal work is designed and located in accordance with the *Guideline: Building and engineering standards for tidal works, Department of Environment and Heritage Protection, 2017* (in DES 2022c).	• Water pollution • Soil loss/degradation • Direct mortality or harm to fauna • Habitat loss/degradation
Water	• During construction, ensure surface runoff management measures include: - timing of construction to avoid wet season rainfall - limiting the extent and duration of exposed soils within the construction area. Where rainfall events of >20 mm are forecast, cover stockpiles with tarps/plastic to minimise infiltration and runoff - appropriate disposal of trade waste (and wastewater) generated during construction - use of bunds or spoon drains to direct surface water sheet flow away from construction areas and stockpiles. • Undertake waterway barrier works (where required) in accordance with accepted development requirements (DAF 2018). Works not able to comply with DAF (2018) will require statutory approval before proceeding. • Manage runoff to minimise the release of pollutants to waterways and achieve relevant State policy water quality objectives (Queensland *Environmental Protection (Water and Wetland Biodiversity) Policy* 2019).	• Water pollution • Soil loss/degradation • Altered hydrological regimes
General	• Prepare and implement separate Environmental Management Plans for construction, operation and decommissioning.	• Air pollution • Light pollution • Noise pollution • Water pollution • Soil loss/degradation • Altered hydrological regimes • Direct mortality or harm to fauna • Biosecurity ingress/proliferation • Unplanned fire (altered fire regimes) • Habitat loss/degradation

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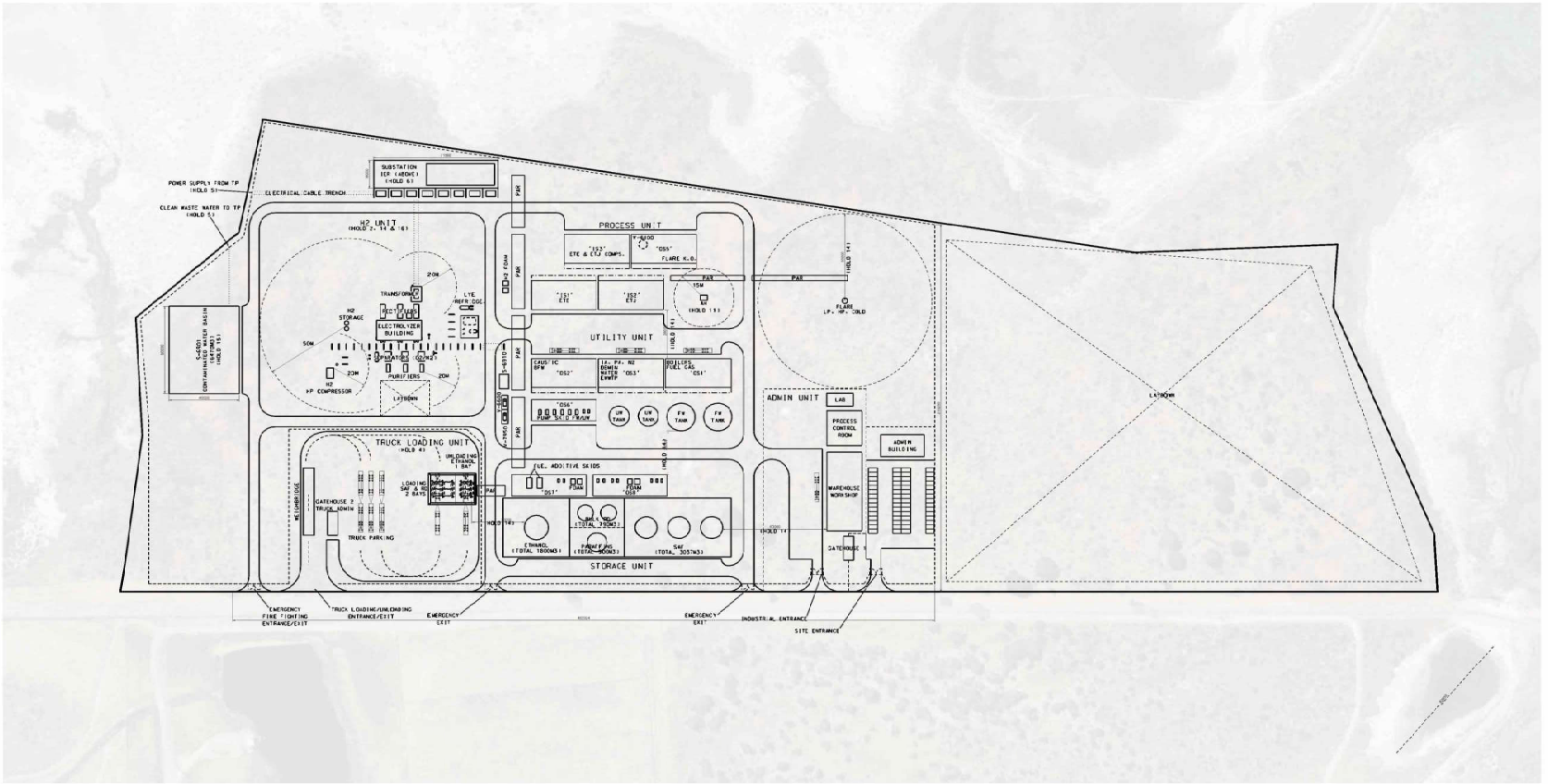
Appendix A:
Conceptual Site Layout

PREVAILING WIND MARCH TO AUG (from SE)

TRUE NORTH

PLANT NORTH

PREVAILING WIND SEP TO FEB (from NE)



SCALE METRES
1:1000

NOTES

1. GOOGLE EARTH SITE IMAGE IS APPROXIMATELY SCALED.
2. ALL COORDINATES IN METERS, ALL DIMENSIONS IN MILLIMETERS.
3. THIS LAYOUT IS BASED ON REV A4 PROCESS DATA.

HOLDS

1. SITE CO-ORDINATES AND BOUNDARY LINE.
2. EQUIPMENT SIZE AND LOCATION.
3. MODULE SIZE AND LOCATION.
4. TRUCK LOADING/UNLOADING.
5. THIRD PARTY TIE-IN LOCATIONS.
6. ADMIN, SUBSTATION & BUILDINGS SIZE AND LOCATION.
7. REQUIREMENT FOR COOLING WATER (NOT SHOWN IN LAYOUT).
8. REQUIREMENT FOR SULPHURIC ACID STORAGE TANK.
9. REQUIREMENT FOR H2 STORAGE BULLETS.
10. FLARE STERLIE RADIUS.
11. ANALYSER HOUSE REQUIREMENT, QUANTITY AND LOCATION.
12. REQUIREMENT FOR CAUSTIC BASIN AND SIZE.
13. FOAM SYSTEM DESIGN.
14. SAFETY DISTANCES ARE BASED UPON EXPERIENCE ON HAZARDOUS AREA CLASSIFICATION & CONSEQUENCE/RISK MODELLING STUDIES. TO BE RE-VALIDATED BY FEED CONTRACTOR AND JUSTIFIED IF CHANGED (MINIMIZED).
15. BASIN SIZE.
16. H2 UNIT LAYOUT IS BASED ON A RECENT HYDROGEN PROJECT.

KEY

- UNDERGROUND
- FENCE
- LAYDOWN/ACCESS
- EQUIPMENT
- MODULE/PIPERACK/STRUCTURE
- ROADS/CIVIL
- PROPOSED SAF PLOT LIVIT

PAR	PRE-ASSEMBLED RACK
PAU	PRE-ASSEMBLED UNIT
TP	THIRD PARTY
AH	ANALYSER HOUSE
IER	INSTRUVENT ELECTRICAL ROOV
SS	SUBSTATION

REFERENCE DRAWINGS

Rev	Date	Revision Object	Written	Checked	Approved Technical	Approved Project
2	15/10/2024	ISSUED FOR INFORMATION	NM	RM	RM	GN

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TECHNIP ENERGIES | Jet Zero AUSTRALIA

PROJECT ULYSSES PRE-FEED
QUEENSLAND, AUSTRALIA

CONCEPTUAL OVERALL PLOT PLAN

SCALE: 1:1000	SHEET:		
CLIENT Doc. Ref.	28011007-PI-LAY-00001	REVISION	FORMAT
T.EN. Doc. Ref.	21665'C-000-DW-0051-0001	0	A0

C-000-DW-0051-0001_Cubris Model 15/10/2024 13:08:19

Appendix B:
Database Search Results

EPBC Act Protected Matters Report

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

Report created: 10-Oct-2024

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

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	2
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	54
Listed Migratory Species:	64

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:	19
Commonwealth Heritage Places:	None
Listed Marine Species:	108
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	None
Nationally Important Wetlands:	2
EPBC Act Referrals:	20
Key Ecological Features (Marine):	None
Biologically Important Areas:	5
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Great Barrier Reef	QLD	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Natural			
Great Barrier Reef	QLD	Listed place	In buffer area only

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Bowling green bay	Within 10km of Ramsar site	In feature area

Great Barrier Reef Marine Park [Resource Information]

Zone Type	Zone ID	IUCN	Buffer Status
Conservation Park	CP-19-4059	IV	In buffer area only
General Use	GU-16-6004	VI	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

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

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

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Arenaria interpres			
Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	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
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In buffer area only
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In buffer area only
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Dasyurus hallucatus](#) Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Petauroides minor](#) Greater Glider (northern), Greater Glider (north-eastern Queensland) [92008]	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 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
[Saccolaimus saccolaimus nudicluniatus](#) Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Xeromys myoides](#) Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			
[Backhousia tetraptera](#) [91337]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
[Dichanthium setosum](#) bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Eucalyptus paedoglauca](#) Mt Stuart Ironbark [56188]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Leichhardtia araujacea](#) [91900]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leichhardtia brevifolia listed as Marsdenia brevifolia [91893]	Vulnerable	Species or species habitat may occur within area	In feature area
Myrmecodia beccarii Ant Plant [11852]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Omphalea celata [64586]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Phlegmariurus tetrastichoides Square Tassel Fern [86555]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tephrosia leveillei [16946]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Varanus mertensi			
Mertens' Water Monitor, Mertens's Water Monitor [1568]	Endangered	Species or species habitat may occur within area	In feature area
SHARK			
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron			
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat likely to occur within area	In buffer area only
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Fregata ariel			
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor			
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
[Sternula albifrons](#) Little Tern [82849]		Breeding likely to occur within area	In buffer area only
Migratory Marine Species			
[Anoxypristis cuspidata](#) Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat known to occur within area	In buffer area only
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
[Carcharhinus longimanus](#) Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
[Carcharias taurus](#) Grey Nurse Shark [64469]		Species or species habitat may occur within area	In buffer area only
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Sousa sahulensis as Sousa chinensis](#) Australian Humpback Dolphin [87942]		Breeding known to occur within area	In buffer area only
Migratory Terrestrial Species			
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat likely to occur within area	In feature area
[Calidris pugnax as Philomachus pugnax](#) Ruff [91256]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In feature area
[Calidris tenuirostris](#) Great Knot [862]	Vulnerable	Roosting known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Charadrius mongolus](#) Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
[Charadrius veredus](#) Oriental Plover, Oriental Dotterel [882]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago megala](#) Swinhoe's Snipe [864]		Roosting likely to occur within area	In feature area
[Gallinago stenura](#) Pin-tailed Snipe [841]		Roosting likely to occur within area	In feature area
[Limicola falcinellus](#) Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area	In buffer area only
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Tringa incana Wandering Tattler [831]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only
Xenus cinereus Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - LAVARACK BARRACKS - TOWNSVILLE [31284]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31285]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31290]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31301]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31300]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31296]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31299]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31304]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31287]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31286]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31298]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31294]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31297]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31292]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31303]	QLD	In buffer area only
Defence - LAVARACK BARRACKS - TOWNSVILLE [31302]	QLD	In buffer area only
Defence - Mount Stuart Close Training Area [31848]	QLD	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - Mount Stuart Close Training Area [31859]	QLD	In buffer area only
Defence - ROSS ISLAND BARRACKS [31965]	QLD	In buffer area only

Listed Marine Species [Resource Information]

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris pugnax as Philomachus pugnax Ruff [91256]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Limicola falcinellus Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa limosa Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		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
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area overfly marine area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pluvialis squatarola Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
Recurvirostra novaehollandiae Red-necked Avocet [871]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Breeding likely to occur within area	In buffer area only
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
Tringa glareola Wood Sandpiper [829]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Tringa incana as Heteroscelus incanus Wandering Tattler [831]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
[Xenus cinereus](#) Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
Fish			
[Acentronura tentaculata](#) Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In buffer area only
[Campichthys tryoni](#) Tryon's Pipefish [66193]		Species or species habitat may occur within area	In buffer area only
[Choeroichthys brachysoma](#) Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In buffer area only
[Choeroichthys suillus](#) Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In buffer area only
[Corythoichthys amplexus](#) Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In buffer area only
[Corythoichthys flavofasciatus](#) Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In buffer area only
[Corythoichthys intestinalis](#) Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area	In buffer area only
[Corythoichthys ocellatus](#) Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area	In buffer area only
[Corythoichthys paxtoni](#) Paxton's Pipefish [66204]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species habitat may occur within area	In buffer area only
Cosmocampus darrosanus D'Arros Pipefish [66207]		Species or species habitat may occur within area	In buffer area only
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In buffer area only
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In buffer area only
Halicampus dunckeri Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area	In buffer area only
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In buffer area only
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area	In buffer area only
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In buffer area only
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In buffer area only
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area	In buffer area only
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus bargibanti Pygmy Seahorse [66721]		Species or species habitat may occur within area	In buffer area only
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In buffer area only
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area	In buffer area only
Hippocampus zebra Zebra Seahorse [66241]		Species or species habitat may occur within area	In buffer area only
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area	In buffer area only
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area	In buffer area only
Nannocampus pictus Painted Pipefish, Reef Pipefish [66263]		Species or species habitat may occur within area	In buffer area only
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In buffer area only
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In buffer area only
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In buffer area only
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In buffer area only
Mammal			
Dugong dugon Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Reptile			
Aipysurus duboisii Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In buffer area only
Aipysurus laevis Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In buffer area only
Aipysurus mosaicus as Aipysurus eydouxii Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hydrophis elegans Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In buffer area only
Hydrophis hardwickii as Lapemis hardwickii Spine-bellied Sea Snake [93516]		Species or species habitat may occur within area	In buffer area only
Hydrophis kingii as Disteira kingii Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In buffer area only
Hydrophis macdowelli as Hydrophis mcdowelli MacDowell's Sea Snake, Small-headed Sea Snake, [75601]		Species or species habitat may occur within area	In buffer area only
Hydrophis major as Disteira major Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In buffer area only
Hydrophis ornatus Spotted Sea Snake, Ornate Reef Sea Snake [1111]		Species or species habitat may occur within area	In buffer area only
Hydrophis peronii as Acalyptophis peronii Horned Sea Snake [93509]		Species or species habitat may occur within area	In buffer area only
Hydrophis platura as Pelamis platurus Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In buffer area only
Hydrophis stokesii as Astrotia stokesii Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In buffer area only
Hydrophis zweiffei as Enhydrina schistosa Australian Beaked Sea Snake [93514]		Species or species habitat may occur within area	In buffer area only
Laticauda colubrina Yellow-lipped Sea Krait [1092]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Laticauda laticaudata a sea krait [1093]		Species or species habitat may occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Sousa sahulensis Australian Humpback Dolphin [87942]		Breeding known to occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Cleveland Bay	Fish Habitat Area (A)	QLD	In buffer area only
Cleveland Bay - Magnetic Island	Dugong Protection Area (A)	QLD	In buffer area only
Great Barrier Reef Coast	Marine Park	QLD	In buffer area only
Stuart Creek	Nature Refuge	QLD	In buffer area only

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

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Stuart Industrial Subdivision	2021/8890		Post-Approval	In buffer area only
WITHDRAWN BEFORE VALIDATION Cleveland Bay	2020/8733		Referral Validation	In feature area
Controlled action				
275kV and 132 kV transmission line from Ross Substation to Townsville South Substation	2001/221	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Cleveland Bay Industrial Park	2020/8810	Controlled Action	Post-Approval	In feature area
Development and Construction of Rocky Springs Masterplanned Community	2007/3574	Controlled Action	Post-Approval	In buffer area only
North Queensland Power Project	2001/412	Controlled Action	Completed	In buffer area only
Townsville Commercial Marine Precinct	2008/4497	Controlled Action	Post-Approval	In buffer area only
Townsville Eastern Access Rail Corridor	2021/9003	Controlled Action	Assessment Approach	In buffer area only
Townsville Port Access Project (Road and Rail)	2003/1011	Controlled Action	Post-Approval	In feature area
Not controlled action				
Cleveland Bay Purification Plant Outfall Upgrade Project, Townsville, Qld	2016/7821	Not Controlled Action	Completed	In buffer area only
Cleveland Bay WasteWater Treatment Facility and Water Reclamation Facility	2006/2882	Not Controlled Action	Completed	In buffer area only
Construction & operation of new intermodal terminal & freight distribution, Townsville, Qld	2015/7424	Not Controlled Action	Completed	In buffer area only
Construction of a western access road, Julago, Qld	2015/7534	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Industrial Development and Reconfiguration of the Lot	2009/4949	Not Controlled Action	Completed	In buffer area only
Subdivision of Lot 12 on SP243847 Elliot Springs Estate, Townsville, Qld	2019/8436	Not Controlled Action	Completed	In buffer area only
Townsville Recreational Boating Park	2012/6375	Not Controlled Action	Completed	In buffer area only
Townsville South Power Station	2005/2047	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Extension to existing Extractive Industry, Roseneath Quarry	2009/4984	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Townsville South to East power line & substation	2006/2626	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

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

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact us page.

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

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: All
Records: All
Date: Since 1980
Latitude: -19.323
Longitude: 146.856
Distance: 5
Email: lindsay@natres.com.au
Date submitted: Thursday 10 Oct 2024 12:04:00
Date extracted: Thursday 10 Oct 2024 12:10:07

The number of records retrieved = 442

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

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			9
animals	amphibians	Hylidae	*Litoria bicolor*	northern sedgefrog		C		1
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		9
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		11
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		5
animals	amphibians	Hylidae	*Litoria inermis*	bumpy rocketfrog		C		3
animals	amphibians	Hylidae	*Litoria nasuta*	striped rocketfrog		C		1
animals	amphibians	Hylidae	*Litoria rothii*	eastern laughing treefrog		C		6
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		24
animals	amphibians	Limnodynastidae	*Limnodynastes convexiusculus*	marbled frog		C		1
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		5
animals	amphibians	Myobatrachidae	*Crinia deserticola*	chirping froglet		C		1
animals	birds	Acanthizidae	*Gerygone levigaster*	mangrove gerygone		C		121
animals	birds	Acanthizidae	*Gerygone magnirostris*	large-billed gerygone		C		5
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		4
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		3
animals	birds	Acanthizidae	*Gerygone palpebrosa*	fairy gerygone		C		16
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		6
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		15
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		C		3
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		14
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		3
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		7
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		2
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		9
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		89
animals	birds	Accipitridae	*Haliastur indus*	brahminy kite		C		73
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		146
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		150
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		1
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		1
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		16
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		1
animals	birds	Alcedinidae	*Ceyx pusillus*	little kingfisher		C		7
animals	birds	Alcedinidae	*Dacelo leachii*	blue-winged kookaburra		C		21
animals	birds	Alcedinidae	*Dacelo novaeguineae*	laughing kookaburra		C		6
animals	birds	Alcedinidae	*Tanysiptera sylvia*	buff-breasted paradise-kingfisher		C		1
animals	birds	Alcedinidae	*Todiramphus macleayii*	forest kingfisher		C		21
animals	birds	Alcedinidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		1
animals	birds	Alcedinidae	*Todiramphus sanctus*	sacred kingfisher		C		65
animals	birds	Alcedinidae	*Todiramphus sordidus*	Torresian kingfisher		C		14
animals	birds	Anatidae	*Anas castanea*	chestnut teal		C		1
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		25
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		48
animals	birds	Anatidae	*Aythya australis*	hardhead		C		6
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		5
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		13
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		23
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		2
animals	birds	Anatidae	*Radjah radjah*	radjah shelduck		C		1
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		93
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		35
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		SL		4
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	1
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		169
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		98
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		6
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		119
animals	birds	Ardeidae	*Butorides striata*	striated heron		C		83
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		143
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		57
animals	birds	Ardeidae	*Egretta picata*	pied heron		C		1
animals	birds	Ardeidae	*Egretta sacra*	eastern reef egret		C		17
animals	birds	Ardeidae	*Ixobrychus flavicollis*	black bittern		C		1
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		17
animals	birds	Artamidae	*Artamus cinereus*	black-faced woodswallow		C		5
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		106
animals	birds	Artamidae	*Artamus superciliosus*	white-browed woodswallow		C		2
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		4
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		1
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		56
animals	birds	Artamidae	*Melloria quoyi*	black butcherbird		C		52
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		1
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		24
animals	birds	Burhinidae	*Esacus magnirostris*	beach stone-curlew		V		38
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		53
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		55
animals	birds	Cacatuidae	*Cacatua tenuirostris*	long-billed corella	Y	C		3
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		74
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		8
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		2
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		88
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		32
animals	birds	Campephagidae	*Edolisoma tenuirostre*	common cicadabird		C		2
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		52
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		7
animals	birds	Caprimulgidae	*Caprimulgus macrurus*	large-tailed nightjar		C		9
animals	birds	Charadriidae	*Charadrius bicinctus*	double-banded plover		SL		1
animals	birds	Charadriidae	*Charadrius leschenaultii*	greater sand plover		V	V	7
animals	birds	Charadriidae	*Charadrius mongolus*	lesser sand plover		E	E	10

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animals	birds	Charadriidae	*Charadrius ruficapillus*	red-capped plover		C		34
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		49
animals	birds	Charadriidae	*Erythrogonys cinctus*	red-kneed dotterel		C		5
animals	birds	Charadriidae	*Pluvialis fulva*	Pacific golden plover		SL		6
animals	birds	Charadriidae	*Pluvialis squatarola*	grey plover		V	V	5
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		167
animals	birds	Charadriidae	*Vanellus miles miles*	masked lapwing (northern subspecies)		C		8
animals	birds	Charadriidae	*Vanellus tricolor*	banded lapwing		C		1
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		17
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		40
animals	birds	Columbidae	*Columba livia*	rock dove	Y			13
animals	birds	Columbidae	*Ducula bicolor*	pied imperial-pigeon		C		10
animals	birds	Columbidae	*Geopelia cuneata*	diamond dove		C		2
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		86
animals	birds	Columbidae	*Geopelia placida*	peaceful dove		C		157
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		21
animals	birds	Columbidae	*Spilopelia chinensis*	spotted dove	Y			1
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		30
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		26
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		92
animals	birds	Corvidae	*Corvus sp.*			C		21
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		5
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		4
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		16
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		47
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		10
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		2
animals	birds	Cuculidae	*Chalcites minutillus*	little bronze-cuckoo		C		15
animals	birds	Cuculidae	*Chalcites minutillus russatus*	Gould's bronze-cuckoo		C		1
animals	birds	Cuculidae	*Chalcites osculans*	black-eared cuckoo		C		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		25
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		10
animals	birds	Dicaeidae	*Dicaeum hirundinaceum*	mistletoebird		C		50
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		92
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		16
animals	birds	Estrildidae	*Lonchura punctulata*	nutmeg mannikin	Y			36
animals	birds	Estrildidae	*Neochmia modesta*	plum-headed finch		C		2
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		1
animals	birds	Estrildidae	*Poephila cincta cincta*	black-throated finch (white-rumped subspecies)		E	E	1
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		34
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		12
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		1
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		13
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		48

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animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		39
animals	birds	Falconidae	*Falco peregrinus macropus*	Australian peregrine falcon		C		5
animals	birds	Falconidae	*Falco subniger*	black falcon		C		1
animals	birds	Fregatidae	*Fregata ariel*	lesser frigatebird		SL		1
animals	birds	Glareolidae	*Stiltia isabella*	Australian pratincole		C		1
animals	birds	Gruidae	*Antigone rubicunda*	brolga		C		10
animals	birds	Haematopodidae	*Haematopus longirostris*	Australian pied oystercatcher		C		51
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		132
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		37
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		7
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		17
animals	birds	Laridae	*Chlidonias hybrida*	whiskered tern		C		2
animals	birds	Laridae	*Chlidonias leucopterus*	white-winged black tern		SL		1
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		125
animals	birds	Laridae	*Gelochelidon macrotarsa*	Australian tern		SL		82
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		99
animals	birds	Laridae	*Leucophaeus pipixcan*	Franklin's gull		C		1
animals	birds	Laridae	*Sternula albifrons*	little tern		SL		17
animals	birds	Laridae	*Thalasseus bengalensis*	lesser crested tern		C		2
animals	birds	Laridae	*Thalasseus bergii*	crested tern		SL		58
animals	birds	Locustellidae	*Cincloramphus mathewsi*	rufous songlark		C		2
animals	birds	Locustellidae	*Cincloramphus timoriensis*	tawny grassbird		C		4
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		45
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		17
animals	birds	Meliphagidae	*Conopophila rufogularis*	rufous-throated honeyeater		C		18
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		31
animals	birds	Meliphagidae	*Gavicalis fasciogularis*	mangrove honeyeater		C		36
animals	birds	Meliphagidae	*Gavicalis versicolor*	varied honeyeater		C		3
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		124
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		2
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		1
animals	birds	Meliphagidae	*Meliphaga notata*	yellow-spotted honeyeater		C		1
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		40
animals	birds	Meliphagidae	*Melithreptus gularis*	black-chinned honeyeater		C		1
animals	birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater		C		49
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		2
animals	birds	Meliphagidae	*Philemon buceroides*	helmeted friarbird		C		75
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		11
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		5
animals	birds	Meliphagidae	*Ptilotula fusca*	fuscous honeyeater		C		1
animals	birds	Meliphagidae	*Ramsayornis modestus*	brown-backed honeyeater		C		19
animals	birds	Meliphagidae	*Stomiopera flava*	yellow honeyeater		C		68
animals	birds	Meliphagidae	*Stomiopera unicolor*	white-gaped honeyeater		C		17
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		163
animals	birds	Monarchidae	*Carterornis leucotis*	white-eared monarch		C		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		125

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		2
animals	birds	Monarchidae	*Myiagra alecto*	shining flycatcher		C		3
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		SL		3
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		1
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		60
animals	birds	Monarchidae	*Symposiachrus trivirgatus*	spectacled monarch		SL		3
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		40
animals	birds	Nectariniidae	*Cinnyris jugularis*	olive-backed sunbird		C		101
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		6
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		56
animals	birds	Otididae	*Ardeotis australis*	Australian bustard		C		3
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		1
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		40
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		15
animals	birds	Pandionidae	*Pandion haliaetus cristatus*	eastern osprey		SL		44
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		12
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			25
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		97
animals	birds	Petroicidae	*Microeca flavigaster*	lemon-bellied flycatcher		C		3
animals	birds	Petroicidae	*Peneoenanthe pulverulenta*	mangrove robin		C		2
animals	birds	Petroicidae	*Poecilodryas superciliosa*	white-browed robin		C		1
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		100
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		8
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		85
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		59
animals	birds	Phasianidae	*Synoicus ypsilophorus*	brown quail		C		10
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		5
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		8
animals	birds	Psittaculidae	*Aprosmictus erythropterus*	red-winged parrot		C		3
animals	birds	Psittaculidae	*Parvipsitta pusilla*	little lorikeet		C		1
animals	birds	Psittaculidae	*Platycercus adscitus*	pale-headed rosella		C		15
animals	birds	Psittaculidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		23
animals	birds	Psittaculidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		118
animals	birds	Ptilonorhynchidae	*Chlamydera maculata*	spotted bowerbird		C		1
animals	birds	Ptilonorhynchidae	*Chlamydera nuchalis*	great bowerbird		C		76
animals	birds	Rallidae	*Amaurornis cinerea*	white-browed crake		C		5
animals	birds	Rallidae	*Gallirallus philippensis*	buff-banded rail		C		4
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		2
animals	birds	Recurvirostridae	*Himantopus leucocephalus*	pied stilt		C		53
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		37
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		19
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		1
animals	birds	Scolopacidae	*Actitis hypoleucos*	common sandpiper		SL		40
animals	birds	Scolopacidae	*Arenaria interpres*	ruddy turnstone		V	V	5
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		V	V	61

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animals	birds	Scolopacidae	*Calidris alba*	sanderling		SL		1
animals	birds	Scolopacidae	*Calidris canutus*	red knot		V	V	11
animals	birds	Scolopacidae	*Calidris ferruginea*	curlew sandpiper		CR	CE	5
animals	birds	Scolopacidae	*Calidris melanotos*	pectoral sandpiper		SL		1
animals	birds	Scolopacidae	*Calidris ruficollis*	red-necked stint		SL		32
animals	birds	Scolopacidae	*Calidris tenuirostris*	great knot		V	V	36
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		V	V	1
animals	birds	Scolopacidae	*Limosa lapponica baueri*	Western Alaskan bar-tailed godwit		E	E	75
animals	birds	Scolopacidae	*Limosa limosa*	black-tailed godwit		E	E	22
animals	birds	Scolopacidae	*Numenius madagascariensis*	eastern curlew		CR	CE	142
animals	birds	Scolopacidae	*Numenius minutus*	little curlew		SL		5
animals	birds	Scolopacidae	*Numenius phaeopus*	whimbrel		SL		144
animals	birds	Scolopacidae	*Tringa brevipes*	grey-tailed tattler		SL		52
animals	birds	Scolopacidae	*Tringa incana*	wandering tattler		SL		2
animals	birds	Scolopacidae	*Tringa nebularia*	common greenshank		E	E	66
animals	birds	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper		SL		27
animals	birds	Scolopacidae	*Xenus cinereus*	terek sandpiper		V	V	8
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		3
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		2
animals	birds	Sturnidae	*Acridotheres tristis*	common myna	Y			35
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		6
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		116
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		7
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		338
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		83
animals	birds	Turnicidae	*Turnix maculosus*	red-backed button-quail		C		1
animals	birds	Tytonidae	*Tyto javanica*	eastern barn owl		C		2
animals	birds	Zosteropidae	*Zosterops lateralis*	silvereye		C		2
animals	insects	Lycaenidae	*Liphyra brassolis major*	moth butterfly		C		1/1
animals	mammals	Canidae	*Canis familiaris*	dog	Y			1
animals	mammals	Canidae	*Canis familiaris (dingo)*	dingo				2
animals	mammals	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat		C		2
animals	mammals	Emballonuridae	*Saccolaimus saccolaimus nudicluniatus*	bare-rumped sheathtail bat		E	V	2
animals	mammals	Leporidae	*Lepus europaeus*	European brown hare	Y			1
animals	mammals	Macropodidae	*Lagorchestes conspicillatus*	spectacled hare-wallaby		C		1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		1
animals	mammals	Macropodidae	*Notamacropus agilis*	agile wallaby		C		8
animals	mammals	Macropodidae	*Osphranter robustus*	common wallaroo		C		1
animals	mammals	Molossidae	*Chaerephon jobensis*	northern freetail bat		C		3
animals	mammals	Molossidae	*Mormopterus lumsdenae*	northern free-tailed bat		C		4
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		2
animals	mammals	Muridae	*Mus musculus*	house mouse	Y			1
animals	mammals	Muridae	*Pseudomys mimulus*	eastern delicate mouse		C		2
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		1
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		5
animals	mammals	Pteropodidae	*Pteropus alecto*	black flying-fox		C		3

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animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		1
animals	mammals	Suidae	*Sus scrofa*	pig	Y			2
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		1
animals	ray-finned fishes	Ambassidae	*Ambassis agrammus*	sailfin glassfish				1
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				1
animals	ray-finned fishes	Atherinidae	*Craterocephalus stercusmuscarum*	flyspecked hardyhead				1
animals	ray-finned fishes	Cichlidae	*Oreochromis mossambica*	Mozambique mouthbrooder	Y			1
animals	ray-finned fishes	Clupeidae	*Nematalosa erebi*	bony bream				1
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia splendida splendida*	eastern rainbowfish				1
animals	ray-finned fishes	Plotosidae	*Neosilurus hyrtlii*	Hyrtl's catfish				1
animals	ray-finned fishes	Poeciliidae	*Gambusia holbrooki*	mosquitofish	Y			1
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				1
animals	reptiles	Agamidae	*Diporiphora australis*	tommy roundhead		C		2
animals	reptiles	Boidae	*Antaresia maculosa*	spotted python		C		1
animals	reptiles	Boidae	*Liasis fuscus*	water python		C		1
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		1
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		2
animals	reptiles	Crocodylidae	*Crocodylus porosus*	estuarine crocodile		V		2
animals	reptiles	Diplodactylidae	*Amalosia rhombifer sensu lato*	zigzag velvet gecko		C		1
animals	reptiles	Diplodactylidae	*Oedura castelnaui*	northern velvet gecko		C		1
animals	reptiles	Diplodactylidae	*Strophurus williamsi*	soft-spined gecko		C		1
animals	reptiles	Elapidae	*Furina ornata*	orange-naped snake		C		1
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		2
animals	reptiles	Gekkonidae	*Hemidactylus frenatus*	house gecko	Y			2
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		4
animals	reptiles	Pygopodidae	*Delma labialis*	striped-tailed delma		C		1
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		1
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		1
animals	reptiles	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink		C		1
animals	reptiles	Scincidae	*Glaphyromorphus punctulatus*	fine-spotted mulch-skink		C		1
animals	reptiles	Scincidae	*Lampropholis delicata*	dark-flecked garden sunskink		C		1
animals	reptiles	Scincidae	*Lampropholis mirabilis*	saxicoline sunskink		NT		1
animals	reptiles	Scincidae	*Morethia taeniopleura*	fire-tailed skink		C		3
animals	reptiles	Varanidae	*Varanus gouldii*	sand monitor		C		1
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending				3
plants	land plants	Acanthaceae	*Barleria prionitis*		Y			1/1
plants	land plants	Acanthaceae	*Ruellia tuberosa*		Y			1/1
plants	land plants	Acanthaceae	*Thunbergia grandiflora*	sky flower	Y			1/1
plants	land plants	Aizoaceae	*Sesuvium portulacastrum*	sea purslane		C		1
plants	land plants	Aizoaceae	*Trianthema compacta*			C		1/1
plants	land plants	Alismataceae	*Limnocharis flava*	yellow burrhead	Y			1
plants	land plants	Amaranthaceae	*Alternanthera brasiliana*		Y			1/1
plants	land plants	Amaranthaceae	*Alternanthera ficoidea*		Y			2/1
plants	land plants	Amaranthaceae	*Celosia argentea*		Y			1/1
plants	land plants	Anacardiaceae	*Mangifera indica*	mango	Y			1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Apocynaceae	*Cryptostegia grandiflora*	rubber vine	Y			3
plants	land plants	Apocynaceae	*Secamone elliptica*			C		1/1
plants	land plants	Apocynaceae	*Vincetoxicum williamsii*			C		1/1
plants	land plants	Arecaceae	*Livistona decora*			SL		1
plants	land plants	Aristolochiaceae	*Aristolochia ringens*		Y			1/1
plants	land plants	Asteraceae	*Chromolaena odorata*	Siam weed	Y			3/1
plants	land plants	Asteraceae	*Xanthium occidentale*		Y			1
plants	land plants	Boraginaceae	*Heliotropium leptaleum*			C		1/1
plants	land plants	Campanulaceae	*Wahlenbergia caryophylloides*			SL		1/1
plants	land plants	Caryophyllaceae	*Polycarpaea corymbosa*			C		1/1
plants	land plants	Celastraceae	*Denhamia disperma*			C		1/1
plants	land plants	Chenopodiaceae	*Atriplex muelleri*	lagoon saltbush		C		1/1
plants	land plants	Chenopodiaceae	*Suaeda australis*			C		1
plants	land plants	Chenopodiaceae	*Tecticornia*					1
plants	land plants	Chenopodiaceae	*Tecticornia australasica*			C		1/1
plants	land plants	Chenopodiaceae	*Tecticornia halocnemoides*			C		1
plants	land plants	Chenopodiaceae	*Tecticornia indica*			C		1
plants	land plants	Cleomaceae	*Gynandropsis gynandra*		Y			1/1
plants	land plants	Colchicaceae	*Gloriosa superba*	glory lily	Y			1/1
plants	land plants	Combretaceae	*Terminalia sericocarpa*	damson		C		1
plants	land plants	Commelinaceae	*Commelina ensifolia*	scurvy grass		C		1/1
plants	land plants	Convolvulaceae	*Cressa australis*			C		1/1
plants	land plants	Convolvulaceae	*Distimake dissectus*		Y			1/1
plants	land plants	Convolvulaceae	*Distimake quinquefolius*		Y			1/1
plants	land plants	Convolvulaceae	*Ipomoea*			C		1
plants	land plants	Cucurbitaceae	*Coccinia grandis*		Y			1/1
plants	land plants	Cucurbitaceae	*Momordica charantia*	balsam pear	Y			1/1
plants	land plants	Cyperaceae	*Cyperus javanicus*			C		1/1
plants	land plants	Euphorbiaceae	*Euphorbia bifida*			C		3/3
plants	land plants	Euphorbiaceae	*Euphorbia hyssopifolia*		Y			1/1
plants	land plants	Euphorbiaceae	*Euphorbia serpens*		Y			1/1
plants	land plants	Euphorbiaceae	*Euphorbia tithymaloides subsp. smallii*		Y			1/1
plants	land plants	Euphorbiaceae	*Mallotus ficifolius*			C		1/1
plants	land plants	Euphorbiaceae	*Mallotus nesophilus*			C		1/1
plants	land plants	Euphorbiaceae	*Mallotus philippensis*	red kamala		C		1
plants	land plants	Hydrocharitaceae	*Ottelia alismoides*			SL		2/2
plants	land plants	Lamiaceae	*Clerodendrum floribundum*			C		1
plants	land plants	Lamiaceae	*Lamiaceae*					1/1
plants	land plants	Lauraceae	*Cryptocarya grandis*			C		1
plants	land plants	Leguminosae	*Alysicarpus vaginalis*		Y			1/1
plants	land plants	Leguminosae	*Clitoria ternatea*	butterfly pea	Y			1/1
plants	land plants	Leguminosae	*Crotalaria pallida*		Y			1
plants	land plants	Leguminosae	*Desmodium muelleri*			C		1/1
plants	land plants	Leguminosae	*Indigofera linifolia*			C		1/1
plants	land plants	Leguminosae	*Leucaena leucocephala*		Y			3
plants	land plants	Leguminosae	*Leucaena leucocephala subsp. leucocephala*		Y			2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Leguminosae	*Millettia pinnata*			C		1
plants	land plants	Leguminosae	*Neltuma pallida*		Y			1/1
plants	land plants	Leguminosae	*Neonotonia wightii var. wightii*		Y			1/1
plants	land plants	Leguminosae	*Neptunia dimorphantha*			C		1/1
plants	land plants	Leguminosae	*Neptunia major*			C		1/1
plants	land plants	Leguminosae	*Parkinsonia aculeata*	parkinsonia	Y			9/4
plants	land plants	Leguminosae	*Rhynchosia acuminatissima*			C		1/1
plants	land plants	Leguminosae	*Senna obtusifolia*		Y			1/1
plants	land plants	Leguminosae	*Sesbania cannabina*			C		1
plants	land plants	Leguminosae	*Tamarindus indica*		Y			1/1
plants	land plants	Leguminosae	*Tephrosia juncea*			C		1/1
plants	land plants	Leguminosae	*Vachellia farnesiana*		Y			1/1
plants	land plants	Leguminosae	*Vachellia nilotica*	prickly acacia	Y			2/1
plants	land plants	Leguminosae	*Vigna radiata var. sublobata*			C		1/1
plants	land plants	Loranthaceae	*Diplatia furcata*			C		1/1
plants	land plants	Malpighiaceae	*Stigmaphyllon australiense*			C		1/1
plants	land plants	Malvaceae	*Abutilon albescens*			C		1/1
plants	land plants	Malvaceae	*Abutilon guineense*		Y			2/2
plants	land plants	Malvaceae	*Malvastrum americanum var. americanum*		Y			2/2
plants	land plants	Malvaceae	*Sida spinosa*	spiny sida	Y			1/1
plants	land plants	Moraceae	*Ficus opposita*			C		1
plants	land plants	Myrtaceae	*Blakella tessellaris*			C		2
plants	land plants	Myrtaceae	*Eucalyptus tereticornis*			C		1
plants	land plants	Myrtaceae	*Eucalyptus xanthoclada*	yellow-branched ironbark		C		1/1
plants	land plants	Myrtaceae	*Melaleuca dealbata*	swamp tea-tree		C		1
plants	land plants	Myrtaceae	*Melaleuca leucadendra*	broad-leaved tea-tree		C		1
plants	land plants	Nymphaeaceae	*Nymphaea violacea*			SL		1/1
plants	land plants	Oleaceae	*Olea paniculata*			C		1/1
plants	land plants	Orobanchaceae	*Rhamphicarpa australiensis*			C		1/1
plants	land plants	Passifloraceae	*Passiflora foetida*		Y			1/1
plants	land plants	Passifloraceae	*Turnera ulmifolia*		Y			2/2
plants	land plants	Plantaginaceae	*Bacopa floribunda*			C		1/1
plants	land plants	Plantaginaceae	*Scoparia dulcis*	scoparia	Y			1/1
plants	land plants	Poaceae	*Alloteropsis cimicina*			C		1/1
plants	land plants	Poaceae	*Alloteropsis semialata*	cockatoo grass		C		1/1
plants	land plants	Poaceae	*Aristida gracilipes*			C		1/1
plants	land plants	Poaceae	*Aristida holathera var. holathera*			C		1/1
plants	land plants	Poaceae	*Cenchrus pedicellatus subsp. pedicellatus*		Y			1/1
plants	land plants	Poaceae	*Cenchrus pennisetiformis*		Y			1/1
plants	land plants	Poaceae	*Chloris gayana*	rhodes grass	Y			3/3
plants	land plants	Poaceae	*Chloris inflata*	purpletop chloris	Y			3/1
plants	land plants	Poaceae	*Chloris virgata*	feathertop rhodes grass	Y			1/1
plants	land plants	Poaceae	*Dactyloctenium aegyptium*	coast button grass	Y			3/3
plants	land plants	Poaceae	*Dichanthium annulatum*	sheda grass	Y			1/1
plants	land plants	Poaceae	*Dichanthium sericeum subsp. polystachyum*			C		1/1
plants	land plants	Poaceae	*Digitaria bicornis*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	*Hackelochloa granularis*			C		1/1
plants	land plants	Poaceae	*Panicum decompositum var. tenuius*			C		1/1
plants	land plants	Poaceae	*Panicum effusum*			C		2/2
plants	land plants	Poaceae	*Panicum paludosum*	swamp panic		C		1/1
plants	land plants	Poaceae	*Sehima nervosum*			C		1/1
plants	land plants	Poaceae	*Sorghum x almum*		Y			1/1
plants	land plants	Poaceae	*Sporobolus caroli*	fairy grass		C		1/1
plants	land plants	Poaceae	*Sporobolus coromandelianus*		Y			2/2
plants	land plants	Poaceae	*Sporobolus jacquemontii*		Y			2/2
plants	land plants	Poaceae	*Sporobolus virginicus*	sand couch		C		1
plants	land plants	Poaceae	*Themeda quadrivalvis*	grader grass	Y			6
plants	land plants	Poaceae	*Themeda triandra*	kangaroo grass		C		1/1
plants	land plants	Poaceae	*Urochloa holosericea subsp. holosericea*			C		1/1
plants	land plants	Poaceae	*Urochloa mosambicensis*	sabi grass	Y			1/1
plants	land plants	Poaceae	*Urochloa mutica*		Y			2/1
plants	land plants	Poaceae	*Urochloa panicoides var. panicoides*		Y			1/1
plants	land plants	Poaceae	*Urochloa subquadripara*		Y			2/2
plants	land plants	Polygalaceae	*Polygala parviloba*			C		1/1
plants	land plants	Polygonaceae	*Antigonon leptopus*		Y			1/1
plants	land plants	Potamogetonaceae	*Potamogeton*					1/1
plants	land plants	Rhamnaceae	*Ziziphus mauritiana*	Indian jujube	Y			5
plants	land plants	Rubiaceae	*Nauclea orientalis*	Leichhardt tree		C		1
plants	land plants	Rutaceae	*Dinosperma erythrococcum*			C		1/1
plants	land plants	Sapindaceae	*Ganophyllum falcatum*			C		1
plants	land plants	Sparrmanniaceae	*Grewia asiatica*		Y			4/3
plants	land plants	Sparrmanniaceae	*Triumfetta pentandra*		Y			1/1
plants	land plants	Tamaricaceae	*Tamarix aphylla*	athel pine	Y			2/2
plants	land plants	Verbenaceae	*Stachytarpheta jamaicensis*	Jamaica snakeweed	Y			1
plants	land plants	Vitaceae	*Causonis trifolia*			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix C:
Regional Ecosystems

Table C1: Regional ecosystem quaternary assessments for the survey area

Site ID	GPS coordinates[A]	Mapped RE[B]	Field verified RE	Short description of mapped RE[C]	Field description	Status of mapped RE[D]		
						EPBC Act	VM Act	BD
Q1	-19.3200°, 146.8552°	11.1.2a	11.1.2b	Samphire forbland on marine clay plains	Samphire forbland on marine clay pans with *Salicornia quinqueflora* subsp. *quinqueflora, Sporobolus virginicus, Tecticornia pergranulata, Diplachne fusca* var. *fusca* and *Bothriochloa* spp.	-	LC	NC
Q2	-19.3202°, 146.8631°	11.3.35	Non-remnant	*Eucalyptus platyphylla, Corymbia clarksoniana* woodland on alluvial plains	Non-remnant clearing with sparse *Ziziphus mauritiana, Vachellia nilotica, V. farnesiana* and *Melaleuca viridiflora* regrowth and a sparse ground layer of *Chloris gayana, Passiflora foetida, Sorghum halepense, Cosmos caudatus* and *Crinum pedunculatum*.	-	LC	NC
Q3	-19.3214°, 146.8596°	11.3.35	Non-remnant	*Eucalyptus platyphylla, Corymbia clarksoniana* woodland on alluvial plains	Open water stock dam. Dense fringing cover dominated by *Urochloa mutica* occurs with *U. mosambicensis* and *Chloris gayana*. No native vegetation observed.	-	LC	NC
Q4	-19.3256°, 146.8527°	11.3.35	Non-remnant	*Eucalyptus platyphylla, Corymbia clarksoniana* woodland on alluvial plains	Non-remnant vegetation dominated by *Vachellia nilotica* and *Ziziphus mauritiana*. Isolated individuals of *Eucalyptus platyphylla, Blakella tessellaris* and *Melaleuca nervosa* occur. The ground layer was dominated by *Urochloa mutica*, with *U. mosambicensis* and *Gomphrena celastroides.*	-	LC	NC
Q5	-19.3262°, 146.8586°	Non-remnant	Non-remnant	-	Non-remnant cattle yard dominated by *Urochloa mutica* with occasional occurrence of *Vachellia nilotica*.	-	-	-
Q6	-19.3201°, 146.8597°	11.3.35	Non-remnant	*Eucalyptus platyphylla, Corymbia clarksoniana* woodland on alluvial plains	Ephemeral watercourse with standing water. No native vegetation – shrub layer of *Ziziphus mauritiana, Leucaena leucocephala* and *Vachellia nilotica*. Ground layer dominated by *Urochloa mutica* with *Sorghum halepense, Chloris gayana*.	-	LC	NC
Q7	-19.3255°, 146.8518°	11.3.35	Non-remnant	*Eucalyptus platyphylla, Corymbia clarksoniana* woodland on alluvial plains	Ephemeral creek dominated by *Vachellia nilotica* and *Ziziphus mauritiana*, with *Leucaena leucocephala*. The ground layer is dominated by *Themeda quadrivalvis* with *Urochloa mutica* and *Gomphrena celosioides*.	-	LC	NC
Q8	-19.3198°, 146.8528°	11.3.12	Non-remnant	*Melaleuca viridiflora, M. argentea* +/- *M. dealbata* woodland on alluvial plains	Ephemeral creek dominated by *Vachellia nilotica* and *Parkinsonia aculeata* with *Cryptostegia grandiflora*. Ground layer of *Urochloa mutica, Sporobolus virginicus* and *Portulaca bicolour*. Ecotone between ephemeral wetland and samphire mudflats.	-	LC	NC
Q9	-19.3197°, 146.8525°	11.3.12	11.3.27x1a	*Melaleuca viridiflora, M. argentea* +/- *M. dealbata* woodland on alluvial plains	Palustrine wetland dominated by *Typha* sp. with *Phragmites australis, Sporobolus virginicus, Vincetoxicum carnosum, Portulaca bicolor, Alternanthera ficoidea, Passiflora foetida, Fimbristylis ferruginea* and *Sesbania cannabina*. Some *Vachellia nilotica* and *Parkinsonia aculeata* individuals occur on wetland levees.	-	LC	NC

[A] Datum GDA2020. As shown on **Figure 9**.

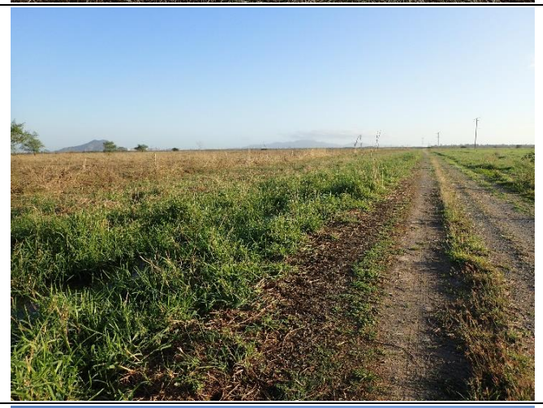
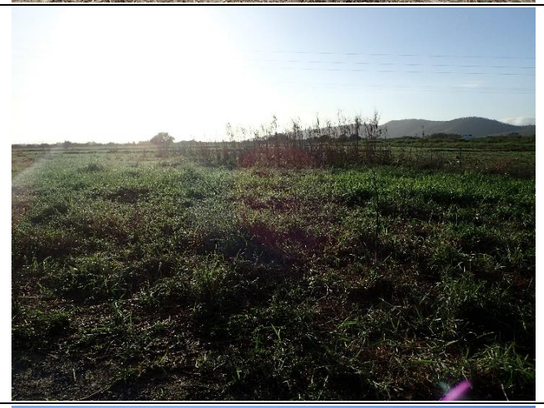
[B] DESI (2024a) and DoR (2024).

[C] DESI (2024b).

[D] Conservation status as at 8 October 2024 under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), Queensland *Vegetation Management Act* 1999 (VM Act) and the Queensland Department of Environment, Science and Innovation Biodiversity (BD) status. Categories include Critically Endangered (CE), Endangered (E), Vulnerable (V), Of Concern (OC), Least Concern (LC), No Concern at Present (NC) and not listed (-).

Table C2: Regional ecosystem assessment site photographs

Site ID	North	East	South	West
Q1				
Q2				
Q3				

Site ID	North	East	South	West
Q4				
Q5				
Q6				

Site ID	North	East	South	West
Q7				
Q8				
Q9				

References

DESI 2024a, *Biodiversity status of 2021 remnant regional ecosystems – Queensland, version 13.1, 15 May 2024,* Queensland Department of Environment, Science and Innovation, Brisbane.

DESI 2024b, *Regional Ecosystem Description Database (REDD), version 13.1, May 2024,* Queensland Department of Environment, Science and Innovation, Brisbane.

DoR 2024, *Vegetation management regional ecosystem map - version 13.00, 30 September 2024,* Queensland Department of Resources, Brisbane.

Appendix D:
Marine Plants Raw Data

Marine plant transects raw survey data

Table D1: North Road access survey area

Quadrat (m)	GPS coordinates[A]		Quadrat location relative to HAT[B]	Cover (%)								Marine plant species present[C]
	Latitude	Longitude		Marine plants[C]	Other plants[D]	Restricted Matter[E]	Leaf litter	Cryptogam	Rock	Bare earth	Water	
Transect T01												
5	-19.3198	146.8521	Below	90	0	0	0	0	0	10	0	*Typha* sp., *Portulaca bicolor, Vincetoxicum carnosum*
10	-19.3198	146.8521	Below	100	0	0	0	0	0	0	0	*Cyperus* sp., *Portulaca bicolor, Vincetoxicum carnosum*
15	-19.3198	146.8521	Below	10	0	0	50	0	0	40	0	*Bothriochloa pertusa, Alternanthera ficoidea*
20	-19.3199	146.8521	Above	0	0	0	0	0	0	100	0	
25	-19.3199	146.8521	Above	0	0	0	0	0	0	100	0	
30	-19.3200	146.8521	Above	0	0	0	0	0	0	100	0	
35	-19.3200	146.8521	Above	0	0	0	0	0	0	100	0	
40	-19.3201	146.8521	Above	5	0	0	0	0	0	95	0	*Sporobolus virginicus*
45	-19.3201	146.8521	Above	5	0	0	5	0	0	90	0	*Sporobolus virginicus*
50	-19.3202	146.8521	Above	5	0	0	0	0	5	90	0	*Sporobolus virginicus*
Transect T02												
0	-19.3198	146.8530	Above	60	40	0	0	0	0	0	0	*Sporobolus virginicus*
5	-19.3199	146.8530	Above	60	15	0	25	0	0	0	0	*Sporobolus virginicus*
10	-19.3199	146.8530	Above	80	10	0	10	0	0	0	0	*Sporobolus virginicus*
15	-19.3199	146.8530	Above	35	25	35	5	0	0	0	0	*Sporobolus virginicus*
20	-19.3200	146.8530	Above	85	0	0	0	0	0	15	0	*Sporobolus virginicus*
25	-19.3200	146.8530	Above	0	0	0	0	0	0	100	0	
30	-19.3201	146.8530	Above	0	0	0	0	0	0	100	0	
35	-19.3201	146.8530	Above	40	50	0	10	0	0	0	0	*Sporobolus virginicus, Salicornia quinqueflora* subsp. *quinqueflora*
40	-19.3202	146.8530	Above	0	0	0	0	0	0	0	0	
45	-19.3202	146.8530	Above	0	0	0	0	0	0	0	0	
Transect T03												
5	-19.3199	146.8540	Above	80	0	0	10	0	0	10	0	*Salicornia quinqueflora* subsp. *quinqueflora*
10	-19.3200	146.8540	Above	25	60	0	5	0	0	10	0	*Sporobolus virginicus, Salicornia quinqueflora* subsp. *quinqueflora*
15	-19.3200	146.8540	Above	0	0	0	0	0	0	100	0	
20	-19.3201	146.8539	Above	30	40	0	10	0	0	20	0	*Sporobolus virginicus, Sesuvium portulacastrum*
25	-19.3201	146.8539	Above	5	5	0	0	0	0	90	0	*Sesuvium portulacastrum*
30	-19.3202	146.8539	Above	0	0	0	0	0	0	100	0	
35	-19.3202	146.8539	Above	5	95	0	0	0	0	0	0	*Sesuvium portulacastrum*
40	-19.3203	146.8539	Above	5	95	0	0	0	0	0	0	*Sesuvium portulacastrum*
45	-19.3203	146.8539	Above	0	0	0	0	0	0	100	0	
50	-19.3204	146.8539	Above	0	0	0	0	0	0	100	0	
Transect T04												
0	-19.3200	146.8549	Below	35	0	0	10	0	0	55	0	*Salicornia quinqueflora* subsp. *quinqueflora*
5	-19.3200	146.8549	Below	35	0	0	5	0	0	60	0	*Salicornia quinqueflora* subsp. *quinqueflora*
10	-19.3201	146.8549	Below	25	0	0	40	0	0	35	0	*Salicornia quinqueflora* subsp. *quinqueflora*
15	-19.3201	146.8549	Below	80	0	0	20	0	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora, Sesuvium portulacastrum*
20	-19.3202	146.8549	Below	0	0	0	0	0	0	100	0	
25	-19.3202	146.8549	Below	5	0	0	0	0	0	95	0	*Sesuvium portulacastrum*
30	-19.3203	146.8549	Below	0	0	0	0	0	0	100	0	
35	-19.3203	146.8549	Below	80	0	0	15	5	0	0	0	*Sporobolus virginicus, Sesuvium portulacastrum, Bothriochloa decipiens*
40	-19.3203	146.8549	Below	25	0	0	75	0	0	0	0	*Sporobolus virginicus*
45	-19.3204	146.8549	Below	35	0	0	65	0	0	0	0	*Sporobolus virginicus*

Quadrat (m)	GPS coordinates[A]		Quadrat location relative to HAT[B]	Cover (%)								Marine plant species present[C]
	Latitude	Longitude		Marine plants[C]	Other plants[D]	Restricted Matter[E]	Leaf litter	Cryptogam	Rock	Bare earth	Water	
Transect T05												
5	-19.3201	146.8558	Below	90	0	0	10	0	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora*, *Tecticornia pergranulata*
10	-19.3202	146.8558	Below	50	0	0	20	25	0	5	0	*Fimbristylis polytrichoides*, *Sporobolus virginicus*, *Salicornia quinqueflora* subsp. *quinqueflora*, *Diplachne fusca* var. *fusca*
15	-19.3202	146.8558	Below	90	0	0	0	0	0	10	0	*Salicornia quinqueflora* subsp. *quinqueflora*
20	-19.3203	146.8558	Below	0	0	0	0	0	0	100	0	
25	-19.3203	146.8558	Below	5	0	0	0	0	0	95	0	*Portulaca bicolor*, *Tecticornia australasica*, *Vincetoxicum carnosum*
30	-19.3203	146.8558	Below	60	0	0	5	35	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora*, *Sesuvium portulacastrum*, *Tecticornia australasica*, *Sporobolus virginicus*
35	-19.3204	146.8558	Below	80	0	0	5	0	0	15	0	*Sesuvium portulacastrum*, *Sporobolus virginicus*
40	-19.3204	146.8558	Below	60	0	0	40	0	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora*, *Sporobolus virginicus*
45	-19.3205	146.8558	Below	30	0	0	30	0	0	40	0	*Salicornia quinqueflora* subsp. *quinqueflora*, *Sporobolus virginicus*
50	-19.3205	146.8558	Below	15	0	0	30	0	0	55	0	*Salicornia quinqueflora* subsp. *quinqueflora*
Transect T06												
0	-19.3202	146.8568	Below	90	0	0	0	10	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora*
5	-19.3202	146.8568	Below	60	0	0	0	40	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora*, *Diplachne fusca* var. *fusca*
10	-19.3203	146.8568	Below	65	0	0	0	35	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora*, *Diplachne fusca* var. *fusca*
15	-19.3203	146.8568	Below	100	0	0	0	0	0	0	0	*Sporobolus virginicus*, *Sesuvium portulacastrum*, *Diplachne fusca* var. *fusca*
20	-19.3203	146.8568	Below	5	0	0	0	0	0	0	95	*Bothriochloa* sp.
25	-19.3203	146.8568	Below	0	0	0	0	0	0	0	100	
30	-19.3203	146.8568	Below	15	0	0	0	40	0	0	45	*Sesuvium portulacastrum*
35	-19.3203	146.8568	Below	100	0	0	0	0	0	0	0	*Sesuvium portulacastrum*, *Sporobolus virginicus*, *Diplachne fusca* var. *fusca*
40	-19.3205	146.8568	Below	10	0	0	10	0	0	80	0	*Salicornia quinqueflora* subsp. *quinqueflora*
45	-19.3206	146.8567	Below	60	0	0	10	0	0	30	0	*Sporobolus virginicus*
Transect T07												
5	-19.3203	146.8578	Below	95	0	0	0	5	0	0	0	*Fimbristylis ferruginea*, *Sporobolus virginicus*, *Salicornia quinqueflora* subsp. *quinqueflora*
10	-19.3204	146.8578	Below	15	0	0	0	85	0	0	0	*Sporobolus virginicus*
15	-19.3204	146.8578	Below	40	0	0	50	0	0	10	0	*Sporobolus virginicus*, *Sesuvium portulacastrum*
20	-19.3204	146.8577	Below	55	0	0	0	45	0	0	0	*Sesuvium portulacastrum*, *Diplachne fusca* var. *fusca*
25	-19.3205	146.8577	Below	90	0	0	0	10	0	0	0	*Bothriochloa* sp.
30	-19.3205	146.8577	Below	90	0	0	0	5	0	5	0	*Sporobolus virginicus*, *Bothriochloa* sp., *Ludwigia hyssopifolia*, *Urochloa mutica*, *Sesuvium portulacastrum*
35	-19.3206	146.8577	Below	100	0	0	0	0	0	0	0	*Urochloa mutica*
40	-19.3206	146.8577	Above	0	0	0	0	0	0	100	0	
45	-19.3207	146.8577	Above	0	0	0	0	0	0	100	0	
50	-19.3207	146.8577	Above	0	0	0	0	0	0	100	0	
T01-T07 Total average cover (%)				**35.9**	**6.2**	**0.5**	**8.1**	**4.9**	**0.1**	**40.9**	**3.4**	

[A] Datum GDA2020. Transect locations are shown on **Figure 4**.

[B] Quadrat location relative to the Queensland Government mapped highest astronomical tide (HAT) (DNRME 2013). Areas below HAT are shown on **Figure 4**.

[C.] Below HAT, all plants that are not Prohibited Matter or Restricted Matter are considered marine plants. Above HAT, only plants that meet the definition of 'adjacent' according to Couchman & Beumer (2007) are marine plants.

[D.] Plants that were observed within quadrats above HAT that did not meet the definition of 'adjacent' according to Couchman & Beumer (2007) were recorded as 'other plants'.

[E] Plants listed as Restricted Matter under the Queensland *Biosecurity Act* 2014 (Biosecurity Act).

Table D2: Facility site survey area

Quadrat (m)	GPS coordinates[A]		Quadrat location Relative to HAT[B]	Cover (%)								Marine plant species present[C]
	Latitude	Longitude		Marine plants[C]	Other plants[D]	Restricted Matter[E]	Leaf litter	Cryptogam	Rock	Bare earth	Water	
Transect T08												
0	-19.3195	146.8647	Above	90	0	0	10	0	0	0	0	*Sporobolus virginicus*
5	-19.3195	146.8647	Above	100	0	0	0	0	0	0	0	*Sporobolus virginicus*
10	-19.3195	146.8646	Above	100	0	0	0	0	0	0	0	*Sporobolus virginicus*
15	-19.3195	146.8646	Above	90	0	0	10	0	0	0	0	*Fimbristylis polytrichoides, Sporobolus virginicus, Salicornia quinqueflora* subsp. *quinqueflora, Portulaca bicolor, Vincetoxicum carnosum*
20	-19.3195	146.8645	Above	95	0	0	5	0	0	0	0	*Sporobolus virginicus, Salicornia quinqueflora* subsp. *quinqueflora*
25	-19.3195	146.8645	Above	80	0	0	20	0	0	0	0	*Sporobolus virginicus*
30	-19.3194	146.8644	Above	80	0	0	20	0	0	0	0	*Salicornia quinqueflora* subsp. *quinqueflora, Sporobolus virginicus*
35	-19.3194	146.8644	Above	100	0	0	0	0	0	0	0	*Sporobolus virginicus*
40	-19.3194	146.8643	Above	40	0	0	60	0	0	0	0	*Sporobolus virginicus*
45	-19.3194	146.8643	Above	45	10	0	45	0	0	0	0	*Sporobolus virginicus*
T08 Total average cover (%)				**82**	**1**	**0**	**17**	**0**	**0**	**0**	**0**	

[A] Datum GDA2020. Transect locations are shown on **Figure 4**.

[B] Quadrat location relative to the Queensland Government mapped highest astronomical tide (HAT) (DNRME 2013). Areas below HAT are shown on **Figure 4**.

[C] Below HAT, all plants that are not Prohibited Matter or Restricted Matter are considered marine plants. Above HAT, only plants that meet the definition of 'adjacent' according to Couchman & Beumer (2007) are marine plants.

[D] Plants that were observed within quadrats above HAT that did not meet the definition of 'adjacent' according to Couchman & Beumer (2007) were recorded as 'other plants'.

[E] Plants listed as Restricted Matter under the Queensland *Biosecurity Act* 2014 (Biosecurity Act).

References

Couchman, D & Beumer, J 2007, *Fish Habitat Management Operational Policy FHMOP 001, Management and protection of marine plants and other tidal fish habitats*, Queensland Department of Primary Industries and Fisheries, Brisbane.

DNRME 2013, *Highest astronomical tide – Queensland, 28 May 2013*, Queensland Department of Natural Resources, Mines and Energy, Brisbane.

Appendix E:
Flora Species List

Table E1: Flora species recorded within the survey area

Species	Common name	Conservation status[A]		Weed status[B]	Survey area		
		NC Act	EPBC Act		Facility site	North Road	Zinc Road
Alternanthera ficoidea	-	-	-	E	✓	✓	✓
Blakella tessellaris	-	-	-	-	-	-	✓
Bothriochloa decipiens	-	-	-	-	-	✓	-
Bothriochloa pertusa	-	-	-	E	✓	✓	✓
Bothriochloa sp.	-	-	-	-	-	✓	-
Chloris gayana	Rhodes Grass	-	-	E	✓	✓	-
Chloris inflata	Purpletop Chloris	-	-	E	-	✓	-
Corchorus olitorius	Jute	-	-	-	-	✓	✓
Cosmos caudatus	-	-	-	E	✓	-	-
Crinum pedunculatum	River Lily	SLC	-	-	✓	-	-
Crotalaria goreensis	Gambia Pea	-	-	E	✓	✓	✓
Cryptostegia grandiflora	Rubber Vine	-	-	E, WoNS, RM, TCC	-	✓	✓
Cyanthillium cinereum	-	-	-	-	✓	-	✓
Cyperus sp.	-	-	-	-	-	✓	-
Desmodium sp.	-	-	-	-	✓	-	-
Digitaria ciliaris	Summer Grass	-	-	E	-	✓	-
Diplachne fusca var. *fusca*	-	-	-	-	✓	✓	-
Echinochloa colona	Awnless Barnyard Grass	-	-	E	-	✓	-
Eucalyptus platyphylla	Poplar Gum	-	-	-	-	-	✓
Fimbristylis ferruginea	-	-	-	-	-	✓	-
Fimbristylis polytrichoides	-	-	-	-	✓	-	-
Gomphrena celosioides	Gomphrena Weed	-	-	E	-	✓	✓
Grevillea striata	Beefwood	-	-	-	✓	-	✓
Grewia savannicola	-	-	-	-	-	✓	-
Leucaena leucocephala	Leucaena	-	-	E	✓	✓	✓
Ludwigia hyssopifolia	-	-	-	E	-	✓	-
Macroptilium atropurpureum	Siratro	-	-	E	-	-	✓
Macroptilium lathyroides	Phasey Bean	-	-	E	-	✓	✓
Megathyrsus maximus	Guinea Grass	-	-	E	✓	-	✓
Melaleuca nervosa	-	-	-	-	-	-	✓
Melaleuca viridiflora	-	-	-	-	✓	-	✓
Mesosphaerum suaveolens	-	-	-	E	-	-	✓
Neptunia dimorphantha	-	-	-	-	✓	✓	-
Panicum effusum	-	-	-	-	✓	-	-
Parkinsonia aculeata	Parkinsonia	-	-	E, WoNS, RM, TCC	-	✓	-
Passiflora foetida	Stinking Passionflower	-	-	E	✓	✓	✓
Persoonia falcata	-	-	-	-	✓	-	-
Phragmites australis	Common Reed	-	-	-	✓	✓	-
Portulaca bicolor	-	-	-	-	✓	✓	-
Pycnospora lutescens	Pycnospora	-	-	-	✓	-	-
Salicornia quinqueflora subsp. *quinqueflora*	Beadweed	-	-	-	✓	✓	-
Salsola australis	-	-	-	-	-	✓	-
Sesbania cannabina	-	-	-	-	✓	✓	-
Sesuvium portulacastrum	Sea Purslane	-	-	-	✓	✓	-
Sida cordifolia	-	-	-	E	✓	-	✓
Sida spinosa	Spiny Sida	-	-	E	-	-	✓
Sorghum halepense	Johnson Grass	-	-	E	✓	✓	-
Sporobolus virginicus	Sand Couch	-	-	-	✓	✓	-
Stachytarpheta jamaicensis	Jamaica Snakeweed	-	-	E	✓	-	✓
Stylosanthes humilis	Townsville Stylo	-	-	E	-	-	✓
Stylosanthes scabra	-	-	-	E	-	✓	✓
Tecticornia australasica	-	-	-	-	-	✓	-
Tecticornia halocnemoides	-	-	-	-	-	✓	-
Tecticornia pergranulata	-	-	-	-	-	✓	-
Themeda quadrivalvis	Grader Grass	-	-	E, TCC	✓	✓	✓
Trianthema portulacastrum	Black Pigweed	-	-	E	-	✓	✓
Typha sp.	-	-	-	-	✓	✓	-
Urochloa mosambicensis	Sabi Grass	-	-	E	-	✓	✓
Urochloa mutica	Para Grass	-	-	E	-	✓	✓
Vachellia farnesiana	Mimosa Bush	-	-	E	✓	-	✓
Vachellia nilotica	Prickly Acacia	-	-	E, WoNS, RM, TCC	✓	✓	✓

Species	Common name	Conservation status[A]		Weed status[B]	Survey area		
		NC Act	EPBC Act		Facility site	North Road	Zinc Road
Vincetoxicum carnosum	-	-	-	-	✓	✓	-
Waltheria indica	-	-	-	-	-	-	✓
Xenostegia tridentata	-	-	-	-	✓	-	-
Ziziphus mauritiana	Chinee Apple	-	-	E, RM, TCC	✓	✓	✓

[A] Status as of October 2024. Listed as Critically Endangered (CE), Endangered (E), Vulnerable (V), Migratory (M), Near Threatened (NT) and/or Special Least Concern (SLC) under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and/or Queensland *Nature Conservation Act* 1994 (NC Act).

[B] Weed species listed under the National, State and/or local government biosecurity framework as:

- WoNS: a Weed of National Significance (EIC 2020)
- RM: Queensland *Biosecurity Act* 2014 Restricted Matter
- PM: Queensland *Biosecurity Act* 2014 Prohibited Matter
- TCC: Townsville City Biosecurity Plan Appendix 3 (2020–2024) priority weed (TCC 2020)
- E: an introduced environmental weed species in Queensland as identified by the Queensland Herbarium (Bean 2024).

'-' No status.

References

Bean 2024, *Census of the Queensland Flora and Fungi 2023,* Queensland Department of Environment, Science and Innovation, Brisbane.

EIC 2020, *Government weeds lists and strategies, November 2020,* Environment and Invasives Committee, Commonwealth Department of Agriculture, Water and the Environment, Canberra.

TCC 2020, *Townsville City Biosecurity Plan (2020 –2024)*, Townsville City Council, Townsville.

Appendix F:
Flora and Fauna Likelihood of Occurrence

Table F1: Likelihood criteria

Likelihood	Criterion
Present	Observed during field surveys.
Probable	Contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory species occurrence.
Possible	Contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory species occurrence. *or* Within the range of a resident population or area of typical migratory occurrence, but contains poor quality habitat.
Unlikely	One or more of the following criteria apply. • Species is considered extinct or extremely rare in the region. • Suitable habitat is not present. • Outside the accepted species distribution.

Table F2: Likelihood of occurrence for Threatened and Near Threatened flora species in the core infrastructure footprint

Scientific name	Common name	Status[A]		Data source[B]			Likelihood of occurrence[C]	Likelihood justification
		EPBC Act	NC Act	PMST	WildNet	ALA		
Backhousia tetraptera		CE	CE	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.
Dichanthium setosum		V	LC	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.
Eucalyptus paedoglauca	Mt Stuart Ironbark	V	V	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.
Leichhardtia araujacea		CE	CE	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.
Leichhardtia brevifolia		V	V	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.
Myrmecodia beccarii		V	V	✓			Unlikely	Core infrastructure footprint is outside the accepted species distribution.
Omphalea celata		V	V	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.
Phlegmariurus tetrastichoides		V	V	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.
Tephrosia flagellaris syn. leveillei		V	LC	✓			Unlikely	Core infrastructure footprint does not contain suitable habitat.

[A] Status as of 8 October 2024. Listed as Critically Endangered (CE), Endangered (E), Vulnerable (V), Near Threatened (NT) or Least Concern (LC) under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and/or Queensland *Nature Conservation Act* 1992 (NC Act).

[B] Species identified via search of WildNet database (DESI 2024), Atlas of Living Australia portal (ALA 2024), and Protected Matters Search Tool (PMST) (DCCEEW 2024).

[C] Likelihood of occurrence assessment considers known species distribution, species ecology and observed habitats (type and condition) on the project area. The categories comprise: Present, Probable, Possible and Unlikely (**Table F1)**.

Table F3: Likelihood of occurrence for Threatened, Near Threatened, Migratory and Special Least Concern fauna species in the core infrastructure footprint and its receiving environment

Scientific name	Common name	Status[A]		Data source[B]			Likelihood of occurrence[C]		Interaction with project	Likelihood justification
		EPBC Act	NC Act	PMST	WildNet	ALA	Core infrastructure footprint	Adjacent[D]		
Birds										
Actitis hypoleucos	Common Sandpiper	M	SLC	✓	✓	✓	Possible	Probable	Intermittent (forage/roost)	Core infrastructure footprint is within the range of a resident population or area of typical migratory occurrence, but it contains poor quality habitat. Adjacent areas contain habitat that would support the species.
Anous stolidus	Common Noddy	M	SLC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Apus pacificus	Fork-tailed Swift	M	SLC	✓	✓	✓	Probable	Probable	Intermittent (forage above)	Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence.
Arenaria interpres	Ruddy Turnstone	V, M	V	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Botaurus poiciloptilus	Australasian Bittern	E	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint are outside of the species' accepted distribution.
Calidris acuminata	Sharp-tailed Sandpiper	V, M	V	✓	✓	✓	Probable	Probable	Intermittent (forage)	Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence.

Scientific name	Common name	Status[A]		Data source[B]			Likelihood of occurrence[C]		Interaction with project	Likelihood justification
		EPBC Act	NC Act	PMST	WildNet	ALA	Core infrastructure footprint	Adjacent[D]		
Calidris alba	Sanderling	M	SLC	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Calidris canutus	Red Knot	V, M	V	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Calidris (syn. *Limicola*) *falcinellus*	Broad-billed Sandpiper	M	SLC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Calidris ferruginea	Curlew Sandpiper	CE, M	CE	✓	✓	✓	Unlikely	Possible	Exceptionally rare (forage/roost nearby)	Core infrastructure footprint does not contain suitable habitat. Surrounding landscape is outside of an area of typical migratory occurrence.
Calidris melanotos	Pectoral Sandpiper	M	SLC	✓	✓	✓	Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory species occurrence.
Calidris (syn. *Philomachus*) *pugnax*	Ruff	M	SLC	✓			Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory species occurrence.
Calidris ruficollis	Red-necked Stint	M	SLC	✓	✓	✓	Unlikely	Probable	Intermittent (forage/roost nearby)	Core infrastructure footprint does not contain suitable habitat. The adjacent areas contain habitat that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence.
Calidris tenuirostris	Great Knot	V, M	V	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Charadrius bicinctus	Double-banded Plover	M	SLC		✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Charadrius leschenaultii	Greater Sand Plover	V, M	V	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Charadrius mongolus	Lesser Sand Plover	E, M	E	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Charadrius veredus	Oriental Plover	M	SLC	✓			Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory species occurrence.
Chlidonias leucopterus	White-winged Black Tern	M	SLC		✓	✓	Possible	Possible	Exceptionally rare (fly over)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory species occurrence.
Cuculus optatus	Oriental Cuckoo	M	SLC	✓		✓	Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint is within the range of a resident population or area of typical migratory occurrence, but it contains poor quality habitat.
Erythrotriorchis radiatus	Red Goshawk	E	E	✓			Unlikely	Unlikely	NA	Species is considered extinct or extremely rare in the region.
Esacus magnirostris	Beach Stone-curlew		V		✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Falco hypoleucos	Grey Falcon	V	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Fregata ariel	Lesser Frigatebird	M	SLC	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.

Scientific name	Common name	Status[A]		Data source[B]			Likelihood of occurrence[C]		Interaction with project	Likelihood justification
		EPBC Act	NC Act	PMST	WildNet	ALA	Core infrastructure footprint	Adjacent[D]		
Fregata minor	Great Frigatebird	M	SLC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Fregetta grallaria grallaria	White-bellied Storm-Petrel (Tasman Sea)	V	LC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Gallinago hardwickii	Latham's Snipe	V, M	V	✓	✓	✓	Probable	Possible	Intermittent (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence. The adjacent areas contain poor quality habitat.
Gallinago megala	Swinhoe's Snipe	M	SLC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint are outside of the species' accepted distribution.
Gallinago stenura	Pin-tailed Snipe	M	SLC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint are outside of the species' accepted distribution.
Gelochelidon nilotica	Gull-billed Tern	M	SLC			✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Geophaps scripta scripta	Squatter Pigeon (southern)	V	V	✓			Unlikely	Unlikely	NA	Species is considered extinct or extremely rare in the region.
Hirundapus caudacutus	White-throated Needletail	V, M	V	✓	✓	✓	Probable	Probable	Exceptionally rare (forage above)	Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence.
Hydroprogne caspia	Caspian Tern	M	SLC		✓	✓	Probable	Present	Intermittent (fly over)	Observed during field surveys (near Core infrastructure footprint). Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence.
Limosa lapponica baueri	Western Alaskan Bar-tailed Godwit	E, M	E	✓	✓	✓	Unlikely	Possible	Exceptionally rare (forage/roost nearby)	Core infrastructure footprint does not contain suitable habitat. Nearby saltmarsh is outside of an area of typical migratory occurrence.
Limosa limosa	Black-tailed Godwit	E, M	E	✓	✓	✓	Present	Possible	Exceptionally rare (forage/roost)	Observed during field surveys (in core infrastructure footprint). Surrounding landscape contains poor quality habitat and habitats within the core infrastructure footprint are only marginally suitable.
Motacilla flava syn. *tschutschensis*	Yellow Wagtail	M	SLC	✓			Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory species occurrence.
Neochmia ruficauda ruficauda	Star Finch (eastern)	E	E	✓			Unlikely	Unlikely	NA	Species is considered extinct or extremely rare in the region.
Numenius madagascariensis	Eastern Curlew	CE, M	CE	✓	✓	✓	Possible	Present	Intermittent (forage/roost)	Observed during field surveys (outside core Infrastructure footprint). Core infrastructure footprint contains poor quality habitat.
Numenius minutus	Little Curlew	M	SLC	✓	✓	✓	Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory occurrence.
Numenius phaeopus	Whimbrel	M	SLC	✓	✓	✓	Possible	Present	Intermittent (forage/roost nearby)	Observed during field surveys (outside core infrastructure footprint). Core infrastructure footprint contains poor quality habitat.
Pandion haliaetus cristatus	Eastern Osprey	M	SLC	✓	✓	✓	Probable	Probable	Intermittent (forage/breed)	Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of

Scientific name	Common name	Status[A]		Data source[B]			Likelihood of occurrence[C]		Interaction with project	Likelihood justification
		EPBC Act	NC Act	PMST	WildNet	ALA	Core infrastructure footprint	Adjacent[D]		
										a resident population or area of typical migratory occurrence.
Phaethon lepturus	White-tailed Tropicbird	M	SLC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Plegadis falcinellus	Glossy Ibis	M	SLC		✓	✓	Probable	Possible	Intermittent (forage)	Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence. The adjacent areas contain poor quality habitat.
Pluvialis fulva	Pacific Golden Plover	M	SLC	✓	✓	✓	Probable	Probable	Intermittent (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is likely to be within the range of a resident population or area of typical migratory occurrence.
Pluvialis squatarola	Grey Plover	V, M	V	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Poephila cincta cincta	Black-throated Finch (southern)	E	E	✓	✓		Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Rostratula australis	Australian Painted-snipe	E	E	✓		✓	Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical occurrence.
Sternula albifrons	Little Tern	M	SLC	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Thalasseus bergii	Crested Tern	M	SLC		✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Tringa brevipes	Grey-tailed Tattler	M	SLC	✓	✓	✓	Unlikely	Possible	Exceptionally rare (forage/roost nearby)	Core infrastructure footprint does not contain suitable habitat. Nearby saltmarsh is outside of an area of typical migratory occurrence.
Tringa glareola	Wood Sandpiper	M	SLC	✓			Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory occurrence.
Tringa incana	Wandering Tattler	M	SLC	✓	✓		Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Tringa nebularia	Common Greenshank	E, M	E	✓	✓	✓	Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory occurrence.
Tringa stagnatilis	Marsh Sandpiper	M	SLC	✓	✓	✓	Possible	Possible	Exceptionally rare (forage/roost)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory occurrence.
Tyto novaehollandiae kimberli	Masked Owl (northern)	V	V	✓			Unlikely	Unlikely	NA	Species is considered extinct or extremely rare in the region.
Xenus cinereus	Terek Sandpiper	V, M	V	✓	✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Mammals										
Balaenoptera edeni	Bryde's Whale	M	LC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Balaenoptera musculus	Blue Whale	E, M	LC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.

Scientific name	Common name	Status[A]		Data source[B]			Likelihood of occurrence[C]		Interaction with project	Likelihood justification
		EPBC Act	NC Act	PMST	WildNet	ALA	Core infrastructure footprint	Adjacent[D]		
Dasyurus hallucatus	Northern Quoll	E	LC	✓			Unlikely	Unlikely	NA	Species is considered extinct or extremely rare in the region.
Dugong dugon	Dugong	M	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Macroderma gigas	Ghost Bat	V	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Megaptera novaeangliae	Humpback Whale	M	LC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Orcaella heinsohni	Australian Snubfin Dolphin	M	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Orcinus orca	Killer Whale	M	LC	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Petauroides minor syn. *volans minor*	Northern Greater Glider	V	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Petauroides volans volans	Southern Greater Glider	E	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Phascolarctos cinereus	Koala	E	E	✓			Unlikely	Unlikely	NA	Species is considered extinct or extremely rare in the region.
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheathtail Bat	V	E	✓	✓		Present	Probable	Regular (forage above)	Detected during the field surveys (in core infrastructure footprint). Surrounding lanscape contains habitats that would support the species and is likely to be within the range of a resident population.
Sousa sahulensis syn. *chinensis*	Australian Humpback Dolphin	M	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Tachyglossus aculeatus	Short-beaked Echidna	-	SLC		✓	✓	Possible	Possible	Intermittent (forage)	Core infrastructure footprint is within the range of a resident population or area of typical migratory occurrence, but it contains poor quality habitat.
Taphozous australis	Coastal Sheathtail Bat	-	NT				Possible (unconfirmed presence)	Possible	Intermittent (forage above)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical occurrence.
Xeromys myoides	Water Mouse	V	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Reptiles										
Caretta caretta	Loggerhead Turtle	E, M	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Chelonia mydas	Green Turtle	V, M	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Crocodylus porosus	Estuarine Crocodile	M	V	✓	✓	✓	Possible	Possible	Intermittent (forage)	Core infrastructure footprint contains habitats that would support the species and is within the species extent of occurrence, though is outside the range of a resident population or area of typical migratory species occurrence.
Dermochelys coriacea	Leatherback Turtle	E, M	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Egernia rugosa	Yakka Skink	V	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Eretmochelys imbricata	Hawksbill Turtle	V, M	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Lampropholis mirabilis	Saxicoline Sunskink	-	NT		✓	✓	Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Lepidochelys olivacea	Olive Ridley Turtle	E, M	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.

Scientific name	Common name	Status[A]		Data source[B]			Likelihood of occurrence[C]		Interaction with project	Likelihood justification
		EPBC Act	NC Act	PMST	WildNet	ALA	Core infrastructure footprint	Adjacent[D]		
Natator depressus	Flatback Turtle	V, M	V	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Varanus mertensi	Mertens' Water Monitor	E	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Sharks										
Anoxypristis cuspidata	Narrow Sawfish	M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Carcharhinus longimanus	Oceanic Whitetip Shark	M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Carcharias taurus	Greynurse Shark	M	E	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Carcharodon carcharias	Great White Shark	V, M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Lamna nasus	Porbeagle	M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Mobula (syn. *Manta*) *alfredi*	Reef Manta Ray	M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Mobula (syn. *Manta*) *birostris*	Giant Manta Ray	M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Pristis pristis	Freshwater Sawfish	V, M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Pristis zijsron	Green Sawfish	V, M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.
Rhincodon typus	Whale Shark	V, M	-	✓			Unlikely	Unlikely	NA	Areas in and near core infrastructure footprint do not contain suitable habitat.

[A] Status as of 8 October 2024. Listed as Critically Endangered (CE), Endangered (E), Vulnerable (V), Migratory (M), Near Threatened (NT), Special Least Concern (SLC) or Least Concern (LC) under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and/or Queensland *Nature Conservation Act* 1992 (NC Act).
'-' No status.
[B] Species identified via search of WildNet database (DESI 2024), Atlas of Living Australia portal (ALA 2024), and Protected Matters Search Tool (PMST) (DCCEEW 2024).
[C] Likelihood of occurrence assessment considers known species distribution, species ecology and NRA's knowledge of the landscape surrounding the Core infrastructure footprint. The categories applied comprise: Present, Probable, Possible or Unlikely (**Table F1)**.
[D] 'Adjacent' refers to areas within 500 m of the core infrastructure footprint.

References

ALA 2024, *Atlas of Living Australia*, Commonwealth Scientific and Industrial Research Organisation, Canberra.

DCCEEW 2024, *EPBC Act Protected Matters Report*, Commonwealth Department of Climate Change, the Environment, Energy and Water, report created 30 April 2024.

DESI 2024, *Wildlife Online Report*, Queensland Government Department of Environment and Science, report created 29 April 2024 09:00:08.

Appendix G:
Microbat Call Identification Report

Microbat Call Identification Report

Prepared for ("Client"):	NRA
Survey location/project name:	TSDA
Survey dates:	19-23 August 2024
Client project reference:	
Job no.:	NRA-2401
Report date:	2 October 2024

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Methods

Data received

Balance! Environmental received 23,205 full-spectrum ultrasonic acoustic files (WAV files), recorded at five sites using three Anabat Swift detectors (Titley Scientific, Brisbane) and two Song Meter SM2 detectors (Wildlife Acoustics, Maynard MA, USA). Each detector was deployed at a single site for 3-4 nights between 19th and 23rd August 2024.

The scope for the analysis is as follows.

- Provide a species inventory for each detector location.
- Confirm presence/absence of Bare-rumped Sheathtail Bat (*Saccolaimus saccolaimus*) at each detector location.
- Quantify number of passes of Bare-rumped Sheathtail Bat at each detector location.

Bat-call analysis

A three-stage analysis was performed with *Anabat Insight* (Version 2.1.2; Titley Scientific).

1. Noise exclusion
    a. All WAV files were scanned using the Search tool, with the following settings:
        i. Characteristic frequency (Fc) 10-165 kHz
        ii. Call/pulse duration (Dur) 2-120 ms
        iii. Inter-pulse interval (IPI) 5-1500 ms
        iv. ZC Threshold 15
        v. Smoothness level 5
        vi. Analyse “per pulse”
        vii. Minimum of four (4) pulses per file required to meet filter criteria
2. *Saccolaimus saccolaimus* analysis
    a. The Search tool was then used to apply a frequency-based filter (Fc = 18-26 kHz), to files that passed the noise filter, to select all files with calls potentially belonging to *Saccolaimus saccolaimus*.
    b. Files thus selected were then processed manually to determine if any of the calls belonged to *S. saccolaimus*.
    c. Manual confirmation involved comparing call spectrograms and derived metrics with those of reference calls for *S. saccolaimus* and other low-frequency species (*Chaerephon jobensis, Saccolaimus flaviventris, Ozimops lumsdenae, Taphozous troughtoni*).
    d. Reference was also made to several published descriptions of *S. saccolaimus* call characteristics (e.g., Armstrong *et al.* 2021, McKenzie *et al.* 2018, Milne 2004, Reinhold et al. 2001).
3. General species inventory
    a. Bat call files that were not already included in the above step were processed with the Decision Tree analysis tool to apply tentative species labels based on a combination of zero-crossing call metrics (predominantly frequency-based).
    b. Labelled calls were then reviewed manually to confirm or adjust species labels. Manual confirmation was achieved by comparing call spectrograms and metrics with those of regionally relevant reference calls and/or published call descriptions (e.g. Milne 2004, Reinhold et al. 2001).

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/.

Species nomenclature follows Armstrong *et al.* (2020).

Results & Discussion

Noise filtration excluded 17,864 files from further analysis. Some 5554 individual bat calls were identified in the remaining 5341 files. Positive call identification was achieved for 57% (3147) of the calls, while the other 2407 "unresolved" calls could not be reliably identified and were assigned to several species complexes.

Saccolaimus saccolaimus

Saccolaimus saccolaimus was detected at four of the five sites (see **Table 1**). Most *S. saccolaimus* calls (160 of 172 total) were detected on Anabat Swift A (located at 19.3196°S,146.8530°E), while 10 or fewer calls were detected at the other sites. As a proportion of all detected bt calls, *S. saccolaimus* represented just 5% of calls recorded by Swift A and Swift B and <1% of calls at the other sites.

Another 20 calls (9 from Swift A and 11 from Swift C) were possibly also from *S. saccolaimus* but these calls may also have belonged to *Taphozous australis* and/or *T. troughtoni*.

Other species

At least 14 and up to 17 other species were detected during the survey (see **Table 1**).

Thirteen call types were positively attributed to 12 distinct species plus the *Nyctophilus* genus, within which species' calls cannot be reliably differentiated. Up to three *Nyctophilus* species potentially occur in the study area, including: *N. bifax; N. geoffroyi;* and *N. gouldi.*

Most unresolved calls belonged to species that were positively identified from more definitive calls. *Vespadelus troughtoni* and/or *Chalinolobus morio* were responsible for 2121 of the 2407 calls in this category. One unresolved call type, however, represented at least one and possibly two additional species that were not otherwise identified. The 28 calls in this group were made by *Scotorepens greyii* and/or *Scotorepens orion.*

Sample call spectrograms are presented in **Appendix 1**.

Table 1 Bats detected during the TSDA survey, 19-23 August 2024.

Number of calls assigned per species or species-complex

Detector/site:	SM A	SM B	Swift A	Swift B	Swift C	Species Total
Positively identified calls						
Chalinolobus gouldii			1		3	4
Chalinolobus morio	5	3	23	1	12	44
Chalinolobus nigrogriseus	5	1	4	2	13	25
Myotis macropus	15	29	35	3	21	103
Nyctophilus sp.		2	1			3
Pipistrellus adamsi	1				2	3
Scotorepens sanborni	3	5	13		13	34
Vespadelus troughtoni	19	21	80	1	11	132
Miniopterus australis	214	21	1360	9	806	2410
Miniopterus orianae oceanensis	3	1	13	1	42	60
Chaerephon jobensis	19	7	43	1	13	83
Ozimops lumsdenae	19	6	28		11	64
Ozimops ridei	1	3	5		1	10
Saccolaimus saccolaimus	1		160	1	10	172
Unresolved calls						
C. gouldii or *O. ridei*			6		2	8
C. nigrogriseus or *Scotorepens* sp.	51	3	21		141	216
M. macropus or *Nyctophilus* sp.	2	11	1			14
Scotorepens greyii or *S. orion*	21		6		1	28
S. saccolaimus or *Taphozous* sp.			9		11	20
V. troughtoni or *C. morio*	279	3	1352	1	486	2121
Site Total	658	116	3161	20	1599	5554

References

Armstrong, K.N., Reardon, T.B., and Jackson, S.M. (2020). A current taxonomic list of Australian Chiroptera. Australasian Bat Society. Version 2020-06-09. URL: http://ausbats.org.au/species-list/4593775065

Armstrong, K.N., Broken-Brow, J., Hoye, G., Ford, G., Thomas, M. and Corben, C. (2021). Effective identification of sheath-tailed bats of Australian forests and woodlands. *Australian Journal of Zoology* **68**(6), 346-363. https://doi.org/10.1071/ZO20044.

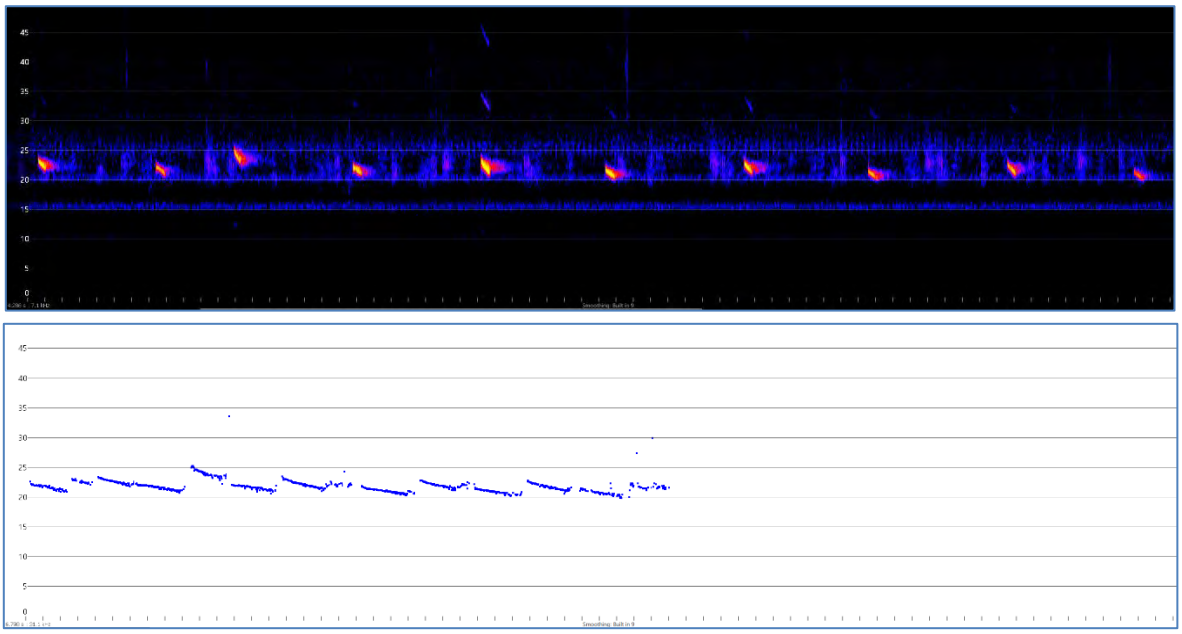
McKenzie, N.L., Bullen, R.D., Cowan, M.A. and Milne, D.J. (2018). Echolocation and distribution of *Saccolaimus saccolaimus* in north-western Australia. *Records of the Western Australian Museum* **33**, 135-144. DOI: 10.18195/issn.0312-3162.33(33 2).2018.135-144

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

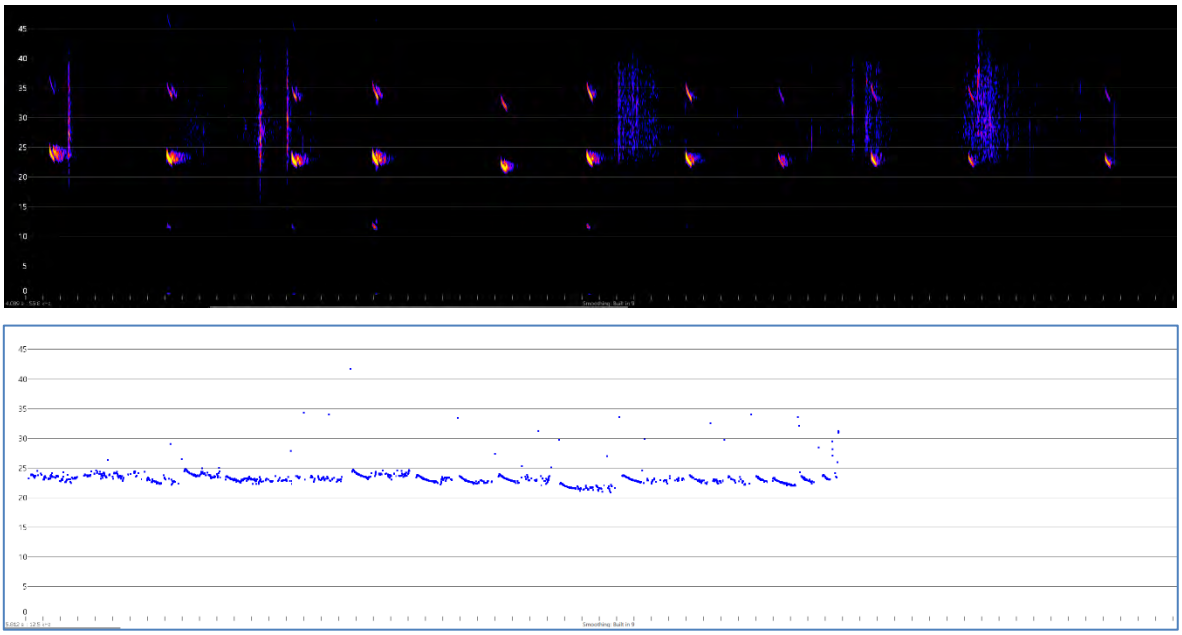
Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

Appendix 1 Representative call spectrograms recorded during the TSDA survey, August 2024.

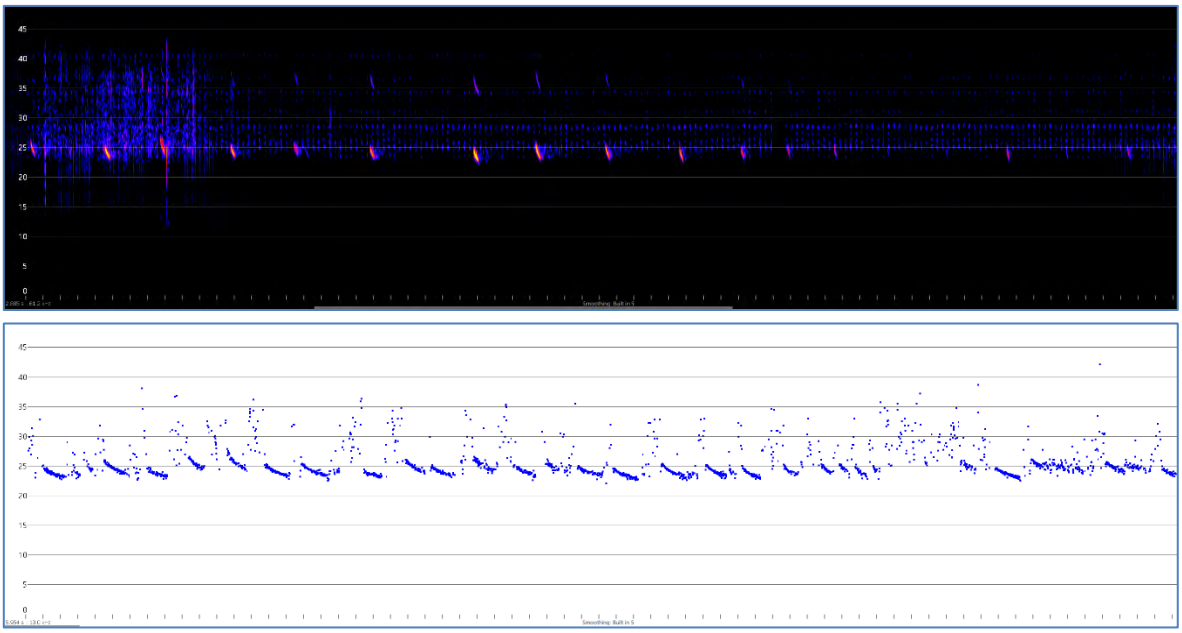
Low-frequency species' call-sequence pairs include uncompressed spectrogram (top) with time-scale at 50ms/tick and compressed zero-crossing (bottom) with time-scale at 10ms/tick



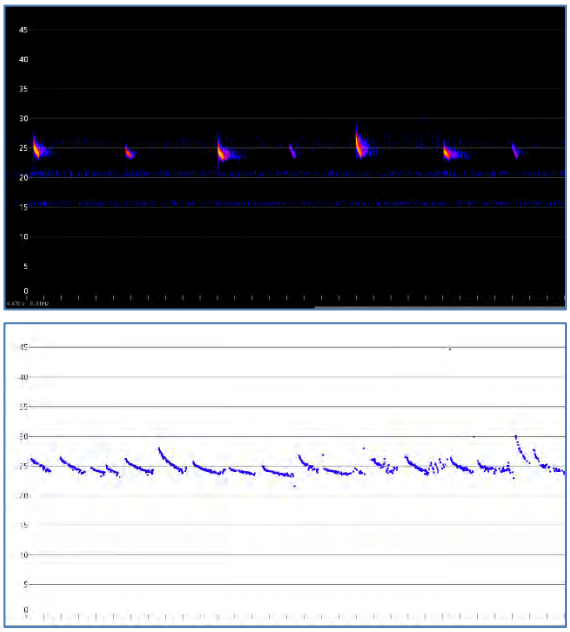
Saccolaimus saccolaimus example 1



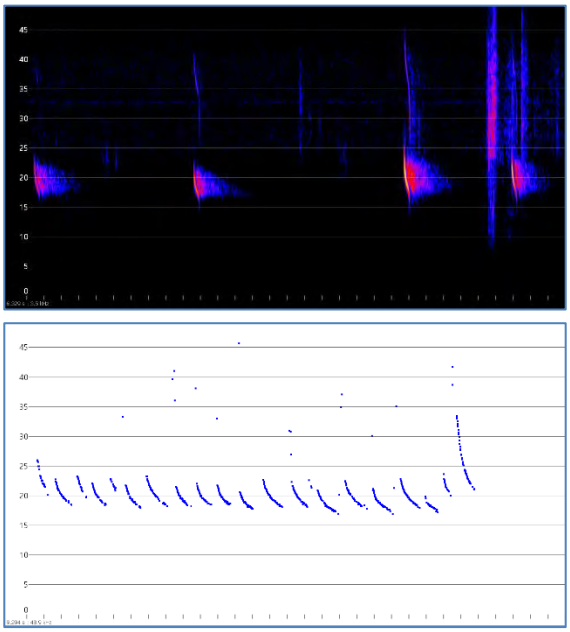
Saccolaimus saccolaimus example 2



Saccolaimus saccolaimus or *Taphozous* sp.



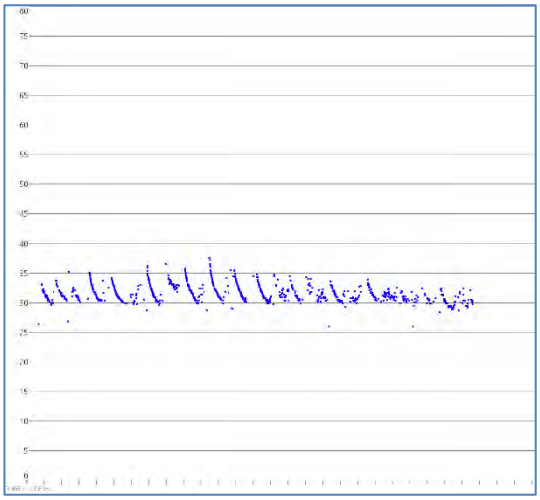
Ozimops lumsdenae



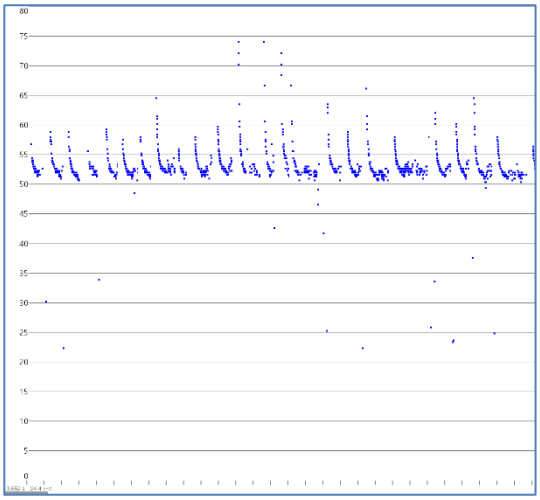
Chaerephon jobensis

Appendix 1b Other species

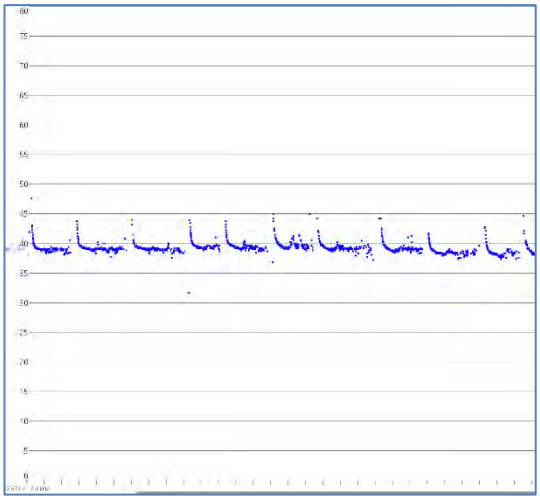
Zero-crossing with time-scale at 10ms/tick and time between pulses compressed



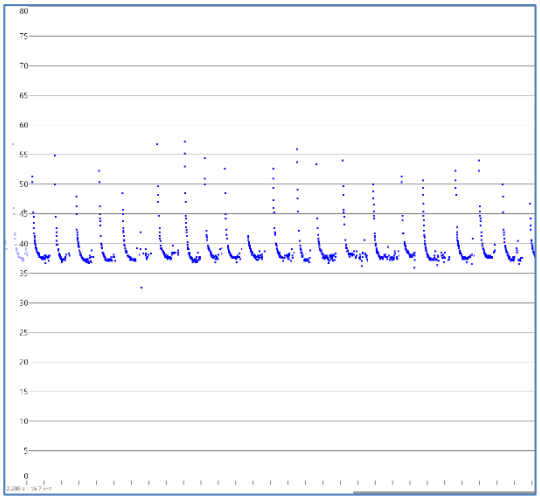
Chalinolobus gouldii



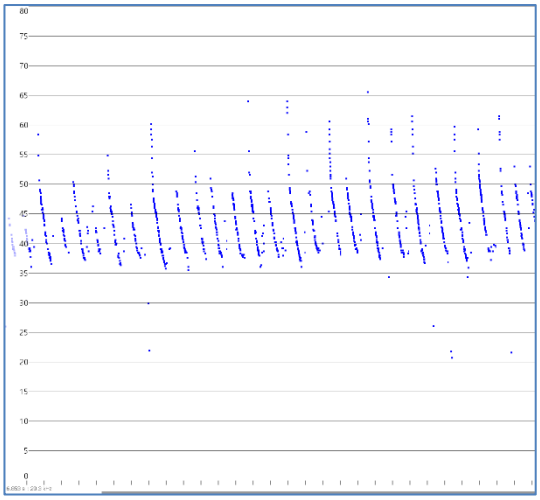
Chalinolobus morio



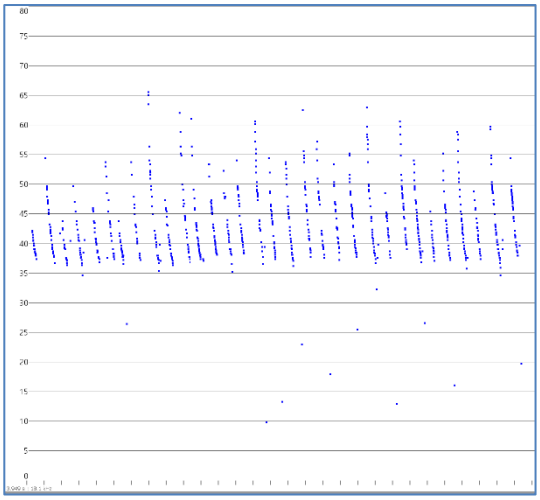
Chalinolobus nigrogriseus



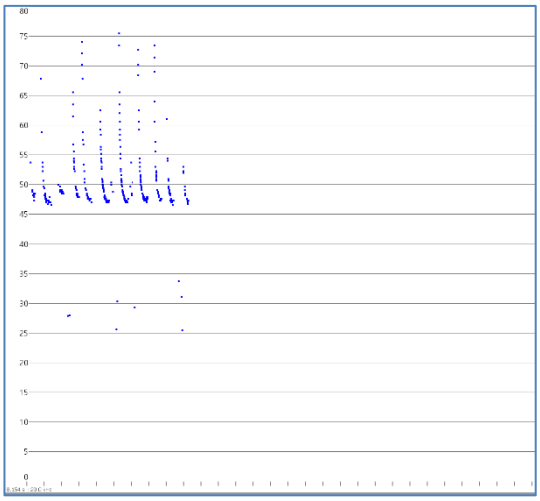
Scotorepens greyii or *S. orion*



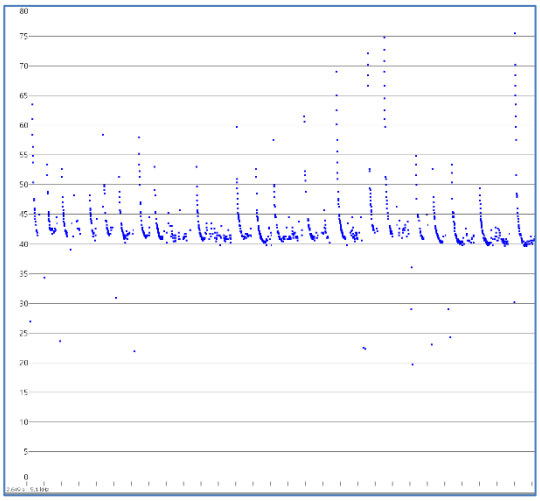
Myotis macropus



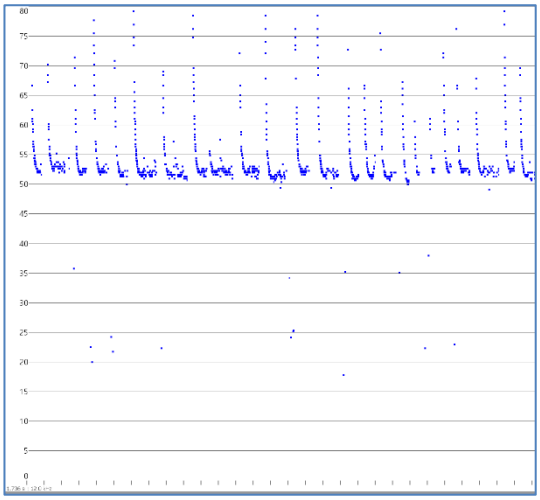
Nyctophilus sp.



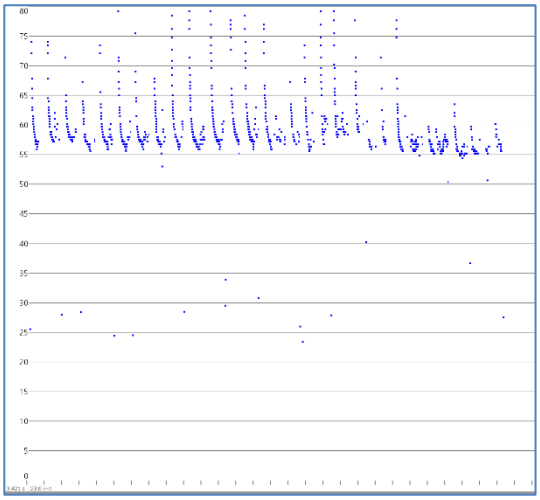
Pipistrellus adamsi



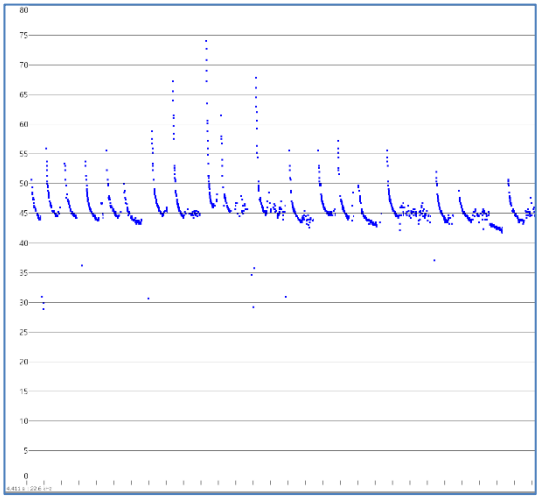
Scotorepens sanborni



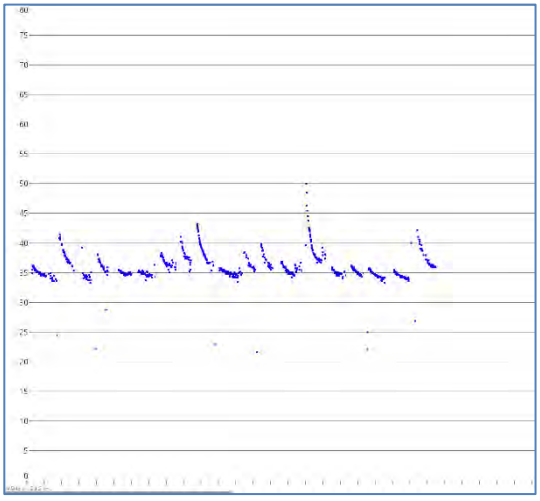
Vespadelus troughtoni



Miniopterus australis



Miniopterus orianae oceanensis



Ozimops ridei

Appendix H:
Fauna Species List

Table H1: List of fauna species recorded in and near the core infrastructure footprint during the August, September and October 2024 field surveys

Scientific name	Common name	Status[A]		Core infrastructure footprint		Adjacent[B]		Incidental
		EPBC Act	NC Act	Non-remnant	Saltmarsh	Freshwater wetland	Saltmarsh	
Amphibians								
Litoria fallax	Eastern Sedgefrog	-	LC					✓
Litoria rothii	Eastern Laughing Treefrog	-	LC					✓
Uperoleia mimula	Mimicking Gungan	-	LC					✓
Birds								
Accipiter fasciatus	Brown goshawk	-	LC	✓				
Acrocephalus australis	Australian Reed-warbler	-	LC	✓		✓		
Anas superciliosa	Pacific Black Duck	-	LC	✓				
Anhinga novaehollandiae	Australasian Darter	-	LC				✓	✓
Anthus novaeseelandiae	Australasian Pipit	-	LC	✓	✓		✓	
Antigone rubicunda	Brolga	-	LC				✓	
Ardea alba modesta	Eastern Great Egret	-	LC			✓	✓	
Ardea intermedia	Intermediate Egret	-	LC			✓		
Ardea pacifica	White-necked Heron	-	LC					✓
Bubulcus ibis	Cattle Egret	-	LC	✓				
Cacatua sanguinea	Little Corella	-	LC	✓				
Cacomantis variolosus	Brush Cuckoo	-	LC	✓				
Calyptorhynchus banksii	Red-tailed Black-cockatoo	-	LC	✓			✓	
Chalcites basalis	Horsfield's Bronze-cuckoo	-	LC	✓				
Charadrius ruficapillus	Red-capped Plover	-	LC				✓	
Cincloramphus timoriensis	Tawny Grassbird	-	LC	✓				
Cinnyris jugularis	Olive-backed Sunbird	-	LC	✓			✓	
Circus approximans	Swamp Harrier	-	LC		✓			
Cisticola exilis	Golden-headed Cisticola	-	LC	✓		✓		
Cisticola juncidis laveryi	Zitting Cisticola	-	LC		✓		✓	
Coracina novaehollandiae	Black-faced Cuckoo-shrike	-	LC				✓	
Corvus coronoides	Australian Raven	-	LC	✓			✓	
Dicaeum hirundinaceum	Mistletoebird	-	LC	✓			✓	
Egretta garzetta	Little Egret	-	LC				✓	
Egretta novaehollandiae	White-faced Heron	-	LC	✓	✓		✓	
Elseyornis melanops	Black-fronted Dotterel	-	LC		✓		✓	
Falco berigora	Brown Falcon	-	LC		✓			
Falco cenchroides	Nankeen Kestrel	-	LC	✓			✓	
Falco subniger	Black Falcon	-	LC				✓	
Gavicalis virescens	Singing Honeyeater	-	LC	✓				
Gelochelidon macrotarsa	Australian Tern	-	LC	✓	✓	✓	✓	
Geopelia humeralis	Bar-shouldered Dove	-	LC	✓			✓	
Grallina cyanoleuca	Magpie-lark	-	LC	✓				
Gymnorhina tibicen	Australian Magpie	-	LC		✓			
Haliaeetus leucogaster	White-bellied Sea-eagle	-	LC				✓	✓
Haliastur indus	Brahminy Kite	-	LC	✓			✓	
Haliastur sphenurus	Whistling Kite	-	LC	✓	✓		✓	
Hirundo neoxena	Welcome Swallow	-	LC	✓	✓		✓	
Hydroprogne caspia	Caspian Tern	M	SLC				✓	
Irediparra gallinacea	Comb-crested Jacana	-	LC			✓		
Lichmera indistincta	Brown Honeyeater	-	LC				✓	
Limosa limosa	Black-tailed godwit	E, M	E	✓				
Lonchura castaneothorax	Chestnut-breasted Mannikin	-	LC	✓				
Lonchura punctulata	Nutmeg Mannikin	-	-	✓		✓		
Malurus melanocephalus	Red-backed Fairy-wren	-	LC	✓				
Melithreptus albogularis	White-throated Honeyeater	-	LC	✓				
Merops ornatus	Rainbow Bee-eater	-	LC	✓			✓	
Microcarbo melanoleucos	Little Pied Cormorant	-	LC					✓
Milvus migrans	Black Kite	-	LC	✓	✓		✓	
Mirafra javanica	Horsfield's Bushlark	-	LC	✓				
Myiagra rubecula	Leaden Flycatcher	-	LC	✓				
Numenius madagascariensis	Eastern Curlew	CE, M	CE				✓	
Numenius phaeopus	Whimbrel	M	SLC				✓	
Pelecanus conspicillatus	Australian Pelican	-	LC			✓		
Petrochelidon nigricans	Tree Martin	-	LC	✓			✓	
Platalea regia	Royal Spoonbill	-	LC				✓	
Rhipidura leucophrys	Willie Wagtail	-	LC	✓				
Scythrops novaehollandiae	Channel-billed Cuckoo	-	LC				✓	✓
Stomiopera flava	Yellow Honeyeater	-	LC	✓				
Synoicus ypsilophorus	Brown Quail	-	LC	✓				
Taeniopygia bichenovii	Double-barred Finch	-	LC	✓				
Taeniopygia guttata	Zebra Finch	-	LC	✓				
Threskiornis molucca	Australian White Ibis	-	LC	✓	✓		✓	
Threskiornis spinicollis	Straw-necked Ibis	-	LC	✓				
Todiramphus macleayii	Forest Kingfisher	-	LC	✓				
Trichoglossus moluccanus	Rainbow Lorikeet	-	LC	✓				
Vanellus miles	Masked Lapwing	-	LC	✓	✓	✓	✓	
Mammals								
Canis familiaris	Dingo/Wild Dog	-	-				✓	✓
Chaerephon jobensis	Northern Freetail Bat	-	LC	✓	✓			
Chalinolobus gouldii	Gould's Wattled Bat	-	LC	✓	✓			
Chalinolobus morio	Chocolate Wattled Bat	-	LC	✓	✓			
Chalinolobus nigrogriseus	Hoary Wattled Bat	-	LC	✓	✓			

Scientific name	Common name	Status[A]		Core infrastructure footprint		Adjacent[B]		Incidental
		EPBC Act	NC Act	Non-remnant	Saltmarsh	Freshwater wetland	Saltmarsh	
Miniopterus australis	Little Bent-wing Bat	-	LC	✓	✓			
Miniopterus orianae oceanensis	Eastern Bent-wing Bat	-	LC	✓	✓			
Mormopterus lumsdenae	Northern Free-tailed Bat	-	LC	✓	✓			
Mormopterus ridei	Eastern Free-tailed Bat	-	LC	✓	✓			
Myotis macropus	Large-footed Myotis	-	LC	✓	✓			
Nyctophilus sp.	Unidentified long-eared bat	-	LC	✓	✓			
Pipistrellus adamsi	Cape York Pipistrelle	-	LC	✓	✓			
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheathtail Bat	V	E	✓	✓			
Scotorepens sanborni	Northern Broad-nosed Bat	-	LC	✓	✓			
Sus scrofa	Pig	-	-					✓
Taphozous australis	Coastal Sheathtail Bat	-	NT	P[C]	P[C]			
Vespadelus troughtoni	Eastern Cave Bat	-	LC	✓	✓			
Reptiles								
Chelodina canni	Cann's Longneck Turtle	-	LC					✓
Cryptoblepharus virgatus	Striped Snake-eyed Skink	-	LC					✓
Hemidactylus frenatus	House Gecko	-	-					✓
Varanus panoptes	Yellow-spotted Monitor	-	LC					✓

[A] Status as of October 2024. Listed as Critically Endangered (CE), Endangered (E), Vulnerable (V), Migratory (M), Near Threatened (NT), Special Least Concern (SLC) and/or Least Concern (LC) under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and/or Queensland *Nature Conservation Act* 1994 (NC Act).

'-' No status.

[B] 'Adjacent' refers to areas within 500 m of the core infrastructure footprint.

[C] 'P' = possible. Ultrasonic calls attributable to either Coastal Sheathtail Bat, another *Taphozous* species or Bare-rumped Sheathtail Bat were detected at two locations in the core infrastructure footprint. Troughton's Sheathtail Bat (*Taphozous troughtoni*), which is listed as Least Concern under the NC Act (and not listed under the EPBC Act) is also known from the Townsville region (Churchill 2008).

References

Churchill, S 2008, *Australian Bats, Second Edition*. Allen & Unwin, Crows Nest.



Environmental Approval & Compliance Solutions

Cairns Office:
Level 1, 320 Sheridan Street, PO Box 5678 Cairns QLD 4870
P: 61 7 4034 5300

Townsville Office:
Suite 2A, Level 1, 41 Denham Street, PO Box 539 Townsville QLD 4810
P: 61 7 4796 9444

www.natres.com.au • nra@natres.com.au

Natural Resource Assessments Pty Ltd trading as NRA Environmental Consultants. ABN: 77 011 073 135
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