



**EPBC ACT REFERRAL -
SUPPORTING INFORMATION
WHITSUNDAY SKYWAY PROJECT
AUSTRALIAN ADVENTURE TOURISM GROUP**

FEBRUARY 2023



**WULGURU TECHNICAL
SERVICES**

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1. Introduction

Wulguru Technical Services Pty Ltd (WTS) was engaged by GAP Tree Change, on behalf of the Australian Adventure Tourism Group (AATG), to prepare a referral for assessment under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*, in relation to the Whitsunday Skyway Project.

This report is submitted to the Department of Agriculture, Water and the Environment and provides a detailed response to the *Matters of National Significance: Significant Impact Guidelines 1.1* (Department of Agriculture, Water and the Environment, 2013).

1.1. Purpose

The purpose of this report is to:

- Describe the Project;
- Assess the impacts of the Project against the EPBC Act Significant Impact Guidelines; and
- Present the outcomes to provide supporting information for an EPBC Act Referral.

1.2. Proposed Action

1.2.1. Project Overview

The proposed Whitsunday Skyway Project (the Project) includes a proposed network of 27.5 kms of mountain bike trails with linkages to the walking trails of the wider Conway National Park. The Project will feature a 1 km cable car ride to approximately 430 m above sea level in the Conway National Park, for uplift biking and public access.

The Project will also include a regionally focused cultural interpretive centre to deliver education and experiential outcomes around the Gia and Ngaro Peoples' traditional connection with the land.

1.2.2. Project Justification

Mountain biking is a rapidly growing recreation, sport and tourism activity internationally, and across Australia. Despite this, there is limited infrastructure to support the demand, particularly in Queensland. The development of the trails presents a significant opportunity for local riders as well as increasing tourism in the region.

The proposed area has strong potential for development as a mountain bike trail destination due to the:

- Accessibility: Airlie Beach is easily accessible for local and interstate riders.
- Climate: the local climate is suitable for year round riding.
- Topography, terrain and elevation: the site has generally moderate slopes and good elevation opportunities.
- Soil type; the acid to intermediate volcanic rocks in the target area provide year-round riding potential and wear characteristics.

- Strong tourism market: established tourism activities and infrastructure for complementary markets (Dirt Art, 2020).

1.2.3. Economic impact

The project will have a significant impact on the local and regional economy, with an anticipated year-one total ride days/visitors of 20,000, and a year-one indirect economic impact of over \$6.7m (Dirt Art, 2020). The project will create approximately ten (10) new jobs during construction and is expected to create 15 Full-time Equivalent (FTE) new jobs once operational (Dirt Art, 2020).

1.2.4. Project Area

The Project is located 1 km from the Airlie Beach town centre, north Queensland. The Project is located within the Whitsunday Regional Council (Figure 1). Approximately 95 ha of the Project area is located within the Conway National Park. The Conway National Park is managed by the Queensland Parks and Wildlife Services under the *Nature Conservation Act 1992*.

The Project location is defined in Table 1 and Figure 2 .

Table 1 Project Location

Lot on Plan	91 on SP201430 90 on SP201430 43 on NPW1144
Project Area	103 ha
Local Government Area	Whitsunday Regional Council
Zoning	Environmental management and conservation, recreation and open space & low density residential

The proposed tenure pathway for the Project is a combination of revocation of land from Lot 43 on Plan NPW1144 for the access road and upper Skyway platform, with the remaining recreative area being managed under lease (Figure 2). No associated infrastructure will be placed on Reserve parcel 87SP189776. There will be overhead connectivity to freehold parcels 90 and 91 SP201430 from the cableway only. The proposed tenure pathway is subject to application and approval.

1.2.5. Construction Program

The Project will include the following works:

- Construction of cable car towers;
- Construction of access tracks;
- Construction of base stations at the base and top of the project area;
- Establishment of walking and mountain bike tracks; and
- Construction of ancillary infrastructure (car parks, power supplies, amenities etc).

The construction will be completed using a combination of hand build construction and mechanical (i.e., excavator) methods.

1.2.6. Alternatives to Project

The final project location was selected due to the reasons discussed in Section 1.2.2.

While a number of smaller, more regional towns were considered, none possessed the combination of existing infrastructure, elevation opportunity and coastal location offered by the proposed Project area (Dirt Art, 2020).

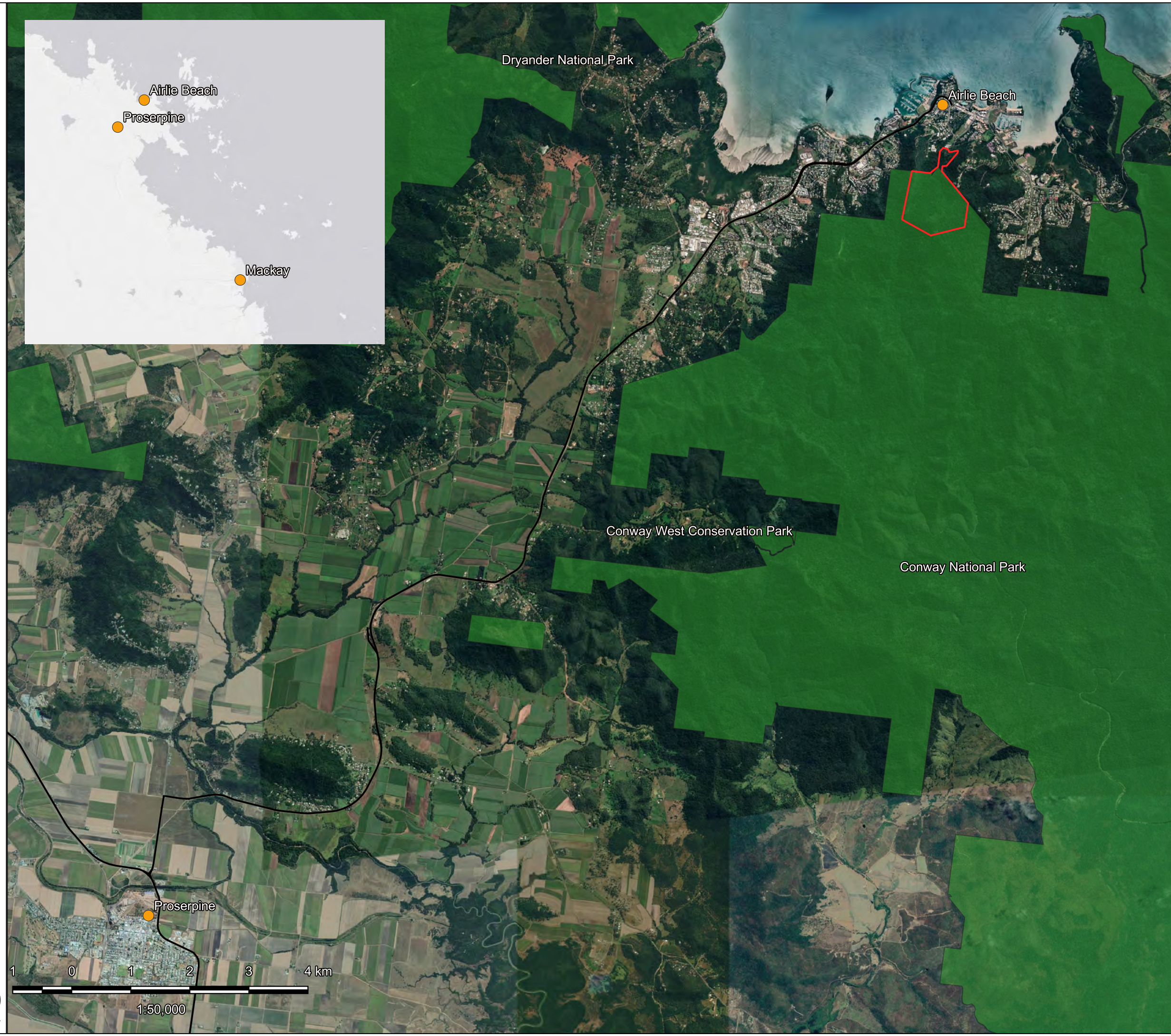
EPBC Act Referral Supporting Information Report – Whitsunday Skyway Project

Figure 1. Project Location

Legend

- Key Features
- Major Roads
- Protected Area
- Study Area

Google Satellite



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Figure 2. Project Area

Legend

- Lot on Plan
- Study Area
- Proposed Skyway Disturbances
 - Access
 - Cableway
 - Mountain Bike Trail
 - Land Indicated for Revocation*

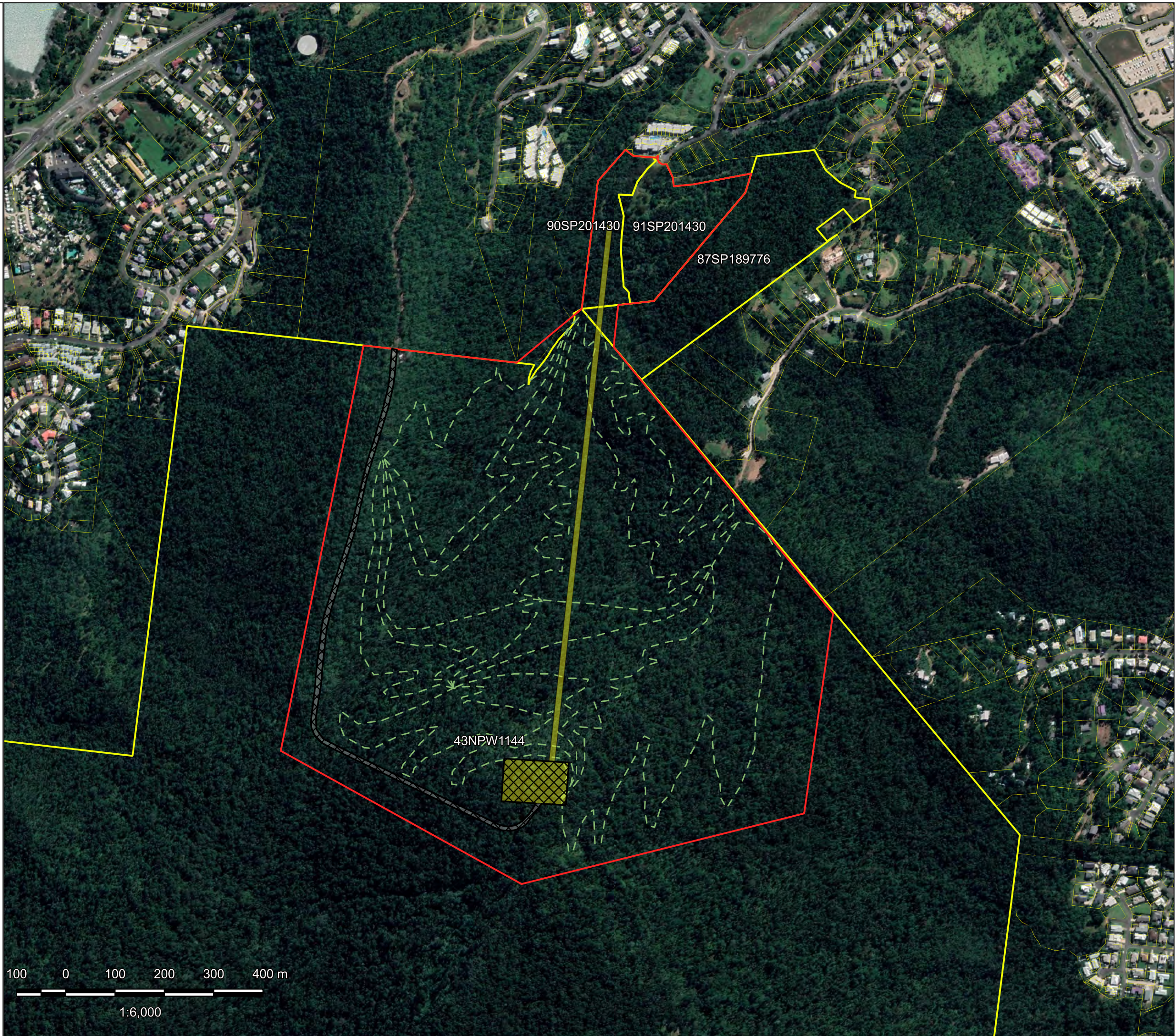
*Final land tenure for the Project is subject to application and approval

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1.3. Legislative Context

1.3.1. Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Commonwealth Government's key piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as matters of national environmental significance (MNES).

MNES under the EPBC Act are:

- World Heritage Properties
- National Heritage Places
- wetlands of international importance (listed under the Ramsar Convention)
- nationally threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- a water resource, in relation to coal seam gas and large coal mining developments

If a proposed development or other action ('proposed action') is likely to have a significant impact upon an MNES, then it must be referred for assessment under the EPBC Act.

This legislation is relevant to the Project due to the mapped protected matters within the Project area.

1.3.2. EPBC Act Environmental Offsets Policy

The Environmental Offsets Policy outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the EPBC Act. Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act.

The EPBC Act Environmental Offsets Policy is not relevant to the Project, as there are no significant impacts that require offsets.

1.3.3. Environmental Protection Act 1994 (Qld)

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

'Environment' is defined under the Act as (section 8):

- Ecosystems and their constituent parts, including people and communities

- All natural and physical resources
- The qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community
- The social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

To ensure the protection of Environmental Values, AATG are required to meet the requirements of the EP Act and its subordinate legislations.

1.3.4. Nature Conservation Act 1992

The Nature Conservation Act 1992 (NCA) and the Nature Conservation (Animals) Regulation 2020 and Nature Conservation (Plants) Regulation 2020 provide a legislative framework for the protection and conservation of Queensland's native plants and animals.

Under the framework, species of conservation significance are assessed and categorised with respect to population, distribution and potential threats and impacts.

The objectives of the NCA are achieved through an integrated and comprehensive conservation strategy that protects and conserves threatened and special interest species and their habitat; and protected areas.

The Nature Conservation Act 1992 is relevant to the Project due to the mapped protected vegetation within the Project area.

1.4. Community

1.4.1. Community profile

The Project is located 1 km from the Airlie Beach town centre, within the Whitsunday Regional Council. The Whitsunday local government area has a population of 37,152 people with approximately 5.8% identifying as Aboriginal and/or Torres Strait Islander (ABS, 2022). The Indigenous traditional owner groups for the Conway National Park are the Gia and Ngaro Peoples.

The Whitsunday area has a strong tourism industry, largely motivated by the climate and access to islands and the Great Barrier Reef Marine Park.

1.4.2. Public Consultation

The Whitsunday Regional Council conducted online public consultation for a period of four (4) weeks on "Your Say Whitsunday" between 25 January and Friday 26 February 2021. A total of 335 submissions were received with 94% responding either 'very happy' or 'happy' with the proposed concept for the Project (Appendix C). Additional targeted consultation has continued with the following key stakeholders:

- Whitsunday Regional Council;
- Queensland Parks and Wildlife Service; and

- Mackay Mountain Bike Club.

The results of the consultation will be considered during the final stages of the Whitsunday Trails Concept planning.

Native Title agreements are currently being considered with the Gia and Ngaro People.

2. Existing Environment

2.1. Climate

The Project is situated within the Central Queensland Coast bioregion which has a sub-tropical to tropical climate with a distinct wet season and dry season. The closest weather station is the Hamilton Island Airport station (Station 033106). Mean climate data from the Hamilton Island weather station is displayed in Figure 3.

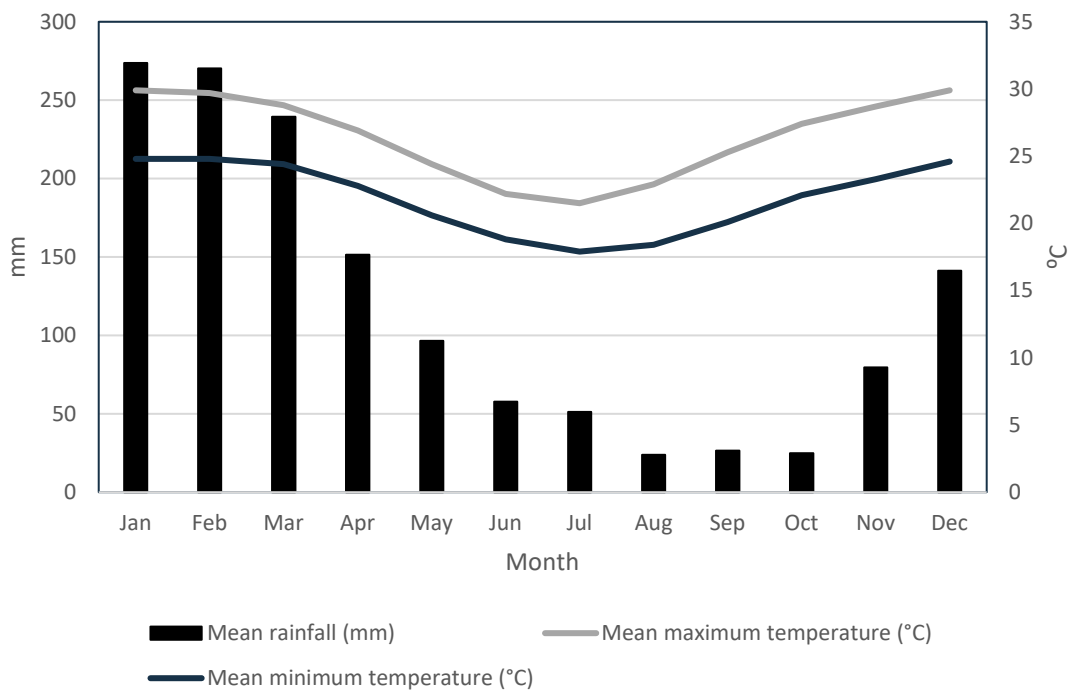


Figure 3 Mean temperature and rainfall at Hamilton Island Airport (033106)



2.2. Topography and Hydrology

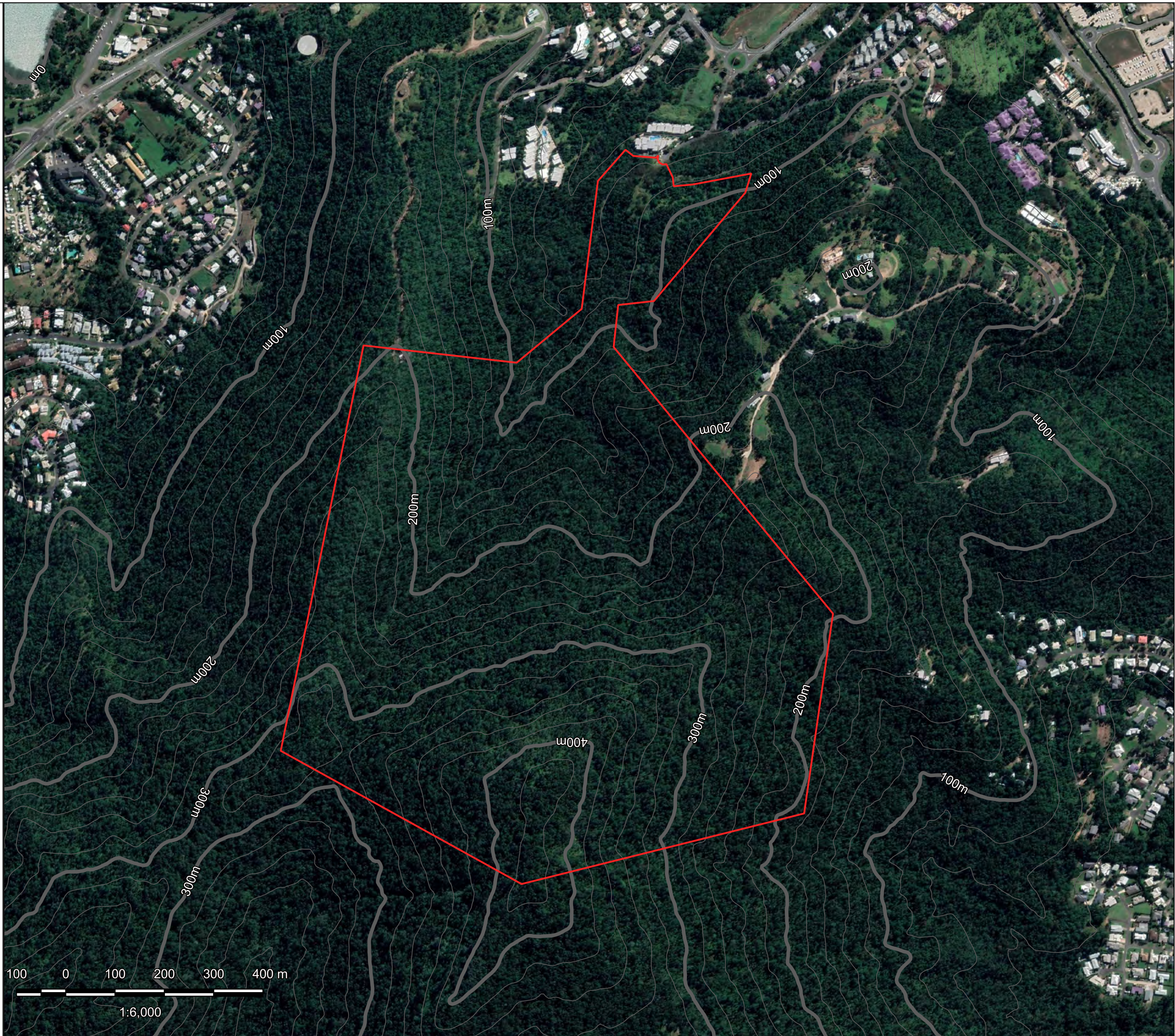
The topography is characterised by the steep undulated terrain of the Conway National Park, ranging from 60m to 420 m Australian Height Datum (AHD). There is one mapped watercourse within the project area, being Airlie Creek, a stream order 1 which discharges into the Coral Sea 1 km north of the project area.

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Figure 4. Topography

Legend

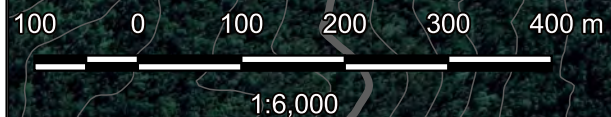
-  Study Area
-  20m Contour
- Google Satellite



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2.3. Geology and Soils

2.3.1. Geology

The Project is located within the Whitsunday Volcanic Province, dominated by medium- to high-grade, dacitic to rhyolitic lithic ignimbrites and intruded by gabbro/dolerite to rhyolite dykes (up to 50 m in width), sills and comagmatic granite (S.E. Bryan et al. 1999).

Site specifically, the project is underlain by two main geological units (Figure 5):

- Proserpine Volcanics - Rhyolite, andesite and minor volcanoclastics; and
- Airlie Volcanics - Felsic to intermediate volcanoclastics and lavas.

2.3.2. Soils

2.3.2.1. Soil Mapping

The Project is situated within the Soils and Land Suitability of the Central Queensland Whitsunday Coast Area (1:50,000) survey area (S. Hardy, 2003). The soils at the site are labelled MTN which is a code used to classify areas not typically assessed in detail. No other information on soil is provided for the site under the Soils and Land Suitability of the Central Queensland Whitsunday Coast Area mapping.

The site is within the Atlas of Australian Soils (1:2,000,000) mapping area (Figure 6). The soils under this mapping are classified as ME2 - gradational brown, A2 horizon nonbleached, acid smooth-ped whole col B horizon (State of Queensland).

A soil survey completed in 2022 (WTS, 2022b), identified one soil mapping unit across the Project area; a Brown Eutrophic Dermosol. This is characterised by dark reddish brown silty loam with many rock fragments and shallow depth.

2.3.2.2. Erosion Hazard

The International Erosion Control Association's (IECA) Best Practice Erosion and Sediment Control Guidelines (IECA 2008) sets erosion hazard based on average rainfalls for regions around Australia. The IECA erosion hazard for the Mackay region is detailed in Table 2.

Table 2. Erosion Hazard (IECA, 2008)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E	E	H	H	M	M	VL	VL	VL	M	M	H

2.3.2.3. Soil Erosion Susceptibility

An assessment of soil erosion susceptibility is given in

Table 3. The soils within the Project area present a low risk of erosion.

Table 3. Soil Erosion Susceptibility

Soil Type	Depth (cm)	Texture	ECEC (meq/100g)	Rating	ESP (%)	Rating	Landform	Vegetation Cover	Erosion Susceptibility
Brown Eutrophic Dermosol	0-10	Silt loam	28.5	Moderate	0.5	Non sodic	Mid Slope/Upper Slope (10-20%)	<2%*	Moderate
	10-20		25.15	Moderate	0.5	Non sodic			

*Very high leaf litter cover.

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Figure 5. Geology

Legend

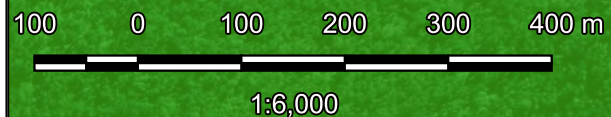
- Study Area
- Surface Geology
 - Airlie Volcanics
 - Proserpine Volcanics
- Google Satellite



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Figure 6. Soils

Legend

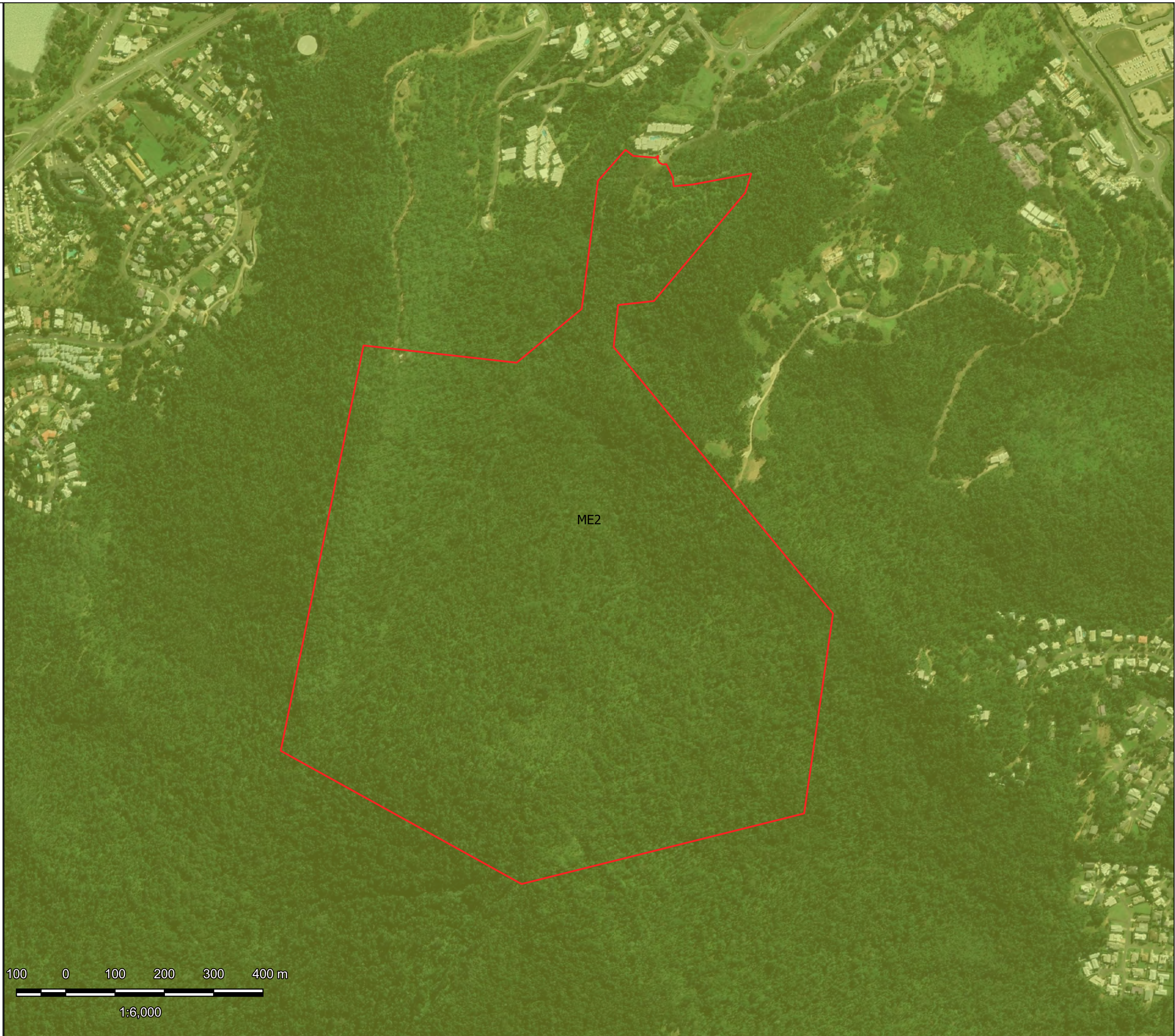
 Study Area

Atlas of Australian Soils

Mapping Unit

 Dermosol

Google Satellite



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2.4. Water

2.4.1. Surface Water

The *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (EPP Water) details the scheduled water quality basins and their specific management intent. The Project is situated within the Proserpine River Basin. The Environmental Values (EVs) for the Project are:

- Aquatic ecosystem – high ecological value
- Human uses:
 - Human consumer
 - Primary recreation
 - Visual recreation
 - Drinking water
 - Cultural and spiritual values

There is one mapped watercourse within the project area being Airlie Creek, a 1st order stream, which discharges into the Coral Sea 1 km north of the project area. Airlie Creek is considered a High Ecological Value (HEV) watercourse, which is defined in the EPP Water as “water in which the biological integrity of the water is effectively unmodified or highly valued”. The lower reaches of Airlie Creek traverse the Airlie Beach town centre, via stormwater drains, before discharging to the Coral Sea. The downstream section of Airlie Creek is influenced by stormwater runoff from surrounding residential and urban land uses.

2.4.2. Groundwater

Knowledge on groundwater at the Project site is limited however, it is assumed that the groundwater aquifers are within fractured igneous rock with flows following the topography of the site in a west to east orientation.

The closest registered bore (RN 1200063) is located approximately 10 km to the southwest of the Project. Limited water quality data is available for this bore however, is likely to be hosted by different geology to the Project area and influenced by topographical features. For this reason, the data has been deemed not relevant to the Project.

Construction activities will be limited to surface works only and no groundwater will be accessed for the Project. The project is not expected to impact upon groundwater; therefore no further assessment has been completed.

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Figure 7. Hydrology

Legend

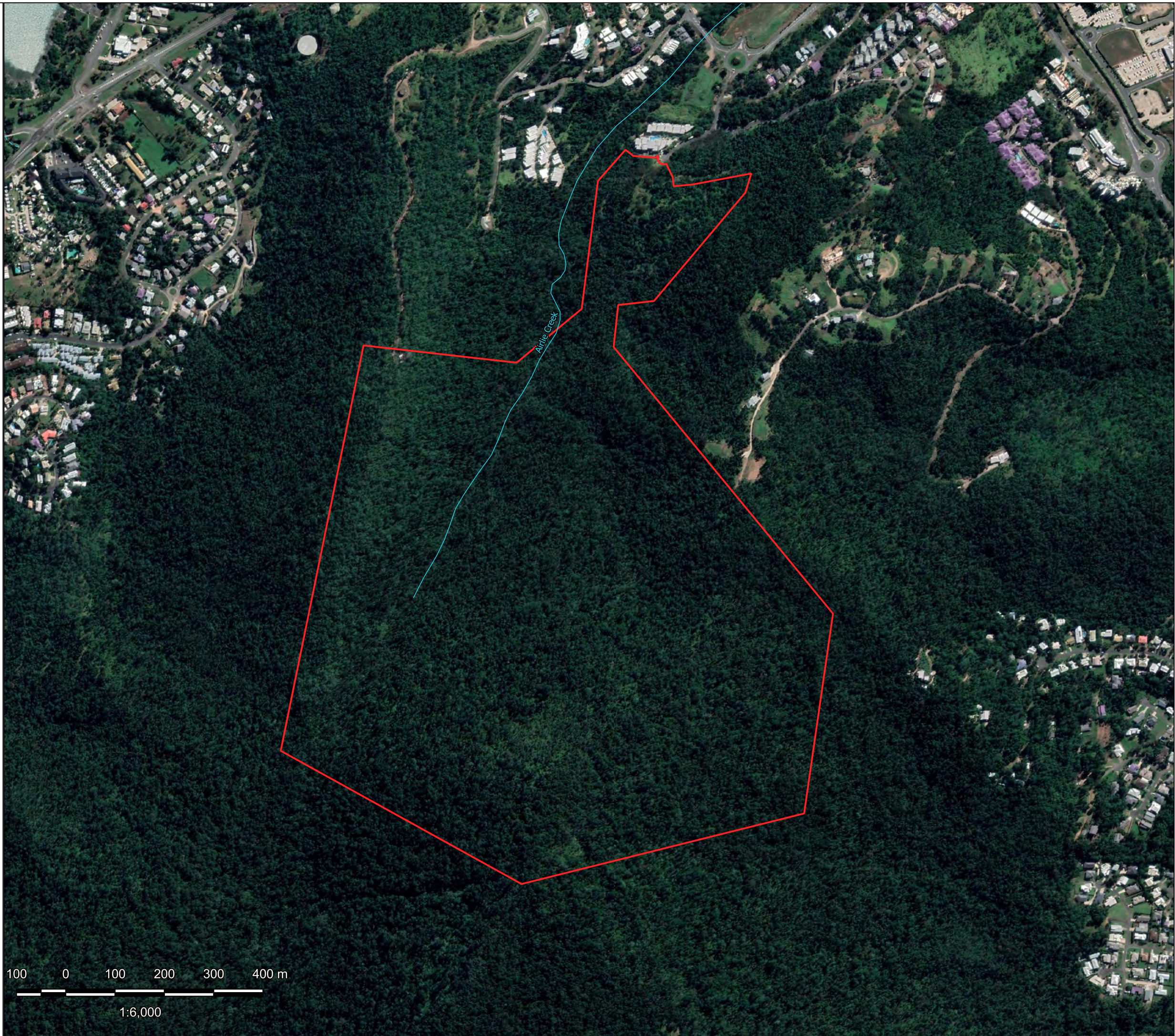
 Study Area

Watercourse - Stream Order

 0

 1

Google Satellite



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2.5. Flora and Fauna

2.5.1. Regional Ecosystem Mapping

Four regional ecosystems (REs) are mapped within the Project area, all of which are classified as Least Concern under the *Vegetation Management Act 1999* with Biodiversity Statuses of No Concern at Present. The mapped REs are described in Table 4. Field surveys conducted in 2022 (WTS, 2022a) identified REs largely consistent with those mapped.

Table 4 Mapped Regional Ecosystems

Regional Ecosystems	Short Description	VM Status ¹	BD Status ²	Structure Category
8.12.11a	Semi-evergreen microphyll vine thicket +/- <i>Araucaria cunninghamii</i> on islands and coastal headlands on Mesozoic to Proterozoic igneous rocks and Tertiary volcanics	LC	NC	Dense
8.12.12d	<i>Eucalyptus tereticornis</i> and/or <i>Corymbia</i> spp. and/or <i>E. platyphylla</i> and/or <i>Lophostemon suaveolens</i> woodland to open forest on hill slopes on Mesozoic to Proterozoic igneous rocks	LC	NC	Sparse
8.12.18	Semi-evergreen notophyll/microphyll to complex notophyll <i>Argyrodendron</i> spp. vine forest +/- <i>Araucaria cunninghamii</i> , of foothills and uplands on near-coastal ranges and islands on Mesozoic to Proterozoic igneous rocks	LC	NC	Dense
8.12.19	Semi-deciduous complex notophyll feather palm vine forest of sheltered gullies and slopes of foothills and uplands on Mesozoic to Proterozoic igneous rocks	LC	NC	Dense
Non-rem	n/a	n/a	n/a	n/a

¹VM Status – *Vegetation Management Act 1999* Status. LC – Least Concern.

²BD Status – *Biodiversity Status*. NC – No concern at present, OC – Of concern, E – Endangered.

2.5.2. Flora

A desktop assessment identified 49 listed conservation significant flora species as potentially present in the Project area, and/or have been recorded within 10 km of the Project (WTS, 2022a). These include:

- 13 Endangered, Vulnerable or Near Threatened (ENVT) flora species; and
- 36 Special Least concern flora species.

BioCondition assessments were completed (WTS, 2022a) and resulted in a total of 390 flora species from 98 plant families observed:

- 1 EVNT flora species - *Brachychiton compactus* (Whitsunday bottle tree) – NT (NCA);
- 15 Special Least Concern (SL) flora species;
- 64 Introduced (I*) flora species; and
- 310 Common (C) flora species.

A full species list is provided in Appendix B.

2.5.3.Fauna

A desktop assessment identified 63 listed conservation significant terrestrial fauna species as potentially present in the Project area, and/or have been recorded within 10 km of the Project. These include:

- 28 ENVT fauna species;
- 43 Marine (Ma) and/or Migratory (M) fauna species; and
- 28 Special Least Concern (SL) fauna species.

Fauna surveys (WTS, 2022a) recorded 65 species present within the Project area. These include:

- 0 amphibians;
- 36 birds;
- 10 mammals;
- 1 ray-finned fish; and
- 18 reptiles.

A full species list is provided in Appendix B.

2.5.4.Pest species

A total of 64 introduced flora species and four introduced and/or feral fauna species were observed within the during the field surveys (WTS, 2022a). A full species list is provided in Appendix B.

2.6. Cultural Heritage

2.6.1. Commonwealth Heritage

There are no Commonwealth Heritage places, or other places recognised as having heritage values within the Project area.

2.6.2. Indigenous Cultural Heritage

The Indigenous traditional owner groups for the Conway National Park are the Gia and Ngaro Peoples. Native Title agreements are currently being considered with the Gia and Ngaro People.

3. Potential Environmental Impacts and Mitigation

3.1. World Heritage

3.1.1. Impact Assessment

There are no World Heritage places within the Project area. The proposed action will not have a direct impact on this protected matter.

The project is located within 5 km of the Great Barrier Reef World Heritage Area. One defined watercourse, Airlie Creek, intersects the Project area for approximately 0.65 km, with the potential to convey impacted waters to the Great Barrier Reef World Heritage Area. For this reason, the potential for an indirect impact to this protected matter has been considered. Impacts to water quality are considered the highest risk to this protected matter.

Vegetation clearing will be required during the construction phase of the project. Vegetation clearing will result in exposed soil whilst works are completed, potentially resulting in increased erosion and runoff to Airlie Creek. The soil erosion susceptibility assessment (Appendix E) completed for the project indicates that the soil within the Project area presents a moderate risk of erosion, due to the steep terrain. This may result in an indirect impact to the protected matter.

It is unlikely that construction activities will generate significant air, noise or vibration nuisance, due to the Projects distance from the protected matter and the attenuation effect of Airlie Beach town centre.

3.1.2. Impact Significance

Impacts are not considered to be significant for the following reasons:

- Clearing works will be completed via mechanical methods and will not require the addition of any chemicals to the Project area.
- There will be no refuelling or maintenance of equipment within the Project area, thus further avoiding the introduction of potential contaminants.
- Any construction waste will be appropriately stored, until being promptly removed from the Project area and disposed of by authorised third parties at a licenced facility.

Furthermore, Airlie Creek is a 1st order stream, and its contribution to the Great Barrier Reef World Heritage Area is negligible. The lower reaches of Airlie Creek traverse the Airlie Beach town centre, via stormwater drains, before discharging to the Coral Sea. The downstream section of Airlie Creek is influenced by stormwater runoff from surrounding residential and urban land uses. Any temporary increase in sedimentation in the upper reaches of Airlie Creek is unlikely to influence the water quality at the discharge point or beyond to the Great Barrier Reef World Heritage Area

3.1.3.Mitigation measures

Consistent with the precautionary principle, the following mitigation measures will be implemented to further reduce any potential impact on the Great Barrier Reef World Heritage Area:

- Works will be completed during the dry season, where possible.
- Clearing activities will occur progressively, limiting the time areas are exposed.
- Erosion and sediment control measures will be implemented during construction activities. Recommended measures are detailed in Appendix E.
- Waste will be disposed of by authorised third parties at a licenced facility.

3.1.4.Summary

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to any World Heritage place.

3.2. National Heritage

3.2.1. Impact Assessment

There are no National Heritage places within the Project area. The proposed action will not have a direct impact on this protected matter.

The project is located within 5 km of the Great Barrier Reef National Heritage Area. One defined watercourse, Airlie Creek, intersects the Project area for approximately 0.65 km, with the potential to convey impacted waters to the Great Barrier Reef World Heritage Area. For this reason, the potential for an indirect impact to this protected matter has been assessed.

Vegetation clearing will be required during the construction phase of the project. Vegetation clearing will result in exposed soil whilst works are completed, potentially resulting in increased erosion and runoff to Airlie Creek. The soil erosion susceptibility assessment (Appendix E) completed for the project indicates that the soil within the Project area presents a moderate risk of erosion, due to the steep terrain. This may result in an indirect impact to the protected matter.

It is unlikely that construction activities will generate significant air, noise or vibration nuisance, due to the Projects distance from the protected matter and the attenuation effect of Airlie Beach town centre.

3.2.2. Impact Significance

Impacts are not considered to be significant for the following reasons:

- Clearing works will be completed via mechanical methods and will not require the addition of any chemicals to the Project area.
- There will be no refuelling or maintenance of equipment within the Project area, thus further avoiding the introduction of potential contaminants.
- Any construction waste will be appropriately stored, until being promptly removed from the Project area and disposed of by authorised third parties at a licenced facility.

Furthermore, Airlie Creek is a 1st order stream, and its contribution to the Great Barrier Reef National Heritage Area is negligible. The lower reaches of Airlie Creek traverse the Airlie Beach town centre, via stormwater drains, before discharging to the Coral Sea. The downstream section of Airlie Creek is influenced by stormwater runoff from surrounding residential and urban land uses. Any temporary increase in sedimentation in the upper reaches of Airlie Creek is unlikely to influence the water quality at the discharge point or beyond to the Great Barrier Reef National Heritage Area

3.2.3.Mitigation measures

Consistent with the precautionary principle, the following mitigation measures will be implemented to further reduce any potential impact on the Great Barrier Reef National Heritage Area:

- Works will be completed during the dry season, where possible.
- Clearing activities will occur progressively, limiting the time areas are exposed.
- Erosion and sediment control measures will be implemented during construction activities. Recommended measures are detailed in Appendix E.
- Waste will be disposed of by authorised third parties at a licenced facility.

3.2.4.Summary

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to any National Heritage place.

3.3. Ramsar Wetlands

There are no wetlands of international significance within the Project area. The Project will not have a direct or indirect impact on any Ramsar Wetlands.

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact on any Ramsar Wetland.

3.4. Nationally Threatened Species and Ecological Communities

3.4.1. Desktop Assessment

The desktop assessment identified a total of ten ENVT flora species with potential to occur within a 10 km radius of the Project area. The EVNT flora species are as follows:

- *Arthraxon hispidus* (hairy-joint grass) – V (NCA), V (EPBC);
- *Eucalyptus raveretiana* (Black ironbox) – LC (NCA), V (EPBC);
- *Graptophyllum ilicifolium* (Holly-leaved Graptophyllum, Mt Blackwood Holly) – V (NCA), V (EPBC);
- *Marsdenia brevifolia* (superseded by *Leichhardtia brevifolia* 2021) – V (NCA), V (EPBC);
- *Medicosma obovata* – V (NCA), V (EPBC);
- *Neisosperma kilneri* – V (NCA), V (EPBC);
- *Omphalea celata* – V (NCA), V (EPBC);
- *Phaius australis* (Lesser swamp-orchid) – E (NCA), E (EPBC);
- *Samadera bidwillii* (Quassia) – V (NCA), V (EPBC); and
- *Solanum graniticum* (Granite nightshade) – E (NCA), E (EPBC).

Desktop assessment identified a total of 26 EVNT fauna species with potential to occur within a 10 km radius of the Project area. A full list of conservation significant species is provided in Appendix B.

Due to the Project's proximity to the coastline, the 10 km radius buffer triggered several flora and fauna species associated with coastal and/or marine habitat. However, the Project area represents a rainforest and vine thicket habitat, unlikely to host the majority of these coastal and/or marine habitat preference species.

Two listed Threatened Ecological Communities: Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland (Endangered) and Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (Critically endangered) are reported to potentially occur within the project area.

3.4.2. Field Assessment

No listed ENVT flora species were identified in the Project area during the field surveys (WTS, 2022).

During the field assessment, no EVNT fauna species were observed in the camera data, nor were any observed incidentally or through secondary signs during the camera installation, rebaiting, or collection (WTS, 2022).

The two mapped Threatened Ecological Communities are represented by the following regional ecosystems.

- Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland (Endangered)

- **8.3.2, *Melaleuca viridiflora* woodland on seasonally inundated alluvial plains with impeded drainage:**
- **8.5.2a, *Melaleuca viridiflora* var. *viridiflora* open woodland to open forest (5-20m tall) on Tertiary sand plains**
- **8.5.2c *Melaleuca viridiflora* var. *viridiflora* and *M. nervosa* open woodland to open forest on Tertiary sand plains**
- **8.5.6 *Melaleuca viridiflora* +/- *Allocasuarina littoralis* woodland on Tertiary sand plains**
- Littoral Rainforest - Coastal Vine Thickets of Eastern Australia (Critically endangered):
 - **8.2.2 *Semi-evergreen microphyll vine thicket to vine forest on coastal dunes***

These ecosystems are not mapped in or within 10 kilometres of the proposed site and are not present in any parts of the catchment downstream of the site. The field survey confirmed these ecosystems were not present within the Project area.

3.4.3. Impact assessment

No nationally threatened species or ecological communities were observed within the Project area; therefore the Project is unlikely to result in any direct and or/indirect impacts on these protected matters.

3.4.4. Mitigation measures

No nationally threatened species or ecological communities were observed within the Project area. However, a weed and pest management program will be implemented at the Project, to limit any potential impacts on vegetation and habitat within the area.

The Weed and Pest Management Plan management plan will be prepared by a suitably qualified person and include specific measures for:

- Weeds of National Significance; and
- Weeds under schedules of the Biosecurity Act (2014) (Qld).

Control of all invasive infestations will be managed by recommended methods. All weed material that is manually removed will be bagged and disposed of at an appropriate location/waste facility, buried or burned to prevent regeneration from vegetative material. Additional measures will include maintenance of ground cover in grazed areas to prevent new infestations. Spot spraying infestations of environmental weeds using a selective herbicide prior to flowering, herbicide use will be undertaken by a licenced operator and in accordance with the recommended methods for the species and the herbicide in use. Follow up monitoring works will be required for all species to control new weed growth.

To facilitate the weed management program, a preliminary site inspection was undertaken to identify the risk associated with piloting unmanned aerial vehicles (UAV) in the study area. In such environments, UAVs offer an efficient alternative for acquiring high resolution imagery for targeted surveys of weeds, including *Lantana camara*.

The inspection identified initial limitations that would impact the safe operation of a UAV. A Ground Sampling Density (GSD) of <3cm is considered a minimum resolution for the potential identification and monitoring of Lantana camara in this environment. Limitations during the baseline assessment phase of the Project prevented data collection via UAV due to the undeveloped nature of the site. Therefore, it is recommended that a UAV based targeted Lantana camara survey be undertaken immediately upon completion of the clearing for the Project access road and cableway platform. Given the location of the upper platform of the cable way, line of sight of the study area for UAV data capture could be achieved at a suitable resolution, facilitating regular remote sensing, targeted selection, and monitoring of weeds of interest (e.g. Lantana camara) as a component of the overall Weed and Pest Management Plan.

3.5. Migratory Species

3.5.1.Desktop Assessment

The Protected Matters Search Tool (PMST) identified 47 migratory fauna species as potentially occurring within a 10 km radius of the Project area. A complete list of mapped species is provided in Appendix B.

3.5.2.Field Assessment

Field fauna surveys were completed in September to October 2022 (WTS, 2022a) to groundtruth the mapped species. A total of 20 camera sites were implemented within the Project area which included a portion of the Conway National Park, Freehold Lots 41, 90, and 91 SP 201430, and the Whitsunday Regional Council reserve and road area along Airlie Creek. Incidental observations and secondary signs observations, such as scats, tracks, and traces, were also noted during the field surveys.

One migratory species, the Spectacled monarch (*Symposiachrus trivirgatus*), was observed during the field surveys (WTS, 2022a), described below.

3.5.3.Spectacled monarch (*Symposiachrus trivirgatus*)

The spectacled monarch (*Symposiachrus trivirgatus*) is a breeding migrant with limited distribution and small population sizes. The species prefers dense understories of mountain or lowland rainforests, moist forests or wet sclerophyll, and occasionally waterside vegetation of mangroves (Pizzey & Knight, 2012). Distribution within Australia occurs coastally from Cape York (QLD) to Port Stephens (NSW), with common occurrences in humid northeast Queensland and breeding from October to February (Pizzey & Knight, 2012). Spectacled monarchs were observed within the Conway National Park section of the Project area. One individual was recorded on a nest along the edge of an established walking track. No eggs were observed within the nest.

3.5.4.Impact assessment

The proposed Project is unlikely to cause significant impact to the population within the Project area as the linear construction plan will cause minimal disturbance and retain patches of suitable habitat large enough to support the species in the surrounding area. The nesting individual was recorded within 1 – 1.5 m of the established walking path of the Conway National Park. The walking path is frequented by hikers daily and suggests the individual is exposed to human encounters often. Urban areas or areas of frequent human encounters are unlikely to contain important habitat or ecologically significant proportions of a population (Department of the Environment, 2015), further supporting the low risk level of significant impact to the population of spectacled monarchs within the Project area (WTS, 2022a).

3.5.5.Impact significance

The *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act* (Department of the Environment, 2015) was utilized to determine the level of potential impact to the species within the Project area. The Department of Environment, Water, Heritage, and the Arts (DEWHA) determines the likelihood of significant impact on a species by a proposed Project's likelihood to "substantially modify,

destroy or isolate an area of important habitat” or “seriously disrupt the lifecycle of an ecologically significant proportion of a population” (DEWHA, 2013). For the spectacled monarch, the area threshold (ha) of important habitat likely to result in significant impact is 0.1% for national significance which equates to 210 ha. The proposed Project area is below the threshold (approximately 100.4 ha), and works are therefore not likely to result in a significant impact to the species.

3.5.6.Mitigation measures

Consistent with the precautionary principle, the following mitigation measures will be implemented to further reduce any potential impact on the Spectacled monarch:

- A pre-clearance survey will be undertaken prior to construction.
- A High-Risk Species Management Program (SMP) will be developed and implemented.
- A Pest Management Plan will be developed and implemented.
- A fauna spotter catcher will be employed during all construction activities.

3.5.7.Summary

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to any Migratory Species.

3.6. Nuclear Action

There are no nuclear activities within the Project area. The Project will not have any direct and/or indirect impact on Nuclear Action.

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to any Nuclear Action.

3.7. Commonwealth Marine Areas

There are no Commonwealth Marine Areas within the Project area. The Project will not have any direct and/or indirect impact on Commonwealth Marine Areas.

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to any Commonwealth Marine Area.

3.8. Great Barrier Reef

3.8.1. Impact Assessment

The project is not located within the Great Barrier Reef. The proposed action will not have a direct impact on this protected matter.

The project is located within 5 km of three Great Barrier Reef Marine Parks. One defined watercourse, Airlie Creek, intersects the Project area for approximately 0.65 km, with the potential to convey impacted waters to the Great Barrier Reef Marine Parks. For this reason, the potential for an indirect impact to this protected matter has been assessed.

Vegetation clearing will be required during the construction phase of the project. Vegetation clearing will result in exposed soil whilst works are completed, potentially resulting in increased erosion and runoff to Airlie Creek. The soil erosion susceptibility assessment (Appendix E) completed for the project indicates that the soil within the Project area presents a moderate risk of erosion, due to the steep terrain. This may result in an indirect impact to the protected matter.

It is unlikely that construction activities will generate significant air, noise or vibration nuisance, due to the Projects distance from the protected matter and the attenuation effect of Airlie Beach town centre.

3.8.2. Impact Significance

Impacts are not considered to be significant for the following reasons:

- Clearing works will be completed via mechanical methods and will not require the addition of any chemicals to the Project area.
- There will be no refuelling or maintenance of equipment within the Project area, thus further avoiding the introduction of potential contaminants.
- Any construction waste will be appropriately stored, until being promptly removed from the Project area and disposed of by authorised third parties at a licenced facility.

Furthermore, Airlie Creek is a 1st order stream, and its contribution to the Great Barrier Reef Marine Parks is negligible. The lower reaches of Airlie Creek traverse the Airlie Beach town centre, via stormwater drains, before discharging to the Coral Sea. The downstream section of Airlie Creek is influenced by stormwater runoff from surrounding residential and urban land uses. Any temporary increase in sedimentation in the upper reaches of Airlie Creek is unlikely to influence the water quality at the discharge point or beyond to the Great Barrier Reef Marine Parks

3.8.3.Mitigation measures

Consistent with the precautionary principle, the following mitigation measures will be implemented to further reduce any potential impact on the Great Barrier Reef Marine Parks:

- Works will be completed during the dry season, where possible.
- Clearing activities will occur progressively, limiting the time areas are exposed.
- Erosion and sediment control measures will be implemented during construction activities. Recommended measures are detailed in Appendix E.
- Waste will be disposed of by authorised third parties at a licenced facility.

3.8.4.Summary

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to an Great Barrier Reef.

3.9. Water Resources in relation to large coal mining development or coal seam gas

The Project is not related to any large coal mining development or coal seam gas. The Project will not have any direct and/or indirect impact on water resources in relation to the protected matter.

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to water resources.

3.10. Commonwealth Land

The Project is not located on Commonwealth Land. The Project will not have any direct and/or indirect impact on the protected matter.

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to Commonwealth Land.

3.11. Commonwealth Heritage Places Overseas

The Project is located within the Whitsunday Regional Council. The Project will not have any direct and/or indirect impact on Commonwealth heritage places overseas.

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to Commonwealth Heritage Places Overseas.

3.12. Commonwealth Agency

The proponent of the activity is Australian Adventure Tourism Group. The Project does not require action by the Commonwealth or a Commonwealth Agency.

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to any Commonwealth Agency.

4. Environmental Risk Assessment

4.1.1.Overview

An environmental risk assessment has been prepared in relation to the proposed activity. The risk methodology utilised has been developed based on the Australia and New Zealand Standard AS/NZS for Risk Management – Principles and Guidelines (ISO 31000:2018).

The risk management process involves the systematic application of policies, procedures, and practices to the activities of communicating and consulting, establishing the context and assessing, treating, monitoring, reviewing, recording, and reporting risk (Figure 8).

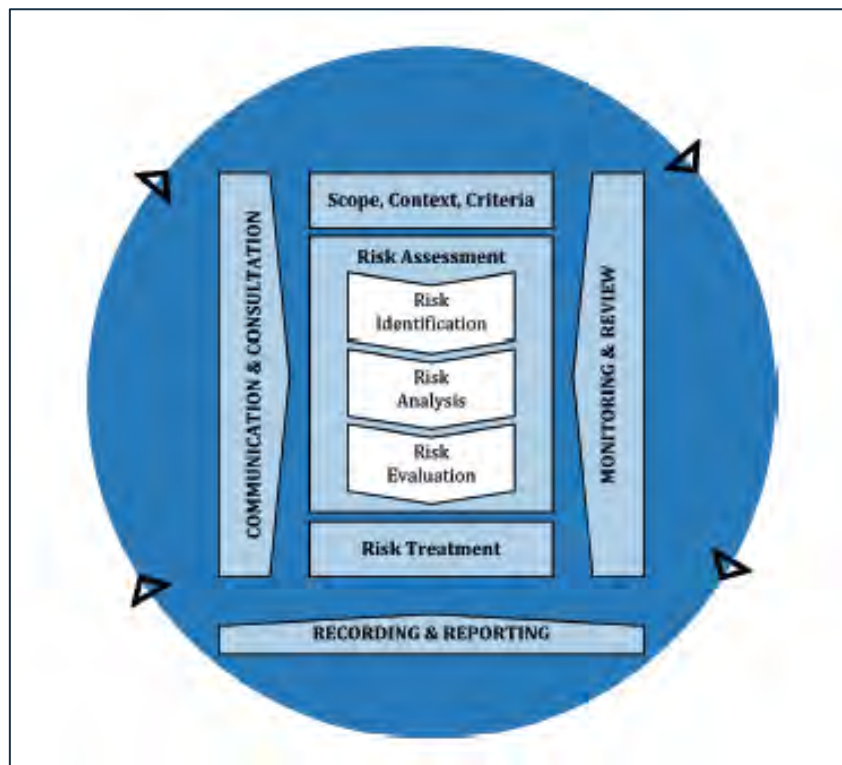


Figure 8. ISO 31000: 2018 Risk management process

4.1.2.Risk Identification

The purpose of risk identification is to find, recognise and describe risks that might help or prevent an organisation achieving its objectives. Relevant, appropriate and up-to-date information is important in identifying risks (Standards Australia, 2018).

The following factors and the relationships among these factors have been considered by this risk assessment:

- Tangible and intangible sources of risk
- Causes and events
- Threats and opportunities
- Vulnerabilities and capabilities

- Changes in the external and internal context
- Indicators or emerging risks
- The nature and value of assets and resources
- Consequences and their impacts on objectives
- Limitations of knowledge and reliability of information
- Time-related factors
- Biases, assumptions, and beliefs of those involved.

4.1.3.Risk Analysis and Evaluation

The purpose of risk analysis is to comprehend the nature of risk and its characteristics, including, where appropriate, the level of risk. Risk analysis can be undertaken with varying degrees of detail and complexity, depending on the purpose of the analysis, the availability and reliability of information and the resources available. Risk analysis techniques can be qualitative, quantitative or a combination of these and should include:

- The likelihood of events and consequences
- The nature and magnitude of consequences
- Complexity and connectivity
- Time-related factors and volatility
- The effectiveness of existing controls
- Sensitivity and confidence levels.

A likelihood of occurrence and severity of consequence rating has been assigned to each identified risk in accordance with the risk matrix detailed in Table 5. Control measures have been developed following the identification of risks to achieve a level of risk that is considered to be an acceptable level, as described in Table 6.

Table 5. Risk matrix

Likelihood of Occurrence	Severity of Consequence				
	Catastrophic	Major	Moderate	Minor	Insignificant
	(5)	(4)	(3)	(2)	(1)
Almost certain (5)	10	9	8	7	6
Likely (4)	9	8	7	6	5
Possible (3)	8	7	6	5	4
Unlikely (2)	7	6	5	4	3
Rare (1)	6	5	4	3	2

Table 6. Risk scores

Risk Score	Risk Rating	Actions Required
9 – 10	Extreme	Requires immediate action to reduce risk score.
7 – 8	High	Requires an action plan approved by senior management.
5 – 6	Moderate	Specific monitoring and procedures required.
2 - 4	Low	Management through routine procedures and protocols.

4.1.4. Risk Assessment Results

Risks identified were assessed using the methodology described above. Six risks were identified with all six rated as ‘Low’ and no risks were identified above this category. All risks considered the existing and proposed controls to reduce the level of risk to as low as reasonably practicable. Control strategies are reflected in Table 7.

Table 7. Risk assessment

Aspect	EPBC Act Protected Matter	Potential Impact	Risk Rating			Risk Controls	Residual Rating			Risk	Comments
			L	C	R		L	C	R		
Water	<ul style="list-style-type: none"> World Heritage Property National Heritage Place Great Barrier Reef Marine Park 	Increased erosion and runoff to Airlie Creek.	2	2	4	<ul style="list-style-type: none"> Works will be completed during the dry season, where possible. Clearing activities will occur progressively, limiting the time areas are exposed. Erosion and sediment control measures will be implemented during construction activities. 	1	2	3		
Water	<ul style="list-style-type: none"> World Heritage Property National Heritage Place Great Barrier Reef Marine Park 	Release of contaminants to Airlie Creek.	2	2	4	<ul style="list-style-type: none"> Works will be completed during the dry season, where possible. Clearing activities will occur progressively, limiting the time areas are exposed. Waste will be disposed of by authorised third parties at a licenced facility. Equipment will be adequately maintained and operated as per manufacture specifications No refuelling or maintenance activities are to occur within the Project area. 	1	2	3		

Aspect	EPBC Act Protected Matter	Potential Impact	Risk Rating			Risk Controls	Residual Rating			Risk	Comments
			L	C	R		L	C	R		
Land	<ul style="list-style-type: none"> Migratory species 	Impacts to the habitat and/or population of the Spectacled monarch	3	2	5	<ul style="list-style-type: none"> A trash rack is located on 366 Shute Harbour Rd, prior to the Airlie Creek discharge point. Any spills (fuels, etc) will be promptly cleaned and remediated as required. A pre-clearance survey will be undertaken prior to construction. A High-Risk Species Management Program (SMP) will be developed and implemented. A Pest Management Plan will be developed and implemented. A fauna spotter catcher will be employed during all construction activities. 	2	2	4		
Land	Nationally threatened species and ecological communities	Introduction and/spread of pest species				<ul style="list-style-type: none"> A Weed and Pest Management Plan will be developed and implemented. Complete a UAV based targeted Lantana camara survey when access permits 					

Aspect	EPBC Act Protected Matter	Potential Impact	Risk Rating			Risk Controls	Residual Rating			Risk	Comments
			L	C	R		L	C	R		
Air	<ul style="list-style-type: none"> World Heritage Property National Heritage Place Great Barrier Reef Marine Park 	Dust emissions from clearing and construction activities	2	2	4	<ul style="list-style-type: none"> Works will be completed during daylight hours only. Conduct visual inspection of work areas. Use and maintenance of equipment according to the manufacturer's specifications. Clearing activities will occur progressively, limiting the time areas are exposed. 	1	1	2		
Noise	<ul style="list-style-type: none"> World Heritage Property National Heritage Place Great Barrier Reef Marine Park 	Noise emissions from clearing and construction activities	2	2	4	<ul style="list-style-type: none"> Works will be completed during daylight hours only. Conduct visual inspection of work areas. Use and maintenance of equipment according to the manufacturer's specifications. 	1	1	2		

5. Conclusion

The proposed action is not considered to be a controlled action, as it is unlikely to have a significant impact to any protected matter under the EPBC Act.

One listed migratory species, the Spectacled monarch (*Symposiachrus trivirgatus*), was observed during field surveys within the Project area. Due to the nature of the construction works and size of the Project area, the proposed work is unlikely to cause significant impact to the population. Potential impacts will be appropriately mitigated through the following measures:

- A pre-clearance survey will be undertaken prior to construction.
- A High-Risk Species Management Program (SMP) will be developed and implemented.
- A Pest Management Plan will be developed and implemented.
- A fauna spotter catcher will be employed during all construction activities.

The Project is located within the coastal region of Airlie Beach, with potential for indirect impacts to the Great Barrier Reef. Impacts have been assessed as being low risk, and will be mitigated through the following measures:

- Works will be completed during the dry season, where possible.
- Clearing activities will occur progressively, limiting the time areas are exposed.
- Erosion and sediment control measures will be implemented during construction activities. Recommended measures are detailed in Appendix E.
- Waste will be disposed of by authorised third parties at a licenced facility.

The following protected matters are not mapped to occur within the Project area and will not be impacted directly or indirectly by the Project:

- nationally threatened species and ecological communities
- wetlands of international importance (listed under the Ramsar Convention)
- nuclear actions (including uranium mining)
- a water resource, in relation to coal seam gas and large coal mining developments
- Commonwealth land
- Commonwealth heritage places overseas.

6. References

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APPENDIX A – PMST REPORT



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: 05-Sep-2022

[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)	None
Great Barrier Reef Marine Park:	6
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	43
Listed Migratory Species:	47

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	86
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:	6
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	16
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

Great Barrier Reef Marine Park [\[Resource Information \]](#)

Zone Type	Zone ID	IUCN	Buffer Status
Conservation Park	CP-20-4080	IV	In buffer area only
Conservation Park	CP-20-4082	IV	In buffer area only
Conservation Park	CP-20-4083	IV	In buffer area only
General Use	GU-16-6004	VI	In buffer area only
Habitat Protection	HP-19-5165	VI	In buffer area only
Habitat Protection	HP-20-5194	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
Broad leaf tea-tree (<i>Melaleuca viridiflora</i>) woodlands in high rainfall coastal north Queensland	Endangered	Community likely to occur within area	In feature area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically 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			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
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
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Turnix olivii Buff-breasted Button-quail [59293]	Endangered	Species or species habitat may occur within area	In feature area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petrogale persephone Proserpine Rock-wallaby [226]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<u>Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</u>			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
<u>Xeromys myoides</u>			
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			
<u>Eucalyptus raveretiana</u>			
Black Ironbox [16344]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Graptophyllum ilicifolium</u>			
Holly-leaved Graptophyllum, Mt Blackwood Holly [8601]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Medicosma obovata</u>			
[17533]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<u>Neisosperma kilneri</u>			
[14319]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<u>Omphalea celata</u>			
[64586]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<u>Phaius australis</u>			
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area	In feature area
<u>Samadera bidwillii</u>			
Quassia [29708]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Solanum graniticum</u>			
Granite Nightshade [84819]	Endangered	Species or species habitat likely to occur within area	In feature area

REPTILE

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known 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
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
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 likely to occur within area	In buffer area only

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		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 likely to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known 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
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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat 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
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 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
Sousa sahalensis 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 may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely 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
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
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
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 likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In 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 likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may 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 nebularia Common Greenshank, Greenshank [832]		Species or species habitat may 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corythoichthys paxtoni Paxton's Pipefish [66204]		Species or species habitat may occur within area	In buffer area only
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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only
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 brevis 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
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			
Acalyptophis peronii Horned Seasnake [1114]		Species or species habitat may occur within area	In buffer area only
Aipysurus duboisii Dubois' Seasnake [1116]		Species or species habitat may occur within area	In buffer area only
Aipysurus eydouxii Spine-tailed Seasnake [1117]		Species or species habitat may occur within area	In buffer area only
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area	In buffer area only
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chitulia ornata as Hydrophis ornatus Spotted Seasnake, Ornate Reef Seasnake [87377]		Species or species habitat may 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
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area	In buffer area only
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area	In buffer area only
Enhydrina schistosa Beaked Seasnake [1126]		Species or species habitat may 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
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area	In buffer area only
Hydrophis macdowellii as Hydrophis mcdowellii Small-headed Seasnake [75601]		Species or species habitat may occur within area	In buffer area only
Lapemis curtus as Lapemis hardwickii Spine-bellied Seasnake [83554]		Species or species habitat may occur within area	In buffer area only
Laticauda colubrina a 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
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may 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 as Orcaella brevirostris Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Sousa sahalensis as Sousa chinensis 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
Conway	Conservation Park	QLD	In buffer area only
Conway	National Park	QLD	In feature area
Conway West	Conservation Park	QLD	In buffer area only
Dryander	National Park	QLD	In buffer area only
Great Barrier Reef Coast	Marine Park	QLD	In buffer area only
Molle Islands	National Park	QLD	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
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	
Controlled action					
Cannonvale Waste Water Treatment Facility upgrade	2010/5710	Controlled Action	Post-Approval	In buffer area only	

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Castaway Bay Resort	2002/546	Controlled Action	Completed	In buffer area only
Construction of marina facility	2003/1308	Controlled Action	Completed	In buffer area only
Construction of Marina Facility	2006/2939	Controlled Action	Post-Approval	In buffer area only
Lot 6 Residential Subdivision - 59 lots	2008/4123	Controlled Action	Post-Approval	In buffer area only
Port of Airlie Integrated Resort & Marina Development	2001/298	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Bagasse-furfural processing plant	2005/2361	Not Controlled Action	Completed	In buffer area only
Geotechnical Investigation for Castaway Bay Proposed Residential Development	2009/4813	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
Integrated Residential Development	2006/2977	Not Controlled Action	Completed	In buffer area only
Refuelling Facility Upgrade	2001/330	Not Controlled Action	Completed	In buffer area only
Residential development of 75 units, 4 shops, conference facility, health club a	2008/4291	Not Controlled Action	Completed	In buffer area only
Whitsunday Springs Golf Resort and Residential Development	2005/2485	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Lot 14 Shoreline Residential	2007/3326	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Ongoing dredging of the existing Abell Point Marina, Qld	2013/6931	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Residential Subdivision Development Mt Marlow	2008/4174	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Biologically Important Areas

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	Likely 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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APPENDIX B – FAUNA SURVEY AND BIOCONDITION ASSESSMENT REPORT (WTS, 2022a)



FAUNA SURVEY AND BIOCONDITION ASSESSMENT REPORT

**WHITSUNDAY SKYWAY PROJECT
AUSTRALIAN ADVENTURE TOURISM
GROUP**



DECEMBER 2022



**WULGURU TECHNICAL
SERVICES**

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Definitions

Term	Definition
AATG	Australia Adventure Tourism Group
ALA	Atlas of Living Australia
AOI	Area of Interest
AHD	Australian Height Datum
BoM	Bureau of Meteorology
BIO	Biosecurity Act 2014 (Queensland)
BVG	Broad Vegetation Group
DAF	Department of Agriculture and Fisheries
DAWE	Department of Agriculture, Water and the Environment
DERM	Department of Environment and Resource Management
DES	Department of Environment and Science
DEWHA	Department of Environment, Water, Heritage and the Arts
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EO	EPBC Act Environmental Offsets Policy
EP	Environmental Protection Act 1990 (Queensland)
EPBC	Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)
ERA	Environmentally Relevant Activities
ESA	Environmentally Sensitive Area
EVNT	Endangered, Vulnerable, Near Threatened
GAP	GAP Tree Change Pty Ltd
GBR	Great Barrier Reef
LOO	Likelihood of Occurrence
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NCA	Nature Conservation Act 1992 (Queensland)
NP	National Park
PMST	Protected Matters Search Tool
Project (the)	Whitsunday Skyway Project
RE	Regional Ecosystem
REDD	Regional ecosystem description database
SL	Special Least Concern
SMP	Species Management Program
SPRAT	Species Profile and Threats Database (Department of Agriculture, Water, and the Environment)
SARA	State Assessment and Referral Agency
SDAP	State Development Assessment Provisions
TSSC	Threatened Species Scientific Committee
VM Act	Vegetation Management Act 1999 (Queensland)
WO	Queensland Government Wildlife Online
WTS	Wulguru Technical Services

1. Introduction

Australian Adventure Tourism Group (AATG) (the Proponent) are proposing the construction of The Whitsunday Skyway Project (the Project), comprising a proposed cable car and mountain bike trail complex. The Project is proposed for construction with an area of approximately 100 ha of Lot 43 on Plan NPW1144 – Conway National Park. In a pre-referral meeting with the Department of Environment two species listed as threatened under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) were identified for targeted species surveys to determine presence and potential impacts. The northern quoll (*Dasyurus hallucatus*) (endangered EPBC) and Proserpine rock-wallaby (*Petrogale persephone*) (endangered EPBC) are both known inhabitants of the region and suitable habitat is known to be present.

Wulguru Technical Services (WTS) has been engaged by the Project to undertake targeted fauna surveys and BioCondition assessments within the proposed Project area to inform relevant components of the application, impact assessment and management actions and recommendations.

This report provides a baseline understanding of vegetation present within the Area of Interest (AOI), fauna habitat suitability, and the results of a targeted fauna survey for the northern quoll (*Dasyurus hallucatus*) and Proserpine rock-wallaby (*Petrogale persephone*). The survey focused on areas of previously undisturbed land and areas currently identified as National Park (NP) or Whitsunday Regional Council Reserve walking tracks.

1.1. Project Description

The Proponent is proposing the construction of the Project, consisting of 1 km cable car and a 27.5 km network of mountain bike trails with linkages to the walking trails within an area of 95.5 hectares of the Conway National Park (Conway NP). The AOI lies adjacent to the township of Airlie Beach which is a popular tourist destination within the Whitsundays region. Popular walking trails are already present within AOI. Mountain bike tracks are proposed to be constructed and operated within the Conway NP and managed by Queensland Parks and Wildlife Services under the Eco-Facilities Framework with land tenure being secured under a lease for approximately 90 ha of land with 3 x 30-year terms (AATG, 2022).

The project will result in land disturbance from the:

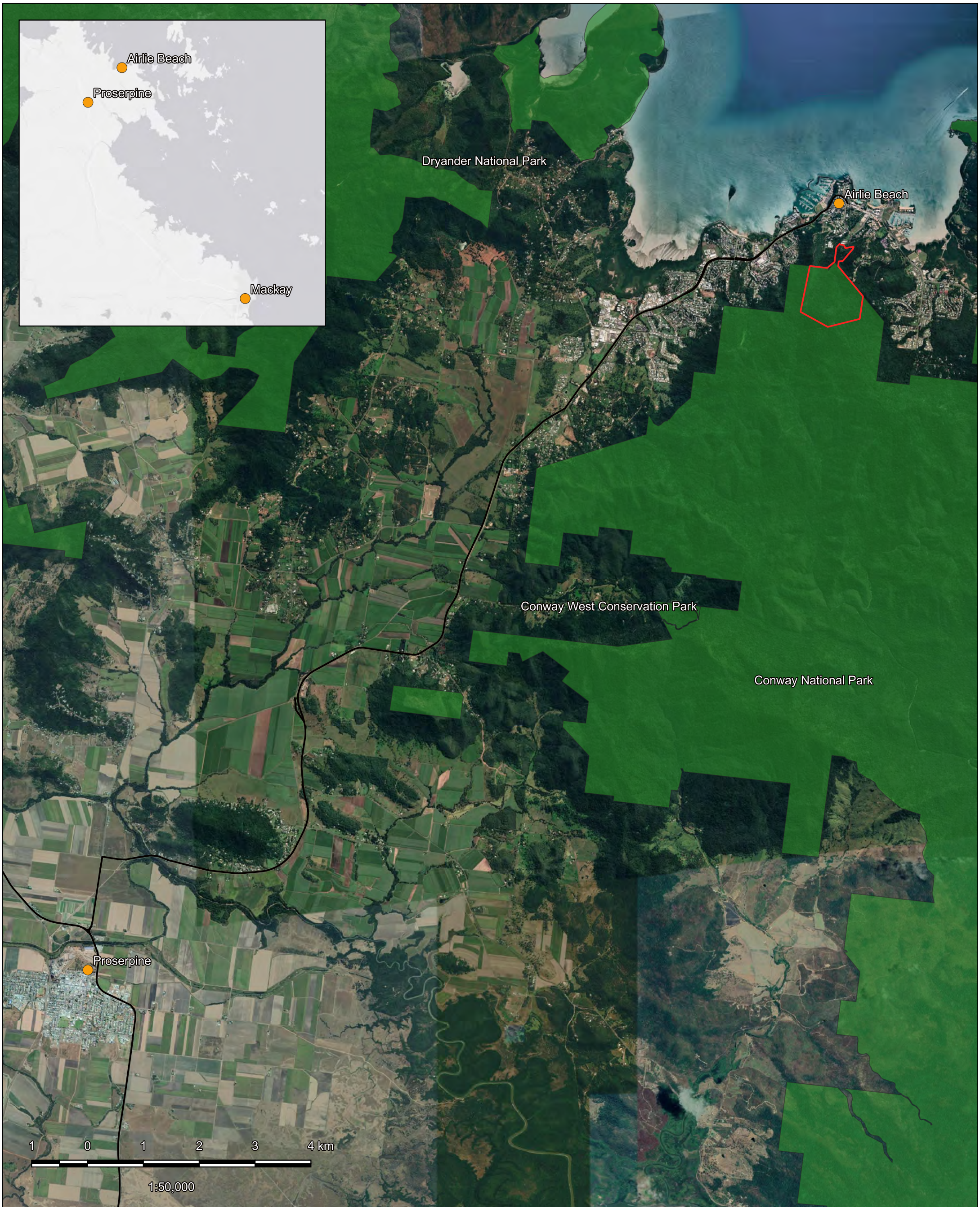
- construction of cable car towers;
- construction of access tracks;
- construction of base stations at the base and top of the project area;
- establishment of walking and mountain bike tracks; and
- construction of ancillary infrastructure (car parks, power supplies, amenities etc).

1.2. Project Location

The Whitsunday Skyway Project is located 1 km from Airlie Beach town centre, north Queensland (Figure 1). The project is located within the Whitsunday Regional Council. Approximately 95.49 ha of the Project is located within the Conway NP (Lot 43 NPW1144), while the remaining area lies within Freehold and Reserve Lots (Table 1).

Table 1. Property description.

Proponent Name – ABN	Australian Adventure Tourism Group
Lot on Plan and Tenure	91 on SP201430 - Freehold 90 on SP201430 - Freehold 43 on NPW1144 – National Park 995 on SP129622 – Reserve 87 on SP189776 – Reserve
Lot/Plan Area	Approximately 32,276 ha
Project Area	Approximately 102.89 ha
Local Government Area	Whitsunday Regional Council
Zoning	Environmental management and conservation, Recreation and open space & Low density residential



Client: GAP Treechange Pty Ltd
 Project number: 2022.08002
 CRS: GDA2020 EPSG:7844
 Date: 6 December 2022

Print as A3



Figure 1. Project Locality

Legend

- Key Features
- Major Roads
- Protected Area
- Study Area
- Google Satellite

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 Digital data for this report is available on the Queensland Government Spatial Portal at <https://qldspatial.information.qld.gov.au>.



1.3. Regional Context and Climate

The Whitsunday Skyway Project is situated within the Central Queensland Coast bioregion which has a sub-tropical to tropical climate with a distinct wet season and dry season. The nearest Bureau of Meteorology (BoM) weather station is the Hamilton Island Airport (Station 033106). Mean climate data from the Hamilton Island weather station is displayed in Figure 2.

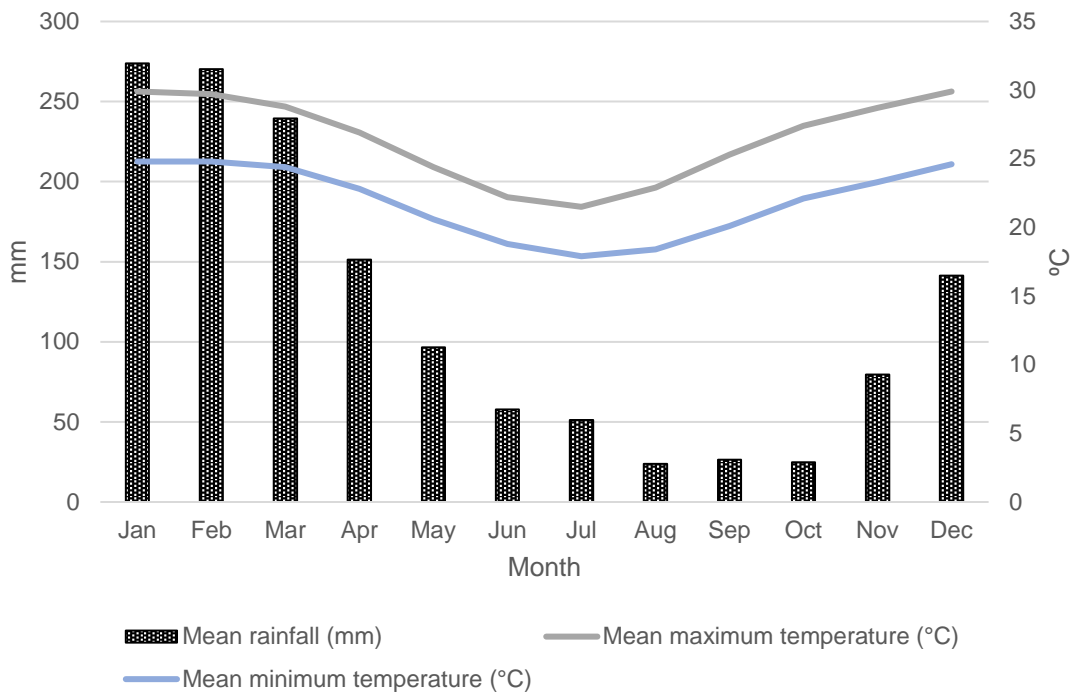


Figure 2. Mean temperature and rainfall at Hamilton Island Airport (Station 033106) (BoM, 2022).

1.4. Legislative Context

1.4.1. Environmental Protection and Biodiversity Conservation Act 1999 (EPBC) (Commonwealth)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) is the Commonwealth Government's key piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places — defined in the EPBC Act as matters of national environmental significance (MNES).

Matters of National Environmental Significance

- World Heritage Properties;
- National Heritage Places;
- wetlands of international importance (listed under the Ramsar Convention);
- nationally threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions (including uranium mining); and
- a water resource, in relation to coal seam gas and large coal mining developments.

If a proposed development or other action ('proposed action') is likely to have a significant impact upon an MNES, then it must be referred for assessment under the EPBC Act.

1.4.2. EPBC Act Environmental Offsets Policy

The Environmental Offsets Policy outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the EPBC Act. Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act.

1.4.3. State Development Assessment Provisions

The State Assessment and Referral Agency (SARA) assesses development applications against the State Development Assessment Provisions (SDAP). SDAP defines the state's interest in development assessment and includes the assessment benchmarks or matters SARA will assess an application against. The state uses SDAP to deliver a coordinated, whole-of-government approach to the state's assessment of development applications (SARA, 2022).

Impacts to Matters of State Environmental Significance are addressed under Performance Outcome 7 (PO7) State code 22: Environmentally relevant activities. The purpose of the code is to ensure that environmentally relevant activities (ERAs):

1. are located and designed to avoid or mitigate environmental harm on environmental values of the natural environment, adjacent sensitive land uses and sensitive receptors;
2. are designed and located to avoid impacts or, where the matters of state environmental significance cannot be reasonably avoided, impacts are reasonably minimised and mitigated;
3. does not result in a significant residual impact on a matter of state environmental significance unless the significant residual impact is acceptable, and an offset is provided.

1.4.4. Nature Conservation Act 1992 (NCA) (Queensland)

The *Nature Conservation Act 1992* (NCA) and the Nature Conservation (Animals) Regulation 2020 and Nature Conservation (Plants) Regulation 2020 provide a legislative framework for the protection and conservation of Queensland's native plants and animals. Under the framework species of conservation significance are assessed and categorised with respect to population, distribution and potential threats and impacts. The objectives of the NCA are achieved through an integrated and comprehensive conservation strategy that protects and conserves threatened and special interest species and their habitat and protected areas.

Matters of State Environmental Significance

Matters of State Environmental Significance (MSES) are defined under Queensland's State the *Environmental Offsets Act 2014* and include:

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

2. Methodology

The scope of the assessments performed by WTS included a targeted fauna survey for the Proserpine rock-wallaby (*Petrogale persephone*) and northern quoll (*Dasyurus hallucatus*), along with BioCondition assessments of the AOI. These assessments were undertaken in a two-stage process (Eyre *et al.* 2018); stage 1 – desktop scoping and review of available literature for the AOI, and stage 2 – field surveys to verify species presence and/or population and the existing environmental condition. Together the efforts provide baseline data to support decisions relevant to the approval process of the proposed project.

2.1. Desktop Analysis

A comprehensive desktop analysis encompassed a literature review, online database searches, and a review of currently available mapping to identify potential environmental values and constraints of the AOI, gaps in current knowledge, and the requirement for further surveys or assessments. The Atlas of Living Australia search tool (ALA) (ALA, 2022), Department of Agriculture Water and the Environment (DAWE) Protected Matters Search Tool (PMST) (DAWE, 2022b), and the Queensland Government Wildlife Online (WO) (DES, 2022b) database were used to determine possible presence of EPBC and NCA listed species, ecological communities, and areas of conservation significance relevant to the AOI. The PMST and WO searches included a 10 km buffer around a central coordinate within the AOI (-20.2833, 148.711), to ensure all conservation significant matters relevant to the site were identified. Search tools used to perform the desktop analysis are summarised in Table 2. The results of database searches and relevance to the AOI are discussed in the Results section of this report.

Table 2. Search tools used to conduct Desktop Analysis.

Search/Tool/Layer	Source	Output
Protected matters search tool (PMST) 10 km buffer radius *Last updated 30 Nov 2022	https://www.awe.gov.au/environment/epbc/protected-matters-search-tool (Appendix A)	Possible presence of species or species habitats for environmentally significant species
Wildlife online database (WO) 10 km buffer radius *Last updated 30 Nov 2022	https://apps.des.qld.gov.au/report-request/species-list (Appendix B)	Point records for species
Atlas of living Australia (ALA) 50 km buffer radius	https://spatial.ala.org.au/	Point records for species
Species Profile and Threats Database (SPRAT)	http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl	EPBC listed species information
Wildnet Database Species Profile Search	https://apps.des.qld.gov.au/species-search/	NCA listed species information
REDD Regional Ecosystems database – Version 12.1 *Last updated 12 May 2021	https://www.data.qld.gov.au/dataset/regional-ecosystem-description-database	Regional ecosystem descriptions and statuses
Vegetation Management Regional Ecosystem Mapping – Version 12.02 *Last updated 07 September 2022	https://www.data.qld.gov.au/dataset/vegetation-management-act-series/resource/7fbb5561-7417-405f-8622-a4799687903b	Spatial layer showing regional ecosystems within an area
Modelled potential habitat for select threatened species – Queensland. Version 1.0 *Last updated 06 May 2021	https://www.data.qld.gov.au/dataset/modelled-potential-habitat-for-selected-threatened-species-queensland	Spatial layer showing modelled potential habitat for threatened flora and fauna species

Queensland Globe interactive mapping	https://qldglobe.information.qld.gov.au/	Surface geology, regulated vegetation, protected plants flora survey trigger map, essential habitat map
Environmental Reports Online *Last updated February 2021	https://www.qld.gov.au/environment/management/environmental/environmental-reports-online (Appendix C)	MSES matters
Vegetation Management Report *Last updated 23 August 2022	https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form	Regulated Vegetation Management Map, Vegetation Management Supporting Map, Protected Plants Flora Survey Trigger Map and Koala priority area and koala habitat area map

2.1.1. Likelihood of Occurrence Analysis

Each species of conservation significance returned in the 10 km radius search was assessed against the criteria in Table 3 to determine the likelihood of occurrence (LOO) within the AOI. It is important to note some locally occurring conservation significant species may not be returned within the database searches for various reasons such as lack of survey effort in the local area, highly cryptic behaviour making observation difficult, or the species being listed in the *Queensland Confidential Species register* (Version 1) (DES, 2016).

Table 3. Likelihood of occurrence criteria.

Status	Definition
Known	Species known to occur from recent reliable records* within the study area.
Likely	Recent reliable records of the species within 1km of the study area and/or preferred habitat known to be present, and recent reliable records within 5 km.
Possible	Species recorded* within 50 km of the study area and/or suitable habitat mapped as present.
Unlikely	Species not recorded within 50 km of the study area and/or suitable habitat not mapped as present.

* Records less than 20 years old and from reputable sources using vetted data (primarily Wildnet)

* May include older and unconfirmed records

2.2. BioCondition Assessment Methods

2.2.1. Survey timing and qualifications

BioCondition assessments, led by WTS Principal Ecologist Delwyn Windridge were conducted on the 19 to 22 September 2022. Delwyn has over 10 years' experience in flora and botanical surveys and is endorsed by DES as a suitably qualified person for the purposes of undertaking protected plant surveys. Also present for some assessments was Managing Director (Principal Ecologist) Grant Paterson of GAP Tree Change Pty Ltd (GAP). Grant Paterson has over 30 years' botanical experience, working both in government and in industry and is a suitably qualified person for the purposes of undertaking protected plant surveys.

2.2.2. Survey techniques

Sites were selected to obtain best representation of the REs present though locations were limited to accessible areas. Consideration was given to best on offer vegetation though, again, these were limited by accessibility.

BioCondition assessments were carried out in accordance with the *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2* (Eyre *et al.*, 2015).

Where BioCondition Benchmarks were not available, assessments were completed, and draft benchmark criteria derived using the methodology provided in the *Method for the Establishment and Survey of Reference Sites for BioCondition. Version 3* (Eyre *et al.*, 2017).

2.2.3. BioCondition scoring methods

Sites were scored in accordance with the abovementioned methodology however as no benchmarks were available, the following methods were adopted and should be reviewed where Benchmarks become available:

- Sites in RE 8.12.12d were scored using 8.12.12a. Queries to the Queensland Herbarium regarding the suitability of these benchmarks for use with RE 8.12.12d were unanswered at the time of this report.
- The results of all three sites in RE 8.12.18 were used to create draft benchmarks as per the guidelines relating to reference sites and the resulting draft benchmarks used to score each site. While this is circular reasoning, each site was close to best on offer and results will be provided to the Herbarium for the development of more formalised benchmarks.

2.3. Fauna Survey Methods

2.3.1. Permits, ethical considerations, and qualifications

WTS is the holder of the following certificates and permits allowing for the undertaking of fauna surveys:

- Scientific research permit number WA0037567; and
- Scientific Use Research Certificate Registration Number SUR001656.

WTS has a signed formal agreement with the Department of Agriculture and Fisheries Animal Ethics Committee. All surveys and fauna interactions are carried out in accordance with this agreement and the Australian code for the care and use of animals for scientific purposes (National Health and Medical Research Council 2013).

Surveys were completed by experienced field ecologists with a minimum bachelor's degree qualification in a relevant field under the supervision of Principal Ecologist Delwyn Windridge. Where deemed necessary or complementary to the surveys, advice was sought from external experts in the field of interest.

2.3.2. Survey timing and site selection

Targeted camera trapping surveys were conducted from 20 September to 16 October 2022. A detailed breakdown of timing for individual camera sites may be found in section 2.3.3.

Survey site locations were selected based on state mapped regional ecosystem mapping, mapped broad vegetation groups on a 1:5 million scale (BVG5M), and satellite imagery. Survey site locations were refined in the field based on suitability of habitat for potential EVNT species and niche microhabitats (section 3.3.1).

A total of 20 camera sites were implemented within the AOI, 15 of which within the Conway NP and the remaining five in Freehold Lots 90 and 91 on SP201430 (Figure 3).



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Figure 3. Camera Trap Locations

Legend

- Study Area
- Walking Track
- Watercourse - Stream Order
- 1
- Camera Trap Locations
- Google Satellite

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2.3.3. Survey design and effort

In a pre-lodgement meeting with DES two threatened fauna species were identified for targeted fauna surveys: the Proserpine rock-wallaby (*Petrogale persephone*) and the northern quoll (*Dasyurus hallucatus*). Both species have a habitat preference for rocky outcrops in notophyll or semi-deciduous forests (DSEWPaC, 2011; Hill & Ward, 2010; Woinarski *et al.*, 2014). The agreed approach was to install 20 camera traps throughout the AOI targeting niche denning and foraging habitat as per survey guidelines for the species' (Department of the Environment, 2016; DSEWPaC, 2011; Eyre *et al.*, 2018). Incidental observations and secondary signs observations, such as scats, tracks, and traces, were also noted during the field surveys.

Camera trapping is a non-invasive survey technique used to target reptiles and medium to large mammals, however if image resolution quality is high enough most taxa can be recorded and identified. This method was used in lieu of cage traps due to higher detection rates of medium to large sized mammals, and ethical benefits (Eyre *et al.* 2018). The main objective of the survey was to target the northern quoll (*Dasyurus hallucatus*) and Proserpine rock-wallaby (*Petrogale persephone*); however, all species observed through camera trapping were recorded. Each of the 20 survey sites included one Reconyx® Hyperfire 2™ Cellular Professional Covert IR camera (Reconyx, 2022a), one bait canister, one net bait bag, and one Reconyx® SC10 Solar Charger (Reconyx, 2022b). Each camera was equipped with twelve AA batteries in case of solar panel failure due to lack sun exposure or equipment failure. All cameras were deployed for a minimum of 20 nights (see Table 4 for site specifics).

The fixed motion sensor cameras were secured to tree trunks approximately 30 – 50 cm from the ground and directed at a downward angle towards a bait canister and net bait bag (Figure 4). Bait canisters, constructed of PVC tubing with ventilation, were secured to tree trunks 1.5 – 2 m from the camera approximately 30 – 50 cm from the ground. Each canister was baited with one Yours Drooly™ chicken tender dog treat (chicken jerky) to attract quolls (DSEWPaC, 2011). Chicken jerky was chosen over raw chicken due to the length of the survey period and the difficulty in access to much of the site due to the terrain and thickened vegetation. Additionally, one net crab bait bag was filled with lucerne and suspended above each bait canister to attract Proserpine rock-wallabies as per guideline recommendations (DSEWPaC, 2011). Camera deployment was staggered due to the availability of cameras and resources and therefore rebaiting was conducted for the initial 13 cameras deployed in early September.

All cameras were set to medium sensitivity to minimize the occurrence of false triggers. Once motion was detected in the camera frame, the camera triggered three photographs in quick succession with no wait time between the next triggering. Cameras were set to be triggered both day and night, utilising an infrared night-time illuminator for nocturnal photographs. Triggering was set to both day and night to increase the probability of recording relevant EVNT species, as the northern quoll is predominantly nocturnal and the Proserpine rock-wallaby is crepuscular (active during twilight) (DSEWPaC, 2011, DAWE, 2021). It is important to note, different microhabitats influence the difficulty in detection when analysing photographs (i.e. high grass near bait canister or excessive leaf litter). Heavily vegetated areas were avoided for camera placement where possible and small amounts of vegetation or debris were removed from the camera frame to minimize false triggers. Niche habitats were targeted for camera placement to increase the probability of encountering relevant EVNT species, e.g., rock overhangs, areas with tree hollows, hollow logs, rock crevices, and vegetation-lined creek lines.

Digital images captured by the Reconyx® cameras were downloaded through cellular data at the time of triggering. All camera data was reviewed by Managing Director (Principal Ecologist) Grant Paterson of GAP Tree Change Pty Ltd (GAP). Species observed through camera trapping are listed in Table 13.

Table 4. Camera trapping survey details (combined effort of 924 nights).

Camera Number	Deployment Date	Collection Date	Rebait	Survey Effort
WC 1	20 September 2022	16 November 2022	18 October 2022	57 nights
WC 2	20 September 2022	16 November 2022	18 October 2022	57 nights
WC 3	20 September 2022	16 November 2022	18 October 2022	57 nights
WC 4	20 September 2022	16 November 2022	18 October 2022	57 nights
WC 5	20 September 2022	16 November 2022	18 October 2022	57 nights
WC 6	20 September 2022	16 November 2022	18 October 2022	57 nights
WC 7	20 September 2022	16 November 2022	19 October 2022	57 nights
WC 8	20 September 2022	16 November 2022	19 October 2022	57 nights
WC 9	22 September 2022	16 November 2022	19 October 2022	55 nights
WC 10	22 September 2022	16 November 2022	19 October 2022	55 nights
WC 11	22 September 2022	15 November 2022	18 October 2022	54 nights
WC 12	22 September 2022	15 November 2022	18 October 2022	54 nights
WC 13	22 September 2022	15 November 2022	18 October 2022	54 nights
WC 14	19 October 2022	16 November 2022	N/a	28 nights
WC 15	19 October 2022	16 November 2022	N/a	28 nights
WC 16	18 October 2022	15 November 2022	N/a	28 nights
WC 17	18 October 2022	15 November 2022	N/a	28 nights
WC 18	19 October 2022	16 November 2022	N/a	28 nights
WC 19	19 October 2022	16 November 2022	N/a	28 nights
WC 20	19 October 2022	16 November 2022	N/a	28 nights



Figure 4. Representative photo of camera trapping set-up. Pictured is camera site WC 11 (22 September 2022).

Throughout the set-up, rebaiting, and camera collection efforts, secondary signs and incidental observations were recorded. Secondary signs of animals can provide indirect records of species presence and activity (Eyre *et al.* 2018). Signs may include tracks, scratches, feeding marks, scats, nest, roosts, feathers, bones, or carcasses. Several taxa may be targeted with this approach including reptiles, nocturnal birds, medium to large terrestrial mammals, arboreal mammals, and volant mammals. These signs are often observed opportunistically during other survey activities or generally in the survey area when travelling between sites. Incidental observations include any species observation (visual and/or auditory) recorded while traveling between sites or outside of active survey searches. Species observed with these methods have been included in the AOI observed species list (Table 14).

3. Results

3.1. Desktop Analysis

3.1.1. Geology and Soils

The topography of the AOI is characterized by the steep undulated terrain of the Conway NP and ranges from 60m to 420 m Australian Height Datum (AHD) (Queensland Government, 2022) (Figure 5). One watercourse is mapped within the AOI, Airlie Creek, which is a stream order 1 which discharges into the Coral Sea 1 km north of the AOI (Figure 5). The AOI is located within the Whitsunday Volcanic Province, dominated by medium- to high-grade, dacitic to rhyolitic lithic ignimbrites and intruded by gabbro/dolerite to rhyolite dykes (up to 50 m in width), sills and comagmatic granite (Bryan *et al.*, 2000). The two main geological units within the AOI are described in Table 5.

Table 5. Geological units within the AOI.

Rock Unit Name	Lithological Summary	Dominant Rock	Rock Type	Age
Proserpine Volcanics (Kvp)	Rhyolite, andesite, and minor volcanoclastics	Mixed mafites and felsites (mainly volcanics)	Stratified unit (including volcanic and metamorphic)	Early Cretaceous
Airlie Volcanics (Pvl)	Felsic to intermediate volcanoclastics and lavas	Mixed mafites and felsites (mainly volcanics)	Stratified unit (including volcanic and metamorphic)	Early Permian

The AOI is situated within the Soils and Land Suitability of the Central Queensland Whitsunday Coast Area (1:50,000) survey area (Hardy, 2003). The soils at the site are labelled MTN which is a code used to classify areas not typically assessed in detail. No other information on soil is provided for the site under the Soils and Land Suitability of the Central Queensland Whitsunday Coast Area mapping.

The site is also within the Atlas of Australian Soils (1:2,000,000) mapping area. The soils within the AOI under this mapping are classified as ME2 – gradational brown, A2 horizon nonbleached, acid smooth-ped whole col B horizon (Queensland Government, 2022).

3.1.2. Landzones

The entirety of the AOI is mapped as Landzone 12, which is described as Mesozoic to Proterozoic igneous rocks, forming ranges, hills, and lowlands with gently undulating rises to steep mountains. Soils in this zone are typically low to moderate in fertility, supporting a diverse range of eucalypt open forest and woodland, or, in more favourable sites, rainforests and vine forest (Wilson & Taylor 2012).



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Figure 5. Topography and Drainage of the Study Area

Legend

- ▭ Study Area
- 20m Contour
- Watercourse - Stream Order
- 1
- Google Satellite

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3.1.3. Regional Ecosystems

Four regional ecosystems (REs) are mapped within the AOI, all of which are classified as Least Concern (LC) under the VM Act and have BD statuses of No Concern at Present (NC). Descriptions for each of the mapped REs may be found in Table 6. Regional ecosystems are mapped within the AOI as one homogenous (discrete) RE and two heterogenous (mixed) REs (Queensland Government, 2022) (Figure 6). Approximately 80% of the AOI is mapped as the heterogenous RE 8.12.18/8.12.11a (Table 7).

Table 6. Descriptions for Regional Ecosystems mapped within the AOI.

Regional Ecosystems	Short Description	VM Status ¹	BD Status ²	Structure Category
8.12.11a	Semi-evergreen microphyll vine thicket +/- <i>Araucaria cunninghamii</i> on islands and coastal headlands on Mesozoic to Proterozoic igneous rocks and Tertiary volcanics	LC	NC	Dense
8.12.12d	<i>Eucalyptus tereticornis</i> and/or <i>Corymbia</i> spp. and/or <i>E. platyphylla</i> and/or <i>Lophostemon suaveolens</i> woodland to open forest on hill slopes on Mesozoic to Proterozoic igneous rocks	LC	NC	Sparse
8.12.18	Semi-evergreen notophyll/microphyll to complex notophyll <i>Argyrodendron</i> spp. vine forest +/- <i>Araucaria cunninghamii</i> , of foothills and uplands on near-coastal ranges and islands on Mesozoic to Proterozoic igneous rocks	LC	NC	Dense
8.12.19	Semi-deciduous complex notophyll feather palm vine forest of sheltered gullies and slopes of foothills and uplands on Mesozoic to Proterozoic igneous rocks	LC	NC	Dense
Non-rem	n/a	n/a	n/a	n/a

¹VM Status – Vegetation Management Act 1999 Status. LC – Least Concern.

²BD Status – Biodiversity Status. NC – No concern at present, OC – Of concern, E – Endangered.

Table 7. Mapped Regional Ecosystems of AOI

Regional Ecosystems	Estimated Percentage Distribution	VM Status ¹	BD Status ²	Sum of Area (ha)
8.12.12d	100	LC	NC	0.56
8.12.18/8.12.11a	60/40	LC/LC	NC/NC	80.57
8.12.18/8.12.11a/8.12.19	50/40/10	LC/LC/LC	NC/NC/NC	21.17
non-rem	100	n/a	n/a	0.61
Total				102.90

¹VM Status – Vegetation Management Act 1999 Status. LC – Least Concern.

²BD Status – Biodiversity Status. NC – No concern at present, OC – Of concern, E – Endangered.



100 0 100 200 300 400 m

1:5,000

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Figure 6. Mapped Regional Ecosystems (REs) within the Study Area

- Legend
- Study Area
 - Regional Ecosystem
 - Least Concern
 - Non-Remnant
 - Google Satellite

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3.1.4. Broad vegetation groups

The AOI is mapped as two remnant Broad Vegetation Groups (BVGs) under a 1:5 million scale. BVG 1:5 million is a national scale of broad vegetation mapping and consists of 16 distinct BVGs (Neldner *et al.*, 2019). The majority of the AOI is mapped as rainforest and scrub (BVG5M:1), with a remaining smaller section of eucalypt woodlands to open forests (mostly eastern) (BVG5M:3) (Queensland Government, 2022).

Under a more detailed regional scale (BVG 1:1 million), the two BVGs within the AOI are:

- 5b: notophyll to microphyll vine forests, frequently with *Araucaria cunninghamii* (hoop pine), on ranges of central coastal bioregions; and
- 9c: Open forests of *Corymbia clarksoniana* (grey bloodwood) (or *C. intermedia* (pink bloodwood) or *C. novoguineensis*), *C. tessellaris* (carbeen) ± *Eucalyptus tereticornis* (blue gum) predominantly on coastal ranges. Other frequent tree species include *Eucalyptus drepanophylla* (grey ironbark), *E. pellita* (large-fruited red mahogany), *E. brassiana* (Cape York red gum) and *Lophostemon suaveolens* (swamp box) (Neldner *et al.*, 2019).

3.1.5. Matters of National Environmental Significance

The desktop assessment identified the following Matters of National Environmental Significance (MNES) within a 10 km radius of the AOI:

- 1 World Heritage Properties: Great Barrier Reef;
- 1 National Heritage Places: Great Barrier Reef;
- 0 Wetlands of International Importance (RAMSAR);
- 6 Great Barrier Reef Marine Park zones: 3 Conservation Park zones, 1 General Use zone, and 2 Habitat Protection zones;
- 0 Commonwealth Marine Areas; and
- 2 Listed Threatened Ecological Communities: Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland (Endangered) and Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (Critically endangered).

The PMST database search returned the following MNES as potentially occurring within a 10 km radius of the AOI.

- 8 EVNT flora species;
- 35 EVNT fauna species;
- 86 listed marine fauna species;
- 12 Whale and other cetacean species; and
- 47 migratory fauna species.

3.1.6. Matters of State Environmental Significance

Matters of state environmental significance (MSES) includes the following:

- Species listed as either ENVT or Special Least Concern (SL) under the NCA;
- Protected areas (estate, special wildlife reserves, and nature refuges)
- Marine parks (highly protected areas);
- Declared fish habitat areas, wildlife habitat (EVNT, SL, or koala);

- Regulated vegetation areas;
- Strategic environmental areas (designated precinct);
- High ecological significance wetlands;
- High ecological value waters (wetland or watercourse); and
- Legally secured offset areas (offset register and regulated vegetation offsets).

The WO database search returned the following MSES conservation significant species as potentially occurring within a 10 km radius of the AOI:

- 3 EVNT flora and 36 SL flora; and
- 16 EVNT fauna and 17 SL fauna.

3.1.6.1. Regulated Vegetation

No areas of Category R – GBR River regulated vegetation were identified within the AOI through desktop assessment. Similarly, no areas of Category B Endangered or Of Concern regulated vegetation were identified within the AOI, however small areas occur in a nearby proximity (less than 2 km from the AOI boundary).

The majority of the AOI is listed as Category B – remnant vegetation, apart from a small area of Category X – Cleared vegetation within the Freehold Lots (approximately 0.61 ha). Additionally, regulated vegetation (intersecting a watercourse) is mapped along Airlie Creek within the AOI.

The greater portion of the AOI is mapped as essential habitat which relates to the EPBC and NCA listed species Proserpine rock-wallaby (*Petrogale persephone*) - endangered (EPBC, NCA).

3.1.6.2. Designated precinct in a strategic environmental area

There are no designated precincts in strategic environmental areas mapped for the AOI or surrounding areas.

3.1.6.3. Water Course and Wetlands

No RAMSAR wetlands were identified within 2 km of the AOI through desktop assessment. Additionally, no High Ecological Value (HEV) or High Ecological Significance (HES) wetlands were identified within 2 km of the AOI.

One defined watercourse, Airlie Creek, intersects the AOI for approximately 0.65 km. Airlie creek is a nonperennial, minor watercourse with a stream order of 1. Airlie creek is considered a HEV watercourse, which is defined in the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* as “water in which the biological integrity of the water is effectively unmodified or highly valued”.

3.1.6.4. Protected Wildlife Habitat

Approximately 94 ha of the AOI is mapped a core habitat for one or more critically endangered, endangered, or vulnerable taxa. The DES MSES report identified core habitat for the Proserpine rock-wallaby (*Petrogale persephone*) and the water mouse (*Xeromys myoides*) within 2 km of the AOI (Appendix C). In addition, approximately 4.43 ha of the Freehold Lot area is mapped as having one or more Special Least Concern (SL) taxa recorded in the locality.

3.1.6.4.1. Protected Plant Trigger Mapping

The Department of Environment and Science defines “high risk areas” on the *Protected Plants Flora Survey Trigger Map* as areas with validated records of EVNT flora and/or habitat highly likely to have one or more ENVT

flora species (DES, 2022a). High risk area is mapped within a 2 km radius of the AOI, including 7.15 ha of the Freehold and Reserve Lots within the AOI. Mapping of high risk areas is limited to areas mapped as remnant vegetation, regrowth vegetation, wetlands, and Category A area under the VM Act. Approximately 95.49 ha of the AOI lies within the Conway NP, which is listed as a protected area under the NCA. All vegetation within a NP is protected under the NCA.

3.1.6.5. Protected Areas

Under the NCA, “protected areas” include national parks, conservation parks, resource reserves, and private land declared as a nature refuge or special wildlife reserve. Approximately 95.49 ha of the AOI is within the Conway NP. The Dryander NP is located approximately 5 km to the northwest of the AOI.

3.1.6.6. Protected Marine Areas and Habitat

There are no Protected Marine Areas or Habitat within 2 km of the AOI. However, two Great Barrier Reef Coast Marine Park areas are located within 10 km of the AOI (Pioneer Bay approximately 3 km northwest and Whitsunday Islands approximately 8 km east).

3.1.6.7. Legally Secured Offset Areas

There are no Legally Secured Offset Areas within a 2 km radius of the AOI.

3.1.7. Conservation Significant Matters

3.1.7.1. Mapped Habitat Values

Modelled potential habitat layers for EVNT species are available through Qspatial: “Modelled potential habitat for select threatened species – Queensland” (DES, 2015). Two EVNT flora species are mapped within the proposed Project area using the modelled potential habitat layer. Neither of these species were returned in the PMST or WO database searches as potentially occurring within a 10 km radius of the AOI. The two EVNT flora species with identified modelled potential habitat include the following:

- *Arthraxon hispidus* (hairy-joint grass) – V (NCA), V (EPBC); and
- *Marsdenia brevifolia* (superseded by *Leichhardtia brevifolia* 2021) – V (NCA), V (EPBC).

Potential habitat is modelled within the proposed Project area for seven EVNT fauna species:

- *Dasyurus hallucatus* (northern quoll) – LC (NCA), E (EPBC);
- *Erythrotriorchis radiatus* (red goshawk) – E (NCA), V (EPBC);
- *Geophaps scripta scripta* (squatter pigeon (southern)) – V (NCA), V (EPBC);
- *Macroderma gigas* (ghost bat) – E (NCA), V (EPBC);
- *Petrogale persephone* (Proserpine rock-wallaby) – E (NCA), E (EPBC);
- *Poephila cincta cincta* (black-throated finch (southern)) – E (NCA), E (EPBC); and
- *Taphozous australis* (coastal sheath-tail bat) – NT (NCA), NL (EPBC).

Of these species, six were returned in the PMST database search as potentially occurring within a 10 km radius of the AOI (northern quoll, red goshawk, squatter pigeon (southern), ghost bat, Proserpine rock-wallaby, and the black-throated finch (southern)). Three of the seven species were returned in the WO database search as having confirmed records within a 10 km radius of the AOI (northern quoll, Proserpine rock-wallaby, and the coastal sheath-tail bat).

3.1.7.2. Threatened Flora Species

Desktop assessment identified a total of 13 EVNT flora species with potential to occur within a 10 km radius of the AOI. An additional 36 flora species listed as Special Least Concern (SL) under the NCA were returned. For the complete list of conservation significant species returned in the database searches, please see Appendix A and Appendix B. The EVNT flora species are as follows:

- *Arthraxon hispidus* (hairy-joint grass) – V (NCA), V (EPBC);
- *Brachychiton compactus* (Whitsunday bottle tree) – NT (NCA), NL (EPBC);
- *Eucalyptus raveretiana* (Black ironbox) – LC (NCA), V (EPBC);
- *Graptophyllum ilicifolium* (Holly-leaved Graptophyllum, Mt Blackwood Holly) – V (NCA), V (EPBC);
- *Marsdenia brevifolia* (superseded by *Leichhardtia brevifolia* 2021) – V (NCA), V (EPBC);
- *Medicosma obovata* – V (NCA), V (EPBC);
- *Neisosperma kilneri* – V (NCA), V (EPBC);
- *Omphalea celata* – V (NCA), V (EPBC);
- *Phaius australis* (Lesser swamp-orchid) – E (NCA), E (EPBC);
- *Rhodamnia glabrescens* – NT (NCA), NL (EPBC);
- *Samadera bidwillii* (Quassia) – V (NCA), V (EPBC);
- *Solanum graniticum* (Granite nightshade) – E (NCA), E (EPBC); and
- *Solanum sporadotrichum* – NT (NCA), NL (EPBC).

3.1.7.3. Threatened Fauna Species

Desktop assessment identified a total of 28 EVNT fauna species with potential to occur within a 10 km radius of the AOI. An additional 28 species listed as Special Least Concern (SL) under the NCA were returned, 27 of which were also listed as Marine (Ma) and/or Migratory (M) under the EPBC. One species, the short-beaked echidna (*Tachyglossus aculeatus*), is listed as SL under the NCA and is not listed on the EPBC. For the complete list of conservation significant species returned in the database searches, please see Appendix A and Appendix B.

3.1.8. Likelihood of Occurrence

Due to the Project's proximity to the coastline, the 10 km radius buffer triggered several flora and fauna species associated with coastal and/or marine habitat. However, the AOI represents a rainforest and vine thicket habitat, unlikely to host the majority of these coastal and/or marine habitat preference species. Terrestrial species of conservation significance returned in the 10 km radius search for MNES and MSES species were assessed against the criteria in Table 3 to determine the likelihood of occurrence (LOO) within the AOI. Details for identified EVNT flora and fauna species, including their corresponding likelihood of occurrence within the AOI, may be found in Table 8 and Table 9 respectively. One Special Least Concern (SL) species, the short-beaked echidna (*Tachyglossus aculeatus*) is also listed in Table 9 due to the cultural significance of the species.

Additional terrestrial fauna listed as either Special Least Concern (SL), Marine (Ma), and/or Migratory (M) with potential to occur within a 10 km radius of the AOI are listed in Appendix D. Due to the relatively small total area of potential impact (approximately 102.9 ha) and most of the planned disturbance to occur in a linear path, potential impacts to these species would be better addressed through a pre-clearance survey of the disturbance once planning is finalized, and therefore have not been addressed here. Post pre-clearance survey, potential

impacts and species management may then be addressed through an approved Species Management Plan (SMP) (DES, 2020).

Table 8. Likelihood of occurrence analysis for EVNT flora species returned in a 10 km radius search of the AOI (n = 13).

Family	Name	Status NCA ¹	Status EPBC ²	PMST 10 km radius	WO Records 10 km radius	ALA Records ³ 50 km radius	Modelled Potential Habitat	Likelihood
Poaceae	<i>Arthraxon hispidus</i> (hairy-joint grass)	V	V	No	0	No	Yes	Unlikely
Sterculiaceae	<i>Brachychiton compactus</i> (Whitsunday bottle tree)	NT	NL	No	7	Yes	No	Likely
Myrtaceae	<i>Eucalyptus raveretiana</i> (Black ironbox)	LC	V	Yes	0	Yes	No	Unlikely
Acanthaceae	<i>Graptophyllum ilicifolium</i> (Holly-leaved Graptophyllum, Mt Blackwood Holly)	V	V	Yes	0	No	No	Unlikely
Apocynaceae	<i>Marsdenia brevifolia</i> (superseded by <i>Leichhardtia brevifolia</i> 2021)	V	V	No	0	No	Yes	Unlikely
Rutaceae	<i>Medicosma obovata</i>	V	V	Yes	0	No	No	Unlikely
Apocynaceae	<i>Neisosperma kilneri</i>	V	V	Yes	0	Yes	No	Possible
Euphorbiaceae	<i>Omphalea celata</i>	V	V	Yes	0	No	No	Unlikely
Orchidaceae	<i>Phaius australis</i> (Lesser swamp-orchid)	E	E	Yes	0	No	No	Unlikely
Myrtaceae	<i>Rhodamnia glabrescens</i>	NT	NL	No	1	No	No	Unlikely
Simaroubaceae	<i>Samadera bidwillii</i> (Quassia)	V	V	Yes	0	No	No	Unlikely
Solanaceae	<i>Solanum graniticum</i> (Granite nightshade)	E	E	Yes	0	No	No	Unlikely
Solanaceae	<i>Solanum sporadotrichum</i>	NT	NL	No	1	No	No	Unlikely

¹NCA Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered.

²EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

³ALA Records within 50 km of the AOI – Yes represents records less than 20 years old.

Table 9. Likelihood of occurrence analysis for EVNT fauna species returned in a 10 km radius search of the AOI (n = 29).

Family	Common Name	Scientific Name	Status NCA ¹	Status EPBC ²	PMST 10 km radius	WO Records 10 km radius	ALA Records ³ 50 km radius	Modelled Potential Habitat	Likelihood
Birds (n = 20)									
Rostratulidae	Australian painted snipe	<i>Rostratula australis</i>	E	E, Ma	Yes	0	Yes	No	Unlikely
Burhinidae	Beach stone-curlew	<i>Esacus magnirostris</i>	V	Ma	No	31	Yes	No	Unlikely
Estrildidae	Black-throated finch (southern)	<i>Poephila cincta cincta</i>	E	E	Yes	0	No	Yes	Unlikely
Turnicidae	Buff-breasted button-quail	<i>Turnix olivii</i>	E	E	Yes	0	No	No	Unlikely
Scolopacidae	Curlew sandpiper	<i>Calidris ferruginea</i>	CR	CE, Ma, M	Yes	0	Yes	No	Unlikely
Scolopacidae	Eastern curlew	<i>Numenius madagascariensis</i>	E	CE, Ma, M	Yes	4	Yes	No	Unlikely
Scolopacidae	Great knot	<i>Calidris tenuirostris</i>	CR	CE, Ma, M	No	1	Yes	No	Unlikely
Charadriidae	Greater sand plover	<i>Charadrius leschenaultii</i>	V	V, Ma, M	Yes	0	Yes	No	Unlikely
Falconidae	Grey falcon	<i>Falco hypoleucos</i>	V	V	Yes	0	No	No	Unlikely
Procellariidae	Kermadec petrel (western)	<i>Pterodroma neglecta neglecta</i>	LC	V	Yes	0	No	No	Unlikely
Charadriidae	Lesser sand plover	<i>Charadrius mongolus</i>	E	E, Ma, M	No	1	Yes	No	Unlikely
Tytonidae	Masked owl (northern)	<i>Tyto novaehollandiae kimberli</i>	V	V	Yes	0	No	No	Unlikely
Accipitridae	Red goshawk	<i>Erythrotriorchis radiatus</i>	E	V	Yes	0	No	Yes	Unlikely
Scolopacidae	Red knot	<i>Calidris canutus</i>	E	E, Ma, M	Yes	0	Yes	No	Unlikely
Procellariidae	Southern giant-petrel	<i>Macronectes giganteus</i>	E	E, Ma, M	Yes	0	No	No	Unlikely
Columbidae	Squatter pigeon (southern)	<i>Geophaps scripta scripta</i>	V	V	Yes	0	Yes	No	Unlikely
Estrildidae	Star finch (eastern)	<i>Neochmia ruficauda ruficauda</i>	E	E	Yes	0	No	No	Unlikely
Scolopacidae	Western Alaskan bar-tailed godwit	<i>Limosa lapponica baueri</i>	V	V	Yes	3	No	No	Unlikely
Oceanitidae	White-bellied storm-petrel	<i>Fregetta grallaria</i>	LC	V	Yes	0	No	No	Unlikely

Family	Common Name	Scientific Name	Status NCA ¹	Status EPBC ²	PMST 10 km radius	WO Records 10 km radius	ALA Records ³ 50 km radius	Modelled Potential Habitat	Likelihood
Apodidae	White-throated needletail	<i>Hirundapus caudacutus</i>	V	V, Ma, M	Yes	2	Yes	No	Unlikely
Mammals (n = 8)									
Emballonuridae	Coastal sheathtail bat	<i>Taphozous australis</i>	NT	NL	No	5	Yes	Yes	Possible
Megadermatidae	Ghost bat	<i>Macroderma gigas</i>	E	V	Yes	0	No	Yes	Unlikely
Pseudocheiridae	Greater glider (southern and central)	<i>Petauroides volans</i>	E	E	Yes	0	No	No	Unlikely
Phascolarctidae	Koala (combined populations of Queensland, New South Wales, and the Australian Capital Territory)	<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)	E	E	Yes	5	Yes	Yes	Possible
Dasyuridae	Northern quoll	<i>Dasyurus hallucatus</i>	LC	E	Yes	8	Yes	Yes	Possible
Macropodidae	Proserpine rock-wallaby	<i>Petrogale persephone</i>	E	E	Yes	109	Yes	Yes	Likely
Tachyglossidae	Short-beaked echidna	<i>Tachyglossus aculeatus</i>	SL	NL	No	10	Yes	No	Possible
Muridae	Water mouse	<i>Xeromys myoides</i>	V	V	Yes	2	Yes	No	Unlikely
Reptiles (n= 1)									
Scincidae	Yakka skink	<i>Egernia rugosa</i>	V	V	Yes	0	No	No	Unlikely

¹NCA Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered.

²EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

³ALA Records within 50 km of the AOI – Yes represents records less than 20 years old.

3.2. BioCondition Assessments

Vegetation within the AOI is somewhat consistent with the regional ecosystems (REs) mapped in the *Vegetation Management Regional Ecosystem Map – version 12.02*. The greater portion of the AOI which is currently mapped as a heterogeneous community comprising three REs, 8.12.18, 8.12.11 and 8.12.19 is largely consistent with RE 8.12.18 - Semi-evergreen notophyll/microphyll to complex notophyll *Argyrodendron* spp. vine forest +/- *Araucaria cunninghamii*, of foothills and uplands on near-coastal ranges and islands on Mesozoic to Proterozoic igneous rocks. RE 8.12.12d - *Corymbia clarksoniana* woodland to open forest (8-30m tall), common associated to codominant species may include *C. tessellaris*, *Eucalyptus platyphylla*, *C. dallachiana*, *E. drepanophylla*, *E. tereticomis* and *Allocasuarina littoralis* is currently mapped as occupying only a small area of the AOI in the northwest corner. This eucalypt dominated community, however, was noted during assessments to continue along the ridgeline south to approximately halfway along the length of the AOI. Apparent encroaching rainforest species in this community are also consistent with the RE description which describes a layer of pioneering rainforest species as occasionally present. Drier marginal areas in the lower sections to the north of the AOI may appear similar to that of RE 8.12.16 - Deciduous to semi-evergreen microphyll vine thicket +/- *Brachychiton* spp. +/- *Araucaria cunninghamii* emergents of foothills and uplands (western areas) on Mesozoic to Proterozoic igneous rocks, however the tree species present are more consistent with RE 8.12.18.

Three locations in each of the two represented REs: 8.12.12d; and 8.12.18, were assessed using the BioCondition assessment methods (section 2.2.2). The results of these assessments are provided in the following sections.

Regional ecosystem 8.12.12d

Three sites were assessed in RE 8.12.12d vegetation communities (WB2, WB3 and WB5) (Figure 7). Sites were located in intact areas considered representative of the community.

The vegetation communities of RE 8.12.12d were scored against BioCondition benchmarks for 8.12.12a in lieu of benchmarks for RE 8.12.12d itself. A comparison of the technical descriptions for each would indicate that 8.12.12a is somewhat dissimilar in strata presence and community composition and is therefore not a good substitute. As the communities present were largely intact and in good condition BioCondition class scores of 2 (Table 10) would also reflect this. The data collected for the AOI do however provide suitable baselines for future monitoring of impacts and data will be provided to the Queensland Herbarium to assist in the development of benchmarks for RE 8.12.12d. Assessment data for each of the sites is provided in Appendix E.

Table 10. Benchmark criteria for RE 8.12.12a and assessment results for RE 8.12.12d sites WB2, WB3, and WB5.

Attributes	8.12.12a Benchmark Criteria	WB2 8.12.12d	Score	WB3 8.12.12d	Score	WB5 8.12.12d	Score
Maximum score	80	80		80		80	
Tree species richness	8	6	2.5	7	2.5	7	2.5
Shrub species richness	13	14	5	12	5	9	2.5
Grass species richness	7	2	2.5	2	2.5	2	2.5
Forb and other species richness	20	3	0	3	0	8	2.5
Emergent canopy height (m)	n/a	20	5	23	5	28	5
Tree canopy height (m)	20	10		12		14	
Tree subcanopy height (m)	9	5		5		7	
Total number of large eucalypts (ha)*	25	25	15	5	10	30	15
Total number of large non-eucalypts (ha)*	13	40		20		45	
Emergent canopy cover %	n/a	63.1	5	21	5	56.3	5
Tree canopy cover %	62	71.2		76.6		75.4	
Tree subcanopy cover %	36	53.6		58.5		73.6	
Shrub canopy cover %	20	0	0	0	0	0	0
Native perennial grass cover %	41	0	0	0	0	0	0
Litter ground cover%	37	63.8	5	52	5	56.4	5
Non-native plant cover%	0	5	5	5	5	5	5
Recruitment %	100	100	5	100	5	100	5
Woody debris length (ha)	444	420	5	245	5	740	5
Total score		0.6875	55/80	0.625	50/80	0.6875	55/80
BioCondition Class			2		2		2

* Benchmark DBH for large trees in RE 8.12.12a are: Eucalypts – 49 cm; and Non-eucalypts – 24cm.

Regional ecosystem 8.11.18

Three sites were assessed in RE 8.12.18 vegetation communities (WB1, WB4 and WB6) (Figure 7). Sites were located in intact areas considered representative of the community. One site (WB1) was located in an area adjacent to a cleared area dominated by Guinea grass (*Megathyrsus maximus*), however the community itself remained relatively intact.

As no BioCondition benchmarks were available for RE 8.12.18 the attribute data from the three sites assessed were also used as reference sites for the calculation of draft BioCondition benchmarks as per the Biocondition Reference site guidelines (Eyre *et al.*, 2017) by which each of the sites were then assessed. These sites were largely intact however walking tracks are frequent in the area and impacts from these tracks may affect the results though only minimally. Sites were otherwise considered intact and best on offer.

As each site was assessed against the mean values of all sites, each site has a BioCondition class score of 1 (Table 11). The data from these assessments will be provided to the Queensland Herbarium to assist in the development of formalised benchmarks by which future monitoring efforts can be scored. Assessment data for each of the sites is provided in Appendix E.

Table 11. Draft benchmark criteria for RE 8.12.18 and assessment results for RE 8.12.18 sites WB1, WB4, and WB6.

Attributes	8.12.18 site averages benchmark	WB1 8.12.18	Score	WB4 8.12.18	Score	WB6 8.12.18	Score
Maximum score	70	70		70		70	
Tree species richness	7	4	2.5	15	5	4	2.5
Shrub species richness	9	17	5	6	2.5	5	2.5
Grass species richness	3	3	5	3	5	3	5
Forb and other species richness	4	2	2.5	7	5	4	5
Emergent canopy height (m)	22	23.5	5	n/a	5	21	5
Tree canopy height (m)	17	9		26		16	
Tree subcanopy height (m)	9	6		12		9	
Total number of large eucalypts (ha)	n/a	n/a	10	n/a	15	n/a	10
Total number of large non-eucalypts (ha)	48	40		85		20	
Emergent canopy cover %	15	22.9	5	0	5	23	5
Tree canopy cover %	70.	87		86.7		36.8	
Tree subcanopy cover %	81	59.8		90.8		92.4	
Shrub canopy cover %	0	0	0	0	0	0	0
Native perennial grass cover %	0	0	0	0	0	0	0
Litter ground cover %	59.6	70	5	61	5	47.8	5
Non-native plant cover%	0	5	10	5	10	5	10
Recruitment %	100	100	5	100	5	100	5
Woody debris length (ha)	235	435	5	220	5	50	2
Total score		86%	60/ 70	96%	67.5/ 70	81%	57/ 70
Draft BioCondition Class		1		1		1	

* Draft benchmark DBH for large trees in RE 8.12.18 (derived using data collected in accordance with reference site methodology) are: Eucalypts – 39 cm; and Non-eucalypts – n/a.



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Figure 7. BioCondition Sites

Legend

- Study Area
 - Walking Track
 - Watercourse - Stream Order
 - 1
 - BioCondition Sites
- Google Satellite

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 Digital data for this report is available on the Queensland Government Spatial Portal at <https://qldspatial.information.qld.gov.au>.



3.2.1. Flora Species Records

BioCondition Assessments and incidental observations resulted in a total of 390 flora species being recorded within the AOI. A complete list of observed species and their NCA status may be found in Appendix F. Only one EVNT species was observed during the survey efforts, *Brachychiton compactus*, which is listed as Near Threatened (NT) under the NCA. However, observations of this species occurred near the Airlie Creek Walking Track adjacent to the northern portion of the AOI (Figure 8). Fifteen observed flora species are listed as Special Least Concern (SL) under the NCA and NL under the EPBC. Twelve of the observed SL flora species were also returned in the desktop assessment (section 3.2.5).

3.2.2. Conservation Significant Matters

3.2.2.1. Threatened Flora Species

Ecologists remained vigilant for the potential presence of EVNT listed plant species during all survey assessments and field work. One EVNT listed species was recorded during survey efforts *Brachychiton compactus* (Whitsunday bottle tree) which is listed as near threatened under the NCA. The individuals found however, were not located within the AOI (Figure 8):

B. compactus was recorded in the lower marginal vine thicket areas in vegetation associated with RE 8.12.16: Deciduous to semi-evergreen microphyll vine thicket +/- *Brachychiton* spp. +/- *Araucaria cunninghamii* emergents of foothills and uplands (western areas) on Mesozoic to Proterozoic igneous rocks. These communities typically occur in the driest areas of microphyll vine thickets and were not detected within the AOI itself though lower and drier marginal vine thickets may provide suitable habitat for the species. It is unlikely that there will be any impact to populations of *B. compactus* as a direct result of the project activities.

3.2.3. Post-survey Likelihood of Occurrence

Likelihood of occurrence rankings were re-assessed post-survey for the conservation significant flora species based on field observations of habitat within the AOI. The LOO ranking for *Brachychiton compactus* was upgraded from Likely to Known due to in-field observations the species. The following 12 SL concern flora species may now be listed as Known due to in-field observations:

- *Adiantum hispidulum*
- *Arachniodes aristate* (prickly shield fern)
- *Brachychiton acerifolius* (flame tree)
- *Cordyline manners-suttoniae* (palm lily)
- *Cordyline murchisoniae*
- *Crinum pedunculatum* (river lily)
- *Doryopteris concolor*
- *Drynaria rigidula*
- *Drynaria sparsisora*
- *Lastreopsis poecilophlebia*
- *Lastreopsis tenera*
- *Microsorium punctatum*
- *Platycterium bifurcatum*
- *Pteris ensiformis* (slender bracken)
- *Xanthorrhoea johnsonii*



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Figure 8. Brachychiton compactus Observations

Legend

- Study Area
- Walking Track
- Watercourse - Stream Order
- 1
- Brachychiton Observations
- Google Satellite

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 Digital data for this report is available on the Queensland Government Spatial Portal at <https://qldspatial.information.qld.gov.au>.



3.3. Fauna Surveys

3.3.1. Habitat suitability

Field observations of the habitat within the AOI confirmed suitable habitat for the Proserpine rock-wallaby (*Petrogale persephone*) and northern quoll (*Dasyurus hallucatus*). Areas of suitable denning habitat, such as rock overhangs, boulder piles, rock crevices, hollows in trees, and hollow logs (DSEWPaC, 2011; Woinarski *et al.*, 2008), were abundant throughout the AOI, particularly within the Conway NP section. Additionally, the dense vegetation and vine understory of the Conway NP and the thick patches of guinea grass (*Megathyrsus maximus var. maximus*) in the Freehold Lot both provide suitable foraging habitat for the Proserpine rock-wallaby.

3.3.2. Observed survey conditions

Weather data relevant to the survey period was obtained from the Hamilton Island Airport station (Station 033106) (BoM, 2022) focusing on daily minimum and maximum temperatures, as well as daily rainfall (Table 12). BoM acknowledges detection reliability by the automatic system varies and some observations may not be available.

Table 12. Weather observations during the camera trapping survey based on data from the Hamilton Island Airport (Station 033106) (BoM, 2022).

Date	Maximum Temperature °C	Minimum temperature °C	Total Rainfall (mm)
19 – 25 September	29.1	21.8	0.2
26 September – 2 October	26.8	18.6	15.8
3 – 9 October	27.3	21.1	5.8
10 – 16 October	27.5	21.6	0.8
17 – 23 October	29.7	21.6	16.8
24 – 30 October	31.7	21.8	32.8
31 October – 6 November	30.3	23.0	2.2
7 – 13 November	28.5	22.6	0.4
14 – 20 November	31.4	23.2	0

3.3.3. Fauna species records

A total of 2,354 images were recorded across the 20 cameras during a combined survey effort of 924 nights from 20 September 2022 to 16 October 2022. Of these images, a total of 1,653 contained fauna species. Twenty-two camera triggers were the result of humans (hikers) inspecting the camera set-up positioned in the boulders at the end of the Airlie Creek walking track. Twelve fauna species were observed through camera trapping and are detailed in Table 13. Both the long-nosed bandicoot (*Perameles nasuta*) and northern brown bandicoot (*Isodon macrourus*) were recorded through camera trapping. Bandicoot records have been combined (26 total sightings) as not all photos could be confidently identified to species level. Both species of bandicoot are LC under the NCA and NL under the EPBC. No EVNT species were observed in camera data, nor were any observed incidentally or through secondary signs during the camera installation, rebaiting, or collection. A total of 60 fauna species were observed incidentally or through secondary signs, five of which were also observed in camera data (Table 14). A combined total of 67 fauna species were observed throughout the entire survey period. It is important to note that lack of record does not confirm absence of species.

Table 13. Fauna species observed through targeted camera trapping from 20 September to 16 October 2022 (n = 12).

Family	Common name	Scientific name	Status NCA ¹	Status EPBC ²	Sightings ³	Individuals	Notes
Birds (n = 2)							
Megapodiidae	Australian brush-turkey (Gweela)	<i>Alectura lathami</i>	LC	NL	151	164	Observed both night and day
Cacatuidae	Sulphur-crested cockatoo	<i>Cacatua galerita</i>	LC	NL	1	1	
Mammals (n = 8)							
Macropodidae	Agile wallaby	<i>Notamacropus agilis</i>	LC	NL	1	1	
Phalangeridae	Brush-tail possum	<i>Trichosurus vulpecula</i>	LC	NL	2	2	
Canidae	Dingo	<i>Canis familiaris dingo</i>	NL	NL	1	1	Restricted Matter under the Biosecurity Act 2014 (BIO)
Muridae	Fawn-footed melomys	<i>Melomys cervinipes</i>	LC	NL	1	1	Nocturnal only
Felidae	Feral cat	<i>Felis catus</i>	I*	NL	4	4	At least 3 different animals; Restricted Matter under the Biosecurity Act 2014 (BIO)
Peramelidae	Long-nosed bandicoot / Northern brown bandicoot	<i>Perameles nasuta / Isoodon macrourus</i>	LC	NL	26	26	Nocturnal only; Both species observed however unable to differentiate in some photos
Muridae	Water rat (Rakali)	<i>Hydromys chrysogaster</i>	LC	NL	1	1	Nocturnal only
Reptiles (n = 2)							
Varanidae	Lace monitor	<i>Varanus varius</i>	LC	NL	32	34	Observed day only
Scincidae	Major skink	<i>Bellatorius frerei</i>	LC	NL	1	1	

¹NCA Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered, I* - Introduced.

²EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

³Sightings – A capture event (sighting) was defined as the same species recorded with a minimum 30-minute time gap since the last capture of that species on the same camera.

Table 14. Fauna species observed through secondary signs or incidental observations from 19 September to 16 October 2022 (n = 60).

Family	Common name	Scientific name	Status NCA ¹	Status EPBC ²	Notes
Birds (n = 37)					
Oriolidae	Australasian figbird	<i>Sphecotheres vieilloti</i>	LC	NL	
Megapodiidae	Australian brush-turkey (Gweela)	<i>Alectura lathami</i>	LC	NL	
Psittacidae	Australian king-parrot	<i>Alisterus scapularis</i>	LC	NL	
Artamidae	Australian magpie	<i>Gymnorhina tibicen</i>	LC	NL	
Artamidae	Black butcherbird	<i>Cracticus quoyi</i>	LC	NL	
Campephagidae	Black-faced cuckoo-shrike	<i>Coracina novaehollandiae</i>	LC	Ma	
Meliphagidae	Blue-faced honeyeater	<i>Entomyzon cyanotis</i>	LC	NL	
Columbidae	Brown cuckoo-dove	<i>Macropygia amboinensis</i>	LC	NL	
Sturnidae	Common myna	<i>Sturnus tristis</i>	I*	NL	Pest Status: Feral
Cuculidae	Eastern koel	<i>Eudynamys orientalis</i>	LC	NL	
Petroicidae	Eastern yellow robin	<i>Eopsaltria australis</i>	LC	NL	
Acanthizidae	Fairy gerygone	<i>Gerygone palpebrosa</i>	LC	NL	
Rhipiduridae	Grey fantail	<i>Rhipidura albiscapa</i>	LC	NL	
Meliphagidae	Helmeted friarbird	<i>Philemon buceroides</i>	LC	NL	
Acanthizidae	Large-billed scrubwren	<i>Sericornis magnirostra</i>	LC	NL	
Meliphagidae	Lewin's honeyeater	<i>Meliphaga lewinii</i>	LC	NL	
Pachycephalidae	Little shrike-thrush	<i>Colluricincla megarhyncha</i>	LC	NL	
Monarchidae	Magpie-lark	<i>Grallina cyanoleuca</i>	LC	Ma	
Pittidae	Noisy pitta	<i>Pitta versicolor</i>	LC	Ma	
Nectariniidae	Olive-backed sunbird	<i>Cinnyris jugularis</i>	LC	NL	
Psittacidae	Pale-headed rosella	<i>Platycercus adscitus</i>	LC	NL	
Cuculidae	Pheasant coucal	<i>Centropus phasianinus</i>	LC	NL	
Artamidae	Pied butcherbird	<i>Cracticus nigrogularis</i>	LC	NL	
Artamidae	Pied currawong	<i>Strepera graculina</i>	LC	NL	
Columbidae	Pied imperial-pigeon	<i>Ducula bicolor</i>	LC	Ma	

Family	Common name	Scientific name	Status NCA ¹	Status EPBC ²	Notes
Meropidae	Rainbow bee-eater	<i>Merops ornatus</i>	LC	Ma	Returned in desktop assessment
Columbidae	Rose-crowned fruit-dove	<i>Ptilinopus regina</i>	LC	NL	
Pachycephalidae	Rufous whistler	<i>Pachycephala rufiventris</i>	LC	NL	
Psittacidae	Scaly-breasted lorikeet	<i>Trichoglossus chlorolepidotus</i>	LC	NL	
Timaliidae	Silvereye	<i>Zosterops lateralis</i>	LC	Ma	
Dicruridae	Spangled drongo	<i>Dicrurus bracteatus</i>	LC	Ma	
Monarchidae	Spectacled monarch	<i>Symposiachrus trivirgatus</i>	SL	Ma, M	Returned in desktop assessment
Columbidae	Spotted dove	<i>Streptopelia chinensis</i>	I*	NL	Pest Status: Feral
Cacatuidae	Sulphur-crested cockatoo	<i>Cacatua galerita</i>	LC	NL	
Corvidae	Torresian crow	<i>Corvus orru</i>	LC	NL	
Acanthizidae	White-browed scrubwren	<i>Sericornis frontalis</i>	LC	NL	
Columbidae	Wompoo fruit-dove	<i>Ptilinopus magnificus</i>	LC	NL	
Ray-finned Fishes (n = 1)					
Anguillidae	Longfin eel	<i>Anguilla reinhardtii</i>	NL	NL	Found deceased on edge of Airlie Creek
Mammals (n = 3)					
Felidae	Feral cat	<i>Felis catus</i>	I*	NL	Restricted Matter under BIO; Pest Status: Feral
Suidae	Feral pig	<i>Sus scrofa</i>	I*	NL	Foraging; Restricted Matter under BIO; Pest Status: Feral
Canidae	Red fox	<i>Vulpes vulpes</i>	I*	NL	Restricted Matter under BIO; Pest Status: Feral
Reptiles (n = 19)					
Varanidae	Black-headed monitor	<i>Varanus tristis</i>	LC	NL	
Scincidae	Blue-throated rainbow-skink	<i>Carlia rhomboidalis</i>	LC	NL	
Pygopodidae	Burton's legless lizard	<i>Lialis burtonis</i>	LC	NL	
Elapidae	Collared whipsnake	<i>Demansia torquata</i>	LC	NL	
Scincidae	Diamond-shielded sunskink	<i>Lampropholis adonis</i>	LC	NL	
Elapidae	Eastern brown snake	<i>Pseudonaja textilis</i>	LC	NL	

Family	Common name	Scientific name	Status NCA ¹	Status EPBC ²	Notes
Scincidae	Eastern striped skink	<i>Ctenotus robustus</i>	LC	NL	
Pygopodidae	Excitable delma	<i>Delma tincta</i>	LC	NL	
Scincidae	Hannah's shadeskink	<i>Saproscincus hannahae</i>	LC	NL	
Varanidae	Lace montior	<i>Varanus varius</i>	LC	NL	
Scincidae	Lemon-barred forest-skink	<i>Concinnia amplus</i>	LC	NL	
Elapidae	Lesser black whipsnake	<i>Demansia vestigiata</i>	LC	NL	
Scincidae	Major skink	<i>Bellatorius frerei</i>	LC	NL	
Scincidae	Metallic snake-eyed skink	<i>Cryptoblepharus metallicus</i>	LC	NL	
Scincidae	Northern bar-sided skink	<i>Concinnia brachysoma</i>	LC	NL	
Elapidae	Red-bellied black snake	<i>Pseudechis porphyriacus</i>	LC	NL	
Scincidae	Robust rainbow-skink	<i>Carlia schmeltzii</i>	LC	NL	
Boidae	Scrub python	<i>Simalia kinghorni</i>	LC	NL	
Elapidae	Yellow-faced whipsnake	<i>Demansia psammophis</i>	LC	NL	

¹NCA Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered, I* - Introduced.

²EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

3.3.4. Conservation Significant Fauna

No EVNT fauna species were observed during the survey period through camera trapping, incidental observations, or secondary signs. Two species of conservation significance returned in the desktop assessment were observed during the field surveys:

- Rainbow bee-eater (*Merops ornatus*) – LC (NCA), Ma (EPBC); and
- Spectacled monarch (*Symposiachrus trivirgatus*) – SL (NCA), Ma and M (EPBC)

An additional six species of conservation significance listed as Marine (Ma) under the EPBC were observed incidentally while in the field:

- Black-faced cuckoo-shrike (*Coracina novaehollandiae*) – LC (NCA), Ma (EPBC);
- Magpie-lark (*Grallina cyanoleuca*) – LC (NCA), Ma (EPBC);
- Noisy pitta (*Pitta versicolor*) – LC (NCA), Ma (EPBC);
- Pied imperial-pigeon (*Ducula bicolor*) – LC (NCA), Ma (EPBC);
- Silveryeye (*Zosterops lateralis*) – LC (NCA), Ma (EPBC); and
- Spangled drongo (*Dicrurus bracteatus*) – LC (NCA), Ma (EPBC).

Further details on the seven observed conservation significant species and EVNT species with potential to occur with the AOI are detailed in the following section 3.3.4.1. It is important to note that lack of record does not confirm the absence of a species within the AOI. Pre-clearance surveys should be performed prior to construction and a Fauna Spotter Catcher should be present during the construction efforts of the proposed Project to increase the likelihood of observing any potential EVNT or conservation significant species on site.

3.3.4.1. Notes on Conservation Significant Fauna

Coastal sheathtail bat (*Taphozous australis*) – NT (NCA), NL (EPBC):

The coastal sheathtail bat (*Taphozous australis*) is the smallest *Taphozous* species in Queensland, occurring within a narrow coastal zone ranging from islands of the Torres Strait and through Cape York Peninsula south to Shoalwater Bay (Churchill, 2008; Duncan et al., 1999; Menkhorst & Knight, 2011). The species only occurs within a few kilometres of the sea, roosting within sea caves and rock crevices (Menkhorst & Knight, 2011). Foraging occurs above the canopy over open eucalypt forest, mangroves, grasslands, coastal heathland, and swamps (Churchill, 2008).

The desktop assessment of the AOI resulted in a LOO ranking of Possible for the coastal sheathtail bat. The species was returned in both the PMST and WO database searches for a 10 km radius buffer of the AOI. However, a more refined WO database search resulted in zero records of the species within a 2 km radius of the AOI. A total of 29 records within a 50 km radius of the AOI have been recorded on the Atlas of Australia (ALA, 2022). Eight of the records occurred within a 10 km radius between 2008 – 2009 (ALA, 2022). All ALA records occur on the coastline and islands to the northwest and east of the AOI (ALA, 2022). Survey guidelines for the species recommend a habitat assessment prior to targeted surveys to verify the presence of rocky shores, mines, caves, or bunkers near the sea, and/or any known roosts within the project area (Hourigan, 2011). Suitable habitat for the species was not observed within the AOI during the field surveys. The LOO ranking for the species has been downgraded from Possible to Unlikely based on lack of suitable roosting or foraging habitat within the AOI and no additional survey effort is recommended.

Koala (combined populations of QLD, NSW, and ACT) (*Phascolarctos cinereus*) = E (NCA), E (EPBC):

The koala is one of the most important and highest priority flagship species in Australia. The combined koala (*Phascolarctos cinereus*) populations of QLD, NSW, and the ACT were declared a separate species for the purpose of the EPBC in 2012 (Commonwealth of Australia 2012). The population's EPBC status was updated from Vulnerable to Endangered in early 2022 (in effect under the EPBC Act from 12 February 2022) (DAWE, 2022a). Distribution of the listed population is widespread, but discontinuous, ranging from the Cairns area of northeast QLD to the NSW-VIC border (DAWE, 2022a). Within Queensland specifically, the species occurs in moist coastal forests, subhumid woodlands in southern and central QLD, and some watercourse-lined eucalypt woodlands in semiarid western QLD (Melzer *et al.*, 2000). The koala is an obligatory folivore (leaf-eater) restricted to the foliage of *eucalyptus*, *corymbia*, and *angophora* species (DAWE, 2022a). This restrictive diet limits the species' distribution and areas of suitable habitat (Youngentob *et al.*, 2021).

Multiple threats have contributed to the decline of the population including but not limited to: Vegetation clearing for agricultural purposes, mining, and urbanization (McAlpine *et al.*, 2015); climate change drivers (Adams-Hosking *et al.*, 2016); mortality due to vehicle strikes and dog attacks; and diseases such as the Koala retrovirus (KoRV) and chlamydia (*Chlamydia pecorum*) (DAWE, 2022a). The recent 2019 – 2020 bushfires throughout the coastal areas of southeast QLD, NSW, and eastern VIC were a significant contributor to the reassessment of the population's EPBC Act status (DAWE, 2022a).

The species occurs in low densities throughout much of its range and can be difficult to detect, therefore indirect survey methods (i.e., scat surveys, observation of scratch marks or urine stains on trees) can be effective methods for gathering presence/absence data (Eyre *et al.*, 2018; Youngentob *et al.*, 2021). Research also suggests spotlighting as an effective technique for surveying (Wilmott *et al.*, 2018). In general, koala populations in the north are patchy and exist at low densities, potentially indicating a southerly shift in their range.

The desktop assessment of the AOI resulted in a LOO ranking of Possible for the koala. The species was returned in both the PMST and WO database searches for a 10 km radius buffer of the AOI. However, a more refined WO database search resulted in zero records of the species within a 2 km radius of the AOI. A total of 16 records within a 50 km radius of the AOI have been recorded on the Atlas of Australia ranging in date from 1914 – 2014 (ALA, 2022). The closest ALA record occurred in 2005 within 10 km of the AOI (ALA, 2022). All ALA records occur inland to the west and southwest of the AOI (ALA, 2022). Most of the habitat within the AOI is mapped as dense rainforest or scrub, particularly notophyll to microphyll vine forest (BVG1M:5b) (Queensland Government, 2022). In-field observations of vegetation within the AOI resulted in only a handful of locally important tree species and ancillary habitat tree species for the koala: *Eucalyptus tereticornis* (blue gum), *Eucalyptus drepanophylla* (grey ironbark), *Corymbia intermedia* (pink bloodwood), and *Lophostemon suaveolens* (swamp box). No observations of the species occurred during the field survey. Although lack of observation does not confirm absence of the species, the LOO ranking has been downgraded to Unlikely due to a lack of records within 2 km of the AOI, the sparse presence of locally important trees, and the dense habitat structure within the AOI.

Northern quoll (*Dasyurus hallucatus*) = LC (NCA), E (EPBC):

The northern quoll (*Dasyurus hallucatus*) is the smallest of the four Australian quoll species, roughly the size of a small cat (Department of the Environment, 2022a; Oakwood, 2004). The species is characterized by reddish brown fur with a cream-coloured underside, white spots along the back and rump, no spots along the tail, and

a pointy snout ((Menkhorst & Knight, 2011; TSSC, 2005). The predominantly nocturnal species breeds once a year between late May and early June and has a short lifespan with males living approximately 1 year and females up to 3 years in the wild (DSEWPaC, 2011; TSSC, 2005). Historically, the species occurred commonly in northern Australian from Pilbara, WA to the Sunshine Coast Hinterland in southern Queensland, however an estimated 75% reduction in range between 1900 – 1990 has contracted distribution to several disjunct populations within this range (Braithwaite & Griffiths, 1994; DSEWPaC, 2011; TSSC, 2005). The main contributing factor to this reduction is thought to be the spread of the invasive cane toad (*Rhinella marina*), although the species suffers from several other threats including predation by feral cats and foxes, inappropriate fire regimes, and habitat degradation and/or destruction (DSEWPaC, 2011; Hill & Ward, 2010; TSSC, 2005).

Habitat critical to the survival of the northern quoll is described as habitat where the species is least exposed to threats or least likely to be in the future (Hill & Ward, 2010). Eucalypt forests and woodlands with shallow soil, proximity to permanent water, and large areas of rocky habitat are the species preferred habitat, however they may also occur in rainforest patches, vegetation along creek lines, and around human settlement (DSEWPaC, 2011; Woinarski *et al.*, 2008). Rocky areas provide denning habitat, protection from predators, retain water, host a diversity of microhabitats with floristic and prey diversity, and ameliorate fire impacts (Hill & Ward, 2010).

The desktop assessment of the AOI resulted in a LOO ranking of Possible for the northern quoll. The species was returned in both the PMST and WO database searches for a 10 km radius buffer of the AOI. A more refined WO database search identified two records of the species within a 2 km radius of the AOI. A total of 33 records within a 50 km radius of the AOI have been recorded on the Atlas of Australia ranging in date from 1982 – 2021 (ALA, 2022). The closest record occurred in 2005 within 5 km of the AOI (ALA, 2022). Further supporting the potential presence of the species within the AOI, a 1999 study reported 50 records of the species in the Mackay – Bowen area ranging from 1936 – 1996, with over 80% of the records occurring between 1990 – 1996 (Pollock, 1999). Due to the presence of historical and recent records, along with the presence of suitable habitat, targeted surveys for the species were conducted within the AOI. Assessment of suitable habitat during the camera deployment stage of the survey identified several areas suitable for denning and foraging within the Conway NP section of the AOI. Motion sensitive cameras were placed near habitat features known to be used for denning, such as rock overhangs, tree hollows, and hollow logs (Woinarski *et al.*, 2008).

No observations of northern quolls occurred during the survey period. Nevertheless, the LOO ranking for the species remains as Possible due to the presence of suitable denning and foraging habitat within the AOI, modelled potential habitat, and historical and recent records within 50 km of the AOI. Additionally, several of the species' prey were observed either incidentally through camera trapping within the AOI, including northern brown bandicoots (*Isodon macrourus*), rodents, common brushtail possum (*Trichosurus vulpecula*), breeding birds, and snakes (Table 13 and Table 14) (DSEWPaC, 2011; TSSC, 2005). Even though the species is currently listed as Least Concern (LC) under the NCA, the EPBC status is Endangered (E), and therefore the recommendation is for the client to err on the side of caution and further surveys should be undertaken within the AOI to prevent overlooking of individuals potentially occurring within the project area. This should include, at minimum, a pre-clearance survey prior to disturbance and the presence of a certified Fauna Spotter Catcher during all clearing activities. Northern quolls are a cryptic species and can be extremely difficult to detect. A lack of records during this survey does not confirm a lack of presence.

Proserpine rock-wallaby (*Petrogale persephone*) – E (NCA), E (EPBC):

The Proserpine rock-wallaby (*Petrogale persephone*) is one of eleven species of rock-wallaby currently recognized in Queensland (DERM, 2010) and has the smallest distribution of any rock-wallaby (DSEWPaC, 2011). The species is characterized by dark grey fur with a mauve tinge, a lighter grey to dirty cream coloured chest and belly, dark brown to black colouration on the back of the ears, a cream stripe from the upper lip to the ear, and a long tail that is mostly black with a rufous base and lighter dorsal surface (DERM, 2010; Johnson, 2003; Menkhorst & Knight, 2011). The hind feet of the species have short, stout toenails and thick flesh pads on the soles to aid in gripping the rocky habitat the species prefers (DERM, 2010). Currently, the species is known to have twenty-four populations in the Whitsunday region of eastern Queensland, occurring within the Conway NP and areas of the Conway Range, Dryander NP, Proserpine State Forest, Mt. Julian, areas throughout the Clarke Range, and around the town of Airlie Beach (DAWE, 2021; DERM, 2010; DSEWPaC, 2011). The species also occurs in a natural population on Gloucester Island and an introduced population on Hayman Island (DERM, 2010; DAWE, 2021).

Due to the restricted distribution of the species and the lack of reliable population size estimates (Woinarski *et al.*, 2014), all areas within the species' preferred habitat and all known populations are considered critical for the species' survival (DAWE, 2021). Preferred habitat is within densely vegetated and/or rocky habitats in semi-deciduous, semi-evergreen, or complex microphyll or notophyll vine forest (DERM, 2010; Johnson & Eldridge, 2008). The species utilizes areas such as rocky outcrops, boulder piles, gorges, or overhangs as refuge sites from predators and high temperatures (DERM, 2010; Woinarski *et al.*, 2014). The Proserpine rock-wallaby diet consists of 60% dropped leaves which is then supplemented with vines, fungus, ferns, and grasses (DERM, 2010). Occasionally, the species has also been observed foraging in the outer margins of rainforest and in residential gardens of surrounding urban areas (DERM, 2010; Woinarski *et al.*, 2014;).

The desktop assessment of the AOI resulted in a LOO ranking of Likely for the Proserpine rock-wallaby. The species was returned in both the PMST and WO database searches with a 10 km radius buffer of the AOI. A total of 109 records of the species within a 10 km radius were returned in the WO database search. A more refined WO database search identified four records of the species within a 2 km radius of the AOI. Additionally, over 300 occurrences of the species are recorded within a 50 km radius of the AOI in the Atlas of Living Australia spatial database, ranging in date from 1974 to 2008. A total of 128 of these occurrences are within a 10 km radius of the AOI (ALA, 2022). Due to the abundance of historical and recent records near the proposed Project site, along with the presence of modelled potential habitat, targeted surveys for the species were conducted within the AOI. Assessment of suitable habitat during the camera deployment stage of the survey identified several areas suitable for denning and foraging within the Conway NP and Freehold lot sections of the AOI. Additionally, known populations of the species (Mandalay and Flametree Creek populations) exist within 5 km of the AOI along Shute Harbour Road (DSEWPaC, 2011).

No observations of the Proserpine rock-wallaby occurred during the survey period. The LOO ranking for the species remains as Likely due to the abundance of nearby by records, proximity to known populations, known distribution of the species, and the presence of suitable habitat within the AOI. The Freehold Lot section of the AOI, the area closest to urban development, consisted of large areas of guinea grass (*Megathyrsus maximus var. maximus*) which the species is known to forage. Several individuals have been subjected to vehicle collision along the nearby Shute Harbour Road due to foraging on the grass along the roadside (DERM, 2010). The presence of this flora species suggests the Proserpine rock-wallaby could potentially forage within this area of

the AOI even though no observations occurred during the field survey. A different species macropod, the agile wallaby (*Notamacropus agilis*), was observed on a camera trap during the survey period, further suggesting habitat is suitable for other macropods (Table 13). The Proserpine rock-wallaby is currently listed as Endangered under both the NCA and EPBC (Department of the Environment, 2022c) due to threats such as habitat fragmentation from urban development, mortality from vehicle collisions and fire, introduced predators (cats and wild dogs), introduced toxic plants from gardens, and introduced diseases (*Toxoplasmosis gondii* and hydatids) (Burnett & Winter, 2019; DAWE, 2021; DERM, 2010; Woinarski *et al.*, 2014). Care should be taken during the commencement of the proposed Project to minimize the potential spread of introduced flora and fauna into the suitable habitat for the species. The species is both timid and crepuscular, increasing the difficulty in detection (Menkhorst & Knight, 2011). While no observations occurred during the targeted field survey, lack of record does not confirm absence and there is potential the species may be discovered during the commencement of construction. Therefore, it is recommended that a thorough pre-clearance survey be conducted prior to works beginning, focusing on areas within the linear disturbance of the proposed Project. A Fauna Spotter Catcher is also recommended to be present during all clearing activities to increase the likelihood of observing the species before harm to individuals or obvious denning habitat occurs.

Rainbow bee-eater (*Merops ornatus*) – LC (NCA), Ma (EPBC):

The rainbow bee-eater (*Merops ornatus*) is a strikingly coloured small to medium sized bird that is abundant across most of Australia. This species is either a breeding resident (northern Australia), seasonal breeding migrant (southeast and southwest Australia) or passage migrant (inland and dry west coast), depending on location (Pizzey & Knight, 2012). The rainbow bee-eater lays its eggs in burrows dug into sandy slopes or bank cuttings, primarily in the north and southeast/southwest of the country. When not breeding, this species inhabits a large variety of habitats, including open woodlands, riverbanks, beaches, mangroves. The species utilises perching vantage points, from large dead trees to powerlines from which it will swoop into the air to take airborne prey. It feeds on insects captured during flight, including bees, wasps, flies, dragonflies and similar (Pizzey & Knight, 2012).

The rainbow bee-eater is abundant across most of Australia and is one of the country's most recognisable species. Known and current threats to this species are minimal, with only a single threatening process quantitatively identified. Cane toads are implicated in the reduced nesting success of the rainbow bee-eater. Cane toads can access the nests of rainbow bee-eaters, and are reported to feed on eggs and young, as well as evict nesting adults from nest burrows (Department of the Environment, 2022b). There is no approved conservation advice, listing advice, or recovery plan currently available for the rainbow bee-eater (Department of the Environment, 2022b). Due to the species wide distribution, it is unlikely that the proposed Project will have a significant impact on individuals within the AOI.

Short-beaked echidna (*Tachyglossus aculeatus*) – SL (NCA), NL (EPBC):

The short-beaked echidna (*Tachyglossus aculeatus*) is one of Australia's most well-known species, and one of only two monotreme species on the continent. It is highly specialised and feeds exclusively on ants and termites, using its powerful forelimbs to access its food items. This species is also Australia's most widely distributed mammal, inhabiting almost every terrestrial habitat on the continent (Menkhorst & Knight, 2011). Across its inhabited range, the echidna varies morphologically, with larger and furrer individuals in the south of the country. Though the echidna is ubiquitous across the entire country, densities of this species may vary greatly between

areas. The echidna may be active at any time of day, though it shelters in burrows, logs, or rock crevices to avoid extreme conditions. Breeding generally occurs in winter, with a single egg laid by the female, before the juvenile is transferred to the pouch, and then eventually to a burrow. During this breeding period is generally the only occasion where groups of echidnas are observed (Menkhorst & Knight, 2011).

Threats to the echidna include predation by introduced predators (primarily as juveniles), habitat degradation and road mortality (Rismiller & McKelvey, 2000; Perry *et al.*, 2022). Despite their significant morphological defences against predators, echidnas are known or suspected to be preyed on by feral cats, pigs, foxes, and dogs (Rismiller & McKelvey, 2000). This is particularly significant in the case of juveniles and subadults. Habitat degradation is also a significant issue, and Menkhorst & Knight (2011) consider “intensively managed farmland” as the only terrestrial habitat the echidna is generally absent from. There were no records of the echidna during the survey period, however, several ALA records occur within a 5 – 10 km radius of the AOI (ALA, 2022). Based on the wide distribution and habitat preference of the species, it is possible the species may occur within the AOI even though no individuals were recorded during the survey period. The minimal disturbance of the proposed Project is unlikely to have a significant impact on potentially present individuals. It should be noted that known predators of the echidna were observed either within or near the AOI (feral cats, feral pigs, foxes, unleashed dogs). The presence of these predators may explain the lack of observations for the species.

Spectacled monarch (*Symposiachrus trivirgatus*) – SL (NCA), Ma and M (EPBC):

The spectacled monarch (*Symposiachrus trivirgatus*) is a breeding migrant with limited distribution and small population sizes. The species prefers dense understories of mountain or lowland rainforests, moist forests or wet sclerophyll, and occasionally waterside vegetation of mangroves (Pizzey & Knight, 2012). Distribution within Australia occurs coastally from Cape York (QLD) to Port Stephens (NSW), with common occurrences in humid northeast Queensland and breeding from October to February (Pizzey & Knight, 2012). Spectacled monarchs were observed within the Conway NP section of the AOI. One individual was recorded on a nest along the edge of the established NP walking track during the September camera deployment effort (Figure 9). No eggs were observed within the nest.

The *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act* [Admin Guideline] (Department of the Environment, 2015) was utilized to determine the level of potential significant impact to the species within the AOI. The Department of Environment, Water, Heritage, and the Arts (DEWHA) determines the likelihood of significant impact on a species by a proposed Project’s likelihood to “substantially modify, destroy or isolate an area of important habitat” or “seriously disrupt the lifecycle of an ecologically significant proportion of a population” (DEWHA, 2013). For the spectacled monarch, the area threshold (ha) of important habitat likely to result in significant impact is 0.1% for national significance which equates to 210 ha. The proposed AOI is below the threshold (approximately 102.9 ha). The nationally significant threshold for an ecologically significant proportion of a population is 0.1%, equating to approximately 650 individuals. The proposed Project is unlikely to cause significant impact to the population within the AOI as the linear construction plan will cause minimal disturbance and retain patches of suitable habitat large enough to support the species in the surrounding area. The nesting individual was recorded within 1 – 1.5 m of the established walking path of the Conway NP. The walking path is frequented by hikers daily and suggests the individual is exposed to human encounters often. Urban areas or areas of frequent human encounters are unlikely to contain important habitat or ecologically significant proportions of a population (Department of the Environment, 2015), further supporting the low risk level of significant impact to the population of spectacled monarchs within the AOI.



Figure 9. Spectacled monarch (*Symposiachrus trivirgatus*) recorded on nest approximately 1 – 1.5 m from edge of Conway NP walking path in September 2022.

Other Marine Listed Species:

An additional six bird species listed as Least Concern (LC) under the NCA and Marine (Ma) under the EPBC were observed incidentally during fieldwork: black-faced cuckoo-shrike (*Coracina novaehollandiae*), magpie-lark (*Grallina cyanoleuca*); noisy pitta (*Pitta versicolor*); pied imperial-pigeon (*Ducula bicolor*); silvereye (*Zosterops lateralis*); and spangled drongo (*Dicrurus bracteatus*). There is no approved conservation advice, listing advice or recovery plans available for any of these species (DAWE, 2022c). It is unlikely that the proposed Project will have a significant impact on any of the observed listed Marine species within the AOI.

3.3.5. Pest plants and animals

A total of 64 introduced flora species were observed during the field survey (Appendix F).

Five non-native fauna species were observed during the field survey:

- Feral Cat (*Felis catus*)
- Feral Pig (*Sus scrofa*)
- Fox (*Vulpes vulpes*)
- Common Myna (*Sturnus tristis*)

Each of these fauna species are listed as a pest by the Queensland Government (DES, 2022c). In addition to these species, there was one observation of a dingo (*Canis familiaris dingo*) on the camera traps. The dingo, fox, pig, and cat are all listed as Restricted Matters under the *Biosecurity Act 2014 (BIO)* (Queensland). Under sections 21 and 22 of the BIO Act, a biosecurity matter (e.g. introduced fauna) is satisfies the restricted matter criteria if:

- (a) The biosecurity matter is currently present in the State; and
- (b) There are reasonable grounds to believe that, if restrictions under this Act are not imposed on the biosecurity matter to reduce, control, or contain it, it may have an adverse effect on a biosecurity consideration.

Each of the observed introduced fauna species, apart from the common myna, have been described as predators or detrimental environmental factors to conservation significant species discussed in the previous section 3.3.4.1. Feral cats, foxes, and wild dogs/dingos are known predators to the echidna, northern quoll, and

Proserpine rock-wallaby (DAWE, 2021; Hill & Ward, 2010; Rismiller & McKelvey, 2000). Given the Project's proximity to human disturbance (i.e. houses, restaurants, cafes), there is a possibility the cats observed are pets from nearby homes or offspring of previously owned individuals. The proximity of urban disturbance likely provides food (e.g. rubbish) and/or shelter to each of these introduced species, allowing for sustained populations to occur. The abundance of these introduced threats should be monitored, and care should be taken during the commencement of the Project to minimize further spread of the species into the AOI and potential habitat of conservation significant species.

3.3.6. Post-survey Likelihood of Occurrence

Likelihood of occurrence rankings were reassessed post-survey for conservation significant fauna species based on ground-truthing of habitat and fauna observations within the AOI. Habitat present within the AOI supports the Unlikely ranking of coastal birds, especially those listed as Marine. The LOO ranking for both the coastal sheathtail bat (*Taphozous australis*) and koala (*Phascolarctos cinereus*) have been changed from Possible to Unlikely due to the lack of suitable habitat within the AOI. Although no individuals were observed during the survey, the rankings for the northern quoll (*Dasyurus hallucatus*) and Proserpine rock-wallaby (*Petrogale persephone*) remain Possible and Likely, respectively, due to the presence of rocky denning habitat within the national park portion of the AOI and recent records within 10 km of the AOI.

There are no Legally Secured Offset Areas within a 2 km radius of the AOI.

3.4. Summary of Matters

3.4.1. Matters of National Environmental Significance

MNES identified during the desktop assessment were ground-truthed and/or confirmed as follows:

- 1 World Heritage Properties: Great Barrier Reef;
- 1 National Heritage Places: Great Barrier Reef;
- 6 Great Barrier Reef Marine Park zones: 3 Conservation Park zones, 1 General Use zone, and 2 Habitat Protection zones;
- 0 Listed Threatened Ecological Communities: Vegetation present is inconsistent with the communities: Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland (Endangered); and Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (Critically endangered);
- 0 EVNT flora species recorded;
- 0 EVNT fauna species recorded;
- 7 listed marine fauna species recorded; and
- 1 migratory fauna species recorded.

3.4.2. Matters of State Environmental Significance

MSES identified during the desktop assessment identified were ground-truthed and/or confirmed as follows:

- 3 Regulated vegetation areas present;
 - Category B regulated vegetation present;
 - Regulated Vegetation intersecting a watercourse is present;

- Essential habitat for Proserpine rock-wallaby (*Petrogale persephone*) - endangered (EPBC, NCA). present;
- Protected wildlife habitat is present for:
 - Endangered or vulnerable species:
 - (*Petrogale persephone*) - endangered (EPBC, NCA); and
 - Special least concern species.
- Species listed as either ENVNT or Special Least Concern (SL) under the NCA;
 - 1 ENVNT listed flora species recorded - *Brachychiton compactus* – NT (NCA) recorded;
 - 15 Special Least Concern (SL) flora species recorded;
 - 0 ENVNT listed fauna species recorded;
 - 1 SL listed fauna species recorded – Spectacled monarch (*Symposiachrus trivirgatus*) – SL (NCA) recorded;
- 1 Protected area present – Conway National Park.

4. Conclusion and Recommendations

4.1.1. Summary of Conservation Significant Matters

- The desktop scoping identified 49 listed conservation significant flora species that have the potential to be present in the AOI, and/or have been recorded within 10 km of the AOI:
 - 13 EVNT flora species; and
 - 36 Special Least Concern (SL) flora species.
- The desktop scoping identified 62 listed conservation significant terrestrial fauna species as potentially present within the AOI, and/or have been recorded within 10 km of the AOI:
 - 28 ENVT fauna species;
 - 43 Marine (Ma) and/or Migratory (M) fauna species; and
 - 28 Special Least Concern (SL) fauna species.
- The BioCondition assessments and incidental observations resulted in a total of 390 flora species from 98 plant families observed:
 - 1 EVNT flora species - *Brachychiton compactus* – NT (NCA);
 - 15 Special Least Concern (SL) flora species;
 - 64 Introduced (I*) flora species; and
 - 310 Common (C) flora species.
- Fauna surveys recorded 67 species present within the AOI:
 - 0 amphibians;
 - 37 birds;
 - 10 mammals;
 - 1 ray-finned fish; and
 - 19 reptiles.
- One species, spectacled monarch (*Symposiachrus trivirgatus*), is listed as Special Least Concern (SL) under the NCA and Marine (Ma) and Migratory (M) under the EPBC. The species is unlikely to be significantly impacted by the Project.
- Seven species are listed Least Concern (LC) under the NCA and Marine (Ma) under the EPBC. None of the seven species are considered conservation significant:
 - Black-faced cuckoo-shrike (*Coracina novaehollandiae*) – LC (NCA), Ma (EPBC);
 - Magpie-lark (*Grallina cyanoleuca*) – LC (NCA), Ma (EPBC);
 - Noisy pitta (*Pitta versicolor*) – LC (NCA), Ma (EPBC);
 - Pied imperial-pigeon (*Ducula bicolor*) – LC (NCA), Ma (EPBC);
 - Rainbow bee-eater (*Merops ornatus*) – LC (NCA), Ma (EPBC);
 - Silvereye (*Zosterops lateralis*) – LC (NCA), Ma (EPBC); and
 - Spangled drongo (*Dicrurus bracteatus*) – LC (NCA), Ma (EPBC).
- Four non-native fauna species were encountered within the AOI:
 - Feral Cat (*Felis catus*);
 - Feral Pig (*Sus scrofa*);
 - Fox (*Vulpes vulpes*); and
 - Common Myna (*Sturnus tristis*).

- No observations of the northern quoll (*Dasyurus hallucatus*) or Proserpine rock-wallaby (*Petrogale persephone*) were made during the field survey. Suitable habitat for both species (e.g. denning and foraging) was observed within the AOI. Lack of observation of the species does not confirm absence, therefore, the likelihood of each species occurring within the AOI remains Possible (northern quoll) and Likely (Proserpine rock-wallaby).

4.1.2. Recommendations

Although no EVNT fauna species were observed during the field survey, a lack of observation does not confirm absence of the species. Suitable habitat for both the Proserpine rock-wallaby (*Petrogale persephone*) and northern quoll (*Dasyurus hallucatus*) was observed within the AOI including boulder piles, rock crevices and overhangs, hollows in trees and logs, a vegetation-lined creek, a dense vine understorey, and areas of thick grasses (DERM, 2010; DSEWPaC, 2011; Woinarski *et al.*, 2008; Woinarski *et al.*, 2014). Based on the presence of suitable habitat and nearby recent records for both species, there is potential the species exist within the AOI. Several Special Least Concern (SL), Marine (Ma), and/or Migratory (M) fauna species are also listed as potentially occurring within the AOI (section 3.3.4). During the surveys, seven species listed as Ma under EPBC were observed within the AOI. One of these species, the spectacled monarch (*Symposiachrus trivirgatus*), is also listed as SL under the NCA and M under the EPBC. The species was observed within a nest, suggesting breeding of the species occurs within the AOI.

Due to the confirmed presence of breeding migrants and potential presence of several EVNT and conservation significant fauna species, WTS recommends the following to client:

- Undertake a Pre-clearance Survey prior to construction;
- Create and implement a High-Risk Species Management Program (SMP) (DES, 2020);
- Create and implement a Pest Management Plan (DAF, 2017); and
- Ensure a Fauna Spotter Catcher is present during all construction activities.

A SMP is required for any proposed activity that will impact on breeding places of colonial breeders, EVNT, SL, or Least Concern (LC) species (DES, 2020). The purpose of the SMP is to:

- assess the threats to native animal breeding places resulting from a planned activity;
- incorporate management actions that will avoid or minimise both the immediate and the long-term impact of removing or altering an animal breeding place; and
- set monitoring and reporting requirements that demonstrate the management actions in the SMP are effectively implemented and produce the intended results (DES, 2020).

A High-Risk SMP will be required per the SMP Guidelines due to the confirmed presence of a SL species on a potential breeding place (spectacled monarch nest) within the AOI. High-Risk SMPs are used for:

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

A Pre-clearance survey will need to be conducted by a suitably qualified person prior to construction to inform the High-Risk SMP. The Project's proposed area of disturbance is relatively small (approximately 102.90 ha) and will occur mostly in a linear path, theoretically causing minimal temporary disturbance. The Pre-clearance survey should focus on niche habitats for potential EVNT species and breeding places (e.g. bird nests, tree hollows, rock crevices) within the planned area of disturbance to increase the likelihood of observing an EVNT or conservation significant species potentially occurring within the AOI. A drafted SMP, including an *Animal breeding place assessment report* and *Impact management plan*, must be submitted to the Department of Environment and Science (DES) for approval prior to construction commencement (DES, 2020). If approved, a Fauna Spotter Catcher is recommended to be present during all disturbance activities to minimize potential harm to fauna species within the disturbance area.

A total of 64 introduced flora species and four introduced and/or feral fauna species were observed within the AOI during the surveys. WTS recommends the implementation of a Pest Management Plan to minimize the spread of weeds and invasive species into the Conway NP. A Pest Management Plan will identify potential impacts spread, implement regular monitoring of species presence within the AOI, identify methods of prevention, and detail control methods in the event of an outbreak. Details and recommendations on how to develop a Pest Management Plan are provided by the Queensland Government (DAF, 2017).

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6. Appendices

Appendix A. EBPC Act Protected Matters Report (10 km buffer).



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: 05-Sep-2022

[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)	None
Great Barrier Reef Marine Park:	6
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	43
Listed Migratory Species:	47

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	86
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:	6
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	16
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

Great Barrier Reef Marine Park [\[Resource Information \]](#)

Zone Type	Zone ID	IUCN	Buffer Status
Conservation Park	CP-20-4080	IV	In buffer area only
Conservation Park	CP-20-4082	IV	In buffer area only
Conservation Park	CP-20-4083	IV	In buffer area only
General Use	GU-16-6004	VI	In buffer area only
Habitat Protection	HP-19-5165	VI	In buffer area only
Habitat Protection	HP-20-5194	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
Broad leaf tea-tree (<i>Melaleuca viridiflora</i>) woodlands in high rainfall coastal north Queensland	Endangered	Community likely to occur within area	In feature area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically 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			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
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
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Turnix olivii Buff-breasted Button-quail [59293]	Endangered	Species or species habitat may occur within area	In feature area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petrogale persephone Proserpine Rock-wallaby [226]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<u>Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</u>			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
<u>Xeromys myoides</u>			
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			
<u>Eucalyptus raveretiana</u>			
Black Ironbox [16344]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Graptophyllum ilicifolium</u>			
Holly-leaved Graptophyllum, Mt Blackwood Holly [8601]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Medicosma obovata</u>			
[17533]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<u>Neisosperma kilneri</u>			
[14319]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<u>Omphalea celata</u>			
[64586]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<u>Phaius australis</u>			
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area	In feature area
<u>Samadera bidwillii</u>			
Quassia [29708]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Solanum graniticum</u>			
Granite Nightshade [84819]	Endangered	Species or species habitat likely to occur within area	In feature area

REPTILE

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known 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
SHARK			
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
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 likely to occur within area	In buffer area only

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		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 likely to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known 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
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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat 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
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 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
Sousa sahalensis 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 may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely 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
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
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
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 likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In 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 likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may 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 nebularia Common Greenshank, Greenshank [832]		Species or species habitat may 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Corythoichthys paxtoni Paxton's Pipefish [66204]		Species or species habitat may occur within area	In buffer area only
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 spinostris 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only
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 brevisrostris 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

Scientific Name	Threatened Category	Presence Text	Buffer Status
<i>Syngnathoides biaculeatus</i> Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
<i>Trachyrhamphus bicoarctatus</i> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
<i>Trachyrhamphus longirostris</i> Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In buffer area only
Mammal			
<i>Dugong dugon</i> Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Reptile			
<i>Acalyptophis peronii</i> Horned Seasnake [1114]		Species or species habitat may occur within area	In buffer area only
<i>Aipysurus duboisii</i> Dubois' Seasnake [1116]		Species or species habitat may occur within area	In buffer area only
<i>Aipysurus eydouxii</i> Spine-tailed Seasnake [1117]		Species or species habitat may occur within area	In buffer area only
<i>Aipysurus laevis</i> Olive Seasnake [1120]		Species or species habitat may occur within area	In buffer area only
<i>Astrotia stokesii</i> Stokes' Seasnake [1122]		Species or species habitat may occur within area	In buffer area only
<i>Caretta caretta</i> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
<i>Chelonia mydas</i> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chitulia ornata as Hydrophis ornatus Spotted Seasnake, Ornate Reef Seasnake [87377]		Species or species habitat may 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
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area	In buffer area only
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area	In buffer area only
Enhydrina schistosa Beaked Seasnake [1126]		Species or species habitat may 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
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area	In buffer area only
Hydrophis macdowellii as Hydrophis mcdowellii Small-headed Seasnake [75601]		Species or species habitat may occur within area	In buffer area only
Lapemis curtus as Lapemis hardwickii Spine-bellied Seasnake [83554]		Species or species habitat may occur within area	In buffer area only
Laticauda colubrina a 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
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may 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 as Orcaella brevirostris Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Sousa sahalensis as Sousa chinensis 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
Conway	Conservation Park	QLD	In buffer area only
Conway	National Park	QLD	In feature area
Conway West	Conservation Park	QLD	In buffer area only
Dryander	National Park	QLD	In buffer area only
Great Barrier Reef Coast	Marine Park	QLD	In buffer area only
Molle Islands	National Park	QLD	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
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	
Controlled action					
Cannonvale Waste Water Treatment Facility upgrade	2010/5710	Controlled Action	Post-Approval	In buffer area only	

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Castaway Bay Resort	2002/546	Controlled Action	Completed	In buffer area only
Construction of marina facility	2003/1308	Controlled Action	Completed	In buffer area only
Construction of Marina Facility	2006/2939	Controlled Action	Post-Approval	In buffer area only
Lot 6 Residential Subdivision - 59 lots	2008/4123	Controlled Action	Post-Approval	In buffer area only
Port of Airlie Integrated Resort & Marina Development	2001/298	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Bagasse-furfural processing plant	2005/2361	Not Controlled Action	Completed	In buffer area only
Geotechnical Investigation for Castaway Bay Proposed Residential Development	2009/4813	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
Integrated Residential Development	2006/2977	Not Controlled Action	Completed	In buffer area only
Refuelling Facility Upgrade	2001/330	Not Controlled Action	Completed	In buffer area only
Residential development of 75 units, 4 shops, conference facility, health club a	2008/4291	Not Controlled Action	Completed	In buffer area only
Whitsunday Springs Golf Resort and Residential Development	2005/2485	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Lot 14 Shoreline Residential	2007/3326	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Ongoing dredging of the existing Abell Point Marina, Qld	2013/6931	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Residential Subdivision Development Mt Marlow	2008/4174	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Biologically Important Areas

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	Likely 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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Appendix B. Wildlife Online Species List (10 km buffer).



Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Queensland status: All

Records: All

Date: All

Latitude: -20.2833

Longitude: 148.7110

Distance: 10

Email: rheanne@wulgurutechservices.com.au

Date submitted: Monday 05 Sep 2022 09:19:03

Date extracted: Monday 05 Sep 2022 09:20:09

The number of records retrieved = 1100

Disclaimer

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

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

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

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

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			38/2
animals	amphibians	Hylidae	<i>Litoria bicolor</i>	northern sedgefrog		C		1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		19
animals	amphibians	Hylidae	<i>Litoria chloris</i>	orange eyed treefrog		C		7/1
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		5
animals	amphibians	Hylidae	<i>Litoria gracilentia</i>	graceful treefrog		C		3
animals	amphibians	Hylidae	<i>Litoria infrafrenata</i>	white lipped treefrog		C		4/1
animals	amphibians	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		10
animals	amphibians	Hylidae	<i>Litoria sp.</i>			C		2
animals	amphibians	Hylidae	<i>Litoria wilcoxii</i>	eastern stony creek frog		C		16/6
animals	amphibians	Limnodynastidae	<i>Limnodynastes peronii</i>	striped marshfrog		C		10
animals	amphibians	Myobatrachidae	<i>Mixophyes fasciolatus</i>	great barred frog		C		1
animals	birds	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill		C		1
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		1
animals	birds	Acanthizidae	<i>Gerygone levigaster</i>	mangrove gerygone		C		3
animals	birds	Acanthizidae	<i>Gerygone magnirostris</i>	large-billed gerygone		C		6
animals	birds	Acanthizidae	<i>Gerygone mouki</i>	brown gerygone		C		12
animals	birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone		C		24
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		27
animals	birds	Acanthizidae	<i>Sericornis magnirostra</i>	large-billed scrubwren		C		19
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		1
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		6
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		7
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		9
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		5
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		1
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		24
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmyny kite		C		34
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		1
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		2
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		SL		33
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		6
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		7
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		2
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		1
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		5
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		1
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		2
animals	birds	Anatidae	<i>Radjah radjah</i>	radjah shelduck		C		1
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		4
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		1
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	2
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		9
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		3
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	<i>Butorides striata</i>	striated heron		C		14
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		5
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		8
animals	birds	Ardeidae	<i>Egretta sacra</i>	eastern reef egret		C		19
animals	birds	Ardeidae	<i>Ixobrychus dubius</i>	Australian little bittern		C		1
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		7
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		13
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		1
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		3
animals	birds	Artamidae	<i>Cracticus quoyi rufescens</i>	black butcherbird (coastal north-central Queensland))		C		1
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		3
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		2
animals	birds	Artamidae	<i>Melloria quoyi</i>	black butcherbird		C		47
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		7
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		17
animals	birds	Burhinidae	<i>Esacus magnirostris</i>	beach stone-curlew		V		31/2
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		58
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		7
animals	birds	Campephagidae	<i>Coracina lineata</i>	barred cuckoo-shrike		C		4
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		10
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		2
animals	birds	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird		C		4
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		49
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		5
animals	birds	Charadriidae	<i>Charadrius mongolus</i>	lesser sand plover		E	E	1
animals	birds	Charadriidae	<i>Euseyonis melanops</i>	black-fronted dotterel		C		1
animals	birds	Charadriidae	<i>Pluvialis squatarola</i>	grey plover		SL		1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		8
animals	birds	Charadriidae	<i>Vanellus miles miles</i>	masked lapwing (northern subspecies)		C		4
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		1
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		2
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		2
animals	birds	Columbidae	<i>Chalcophaps longirostris</i>	Pacific emerald dove		C		40
animals	birds	Columbidae	<i>Columba leucomela</i>	white-headed pigeon		C		4
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			1
animals	birds	Columbidae	<i>Ducula bicolor</i>	piebald imperial-pigeon		C		23
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		24
animals	birds	Columbidae	<i>Geopelia placida</i>	peaceful dove		C		31
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		2
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		32
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		1
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		1
animals	birds	Columbidae	<i>Ptilinopus magnificus</i>	wompoo fruit-dove		C		29
animals	birds	Columbidae	<i>Ptilinopus regina</i>	rose-crowned fruit-dove		C		21
animals	birds	Columbidae	<i>Ptilinopus superbus</i>	superb fruit-dove		C		21

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	<i>Streptopelia chinensis</i>	spotted dove	Y			1
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		1
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow			C	20
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo			C	10
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo			C	2
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo			C	1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal			C	13
animals	birds	Cuculidae	<i>Chalcites basal</i>	Horsfield's bronze-cuckoo			C	1
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo			C	4
animals	birds	Cuculidae	<i>Chalcites minutill</i>	little bronze-cuckoo			C	14
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel			C	12
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo			C	3
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo			C	36
animals	birds	Dicruridae	<i>Dicrurus bracteatus bracteatus</i>	spangled drongo (eastern Australia)			C	2
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin			C	5
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			6
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch			C	2
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon			C	3
animals	birds	Fregatidae	<i>Fregata ariel</i>	lesser frigatebird			SL	1
animals	birds	Haematopodidae	<i>Haematopus fuliginosus</i>	sooty oystercatcher			C	7
animals	birds	Haematopodidae	<i>Haematopus longirostris</i>	Australian pied oystercatcher			C	16
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra			C	2
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra			C	25
animals	birds	Halcyonidae	<i>Tanysiptera sylvia</i>	buff-breasted paradise-kingfisher			C	17
animals	birds	Halcyonidae	<i>Todiramphus macleayi</i>	forest kingfisher			C	6
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher			C	7
animals	birds	Halcyonidae	<i>Todiramphus sordidus</i>	Torresian kingfisher			C	7
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow			C	24
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin			C	1
animals	birds	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull			C	36
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern			SL	1
animals	birds	Laridae	<i>Onychoprion anaethetus</i>	bridled tern			SL	2
animals	birds	Laridae	<i>Sterna sumatrana</i>	black-naped tern			SL	15
animals	birds	Laridae	<i>Thalasseus bengalensis</i>	lesser crested tern			C	4
animals	birds	Laridae	<i>Thalasseus bergii</i>	crested tern			SL	19
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren			C	2
animals	birds	Megaluridae	<i>Cincloramphus timoriensis</i>	tawny grassbird			C	4
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey			C	39
animals	birds	Megapodiidae	<i>Megapodius reinwardt</i>	orange-footed scrubfowl			C	25
animals	birds	Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	eastern spinebill			C	1
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater			C	9
animals	birds	Meliphagidae	<i>Gavicalis fasciogularis</i>	mangrove honeyeater			C	14
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater			C	5
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner			C	1
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater			C	69
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater			C	24

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater		C		46
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		10
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		27
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		5
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		6
animals	birds	Meliphagidae	<i>Phylidonyris niger</i>	white-cheeked honeyeater		C		1
animals	birds	Meliphagidae	<i>Stomiopera flava</i>	yellow honeyeater		C		5
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		23
animals	birds	Monarchidae	<i>Carterornis leucotis</i>	white-eared monarch		C		13
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		17
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		9
animals	birds	Monarchidae	<i>Myiagra alecto</i>	shining flycatcher		C		2
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		27
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		SL		51
animals	birds	Nectariniidae	<i>Cinnyris jugularis</i>	olive-backed sunbird		C		27
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		25
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		14
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		48
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		2
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		37
animals	birds	Pachycephalidae	<i>Pachycephala melanura</i>	mangrove golden whistler		C		1
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		5
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		9
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		2
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		2
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			5
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		4
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		27
animals	birds	Petroicidae	<i>Poecilodryas superciliosa</i>	white-browed robin		C		2
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		12
animals	birds	Phasianidae	<i>Pavo cristatus</i>	Indian peafowl	Y			1
animals	birds	Phasianidae	<i>Synoicus ypsilophorus</i>	brown quail		C		1
animals	birds	Pittidae	<i>Pitta versicolor</i>	noisy pitta		C		15
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		5
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		2
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		5
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		6
animals	birds	Psittacidae	<i>Platycercus adscitus palliceps</i>	pale-headed rosella (southern form)		C		1
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		10
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		31
animals	birds	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird		C		1
animals	birds	Ptilonorhynchidae	<i>Chlamydera nuchalis</i>	great bowerbird		C		2
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		1

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animals	birds	Rallidae	<i>Gallirallus philippensis</i>	buff-banded rail		C		4
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		2
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		32
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		5
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		36
animals	birds	Scolopacidae	<i>Actitis hypoleucos</i>	common sandpiper		SL		2
animals	birds	Scolopacidae	<i>Calidris tenuirostris</i>	great knot		CR	CE	1
animals	birds	Scolopacidae	<i>Limosa lapponica baueri</i>	Western Alaskan bar-tailed godwit		V	V	3
animals	birds	Scolopacidae	<i>Numenius madagascariensis</i>	eastern curlew		E	CE	4
animals	birds	Scolopacidae	<i>Numenius phaeopus</i>	whimbrel		SL		8
animals	birds	Scolopacidae	<i>Tringa brevipes</i>	grey-tailed tattler		SL		2
animals	birds	Scolopacidae	<i>Xenus cinereus</i>	terek sandpiper		SL		1
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		3
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		1
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		C		5
animals	birds	Sturnidae	<i>Acridotheres tristis</i>	common myna	Y			1
animals	birds	Sturnidae	<i>Aplonis metallica</i>	metallic starling		C		11
animals	birds	Sulidae	<i>Sula leucogaster</i>	brown booby		SL		1
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		3
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		8
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		4
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		29
animals	birds	Timaliidae	<i>Zosterops lateralis cornwalli</i>	silveryeye (eastern)		C		2
animals	birds	Tytonidae	<i>Tyto javanica</i>	eastern barn owl		C		1
animals	cartilaginous fishes	Dasyatidae	<i>Taeniura lymma</i>	bluespotted fantail ray				1
animals	insects	Formicidae	<i>Pheidole megacephala</i>	African big-headed ant	Y			1
animals	insects	Formicidae	<i>Tapinoma melanocephalum</i>	ghost ant	Y			1
animals	insects	Hesperiidae	<i>Tagiades japetus janetta</i>	ped flat				4
animals	insects	Lycaenidae	<i>Arhopala madytus</i>	bright oak-blue				1
animals	insects	Lycaenidae	<i>Arhopala micale amytis</i>	shining oak-blue (Cape York subspecies)				1
animals	insects	Lycaenidae	<i>Candalides erinus erinus</i>	small dusky-blue				1
animals	insects	Lycaenidae	<i>Candalides hyacinthinus hyacinthinus</i>	varied dusky-blue				1
animals	insects	Lycaenidae	<i>Hypolycaena phorbis phorbis</i>	black-spotted flash				1
animals	insects	Lycaenidae	<i>Nacaduba berenice berenice</i>	large purple line-blue				1
animals	insects	Lycaenidae	<i>Prosotas dubiosa dubiosa</i>	purple line-blue				1
animals	insects	Lycaenidae	<i>Rapala varuna simsoni</i>	indigo flash				1
animals	insects	Nymphalidae	<i>Cupha prosopse prosopse</i>	bordered rustic (Australian subspecies)				2
animals	insects	Nymphalidae	<i>Danaus affinis affinis</i>	swamp tiger				1
animals	insects	Nymphalidae	<i>Danaus plexippus</i>	monarch	Y			3
animals	insects	Nymphalidae	<i>Doleschallia bisaltide australis</i>	leafwing				2
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				2
animals	insects	Nymphalidae	<i>Euploea sylvester sylvester</i>	two-brand crow				1
animals	insects	Nymphalidae	<i>Euploea tulliolus tulliolus</i>	purple crow				2
animals	insects	Nymphalidae	<i>Hypocysta irius</i>	orange-streaked ringlet				2

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animals	insects	Nymphalidae	<i>Hypolimnas alimena lamina</i>	blue-banded eggfly				1
animals	insects	Nymphalidae	<i>Hypolimnas bolina nerina</i>	varied eggfly				3
animals	insects	Nymphalidae	<i>Melanitis leda bankia</i>	evening brown				4
animals	insects	Nymphalidae	<i>Mycalesis terminus terminus</i>	orange bush-brown				2
animals	insects	Nymphalidae	<i>Pantoporia consimilis consimilis</i>	orange plane				3
animals	insects	Nymphalidae	<i>Tirumala hamata hamata</i>	blue tiger				5
animals	insects	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail				1
animals	insects	Papilionidae	<i>Graphium agamemnon ligatum</i>	green-spotted triangle				2
animals	insects	Papilionidae	<i>Papilio aegaeus aegaeus</i>	orchard swallowtail (Australian subspecies)				1
animals	insects	Papilionidae	<i>Papilio fuscus capaneus</i>	fuscous swallowtail (Australian subspecies)				1
animals	insects	Papilionidae	<i>Papilio ulysses joesa</i>	Ulysses butterfly		C		1
animals	insects	Pieridae	<i>Appias paulina ega</i>	yellow albatross				1
animals	insects	Pieridae	<i>Catopsilia pomona</i>	lemon migrant				1
animals	insects	Pieridae	<i>Delias mysis mysis</i>	red-banded jezebel				1
animals	insects	Pieridae	<i>Elodina queenslandica</i>					1
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				2
animals	mammals	Balaenopteridae	<i>Megaptera novaeangliae</i>	humpback whale		C		10
animals	mammals	Canidae	<i>Canis familiaris</i>	dog	Y			3
animals	mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				3
animals	mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	northern quoll		C	E	8
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		28/4
animals	mammals	Delphinidae	<i>Orcaella heinsohni</i>	Australian snubfin dolphin		V		1
animals	mammals	Delphinidae	<i>Sousa sahalensis</i>	Australian humpback dolphin		V		1
animals	mammals	Dugongidae	<i>Dugong dugon</i>	dugong		V		18
animals	mammals	Emballonuridae	<i>Taphozous australis</i>	coastal sheath-tail bat		NT		5
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			4
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		1
animals	mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby		C		3
animals	mammals	Macropodidae	<i>Petrogale persephone</i>	Proserpine rock-wallaby		E	E	109
animals	mammals	Macropodidae	<i>Thylogale stigmatica</i>	red-legged pademelon		C		2
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		8
animals	mammals	Miniopteridae	<i>Miniopterus australis</i>	little bent-wing bat		C		1
animals	mammals	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat		C		1
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		8
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		9/4
animals	mammals	Muridae	<i>Melomys cervinipes</i>	fawn-footed melomys		C		79/1
animals	mammals	Muridae	<i>Rattus fuscipes</i>	bush rat		C		1
animals	mammals	Muridae	<i>Rattus norvegicus</i>	brown rat	Y			1
animals	mammals	Muridae	<i>Rattus rattus</i>	black rat	Y			1
animals	mammals	Muridae	<i>Xeromys myoides</i>	water mouse		V	V	2
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		12
animals	mammals	Peramelidae	<i>Perameles nasuta</i>	long-nosed bandicoot		C		4
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		8
animals	mammals	Petauridae	<i>Petaurus notatus</i>	Kreff's glider		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		17
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		E	E	5
animals	mammals	Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	common ringtail possum		C		4
animals	mammals	Pteropodidae	<i>Nyctimene robinsoni</i>	eastern tube-nosed bat		C		12
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		5
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		1
animals	mammals	Pteropodidae	<i>Syconycteris australis</i>	eastern blossom bat		C		4/1
animals	mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	eastern horseshoe-bat		C		3/1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			7
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		10
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		1
animals	mammals	Vespertilionidae	<i>Nyctophilus bifax</i>	northern long-eared bat		C		16/2
animals	mammals	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat		C		1
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat		C		6
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				1
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris sp.</i>					1
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				2
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				2
animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	Y			1
animals	ray-finned fishes	Poeciliidae	<i>Poecilia reticulata</i>	guppy	Y			1
animals	ray-finned fishes	Poeciliidae	<i>Xiphophorus hellerii</i>	swordtail	Y			2
animals	ray-finned fishes	Poeciliidae	<i>Xiphophorus maculatus</i>	platy	Y			1
animals	ray-finned fishes	Pseudomugilidae	<i>Pseudomugil signifer</i>	Pacific blue eye				2
animals	ray-finned fishes	Synbranchidae	<i>Ophisternon gutturale</i>	swamp eel				1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead			C	3
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon			C	9/2
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python			C	5/1
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python			C	11
animals	reptiles	Boidae	<i>Simalia kinghorni</i>	amethystine python (Australian form)			C	8
animals	reptiles	Carphodactylidae	<i>Phyllurus ossa</i>	Mount Ossa broad-tailed gecko			C	3/2
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle			C	1
animals	reptiles	Chelidae	<i>Wollumbinia latisternum</i>	saw-shelled turtle			C	2
animals	reptiles	Cheloniidae	<i>Natator depressus</i>	flatback turtle		V	V	1
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake			C	7/1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake			C	8
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake			C	2/1
animals	reptiles	Crocodylidae	<i>Crocodylus porosus</i>	estuarine crocodile			V	8
animals	reptiles	Diplodactylidae	<i>Amalosia lesueurii</i>	Lesueur's velvet gecko			C	1
animals	reptiles	Diplodactylidae	<i>Amalosia rhombifer</i>	zig-zag gecko			C	7
animals	reptiles	Diplodactylidae	<i>Oedura monilis</i>	ocellated velvet gecko			C	3
animals	reptiles	Diplodactylidae	<i>Oedura monilis sensu lato</i>	ocellated velvet gecko			C	2
animals	reptiles	Diplodactylidae	<i>Oedura sp.</i>				C	1
animals	reptiles	Elapidae	<i>Cacophis harriettae</i>	white-crowned snake			C	1/1

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animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake		C		3/1
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		2
animals	reptiles	Elapidae	<i>Demansia torquata</i>	collared whipsnake		C		5/1
animals	reptiles	Elapidae	<i>Demansia vestigiata</i>	lesser black whipsnake		C		4
animals	reptiles	Elapidae	<i>Pseudechis porphyriacus</i>	red-bellied black snake		C		13/1
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		2
animals	reptiles	Gekkonidae	<i>Hemidactylus frenatus</i>	house gecko	Y			3
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		5
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		1
animals	reptiles	Scincidae	<i>Bellatorias frerei</i>	major skink		C		3/2
animals	reptiles	Scincidae	<i>Bellatorias major</i>	land mullet		C		1
animals	reptiles	Scincidae	<i>Carlia decora</i>	elegant rainbow skink		C		4
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		5
animals	reptiles	Scincidae	<i>Carlia rhomboidalis</i>	blue-throated rainbow-skink		C		24/3
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		4/4
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		3
animals	reptiles	Scincidae	<i>Carlia sp.</i>			C		1
animals	reptiles	Scincidae	<i>Concinnia amplus</i>	lemon-barred forest-skink		C		5/3
animals	reptiles	Scincidae	<i>Concinnia brachysoma</i>	northern bar-sided skink		C		6/4
animals	reptiles	Scincidae	<i>Concinnia sokosoma</i>	stout bar-sided skink		C		2
animals	reptiles	Scincidae	<i>Concinnia tenuis</i>	bar-sided skink		C		6
animals	reptiles	Scincidae	<i>Cryptoblepharus litoralis litoralis</i>	coastal snake-eyed skink		C		6
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus sensu lato</i>			C		4
animals	reptiles	Scincidae	<i>Ctenotus eutaenius</i>	black-backed yellow-lined ctenotus		C		1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		3
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		1
animals	reptiles	Scincidae	<i>Cyclodomorphus gerrardii</i>	pink-tongued lizard		C		4/1
animals	reptiles	Scincidae	<i>Eulamprus quoyii</i>	eastern water skink		C		4/3
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		2
animals	reptiles	Scincidae	<i>Lampropholis adonis</i>	diamond-shielded sunskink		C		50/8
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		2
animals	reptiles	Scincidae	<i>Lampropholis sp.</i>			C		1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		1
animals	reptiles	Scincidae	<i>Saproscincus basiliscus</i>	basilisk shadeskink		C		1
animals	reptiles	Scincidae	<i>Saproscincus hannahae</i>	Hannah's shadeskink		C		42/5
animals	reptiles	Typhlopidae	<i>Anilius torresianus</i>	north-eastern blind snake		C		1/1
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		1
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		10
animals	uncertain	Indeterminate	<i>Indeterminate</i>	Unknown or Code Pending				6
chromists	brown algae	Ectocarpaceae	<i>Ectocarpus siliculosus</i>			C		1/1
chromists	brown algae	Scytosiphonaceae	<i>Rosenvingea orientalis</i>			C		1/1
fungi	Agaricomycetes	Fomitopsidaceae	<i>Daedalea</i>					1/1
fungi	Agaricomycetes	Ganodermataceae	<i>Ganoderma</i>					1/1
fungi	Agaricomycetes	Hymenochaetaceae	<i>Phellinus</i>					2/2
fungi	Agaricomycetes	Polyporaceae	<i>Microporus xanthopus</i>			C		1/1

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fungi	Agaricomycetes	Polyporaceae	<i>Pycnoporus sanguineus</i>			C		1/1
fungi	Agaricomycetes	Steccherinaceae	<i>Flavodon flavus</i>			C		1/1
fungi	arthoniomycetes	Roccellaceae	<i>Enterographa</i>					1/1
fungi	lecanoromycetes	Collemataceae	<i>Collema rugosum</i>			C		1/1
fungi	lecanoromycetes	Collemataceae	<i>Leptogium cyanescens</i>			C		1/1
fungi	lecanoromycetes	Graphidaceae	<i>Graphis analoga</i>			C		1/1
fungi	lecanoromycetes	Haematommataceae	<i>Haematomma africanum</i>			C		7/7
fungi	lecanoromycetes	Haematommataceae	<i>Haematomma stevensiae</i>			C		2/2
fungi	lecanoromycetes	Lecanoraceae	<i>Lecanora pseudodecorata</i>			C		1/1
fungi	lecanoromycetes	Pannariaceae	<i>Physma</i>					1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Relicynopsis malaccensis</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Relicynopsis rahengensis</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Usnea nidifica</i>			C		1/1
fungi	lecanoromycetes	Ramalinaceae	<i>Phyllopsora conwayensis</i>			C		1/1
fungi	lecanoromycetes	Ramalinaceae	<i>Ramalina pacifica</i>			C		4/4
fungi	lecanoromycetes	Ramalinaceae	<i>Ramalina subfraxinea</i> var. <i>subfraxinea</i>			C		1/1
plants	Florideophyceae	Caulacanthaceae	<i>Catenella</i>					1/1
plants	Florideophyceae	Caulacanthaceae	<i>Catenella nipae</i>			C		1/1
plants	Florideophyceae	Ceramiales	<i>Centroceras clavulatum</i>			C		1/1
plants	Florideophyceae	Ceramiales	<i>Ceramium codii</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Bostrychia kelanensis</i>			C		1/1
plants	Florideophyceae	Rhodomelaceae	<i>Bostrychia radicans</i>			C		1/1
plants	Ulvophyceae	Cladophoraceae	<i>Cladophora</i>					1/1
plants	Ulvophyceae	Cladophoraceae	<i>Rhizoclonium implexum</i>			C		1/1
plants	Ulvophyceae	Udoteaceae	<i>Boodleopsis pusilla</i>			C		2/2
plants	Ulvophyceae	Ulvaceae	<i>Enteromorpha</i>					1/1
plants	Ulvophyceae	Ulvaceae	<i>Ulva flexuosa</i> subsp. <i>paradoxa</i>			C		2/2
plants	land plants	Acanthaceae	<i>Avicennia marina</i> subsp. <i>eucalyptifolia</i>			C		2/2
plants	land plants	Acanthaceae	<i>Barleria repens</i>		Y			2/2
plants	land plants	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		1/1
plants	land plants	Acanthaceae	<i>Harnieria hygrophiloides</i>	white karambal		C		10/9
plants	land plants	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		4/2
plants	land plants	Acanthaceae	<i>Rostellularia</i>					1/1
plants	land plants	Acanthaceae	<i>Rostellularia obtusa</i>			C		1/1
plants	land plants	Acanthaceae	<i>Thunbergia grandiflora</i>	sky flower	Y			1/1
plants	land plants	Aizoaceae	<i>Sesuvium portulacastrum</i>	sea purslane		C		2/2
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata</i>	lesser joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		2/2
plants	land plants	Amaranthaceae	<i>Deeringia arborescens</i>	climbing deeringia		C		1
plants	land plants	Amaryllidaceae	<i>Crinum pedunculatum</i>	river lily		SL		1/1
plants	land plants	Amaryllidaceae	<i>Proiphys infundibularis</i>			SL		1/1
plants	land plants	Anacardiaceae	<i>Euroschinus falcatus</i>			C		2
plants	land plants	Anacardiaceae	<i>Euroschinus falcatus</i> var. <i>falcatus</i>			C		2/2
plants	land plants	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		4/4
plants	land plants	Annonaceae	<i>Annona squamosa</i>		Y			1/1
plants	land plants	Annonaceae	<i>Fitzalania heteropetala</i>			C		9/7

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plants	land plants	Annonaceae	<i>Huberantha nitidissima</i>			C		1/1
plants	land plants	Annonaceae	<i>Melodorum crassipetalum</i>			C		1/1
plants	land plants	Annonaceae	<i>Melodorum leichhardtii</i>			C		5/3
plants	land plants	Annonaceae	<i>Milium brahei</i>			C		3/2
plants	land plants	Annonaceae	<i>Xylopiac maccraeae</i>			C		4/4
plants	land plants	Anthocerotaceae	<i>Anthoceros</i>					1/1
plants	land plants	Apiaceae	<i>Ammi majus</i>	bishop's weed	Y			1/1
plants	land plants	Apiaceae	<i>Centella asiatica</i>			C		2/1
plants	land plants	Apiaceae	<i>Mackinlaya macrosciadea</i>	mackinlaya		C		6/5
plants	land plants	Apocynaceae	<i>Alstonia scholaris</i>	white cheesewood		C		4/3
plants	land plants	Apocynaceae	<i>Alyxia ruscifolia</i>			C		5/2
plants	land plants	Apocynaceae	<i>Asclepias curassavica</i>	red-head cottonbush	Y			1/1
plants	land plants	Apocynaceae	<i>Cynanchum viminalis subsp. brunonianum</i>			C		1/1
plants	land plants	Apocynaceae	<i>Gymnema pleiadenium</i>			C		1
plants	land plants	Apocynaceae	<i>Gymnema tricholepis</i>			C		4/4
plants	land plants	Apocynaceae	<i>Heterostemma acuminatum</i>			C		2/2
plants	land plants	Apocynaceae	<i>Hoya australis</i>			C		1
plants	land plants	Apocynaceae	<i>Leichhardtia glandulifera</i>			C		1/1
plants	land plants	Apocynaceae	<i>Leichhardtia micradenia</i>			C		1/1
plants	land plants	Apocynaceae	<i>Melodinus australis</i>	southern melodinus		C		2/2
plants	land plants	Apocynaceae	<i>Neisosperma poweri</i>			C		7/5
plants	land plants	Apocynaceae	<i>Ochrosia elliptica</i>	northern ochrosia		C		4/4
plants	land plants	Apocynaceae	<i>Parsonsia</i>					1
plants	land plants	Apocynaceae	<i>Parsonsia longipetiolata</i>			C		1/1
plants	land plants	Apocynaceae	<i>Parsonsia plaesiophylla</i>			C		3/3
plants	land plants	Apocynaceae	<i>Parsonsia rotata</i>	veinless silkpod		C		2/2
plants	land plants	Apocynaceae	<i>Parsonsia velutina</i>	hairy silkpod		C		3/3
plants	land plants	Apocynaceae	<i>Tabernaemontana orientalis</i>			C		4/2
plants	land plants	Apocynaceae	<i>Tabernaemontana pandacaqui</i>	banana bush		C		1
plants	land plants	Apocynaceae	<i>Vincetoxicum carnosum</i>			C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum polyanthum</i>			C		3/2
plants	land plants	Araceae	<i>Alocasia brisbanensis</i>			C		2/1
plants	land plants	Araceae	<i>Pothos longipes</i>			C		1
plants	land plants	Araliaceae	<i>Polyscias australiana</i>	ivory basswood		C		2/2
plants	land plants	Araliaceae	<i>Polyscias elegans</i>	celery wood		C		3/2
plants	land plants	Araliaceae	<i>Polyscias nodosa</i>			C		1/1
plants	land plants	Arecaceae	<i>Archontophoenix alexandrae</i>	Alexandra palm		C		1
plants	land plants	Arecaceae	<i>Ptychosperma elegans</i>	solitaire palm		C		2/2
plants	land plants	Aristolochiaceae	<i>Aristolochia acuminata</i>			C		1/1
plants	land plants	Aristolochiaceae	<i>Aristolochia pubera var. pubera</i>			C		1/1
plants	land plants	Aspleniaceae	<i>Asplenium australasicum</i>			C		1
plants	land plants	Aspleniaceae	<i>Asplenium paleaceum</i>	scaly asplenium		C		3/2
plants	land plants	Asteraceae	<i>Ageratum conyzoides</i>	billygoat weed	Y			1
plants	land plants	Asteraceae	<i>Apowollastonia spilanthisoides</i>				C	1/1
plants	land plants	Asteraceae	<i>Bidens alba var. radiata</i>		Y			3/3
plants	land plants	Asteraceae	<i>Bidens pilosa</i>		Y			1

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plants	land plants	Asteraceae	<i>Calyptocarpus vialis</i>	creeping cinderella weed	Y			1/1
plants	land plants	Asteraceae	<i>Carthamus tinctorius</i>	safflower	Y			1/1
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		3/2
plants	land plants	Asteraceae	<i>Eclipta</i>					1
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			1/1
plants	land plants	Asteraceae	<i>Eleutheranthera ruderalis</i>		Y			1/1
plants	land plants	Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i>		Y			1/1
plants	land plants	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			2/2
plants	land plants	Asteraceae	<i>Picris angustifolia</i> subsp. <i>carolorum-henricorum</i>			C		1/1
plants	land plants	Asteraceae	<i>Sigesbeckia orientalis</i>	Indian weed		C		1/1
plants	land plants	Asteraceae	<i>Sphagneticola trilobata</i>		Y			1/1
plants	land plants	Asteraceae	<i>Synedrella nodiflora</i>		Y			2/1
plants	land plants	Asteraceae	<i>Youngia japonica</i>			C		1/1
plants	land plants	Aulacomniaceae	<i>Mesochaete undulata</i>			C		2/2
plants	land plants	Balanophoraceae	<i>Balanophora fungosa</i> subsp. <i>fungosa</i>			C		1
plants	land plants	Bignoniaceae	<i>Pandorea jasminoides</i>			C		2/1
plants	land plants	Bignoniaceae	<i>Spathodea campanulata</i> subsp. <i>nilotica</i>		Y			1/1
plants	land plants	Blechnaceae	<i>Blechnum medium</i>			SL		2/2
plants	land plants	Boraginaceae	<i>Argusia argentea</i>	octopus bush		C		1/1
plants	land plants	Boraginaceae	<i>Cordia aspera</i>			C		2/2
plants	land plants	Boraginaceae	<i>Cordia dichotoma</i>			C		7/5
plants	land plants	Boraginaceae	<i>Cordia subcordata</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium sarmentosum</i>			C		5/5
plants	land plants	Brachytheciaceae	<i>Rhynchosyrium tenuifolium</i>			C		4/4
plants	land plants	Braithwaiteaceae	<i>Braithwaitea sulcata</i>			C		1/1
plants	land plants	Brassicaceae	<i>Rapistrum rugosum</i>		Y			1/1
plants	land plants	Burseraceae	<i>Canarium muelleri</i>	scrub turpentine		C		1/1
plants	land plants	Byttneriaceae	<i>Commersonia bartramia</i>	brown kurrajong		C		2/2
plants	land plants	Calymperaceae	<i>Calymperaceae</i>					1/1
plants	land plants	Calymperaceae	<i>Calymperes graeffeanum</i>			C		7/7
plants	land plants	Calymperaceae	<i>Calymperes tenerum</i>			C		3/3
plants	land plants	Calymperaceae	<i>Leucophanes octoblepharoides</i>			C		10/10
plants	land plants	Calymperaceae	<i>Mitthyridium flavum</i>			C		2/2
plants	land plants	Calymperaceae	<i>Mitthyridium leucoloma</i>			C		1/1
plants	land plants	Calymperaceae	<i>Syrrhopodon armatus</i>			C		8/8
plants	land plants	Capparaceae	<i>Capparis</i>					2
plants	land plants	Capparaceae	<i>Capparis arborea</i>	brush caper berry		C		3/3
plants	land plants	Capparaceae	<i>Capparis lucida</i>			C		3/3
plants	land plants	Capparaceae	<i>Capparis sepiaria</i>			C		1/1
plants	land plants	Celastraceae	<i>Celastrus subspicata</i>	large-leaved staffvine		C		6/4
plants	land plants	Celastraceae	<i>Elaeodendron melanocarpum</i>			C		10/7
plants	land plants	Clusiaceae	<i>Calophyllum australianum</i>			C		1/1
plants	land plants	Clusiaceae	<i>Calophyllum sil</i>			C		1/1
plants	land plants	Combretaceae	<i>Macropteranthes fitzalanii</i>			C		14/13
plants	land plants	Combretaceae	<i>Terminalia porphyrocarpa</i>			C		1/1
plants	land plants	Combretaceae	<i>Terminalia sericocarpa</i>	damson		C		2/1

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plants	land plants	Commelinaceae	<i>Aneilema acuminatum</i>			C		5/3
plants	land plants	Commelinaceae	<i>Commelina diffusa</i>	wandering jew		C		2/2
plants	land plants	Commelinaceae	<i>Commelina lanceolata</i>			C		1/1
plants	land plants	Commelinaceae	<i>Murdannia graminea</i>	murdannia		C		1/1
plants	land plants	Commelinaceae	<i>Pollia macrophylla</i>			C		2/2
plants	land plants	Commelinaceae	<i>Tradescantia spathacea</i>		Y			1/1
plants	land plants	Connaraceae	<i>Rourea brachyandra</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Argyreia nervosa</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Erycibe coccinea</i>			C		3/3
plants	land plants	Convolvulaceae	<i>Ipomoea abrupta</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea indica</i>	blue morning-glory	Y			1/1
plants	land plants	Convolvulaceae	<i>Ipomoea pes-caprae subsp. brasiliensis</i>	goatsfoot		C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea quamoclit</i>	star of Bethlehem	Y			4/4
plants	land plants	Convolvulaceae	<i>Ipomoea violacea</i>			C		2/2
plants	land plants	Convolvulaceae	<i>Merremia hirta</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Xenostegia tridentata</i>			C		1/1
plants	land plants	Cornaceae	<i>Alangium polyosmoides subsp. tomentosum</i>			C		5/5
plants	land plants	Cryphaeaceae	<i>Cryphaea</i>					1/1
plants	land plants	Cucurbitaceae	<i>Cucumis althaeoides</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Diplocyclos palmatus</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Diplocyclos palmatus subsp. palmatus</i>			C		4/4
plants	land plants	Cucurbitaceae	<i>Momordica charantia</i>	balsam pear	Y			2/2
plants	land plants	Cucurbitaceae	<i>Neoalsomitra clavigera</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Sicyos australis</i>	star cucumber		C		1
plants	land plants	Cycadaceae	<i>Cycas media subsp. media</i>			SL		1/1
plants	land plants	Cyperaceae	<i>Carex</i>					1
plants	land plants	Cyperaceae	<i>Carex horsfieldii</i>			C		1/1
plants	land plants	Cyperaceae	<i>Carex indica</i>			C		1/1
plants	land plants	Cyperaceae	<i>Carex polyantha</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus</i>					1
plants	land plants	Cyperaceae	<i>Cyperus cyperinus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus dietrichiae</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus difformis</i>	rice sedge		C		2/2
plants	land plants	Cyperaceae	<i>Cyperus enervis</i>			C		5/5
plants	land plants	Cyperaceae	<i>Cyperus gymnocaulos</i>	spiny flatsedge		C		1/1
plants	land plants	Cyperaceae	<i>Cyperus iria</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus laevis</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus perangustus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus polystachyos var. polystachyos</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus scaber</i>			C		1
plants	land plants	Cyperaceae	<i>Cyperus tetraphyllus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus trinervis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis ferruginea</i>			C		1/1
plants	land plants	Cyperaceae	<i>Gahnia aspera</i>			C		4/2
plants	land plants	Cyperaceae	<i>Schoenoplectiella mucronata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenoplectus tabernaemontani</i>			C		1/1

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plants	land plants	Cyperaceae	<i>Schoenus sparteus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria</i>					1
plants	land plants	Cyperaceae	<i>Scleria lithosperma var. linearis</i>			C		3/3
plants	land plants	Cyperaceae	<i>Scleria mackaviensis</i>			C		2/2
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>			C		3/3
plants	land plants	Dennstaedtiaceae	<i>Microlepia speluncae</i>	cave fern		C		1/1
plants	land plants	Dennstaedtiaceae	<i>Pteridium esculentum</i>	common bracken		C		1/1
plants	land plants	Dioscoreaceae	<i>Dioscorea transversa</i>	native yam		C		3/2
plants	land plants	Dryopteridaceae	<i>Lastreopsis poecilophlebia</i>			SL		5/3
plants	land plants	Dryopteridaceae	<i>Lastreopsis tenera</i>			SL		3/2
plants	land plants	Dryopteridaceae	<i>Parapolystichum rufescens</i>			SL		3/3
plants	land plants	Ebenaceae	<i>Diospyros compacta</i>			C		6/6
plants	land plants	Ebenaceae	<i>Diospyros fasciculosa</i>	grey ebony		C		1/1
plants	land plants	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		2/2
plants	land plants	Ebenaceae	<i>Diospyros hebecarpa</i>			C		4/3
plants	land plants	Ebenaceae	<i>Diospyros laurina</i>			C		3/3
plants	land plants	Elaeagnaceae	<i>Elaeagnus triflora</i>			C		2/2
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus obovatus</i>	blueberry ash		C		1
plants	land plants	Elaeocarpaceae	<i>Elaeocarpus obovatus subsp. obovatus</i>			C		4/4
plants	land plants	Ericaceae	<i>Acrotriche aggregata</i>	red cluster heath		C		4/4
plants	land plants	Euphorbiaceae	<i>Baloghia inophylla</i>	scrub bloodwood		C		3/3
plants	land plants	Euphorbiaceae	<i>Claoxylon angustifolium</i>			C		8/7
plants	land plants	Euphorbiaceae	<i>Cleidion javanicum</i>			C		4/4
plants	land plants	Euphorbiaceae	<i>Croton arnhemicus</i>			C		4/4
plants	land plants	Euphorbiaceae	<i>Euphorbia bifida</i>			C		2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia heterophylla</i>		Y			1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia tannensis subsp. tannensis</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Excoecaria agallocha</i>	milky mangrove		C		1/1
plants	land plants	Euphorbiaceae	<i>Homalanthus populifolius</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Macaranga involucreta</i>			C		1
plants	land plants	Euphorbiaceae	<i>Macaranga involucreta var. mallotoides</i>			C		3/3
plants	land plants	Euphorbiaceae	<i>Macaranga tanarius</i>	macaranga		C		2/2
plants	land plants	Euphorbiaceae	<i>Mallotus mollissimus</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Mallotus nesophilus</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Mallotus paniculatus</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		5/3
plants	land plants	Euphorbiaceae	<i>Mallotus polyadenos</i>			C		7/7
plants	land plants	Fissidentaceae	<i>Fissidens</i>					6/6
plants	land plants	Fissidentaceae	<i>Fissidens linearis</i>			C		2/2
plants	land plants	Fissidentaceae	<i>Fissidens oblongifolius var. oblongifolius</i>			C		1/1
plants	land plants	Fissidentaceae	<i>Fissidens tenellus</i>			C		1/1
plants	land plants	Flagellariaceae	<i>Flagellaria indica</i>	whip vine		C		1
plants	land plants	Frullaniaceae	<i>Frullania</i>					2/2
plants	land plants	Frullaniaceae	<i>Frullania hicksiae forma litoralis</i>			C		1/1
plants	land plants	Geocalycaceae	<i>Chiloscyphus semiteres var. semiteres</i>			C		1/1
plants	land plants	Haloragaceae	<i>Myriophyllum</i>					1/1

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plants	land plants	Hemerocallidaceae	<i>Dianella bambusifolia</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		3/1
plants	land plants	Hemerocallidaceae	<i>Geitonoplesium cymosum</i>	scrambling lily		C		3/1
plants	land plants	Hernandiaceae	<i>Gyrocarpus americanus subsp. americanus</i>			C		1/1
plants	land plants	Hymenophyllaceae	<i>Crepidomanes bipunctatum</i>			SL		4/4
plants	land plants	Hymenophyllaceae	<i>Crepidomanes saxifragoides</i>			SL		3/3
plants	land plants	Hypnaceae	<i>Ectropothecium</i>					2/2
plants	land plants	Hypnaceae	<i>Vesicularia</i>					2/2
plants	land plants	Hypopterygiaceae	<i>Hypopterygium tamarisci</i>			C		3/3
plants	land plants	Hypoxidaceae	<i>Curculigo ensifolia var. ensifolia</i>			C		1/1
plants	land plants	Juncaceae	<i>Juncus polyanthemus</i>			C		1/1
plants	land plants	Lamiaceae	<i>Anisomeles moschata</i>			C		1/1
plants	land plants	Lamiaceae	<i>Callicarpa longifolia</i>			C		2/1
plants	land plants	Lamiaceae	<i>Callicarpa pedunculata</i>	velvet leaf		C		1/1
plants	land plants	Lamiaceae	<i>Clerodendrum floribundum</i>			C		3/2
plants	land plants	Lamiaceae	<i>Clerodendrum inerme</i>	coastal lolly bush		C		2/2
plants	land plants	Lamiaceae	<i>Clerodendrum longiflorum var. glabrum</i>			C		1/1
plants	land plants	Lamiaceae	<i>Coleus diversus</i>			C		1/1
plants	land plants	Lamiaceae	<i>Leucas decemdentata</i>			C		1/1
plants	land plants	Lamiaceae	<i>Premna dallachyana</i>			C		3/3
plants	land plants	Lamiaceae	<i>Salvia coccinea</i>	red salvia	Y			1/1
plants	land plants	Lamiaceae	<i>Teucrium argutum</i>			C		1/1
plants	land plants	Lamiaceae	<i>Vitex acuminata</i>			C		1/1
plants	land plants	Lamiaceae	<i>Vitex melicopea</i>			C		3/3
plants	land plants	Lamiaceae	<i>Vitex trifolia var. trifolia</i>			C		2/2
plants	land plants	Lauraceae	<i>Beilschmiedia obtusifolia</i>	hard bolly gum		C		5/4
plants	land plants	Lauraceae	<i>Cassytha filiformis</i>	dodder laurel		C		2/1
plants	land plants	Lauraceae	<i>Cryptocarya bidwillii</i>	yellow laurel		C		2/1
plants	land plants	Lauraceae	<i>Cryptocarya hypospodia</i>	north Queensland purple laurel		C		3/3
plants	land plants	Lauraceae	<i>Cryptocarya murrayi</i>	Murray's laurel		C		1/1
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis</i>			C		2
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis var. pubens</i>			C		3/3
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis var. triplinervis</i>			C		1/1
plants	land plants	Lauraceae	<i>Endiandra cowleyana</i>	northern rose walnut		C		3/3
plants	land plants	Lauraceae	<i>Endiandra muelleri subsp. bracteata</i>			C		2/2
plants	land plants	Lauraceae	<i>Litsea fawcettiana</i>			C		4/4
plants	land plants	Lauraceae	<i>Litsea glutinosa</i>			C		2/2
plants	land plants	Lauraceae	<i>Litsea reticulata</i>			C		2
plants	land plants	Lauraceae	<i>Neolitsea brassii</i>			C		2/1
plants	land plants	Lauraceae	<i>Neolitsea dealbata</i>	white bolly gum		C		1/1
plants	land plants	Laxmanniaceae	<i>Cordyline murchisoniae</i>			SL		2
plants	land plants	Laxmanniaceae	<i>Eustrephus latifolius</i>	wombat berry		C		5/3
plants	land plants	Laxmanniaceae	<i>Lomandra filiformis</i>			C		1
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>			C		2/1
plants	land plants	Laxmanniaceae	<i>Lomandra multiflora</i>			C		1
plants	land plants	Laxmanniaceae	<i>Lomandra multiflora subsp. multiflora</i>			C		1/1

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plants	land plants	Lecythidaceae	<i>Planchonia careya</i>	cockatoo apple		C		2/1
plants	land plants	Leguminosae	<i>Acacia aulacocarpa</i>			C		1
plants	land plants	Leguminosae	<i>Acacia decora</i>	pretty wattle		C		3/3
plants	land plants	Leguminosae	<i>Acacia flavescens</i>	toothed wattle		C		3/2
plants	land plants	Leguminosae	<i>Acacia leptocarpa</i>	north coast wattle		C		1
plants	land plants	Leguminosae	<i>Acacia maidenii</i>	Maiden's wattle		C		4/3
plants	land plants	Leguminosae	<i>Acacia simsii</i>			C		2/1
plants	land plants	Leguminosae	<i>Acacia spirorbis</i> subsp. <i>solandri</i>			C		4/3
plants	land plants	Leguminosae	<i>Acaciella glauca</i>	redwood	Y			5/5
plants	land plants	Leguminosae	<i>Aeschynomene americana</i> var. <i>americana</i>		Y			1/1
plants	land plants	Leguminosae	<i>Albizia procera</i>			C		4/4
plants	land plants	Leguminosae	<i>Archidendron grandiflorum</i>	lace flower tree		C		3/3
plants	land plants	Leguminosae	<i>Archidendron hendersonii</i>	white lace flower		C		2/2
plants	land plants	Leguminosae	<i>Austrosteenisia blackii</i>	bloodvine		C		1
plants	land plants	Leguminosae	<i>Austrosteenisia blackii</i> var. <i>blackii</i>			C		2/2
plants	land plants	Leguminosae	<i>Bauhinia variegata</i>		Y			1/1
plants	land plants	Leguminosae	<i>Canavalia papuana</i>	wild jack bean		C		3/3
plants	land plants	Leguminosae	<i>Cassia fistula</i>	Indian laburnum	Y			1/1
plants	land plants	Leguminosae	<i>Cassia</i> sp. (Woodwark Bay G.N.Batianoff 940543)			C		7/7
plants	land plants	Leguminosae	<i>Centrosema molle</i>		Y			6/6
plants	land plants	Leguminosae	<i>Centrosema pascuorum</i>		Y			1/1
plants	land plants	Leguminosae	<i>Crotalaria goreensis</i>	gambia pea	Y			1/1
plants	land plants	Leguminosae	<i>Crotalaria incana</i> subsp. <i>incana</i>		Y			1/1
plants	land plants	Leguminosae	<i>Crotalaria juncea</i>	sunhemp	Y			1/1
plants	land plants	Leguminosae	<i>Crotalaria pallida</i> var. <i>obovata</i>		Y			1/1
plants	land plants	Leguminosae	<i>Cynometra iripa</i>			C		2/2
plants	land plants	Leguminosae	<i>Delonix regia</i>	poinciana	Y			1/1
plants	land plants	Leguminosae	<i>Derris trifoliata</i>			C		3/3
plants	land plants	Leguminosae	<i>Desmanthus leptophyllus</i>		Y			1/1
plants	land plants	Leguminosae	<i>Desmodium</i>					1
plants	land plants	Leguminosae	<i>Desmodium gangeticum</i>			C		1/1
plants	land plants	Leguminosae	<i>Desmodium heterocarpon</i> var. <i>strigosum</i>			C		1/1
plants	land plants	Leguminosae	<i>Desmodium rhytidophyllum</i>			C		3/2
plants	land plants	Leguminosae	<i>Desmodium tortuosum</i>	Florida beggar-weed	Y			1
plants	land plants	Leguminosae	<i>Desmodium triflorum</i>		Y			1/1
plants	land plants	Leguminosae	<i>Erythrina variegata</i>	Indian coral tree		C		1/1
plants	land plants	Leguminosae	<i>Erythrina vespertilio</i> subsp. <i>vespertilio</i>			C		2/2
plants	land plants	Leguminosae	<i>Falcataria toona</i>			C		2
plants	land plants	Leguminosae	<i>Flemingia lineata</i>			C		2/2
plants	land plants	Leguminosae	<i>Flemingia parviflora</i>	flemingia		C		2/1
plants	land plants	Leguminosae	<i>Glycine</i>					1
plants	land plants	Leguminosae	<i>Glycine clandestina</i>			C		1
plants	land plants	Leguminosae	<i>Glycine cyrtoloba</i>			C		1/1
plants	land plants	Leguminosae	<i>Glycine tomentella</i>	woolly glycine		C		1/1
plants	land plants	Leguminosae	<i>Guilandina bonduc</i>			C		4/4
plants	land plants	Leguminosae	<i>Hanslia ormocarpoides</i>			C		6/6

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plants	land plants	Leguminosae	<i>Indigofera tinctoria</i>		Y			1/1
plants	land plants	Leguminosae	<i>Indigofera trifoliata</i>			C		2/2
plants	land plants	Leguminosae	<i>Intsia bijuga</i>			C		1/1
plants	land plants	Leguminosae	<i>Lotus australis</i>	Australian trefoil		C		1/1
plants	land plants	Leguminosae	<i>Macroptilium atropurpureum</i>	siratro	Y			1
plants	land plants	Leguminosae	<i>Millettia pinnata</i>			C		3/3
plants	land plants	Leguminosae	<i>Mimosa pudica</i> var. <i>hispida</i>		Y			1/1
plants	land plants	Leguminosae	<i>Mimosa pudica</i> var. <i>unijuga</i>		Y			1/1
plants	land plants	Leguminosae	<i>Mucuna gigantea</i>	burny bean		C		3/2
plants	land plants	Leguminosae	<i>Rhynchosia acuminatissima</i>			C		2/2
plants	land plants	Leguminosae	<i>Schotia brachypetala</i>	kaffir bean	Y			1/1
plants	land plants	Leguminosae	<i>Senna hirsuta</i>		Y			1/1
plants	land plants	Leguminosae	<i>Senna sophera</i> var. (40Mile Scrub J.R.Clarkson+6908)			C		1/1
plants	land plants	Leguminosae	<i>Sesbania cannabina</i> var. <i>cannabina</i>			C		1/1
plants	land plants	Leguminosae	<i>Sophora tomentosa</i> subsp. <i>australis</i>			C		4/4
plants	land plants	Leguminosae	<i>Tephrosia</i>					1
plants	land plants	Leguminosae	<i>Tephrosia brachyodon</i> var. <i>brachyodon</i>			C		7/7
plants	land plants	Leguminosae	<i>Tephrosia candida</i>		Y			1/1
plants	land plants	Leguminosae	<i>Vigna vexillata</i> var. <i>youngiana</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Archilejeunea planiuscula</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Cheilolejeunea</i>					4/4
plants	land plants	Lejeuneaceae	<i>Cololejeunea falcata</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Drepanolejeunea</i>					2/2
plants	land plants	Lejeuneaceae	<i>Lejeunea drummondii</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Lejeunea ramosissima</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Leptolejeunea elliptica</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Lopholejeunea hispidissima</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Lopholejeunea javanica</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Microlejeunea filicuspis</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Schiffneriolejeunea pulopenangensis</i>			C		1/1
plants	land plants	Lejeuneaceae	<i>Thysananthus</i>					2/2
plants	land plants	Lejeuneaceae	<i>Thysananthus indicus</i>			C		3/3
plants	land plants	Lejeuneaceae	<i>Thysananthus retusus</i>			C		3/3
plants	land plants	Lembophyllaceae	<i>Camptochaete excavata</i>			C		8/8
plants	land plants	Lepidoziaceae	<i>Bazzania corbieri</i>			C		1/1
plants	land plants	Lepidoziaceae	<i>Bazzania fuhreri</i>			C		2/2
plants	land plants	Leucobryaceae	<i>Leucobryum</i>					1/1
plants	land plants	Leucobryaceae	<i>Leucobryum candidum</i>			C		4/4
plants	land plants	Loganiaceae	<i>Mitrasacme pygmaea</i>			C		1/1
plants	land plants	Loganiaceae	<i>Strychnos psilosperma</i>	strychnine tree		C		2/2
plants	land plants	Lophocoleaceae	<i>Chiloscyphus semiteres</i>			C		1/1
plants	land plants	Lophocoleaceae	<i>Heteroscyphus argutus</i>			C		13/13
plants	land plants	Lophocoleaceae	<i>Heteroscyphus coalitus</i>			C		2/2
plants	land plants	Loranthaceae	<i>Amyema congener</i> subsp. <i>congener</i>			C		1/1
plants	land plants	Loranthaceae	<i>Amyema conspicua</i> subsp. <i>conspicua</i>			C		1/1

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plants	land plants	Loranthaceae	<i>Dendrophthoe curvata</i>			C		1/1
plants	land plants	Loranthaceae	<i>Dendrophthoe glabrescens</i>			C		1/1
plants	land plants	Loranthaceae	<i>Dendrophthoe vitellina</i>	long-flowered mistletoe		C		1/1
plants	land plants	Lythraceae	<i>Ammannia baccifera</i>			C		1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		1/1
plants	land plants	Lythraceae	<i>Sonneratia alba</i>			C		1/1
plants	land plants	Malpighiaceae	<i>Stigmaphyllon australiense</i>			C		1/1
plants	land plants	Malvaceae	<i>Abelmoschus moschatus subsp. tuberosus</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon albescens</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon guineense</i>		Y			1/1
plants	land plants	Malvaceae	<i>Hibiscus heterophyllus</i>			C		3/2
plants	land plants	Malvaceae	<i>Malvastrum coromandelianum subsp. coromandelianum</i>		Y			1/1
plants	land plants	Malvaceae	<i>Sida rhombifolia</i>		Y			1/1
plants	land plants	Malvaceae	<i>Thespesia populnea</i>				C	4/4
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			2/1
plants	land plants	Marantaceae	<i>Thalia geniculata</i>		Y			1/1
plants	land plants	Melastomataceae	<i>Melastoma malabathricum subsp. malabathricum</i>				C	1/1
plants	land plants	Meliaceae	<i>Aglaiia brownii</i>				C	4/3
plants	land plants	Meliaceae	<i>Aglaiia sapindina</i>				C	2
plants	land plants	Meliaceae	<i>Dysoxylum alliaceum</i>				C	7/7
plants	land plants	Meliaceae	<i>Dysoxylum klanderi</i>				C	1/1
plants	land plants	Meliaceae	<i>Dysoxylum papuanum</i>				C	1/1
plants	land plants	Meliaceae	<i>Dysoxylum rufum</i>				C	1/1
plants	land plants	Meliaceae	<i>Melia azedarach</i>	white cedar			C	1
plants	land plants	Meliaceae	<i>Toona ciliata</i>	red cedar			C	2/2
plants	land plants	Meliaceae	<i>Turraea pubescens</i>	native honeysuckle			C	5/5
plants	land plants	Meliaceae	<i>Vavaea amicorum</i>				C	7/6
plants	land plants	Meliaceae	<i>Xylocarpus granatum</i>	cedar mangrove			C	1/1
plants	land plants	Memecylaceae	<i>Memecylon pauciflorum</i>				C	8/6
plants	land plants	Menispermaceae	<i>Hypserpa laurina</i>				C	2/2
plants	land plants	Menispermaceae	<i>Legnephora moorei</i>				C	2/2
plants	land plants	Menispermaceae	<i>Pachygone ovata</i>				C	3/2
plants	land plants	Menispermaceae	<i>Pleogyne australis</i>	wiry grape			C	1/1
plants	land plants	Menispermaceae	<i>Stephania japonica</i>				C	1
plants	land plants	Menispermaceae	<i>Tinospora smilacina</i>	snakevine			C	1
plants	land plants	Meteoriaceae	<i>Aerobryopsis longissima</i>				C	2/2
plants	land plants	Meteoriaceae	<i>Meteorium polytrichum</i>				C	2/2
plants	land plants	Meteoriaceae	<i>Papillaria crocea</i>				C	2/2
plants	land plants	Metzgeriaceae	<i>Metzgeria furcata</i>				C	2/2
plants	land plants	Monimiaceae	<i>Wilkiea macrophylla</i>	large-leaved wilkiea			C	2/1
plants	land plants	Monimiaceae	<i>Wilkiea pubescens</i>				C	1/1
plants	land plants	Moraceae	<i>Ficus adenosperma</i>				C	4/4
plants	land plants	Moraceae	<i>Ficus copiosa</i>				C	2/2
plants	land plants	Moraceae	<i>Ficus fraseri</i>	white sandpaper fig			C	1/1
plants	land plants	Moraceae	<i>Ficus hispida</i>				C	1
plants	land plants	Moraceae	<i>Ficus hispida var. hispida</i>				C	1/1

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plants	land plants	Moraceae	<i>Ficus microcarpa</i>			C		2/2
plants	land plants	Moraceae	<i>Ficus opposita</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus racemosa</i>			C		1
plants	land plants	Moraceae	<i>Ficus racemosa var. racemosa</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus religiosa</i>		Y			1/1
plants	land plants	Moraceae	<i>Ficus septica</i>			C		3/2
plants	land plants	Moraceae	<i>Ficus septica var. septica</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus virens</i>			C		1
plants	land plants	Moraceae	<i>Ficus virens var. virens</i>			C		2/2
plants	land plants	Moraceae	<i>Maclura cochinchinensis</i>	cockspur thorn		C		2/1
plants	land plants	Moraceae	<i>Trophis scandens</i>			C		2
plants	land plants	Moraceae	<i>Trophis scandens subsp. scandens</i>			C		3/3
plants	land plants	Myristicaceae	<i>Myristica globosa subsp. muelleri</i>	native nutmeg		C		3/3
plants	land plants	Myrsinaceae	<i>Aegiceras corniculatum</i>	river mangrove		C		3/3
plants	land plants	Myrsinaceae	<i>Myrsine variabilis</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Tapeinosperma pseudojambosa</i>	tapeinosperma		C		1/1
plants	land plants	Myrtaceae	<i>Acmenosperma claviflorum</i>	grey satinash		C		11/9
plants	land plants	Myrtaceae	<i>Backhousia citriodora</i>	lemon ironwood		C		4/3
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		1/1
plants	land plants	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C		5/4
plants	land plants	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		1
plants	land plants	Myrtaceae	<i>Eucalyptus acmenoides</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		5/4
plants	land plants	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		3/2
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C		1
plants	land plants	Myrtaceae	<i>Eucalyptus portuensis</i>			C		9/9
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		1
plants	land plants	Myrtaceae	<i>Eugenia reinwardtiana</i>	beach cherry		C		8/6
plants	land plants	Myrtaceae	<i>Gossia bidwillii</i>			C		8/6
plants	land plants	Myrtaceae	<i>Gossia myrsinocarpa</i>			C		5/4
plants	land plants	Myrtaceae	<i>Gossia pubiflora</i>			C		15/13
plants	land plants	Myrtaceae	<i>Lophostemon confertus</i>	brush box		C		2/1
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus subsp. riparius</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca dealbata</i>	swamp tea-tree		C		1
plants	land plants	Myrtaceae	<i>Osbornia octodonta</i>	myrtle mangrove		C		3/3
plants	land plants	Myrtaceae	<i>Rhodamnia costata</i>			C		1
plants	land plants	Myrtaceae	<i>Rhodamnia glabrescens</i>			NT		1/1
plants	land plants	Myrtaceae	<i>Rhodamnia pauciovulata</i>			C		4/4
plants	land plants	Myrtaceae	<i>Rhodamnia spongiosa</i>			C		7/6
plants	land plants	Myrtaceae	<i>Rhodomyrtus macrocarpa</i>	finger cherry		C		2/2
plants	land plants	Myrtaceae	<i>Syzygium australe</i>	scrub cherry		C		4/4
plants	land plants	Myrtaceae	<i>Syzygium johnsonii</i>	Johnson's satinash		C		1/1
plants	land plants	Myrtaceae	<i>Tristaniopsis exiliflora</i>	kanuka box		C		1/1
plants	land plants	Neckeraceae	<i>Neckeropsis cyclophylla</i>			C		7/7
plants	land plants	Neckeraceae	<i>Thamnobryum pandum</i>			C		6/6
plants	land plants	Nephrolepidaceae	<i>Nephrolepis hirsutula</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Notothyladaceae	<i>Phaeoceros carolinianus</i>			C		4/4
plants	land plants	Nyctaginaceae	<i>Bougainvillea glabra</i>		Y			1/1
plants	land plants	Nyctaginaceae	<i>Pisonia umbellifera</i>	birdlime tree		C		2/1
plants	land plants	Octoblepharaceae	<i>Octoblepharum albidum</i>			C		3/3
plants	land plants	Olaceaceae	<i>Ximenia americana</i>			C		1/1
plants	land plants	Oleaceae	<i>Chionanthus ramiflorus</i>	northern olive		C		2/1
plants	land plants	Oleaceae	<i>Jasminum didymum</i>			C		2
plants	land plants	Oleaceae	<i>Jasminum didymum</i> subsp. <i>racemosum</i>			C		4/4
plants	land plants	Oleaceae	<i>Olea paniculata</i>			C		1/1
plants	land plants	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C		1/1
plants	land plants	Ophioglossaceae	<i>Helminthostachys zeylanica</i>	flowering fern		C		1/1
plants	land plants	Orchidaceae	<i>Corymborkis veratrifolia</i>	cinnamon orchid		SL		1/1
plants	land plants	Orchidaceae	<i>Cymbidium madidum</i>			SL		1
plants	land plants	Orchidaceae	<i>Cymbidium suave</i>			SL		1
plants	land plants	Orchidaceae	<i>Dendrobium discolor</i>			SL		2
plants	land plants	Orchidaceae	<i>Dendrobium tetragonum</i>	tree spider orchid		SL		1
plants	land plants	Orchidaceae	<i>Denia ophrydis</i>			SL		1/1
plants	land plants	Orchidaceae	<i>Dockrillia bowmanii</i>	scrub pencil orchid		SL		1/1
plants	land plants	Orchidaceae	<i>Geodorum densiflorum</i>	pink nodding orchid		SL		1
plants	land plants	Orchidaceae	<i>Nervilia plicata</i>			SL		1/1
plants	land plants	Orthotrichaceae	<i>Macromitrium microstomum</i>			C		2/2
plants	land plants	Pandanaceae	<i>Freycinetia scandens</i>			C		1/1
plants	land plants	Pandanaceae	<i>Pandanus</i>					1
plants	land plants	Passifloraceae	<i>Passiflora foetida</i>		Y			3/2
plants	land plants	Passifloraceae	<i>Passiflora pallida</i>		Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora suberosa</i>	corky passion flower	Y			2
plants	land plants	Passifloraceae	<i>Passiflora suberosa</i> subsp. <i>litoralis</i>		Y			1/1
plants	land plants	Petiveriaceae	<i>Rivina humilis</i>		Y			2/1
plants	land plants	Phyllanthaceae	<i>Actephila</i>					2/2
plants	land plants	Phyllanthaceae	<i>Actephila sessilifolia</i>			C		1
plants	land plants	Phyllanthaceae	<i>Antidesma erostre</i>			C		1
plants	land plants	Phyllanthaceae	<i>Antidesma parvifolium</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		2/1
plants	land plants	Phyllanthaceae	<i>Bridelia leichhardtii</i>			C		4/4
plants	land plants	Phyllanthaceae	<i>Cleistanthus dallachyanus</i>			C		3/3
plants	land plants	Phyllanthaceae	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Glochidion apodogynum</i>			C		2/1
plants	land plants	Phyllanthaceae	<i>Glochidion disparipes</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Glochidion ferdinandi</i>			C		1
plants	land plants	Phyllanthaceae	<i>Glochidion lobocarpum</i>			C		2/1
plants	land plants	Phyllanthaceae	<i>Glochidion sumatranum</i>	umbrella cheese tree		C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus microcladus</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Phyllanthus novae-hollandiae</i>			C		3/2
plants	land plants	Phyllanthaceae	<i>Synostemon albiflorus</i>			C		1/1
plants	land plants	Piperaceae	<i>Peperomia leptostachya</i>			C		2/2
plants	land plants	Piperaceae	<i>Piper hederaceum</i> var. <i>hederaceum</i>			C		2/2

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plants	land plants	Piperaceae	<i>Piper interruptum</i>			C		5/5
plants	land plants	Piperaceae	<i>Piper umbellatum</i>			C		2/2
plants	land plants	Pittosporaceae	<i>Auranticarpa rhombifolia</i>			C		2/1
plants	land plants	Pittosporaceae	<i>Bursaria incana</i>			C		2/2
plants	land plants	Pittosporaceae	<i>Bursaria tenuifolia</i>			C		4/4
plants	land plants	Pittosporaceae	<i>Pittosporum spinescens</i>			C		4/4
plants	land plants	Plantaginaceae	<i>Kickxia elatine subsp. crinita</i>	pointed toadflax	Y			1/1
plants	land plants	Plantaginaceae	<i>Mecardonia procumbens</i>		Y			1/1
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			2/2
plants	land plants	Poaceae	<i>Ancistrachne uncinulata</i>	hooky grass		C		3/2
plants	land plants	Poaceae	<i>Aristida</i>					1
plants	land plants	Poaceae	<i>Aristida spuria</i>			C		2/2
plants	land plants	Poaceae	<i>Axonopus compressus</i>		Y			1
plants	land plants	Poaceae	<i>Bothriochloa pertusa</i>		Y			2/2
plants	land plants	Poaceae	<i>Capillipedium parviflorum</i>	scented top		C		1/1
plants	land plants	Poaceae	<i>Capillipedium spicigerum</i>	spicytop		C		2/2
plants	land plants	Poaceae	<i>Cenchrus calculatus</i>	hillside burrgrass		C		1/1
plants	land plants	Poaceae	<i>Cenchrus echinatus</i>	Mossman River grass	Y			2/2
plants	land plants	Poaceae	<i>Chloris virgata</i>	feathertop rhodes grass	Y			1/1
plants	land plants	Poaceae	<i>Chrysopogon filipes</i>			C		1/1
plants	land plants	Poaceae	<i>Cymbopogon ambiguus</i>	lemon grass		C		1/1
plants	land plants	Poaceae	<i>Cymbopogon obtectus</i>			C		2/2
plants	land plants	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass		C		1/1
plants	land plants	Poaceae	<i>Digitaria parviflora</i>			C		1
plants	land plants	Poaceae	<i>Eleusine indica</i>	crowsfoot grass	Y			1/1
plants	land plants	Poaceae	<i>Enteropogon unispiceus</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis spartinooides</i>			C		1
plants	land plants	Poaceae	<i>Eragrostis uniolooides</i>		Y			1/1
plants	land plants	Poaceae	<i>Eriachne pallescens</i>			C		1/1
plants	land plants	Poaceae	<i>Eriachne pallescens var. pallescens</i>			C		1/1
plants	land plants	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		1
plants	land plants	Poaceae	<i>Heteropogon triticeus</i>	giant speargrass		C		2/1
plants	land plants	Poaceae	<i>Hyparrhenia rufa subsp. rufa</i>		Y			1/1
plants	land plants	Poaceae	<i>Imperata cylindrica</i>	blady grass		C		1
plants	land plants	Poaceae	<i>Megathyrsus maximus var. maximus</i>		Y			3/3
plants	land plants	Poaceae	<i>Melinis minutiflora</i>	molasses grass	Y			2/1
plants	land plants	Poaceae	<i>Mnesithea rottboellioides</i>			C		2/1
plants	land plants	Poaceae	<i>Oplismenus aemulus</i>	creeping shade grass		C		4/2
plants	land plants	Poaceae	<i>Oplismenus compositus</i>			C		3/3
plants	land plants	Poaceae	<i>Oplismenus imbecillis</i>			C		1/1
plants	land plants	Poaceae	<i>Oplismenus mollis</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum mitchellii</i>			C		3/2
plants	land plants	Poaceae	<i>Panicum robustum</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum simile</i>			C		2/1
plants	land plants	Poaceae	<i>Paspalum paniculatum</i>	Russell River grass	Y			3/3
plants	land plants	Poaceae	<i>Setaria australiensis</i>	scrub pigeon grass		C		1/1

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plants	land plants	Poaceae	<i>Sorghum nitidum</i>			C		1
plants	land plants	Poaceae	<i>Sporobolus fertilis</i>	giant Parramatta grass	Y			1/1
plants	land plants	Poaceae	<i>Sporobolus jacquemontii</i>		Y			5/5
plants	land plants	Poaceae	<i>Sporobolus pyramidalis</i>		Y			1/1
plants	land plants	Poaceae	<i>Sporobolus sessilis</i>			C		1/1
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			1/1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		1
plants	land plants	Poaceae	<i>Urochloa mutica</i>		Y			2/2
plants	land plants	Poaceae	<i>Urochloa subquadriflora</i>		Y			1/1
plants	land plants	Polygonaceae	<i>Persicaria attenuata</i>			C		1/1
plants	land plants	Polygonaceae	<i>Persicaria barbata</i>			C		1/1
plants	land plants	Polypodiaceae	<i>Drynaria rigidula</i>			SL		3/1
plants	land plants	Polypodiaceae	<i>Drynaria sparsisora</i>			SL		1
plants	land plants	Polypodiaceae	<i>Microsorium punctatum</i>			SL		1/1
plants	land plants	Polypodiaceae	<i>Platycterium bifurcatum</i>			SL		1
plants	land plants	Portulacaceae	<i>Portulaca australis</i>			C		1/1
plants	land plants	Proteaceae	<i>Banksia integrifolia subsp. compar</i>			C		1/1
plants	land plants	Pteridaceae	<i>Adiantum diaphanum</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Adiantum hispidulum</i>			SL		1
plants	land plants	Pteridaceae	<i>Adiantum hispidulum var. hispidulum</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Adiantum hispidulum var. minus</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes sieberi</i>			C		1
plants	land plants	Pteridaceae	<i>Cheilanthes tenuifolia</i>	rock fern		C		1/1
plants	land plants	Pteridaceae	<i>Doryopteris concolor</i>			SL		2/1
plants	land plants	Pteridaceae	<i>Haplopteris elongata</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Haplopteris ensiformis</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Pellaea nana</i>			SL		1/1
plants	land plants	Pteridaceae	<i>Pteris ensiformis</i>	slender bracken		SL		2/2
plants	land plants	Pteridaceae	<i>Pteris pacifica</i>	comb bracken		SL		1/1
plants	land plants	Pteridaceae	<i>Vittaria</i>					1
plants	land plants	Ptychomniaceae	<i>Garovaglia elegans subsp. dietrichiae</i>			C		3/3
plants	land plants	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		2
plants	land plants	Pylaisiadelphaceae	<i>Isopterygium albescens</i>			C		9/9
plants	land plants	Racopilaceae	<i>Racopilum cuspidigerum</i>			C		1/1
plants	land plants	Radulaceae	<i>Radula</i>					2/2
plants	land plants	Ranunculaceae	<i>Ranunculus lappaceus</i>	common buttercup		C		1/1
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		3/2
plants	land plants	Rhamnaceae	<i>Alphitonia oblata</i>			C		2/2
plants	land plants	Rhamnaceae	<i>Alphitonia petriei</i>	pink ash		C		1
plants	land plants	Rhamnaceae	<i>Colubrina asiatica</i>			C		5/5
plants	land plants	Rhamnaceae	<i>Emmenosperma cunninghamii</i>			C		2/2
plants	land plants	Rhamnaceae	<i>Ventilago ecorollata</i>			C		4/2
plants	land plants	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y			1/1
plants	land plants	Rhizophoraceae	<i>Bruguiera exaristata</i>			C		1/1
plants	land plants	Rhizophoraceae	<i>Bruguiera gymnorhiza</i>	large-fruited orange mangrove		C		1/1
plants	land plants	Rhizophoraceae	<i>Bruguiera parviflora</i>			C		1/1

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plants	land plants	Rhizophoraceae	<i>Carallia brachiata</i>	carallia		C		3/2
plants	land plants	Rhizophoraceae	<i>Ceriops australis</i>			C		1/1
plants	land plants	Rhizophoraceae	<i>Ceriops tagal</i>	yellow mangrove		C		2/2
plants	land plants	Rhizophoraceae	<i>Rhizophora apiculata</i>			C		2/2
plants	land plants	Ricciaceae	<i>Riccia</i>					4/4
plants	land plants	Ripogonaceae	<i>Ripogonum danesii</i>			C		2/2
plants	land plants	Rosaceae	<i>Rubus probus</i>			C		1/1
plants	land plants	Rubiaceae	<i>Aidia racemosa</i>			C		6/4
plants	land plants	Rubiaceae	<i>Antirhea tenuiflora</i>			C		1/1
plants	land plants	Rubiaceae	<i>Atractocarpus fitzalanii</i>			C		1
plants	land plants	Rubiaceae	<i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i>			C		11/11
plants	land plants	Rubiaceae	<i>Coelospermum paniculatum</i> var. <i>paniculatum</i>			C		2/2
plants	land plants	Rubiaceae	<i>Coelospermum reticulatum</i>			C		1
plants	land plants	Rubiaceae	<i>Guettarda speciosa</i>			C		1/1
plants	land plants	Rubiaceae	<i>Gynochthodes jasminoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Ixora timorensis</i>			C		9/8
plants	land plants	Rubiaceae	<i>Larsenaikia jardinei</i>			C		6/5
plants	land plants	Rubiaceae	<i>Nauclea orientalis</i>	Leichhardt tree		C		4/3
plants	land plants	Rubiaceae	<i>Psychotria</i>					4/4
plants	land plants	Rubiaceae	<i>Psychotria daphnoides</i>			C		2/1
plants	land plants	Rubiaceae	<i>Psychotria daphnoides</i> var. <i>daphnoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psychotria loniceroides</i>	hairy psychotria		C		2/2
plants	land plants	Rubiaceae	<i>Psychotria polioSTEMMA</i>			C		2/1
plants	land plants	Rubiaceae	<i>Psychotria</i> sp. (Shute Harbour L.J.Webb+ 7916)			C		3/3
plants	land plants	Rubiaceae	<i>Psydrax odorata</i>			C		1
plants	land plants	Rubiaceae	<i>Randia</i> sp. (Shute Harbour D.A.Halford Q811)			C		8/8
plants	land plants	Rubiaceae	<i>Tarenna dallachiana</i>			C		1
plants	land plants	Rubiaceae	<i>Tarenna dallachiana</i> subsp. <i>dallachiana</i>			C		4/4
plants	land plants	Rubiaceae	<i>Timonius timon</i>			C		1
plants	land plants	Rubiaceae	<i>Timonius timon</i> var. <i>timon</i>			C		3/3
plants	land plants	Rutaceae	<i>Acronychia laevis</i>	glossy acronychia		C		5/3
plants	land plants	Rutaceae	<i>Bosistoa medicinalis</i>			C		2/2
plants	land plants	Rutaceae	<i>Bosistoa pentacocca</i> subsp. <i>connaricarpa</i>			C		5/5
plants	land plants	Rutaceae	<i>Dinosperma melanophloium</i>			C		1/1
plants	land plants	Rutaceae	<i>Flindersia schottiana</i>	bumpy ash		C		4/2
plants	land plants	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		5/5
plants	land plants	Rutaceae	<i>Glycosmis trifoliata</i>			C		1/1
plants	land plants	Rutaceae	<i>Melicope bonwickii</i>			C		1/1
plants	land plants	Rutaceae	<i>Melicope xanthoxyloides</i>			C		1/1
plants	land plants	Rutaceae	<i>Micromelum minutum</i>	clusterberry		C		1
plants	land plants	Rutaceae	<i>Murraya ovatifoliolata</i>			C		3/3
plants	land plants	Rutaceae	<i>Sarcomelicope simplicifolia</i>			C		1
plants	land plants	Rutaceae	<i>Zanthoxylum brachyacanthum</i>			C		3/2
plants	land plants	Salicaceae	<i>Homalium</i> sp. (South Molle Island J.A.Gresty AQ208995)			C		2/2
plants	land plants	Salicaceae	<i>Scolopia braunii</i>	flintwood		C		2/1

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plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		2/2
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		2/1
plants	land plants	Sapindaceae	<i>Alectryon tomentosus</i>			C		1
plants	land plants	Sapindaceae	<i>Arytera divaricata</i>	coogera		C		2
plants	land plants	Sapindaceae	<i>Arytera sp. (Dryander Creek P.R.Sharpe 4184)</i>			C		1/1
plants	land plants	Sapindaceae	<i>Atalaya rigida</i>			C		16/9
plants	land plants	Sapindaceae	<i>Cardiospermum grandiflorum</i>	heart seed vine	Y			2/2
plants	land plants	Sapindaceae	<i>Cardiospermum halicacabum var. halicacabum</i>		Y			1/1
plants	land plants	Sapindaceae	<i>Cupaniopsis anacardioides</i>	tuckeroo		C		3/1
plants	land plants	Sapindaceae	<i>Cupaniopsis wadsworthii</i>			C		4/2
plants	land plants	Sapindaceae	<i>Dimocarpus australianus</i>			C		2/2
plants	land plants	Sapindaceae	<i>Diploglottis obovata</i>			C		7/6
plants	land plants	Sapindaceae	<i>Dodonaea lanceolata var. subsessilifolia</i>			C		2/1
plants	land plants	Sapindaceae	<i>Elattostachys bidwillii</i>			C		2/2
plants	land plants	Sapindaceae	<i>Elattostachys megalantha</i>			C		1
plants	land plants	Sapindaceae	<i>Ganophyllum falcatum</i>			C		4/3
plants	land plants	Sapindaceae	<i>Guioa lasioneura</i>			C		1/1
plants	land plants	Sapindaceae	<i>Harpullia hillii</i>			C		2/2
plants	land plants	Sapindaceae	<i>Harpullia pendula</i>			C		3/2
plants	land plants	Sapindaceae	<i>Jagera pseudorhus</i>			C		1
plants	land plants	Sapindaceae	<i>Jagera pseudorhus var. pseudorhus</i>			C		6/6
plants	land plants	Sapindaceae	<i>Lepiderema punctulata</i>			C		8/6
plants	land plants	Sapindaceae	<i>Lepiderema sp. (Impulse Creek A.B.Pollock 73)</i>			C		7/7
plants	land plants	Sapindaceae	<i>Mischocarpus anodontus</i>	veiny pearfruit		C		5/3
plants	land plants	Sapindaceae	<i>Mischocarpus pyriformis</i>			C		1
plants	land plants	Sapindaceae	<i>Sarcopteryx martyana</i>			C		1/1
plants	land plants	Sapotaceae	<i>Mimusops elengi</i>			C		2/2
plants	land plants	Sapotaceae	<i>Planchonella chartacea</i>			C		2/2
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia var. cotinifolia</i>			C		1/1
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia var. pubescens</i>			C		1
plants	land plants	Sapotaceae	<i>Planchonella myrsinifolia subsp. myrsinifolia</i>			C		2/2
plants	land plants	Sapotaceae	<i>Planchonella myrsinodendron</i>			C		3/3
plants	land plants	Sapotaceae	<i>Planchonella pohlmaniana</i>			C		1
plants	land plants	Sapotaceae	<i>Pleioluma queenslandica</i>			C		1
plants	land plants	Scrophulariaceae	<i>Myoporum boninense subsp. australe</i>			C		1/1
plants	land plants	Sematophyllaceae	<i>Meiothecium secundifolium</i>			C		1/1
plants	land plants	Sematophyllaceae	<i>Trichosteleum subfalcatulum</i>			C		1/1
plants	land plants	Simaroubaceae	<i>Ailanthus triphysa</i>	white siris		C		4/3
plants	land plants	Simaroubaceae	<i>Brucea javanica</i>			C		6/5
plants	land plants	Smilacaceae	<i>Smilax australis</i>	barbed-wire vine		C		6/4
plants	land plants	Solanaceae	<i>Brugmansia x candida</i>	Angel's trumper	Y			1/1
plants	land plants	Solanaceae	<i>Capsicum frutescens</i>		Y			2/2
plants	land plants	Solanaceae	<i>Lycianthes shanesii</i>			C		1/1
plants	land plants	Solanaceae	<i>Physalis angulata</i>		Y			1/1
plants	land plants	Solanaceae	<i>Physalis peruviana</i>		Y			1/1
plants	land plants	Solanaceae	<i>Physalis pubescens</i>		Y			1/1

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plants	land plants	Solanaceae	<i>Solanum seafortianum</i>	Brazilian nightshade	Y			3/1
plants	land plants	Solanaceae	<i>Solanum sporadotrichum</i>				NT	1/1
plants	land plants	Solanaceae	<i>Solanum torvum</i>	devil's fig	Y			1/1
plants	land plants	Sparrmanniaceae	<i>Corchorus oltorius</i>	jute			C	1/1
plants	land plants	Sparrmanniaceae	<i>Grewia australis</i>				C	3/3
plants	land plants	Sparrmanniaceae	<i>Grewia oxyphylla</i>				C	3/3
plants	land plants	Sparrmanniaceae	<i>Grewia savannicola</i>				C	1/1
plants	land plants	Sparrmanniaceae	<i>Triumfetta rhomboidea</i>	chinese burr	Y			1/1
plants	land plants	Sterculiaceae	<i>Argyrodendron actinophyllum subsp. diversifolium</i>				C	3/3
plants	land plants	Sterculiaceae	<i>Argyrodendron polyandrum</i>	brown tulip oak			C	5/3
plants	land plants	Sterculiaceae	<i>Brachychiton acerifolius</i>	flame tree			SL	5/3
plants	land plants	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree			SL	1/1
plants	land plants	Sterculiaceae	<i>Brachychiton compactus</i>				NT	7/7
plants	land plants	Sterculiaceae	<i>Heritiera littoralis</i>				C	1/1
plants	land plants	Sterculiaceae	<i>Sterculia quadrifida</i>	peanut tree			C	3/2
plants	land plants	Symplocaceae	<i>Symplocos puberula</i>				C	5/5
plants	land plants	Taccaceae	<i>Tacca leontopetaloides</i>				C	1
plants	land plants	Tectariaceae	<i>Tectaria confluens</i>				C	1/1
plants	land plants	Thelypteridaceae	<i>Christella parasitica</i>				SL	1/1
plants	land plants	Thelypteridaceae	<i>Thelypteridaceae</i>					1/1
plants	land plants	Thuidiaceae	<i>Thuidiopsis sparsa</i>				C	1/1
plants	land plants	Thuidiaceae	<i>Thuidiopsis sparsa var. sparsa</i>				C	3/3
plants	land plants	Thuidiaceae	<i>Thuidium cymbifolium</i>				C	2/2
plants	land plants	Thymelaeaceae	<i>Phaleria octandra</i>	phaleria			C	1/1
plants	land plants	Ulmaceae	<i>Aphananthe philippinensis</i>				C	5/4
plants	land plants	Ulmaceae	<i>Celtis paniculata</i>	native celtis			C	2/1
plants	land plants	Ulmaceae	<i>Celtis philippensis</i>				C	2/2
plants	land plants	Ulmaceae	<i>Trema orientalis</i>	tree peach			C	1/1
plants	land plants	Ulmaceae	<i>Trema tomentosa</i>				C	1
plants	land plants	Ulmaceae	<i>Trema tomentosa var. aspera</i>				C	1/1
plants	land plants	Urticaceae	<i>Dendrocnide moroides</i>	Gympie stinger			C	3/1
plants	land plants	Urticaceae	<i>Dendrocnide photiniphylla</i>	shiny-leaved stinging tree			C	2/1
plants	land plants	Urticaceae	<i>Pipturus argenteus</i>	white nettle			C	3/3
plants	land plants	Verbenaceae	<i>Lantana camara</i>	lantana	Y			3/1
plants	land plants	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			2/1
plants	land plants	Verbenaceae	<i>Stachytarpheta mutabilis</i>	pink snakeweed	Y			1/1
plants	land plants	Violaceae	<i>Pigea enneasperma</i>				C	1/1
plants	land plants	Violaceae	<i>Pigea stellarioides</i>				C	1/1
plants	land plants	Vitaceae	<i>Cissus cardiophylla</i>				C	1/1
plants	land plants	Vitaceae	<i>Cissus hastata</i>				C	6/6
plants	land plants	Vitaceae	<i>Cissus oblonga</i>				C	5/4
plants	land plants	Vitaceae	<i>Cissus penninervis</i>				C	2/1
plants	land plants	Vitaceae	<i>Clematicissus opaca</i>				C	1/1
plants	land plants	Vitaceae	<i>Leea novoguineensis</i>				C	5/5
plants	land plants	Vitaceae	<i>Tetrastigma nitens</i>	shining grape			C	2/1
plants	land plants	Vitaceae	<i>Tetrastigma thorsborneorum</i>				C	4/3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Xanthorrhoeaceae	<i>Xanthorrhoea</i>					1
plants	land plants	Zingiberaceae	<i>Alpinia caerulea</i>	wild ginger		C		1
plants	land plants	Zygophyllaceae	<i>Tribulus cistoides</i>	bulls head vine		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. Environmental Report: Matters of State Environmental Significance.



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 148.711 Latitude: -20.2833 with 2 kilometre radius

Environmental Reports - General Information

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

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

Figures in tables may be affected by rounding.

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

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

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

Disclaimer

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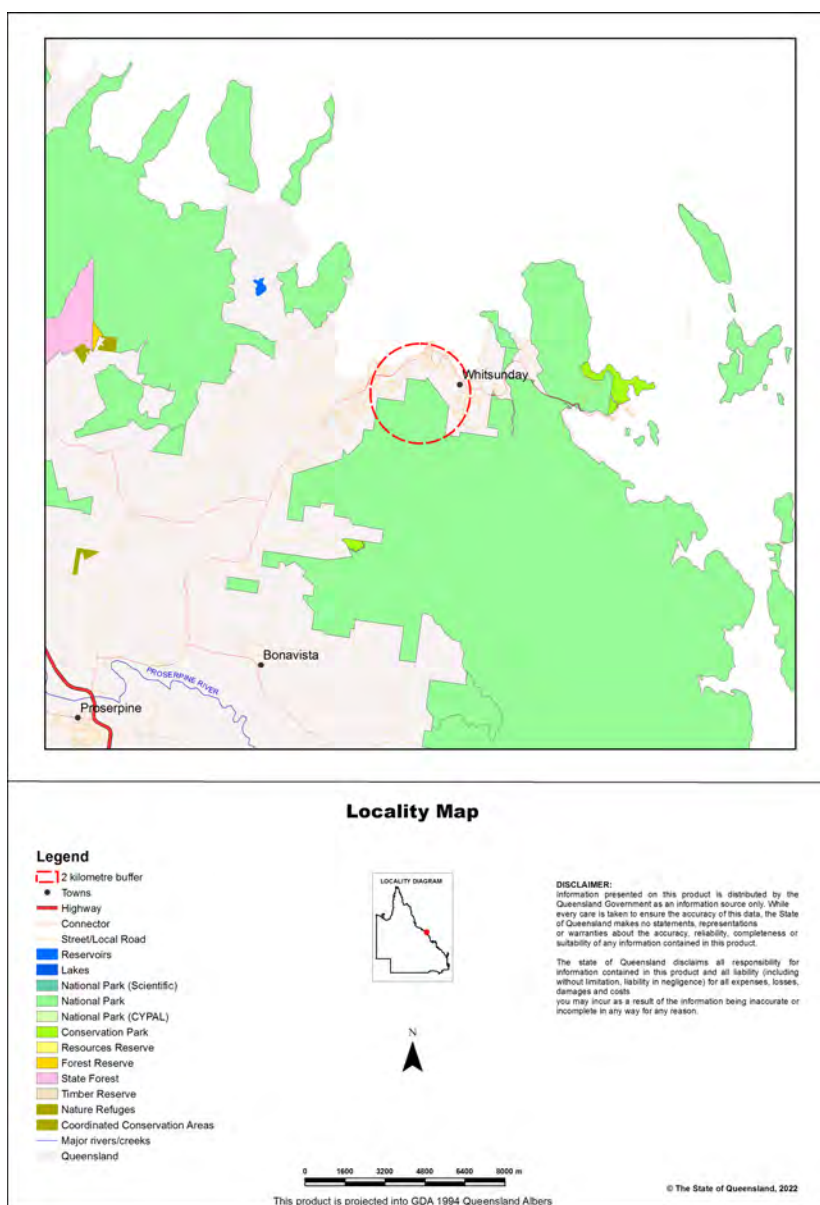
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Assessment Area Details

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

Table 1: Summary table, details for AOI Longitude: 148.711 Latitude: -20.2833

Size (ha)	1,256.55
Local Government(s)	Whitsunday Regional
Bioregion(s)	Central Queensland Coast
Subregion(s)	Whitsunday
Catchment(s)	Coral Sea, Proserpine



Matters of State Environmental Significance (MSES)

MSES Categories

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

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

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

The SPP defines matters of state environmental significance as:

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

MSES Values Present

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

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	528.0 ha	42.0%
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways	1.6 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	528.54 ha	42.1%
7b Special least concern animals	106.67 ha	8.5%
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
7d Sea turtle nesting areas	0.0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	56.19 ha	4.5%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.0 ha	0.0 %
8c Regulated Vegetation - Category R (GBR riverine regrowth)	16.8 ha	1.3%
8d Regulated Vegetation - Essential habitat	531.99 ha	42.3%
8e Regulated Vegetation - intersecting a watercourse	3.9 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

Estate name
Conway National Park

1b. Protected Areas - nature refuges

(no results)

1c. Protected Areas - special wildlife reserves

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

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

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

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

(no results)

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

(no results)

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

Natural waterways that occur in HEV (maintain) freshwater and estuarine areas under the Environmental Protection (water) Policy are present.

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

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Values are present

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

Not applicable

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

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

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

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

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
<i>Crocodylus porosus</i>	estuarine crocodile	V		Y
<i>Numenius madagascariensis</i>	eastern curlew	E	CE	Y

Scientific name	Common name	NCA status	EPBC status	Migratory status
<i>Limosa lapponica baueri</i>	Western Alaskan bar-tailed godwit	V	V	Y
<i>Calidris tenuirostris</i>	great knot	CE	CE	Y

Special least concern animal species records

Scientific name	Common name	Migratory status
<i>Actitis hypoleucos</i>	common sandpiper	Y
<i>Numenius phaeopus</i>	whimbrel	Y

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

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

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

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

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

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

MSES - Regulated Vegetation

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

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

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

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

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

Regional ecosystem	Vegetation management polygon	Vegetation management status
8.12.26/8.12.12d	O-dom	rem_oc
8.3.10	O-dom	rem_oc
8.3.1a	O-dom	rem_oc
8.3.5	O-dom	rem_oc

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

Not applicable

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

Regulated vegetation map category	Map number
R	8657

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

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

Not applicable

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

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

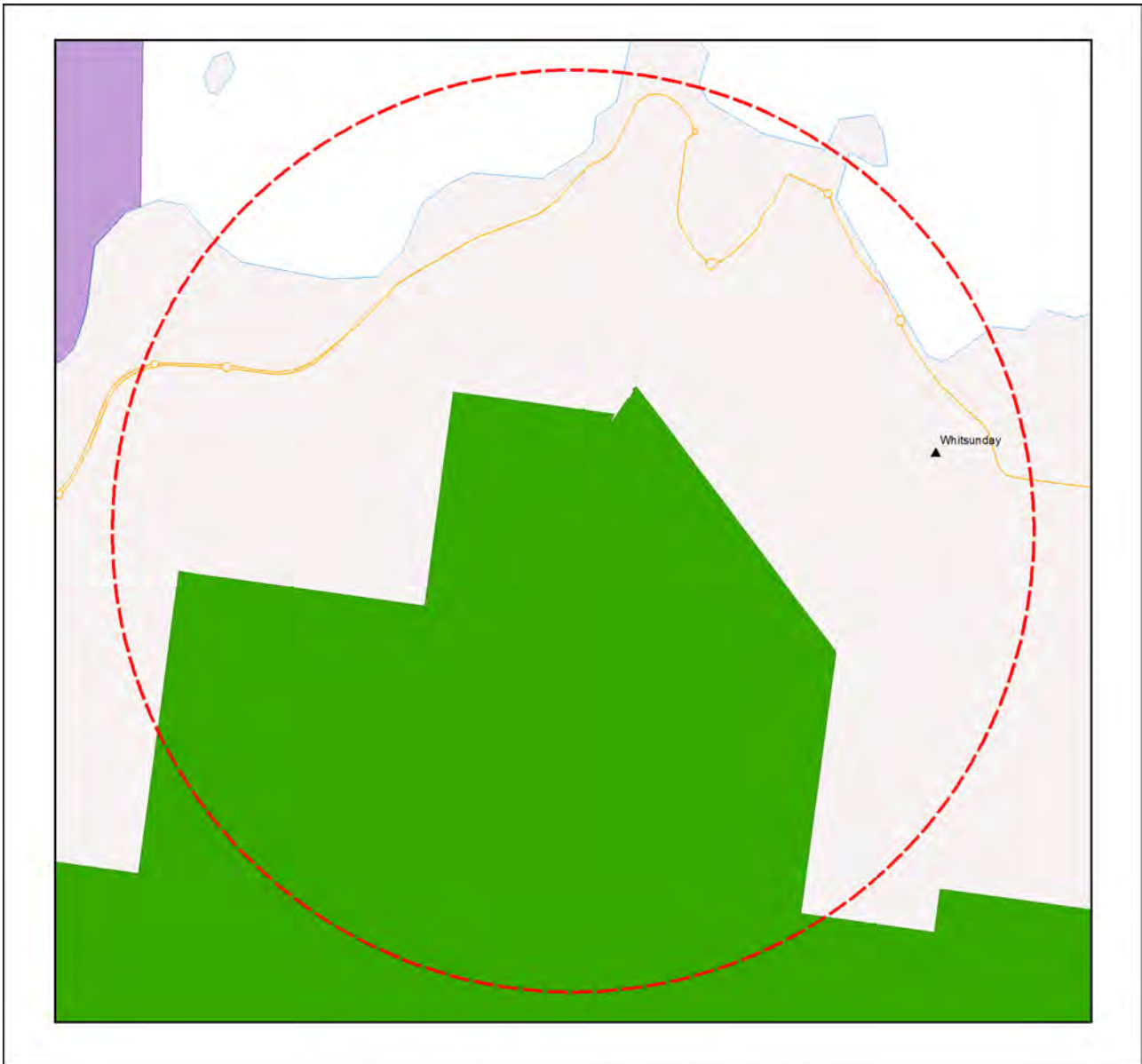
(no results)

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

(no results)

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

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

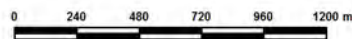
Area of Interest

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



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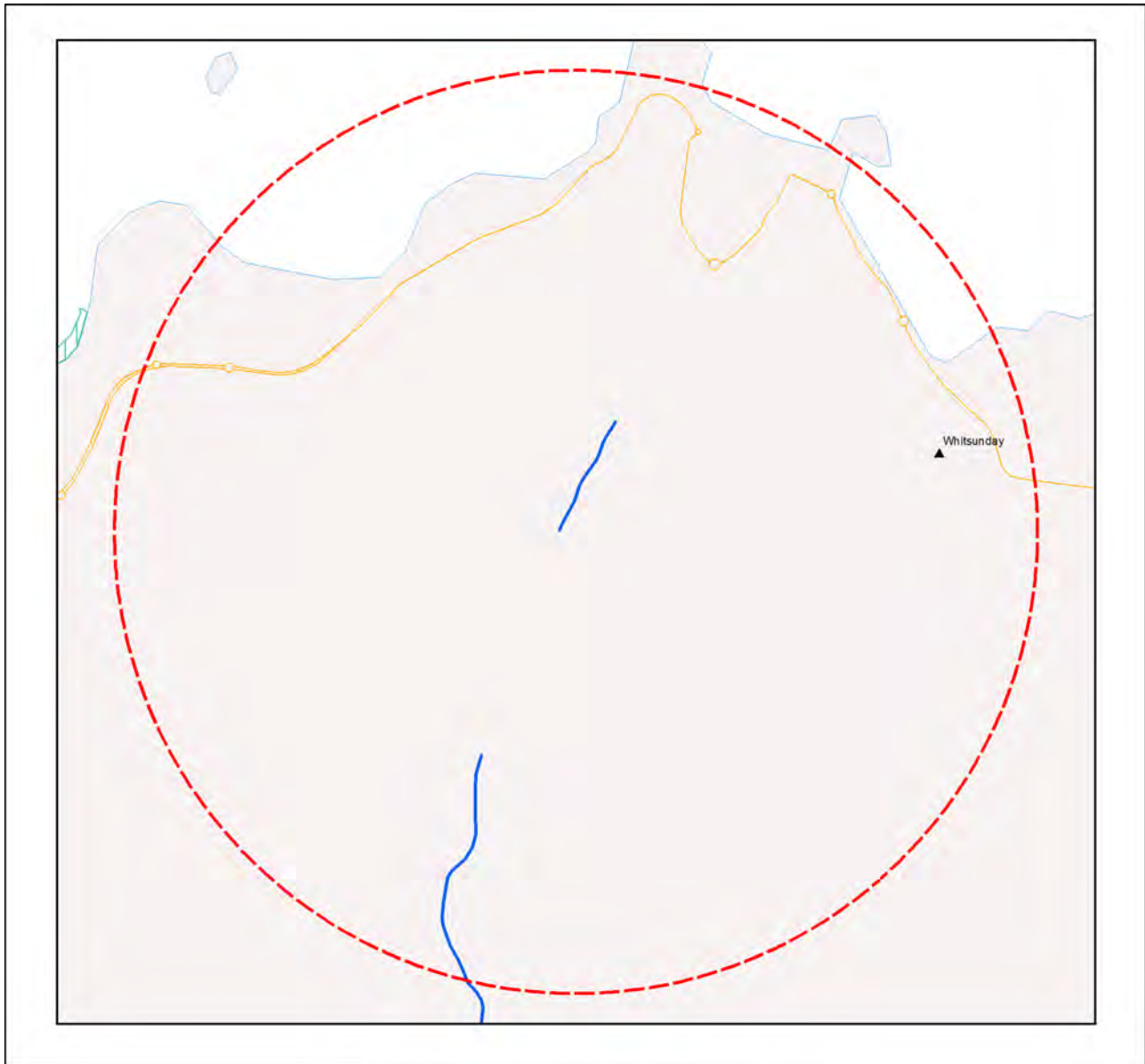
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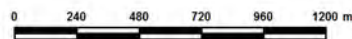
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

Area of Interest

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



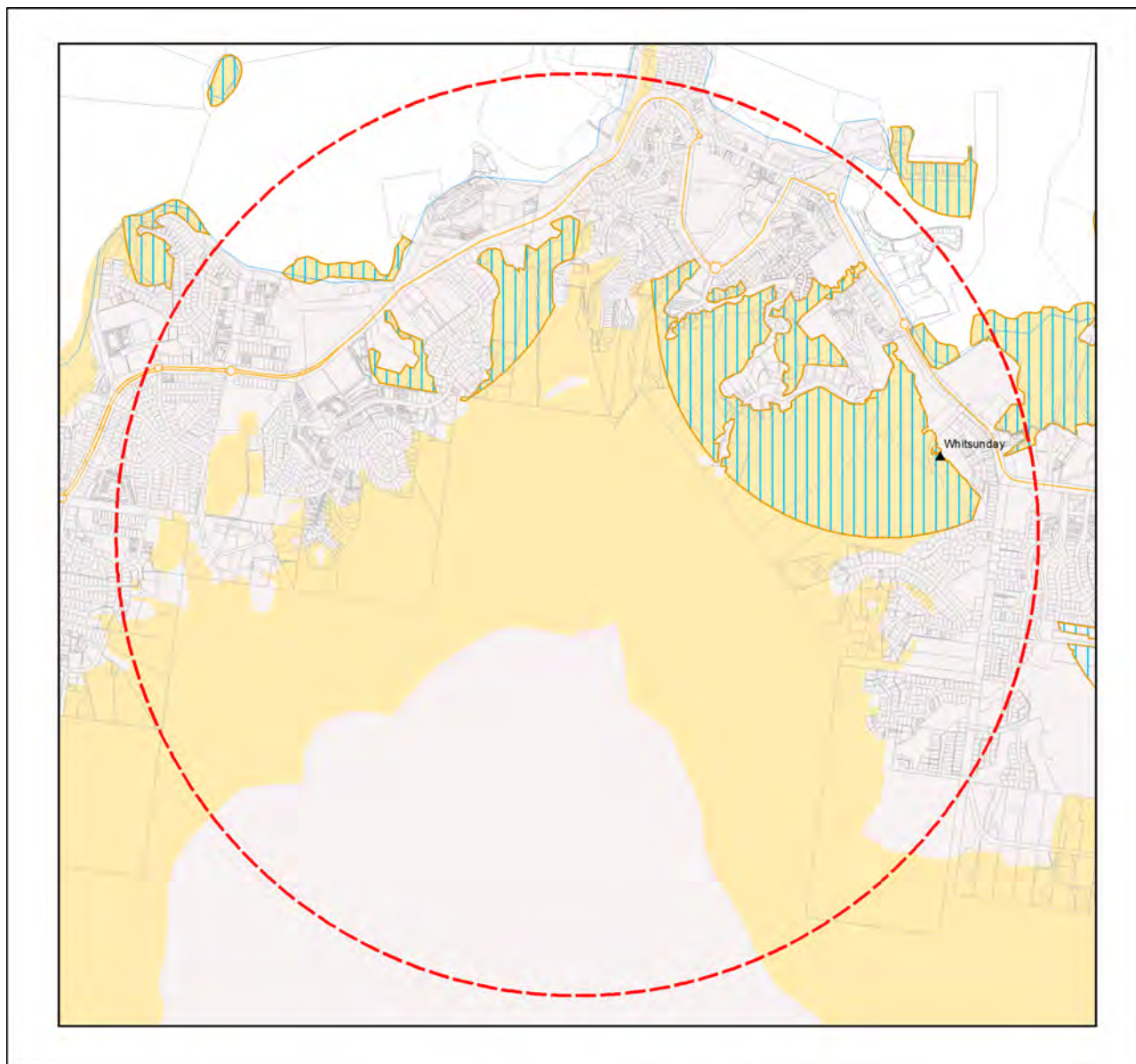
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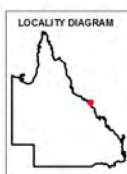
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



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

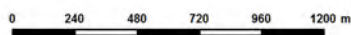
Area of Interest

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



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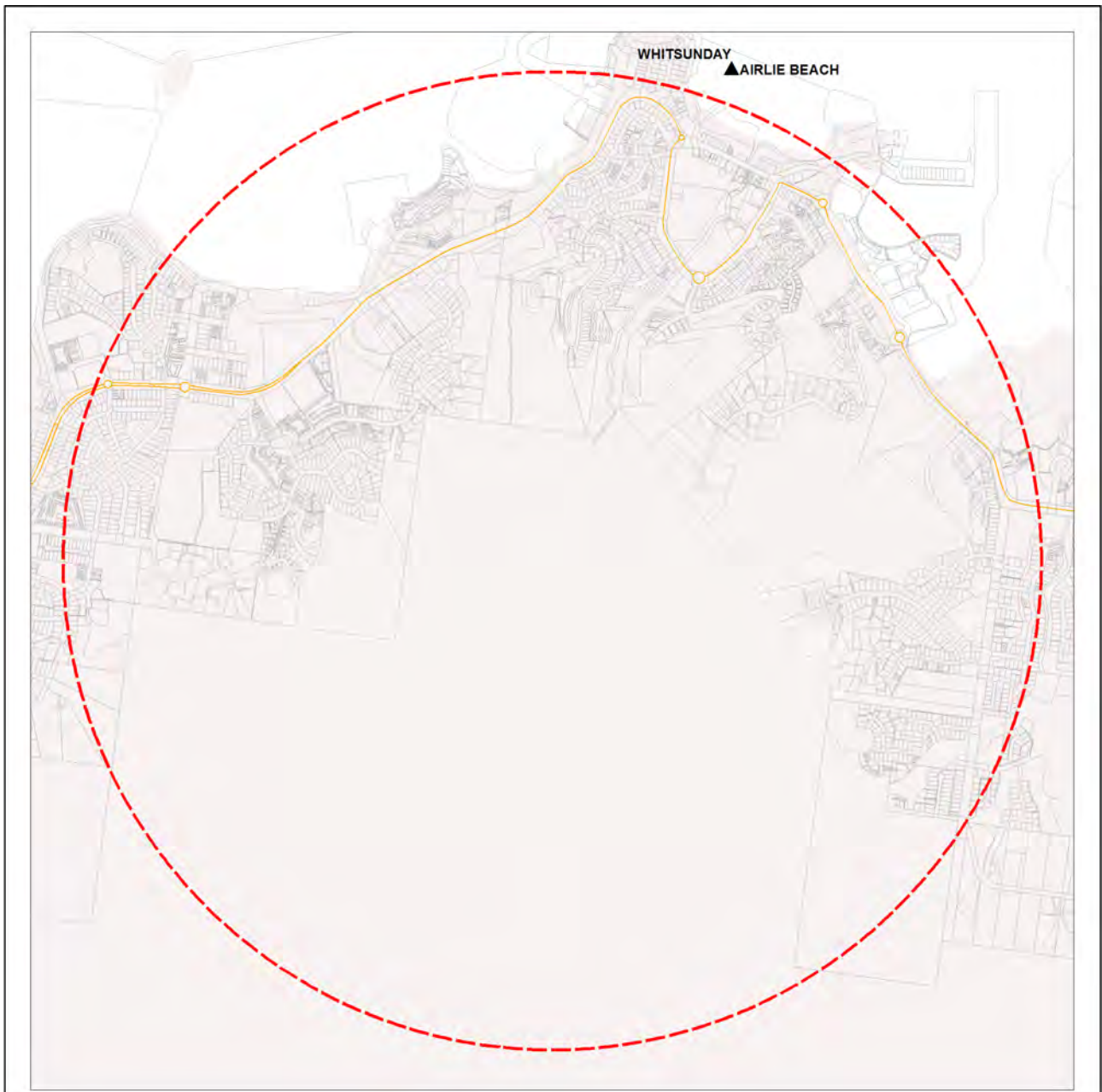
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Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species Koala habitat area (SEQ)

Area of Interest

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



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

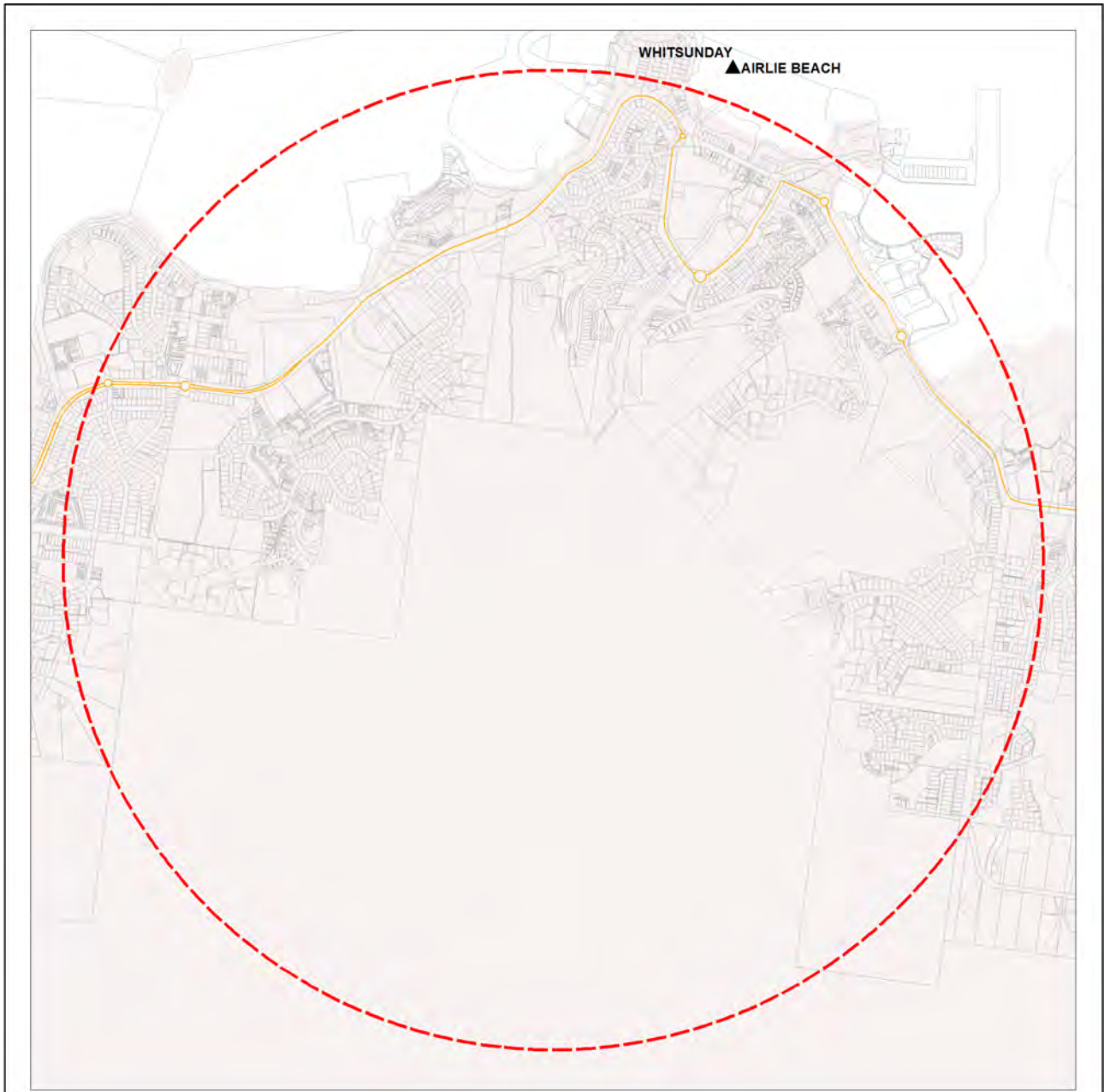
The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



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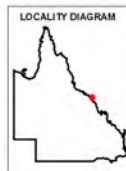
Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

Area of Interest

- 2 kilometre buffer
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)

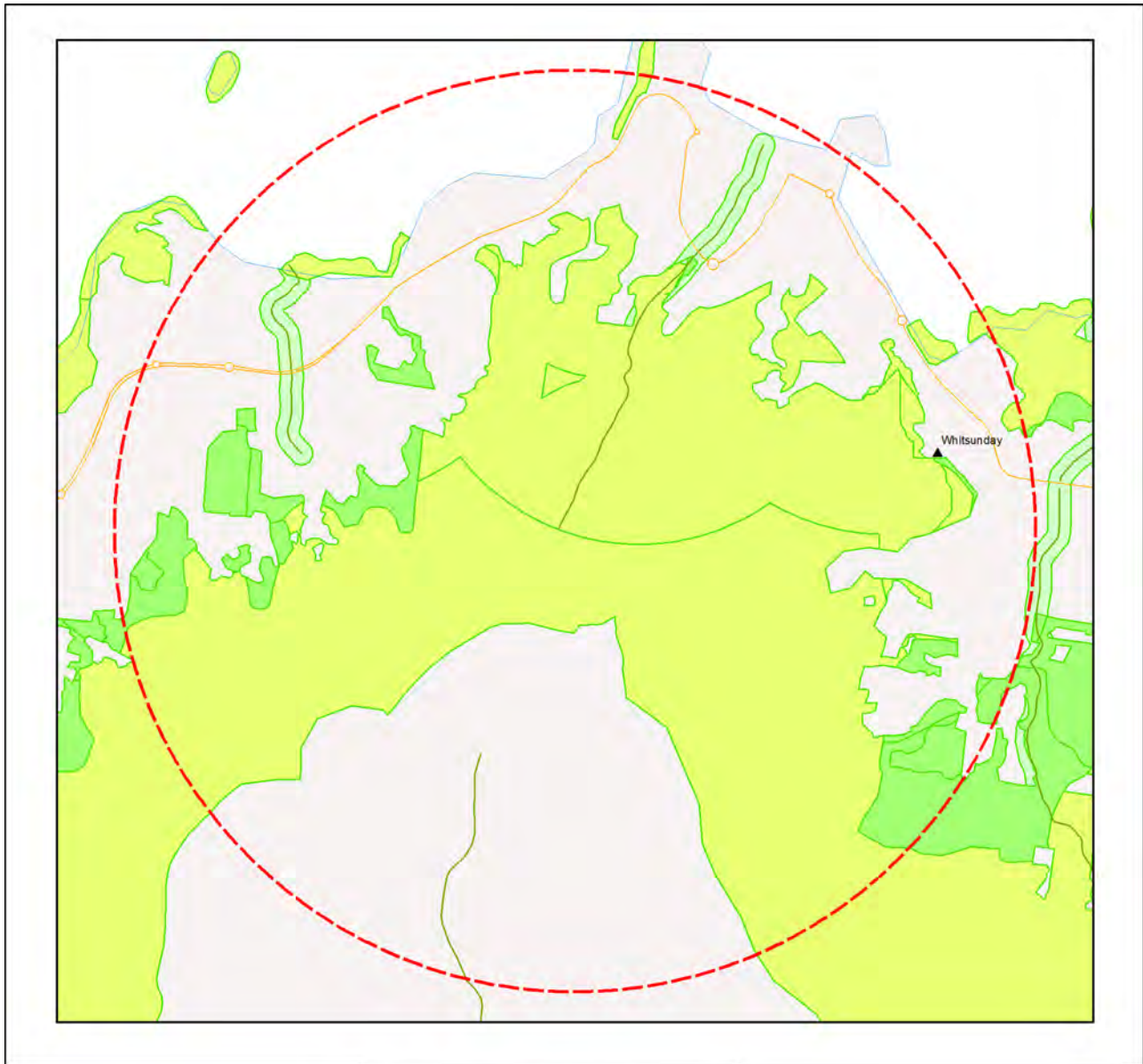


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MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.



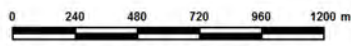
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

Area of Interest

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



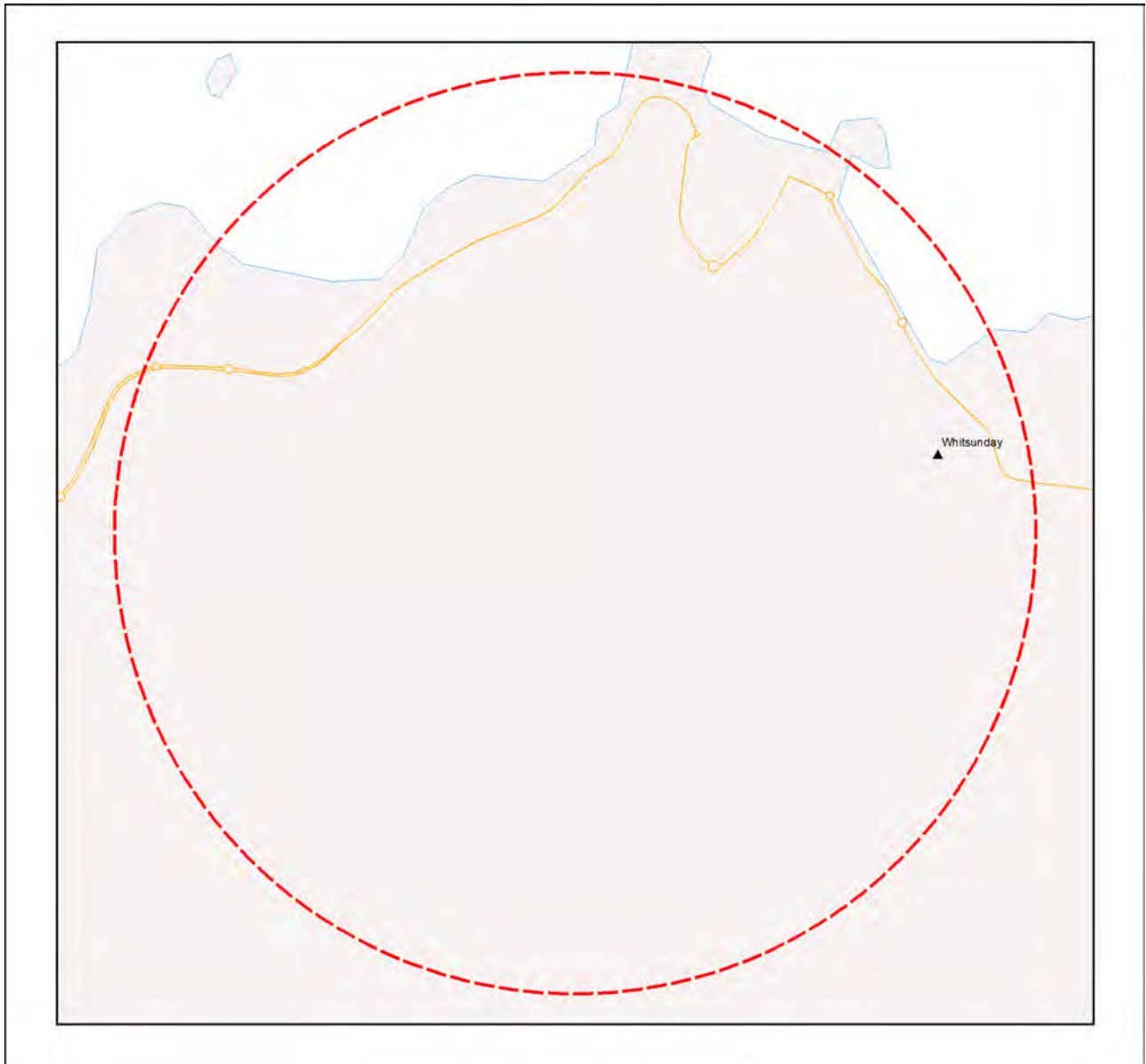
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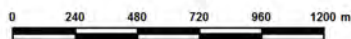
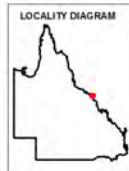
Map 5 - MSES - Offset Areas



MSES - Offsets

Area of Interest

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



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Appendices

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

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

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

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

Appendix 2 - Source Data

The datasets listed below are available on request from:

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

- Matters of State environmental significance

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

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

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

Appendix 3 - Acronyms and Abbreviations

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

Appendix D. Pre-survey likelihood of occurrence assessment for all conservation significant terrestrial fauna returned in a 10 km radius search of the AOI (n = 62).

Family	Common Name	Scientific Name	Status NCA ¹	Status EPBC ²	PMST 10 km radius	WO Records 10 km radius	ALA Records ³ 50 km radius	Modelled Potential Habitat	Likelihood
Birds (n = 53)									
Rostratulidae	Australian painted snipe	Rostratula australis	E	E, Ma	Yes	0	Yes	No	Unlikely
Burhinidae	Beach stone-curlew	Esacus magnirostris	V	Ma	No	31	Yes	No	Unlikely
Cuculidae	Black-eared Cuckoo	Chalcites osculans	LC	Ma	Yes	0	No	No	Unlikely
Monarchidae	Black-faced monarch	Monarcha melanopsis	SL	Ma, M	Yes	9	Yes	No	Likely
Laridae	Black-naped tern	Sterna sumatrana	SL	Ma, M	No	15	Yes	No	Possible
Estrildidae	Black-throated finch (southern)	Poephila cincta cincta	E	E	Yes	0	No	Yes	Unlikely
Laridae	Bridled tern	Onychoprion anaethetus	SL	Ma, M	No	2	Yes	No	Possible
Sulidae	Brown booby	Sula leucogaster	SL	Ma, M	No	1	Yes	No	Possible
Turnicidae	Buff-breasted button-quail	Turnix olivii	E	E	Yes	0	No	No	Unlikely
Laridae	Caspian tern	Hydroprogne caspia	SL	Ma, M	No	1	Yes	No	Possible
Ardeidae	Cattle Egret	Bubulcus ibis	LC	Ma	Yes	0	Yes	No	Possible
Scolopacidae	Common greenshank	Tringa nebularia	SL	Ma, M	Yes	0	No	No	Unlikely
Laridae	Common noddy	Anous stolidus	SL	Ma, M	Yes	0	Yes	No	Possible
Scolopacidae	Common sandpiper	Actitis hypoleucos	SL	Ma, M	Yes	2	Yes	No	Possible
Laridae	Crested tern	Thalasseus bergii	SL	Ma, M	No	19	Yes	No	Possible
Scolopacidae	Curlew sandpiper	Calidris ferruginea	CR	CE, Ma, M	Yes	0	Yes	No	Unlikely
Scolopacidae	Eastern curlew	Numenius madagascariensis	E	CE, Ma, M	Yes	4	Yes	No	Unlikely
Accipitridae	Eastern osprey	Pandion cristatus	SL	Ma, M	No	33	Yes	No	Possible
Procellariidae	Flesh-footed Shearwater	Ardenna carneipes	SL	Ma, M	Yes	0	No	No	Unlikely
Apodidae	Fork-tailed swift	Apus pacificus	SL	Ma, M	Yes	1	Yes	No	Possible
Scolopacidae	Great knot	Calidris tenuirostris	CR	CE, Ma, M	No	1	Yes	No	Unlikely

Family	Common Name	Scientific Name	Status NCA ¹	Status EPBC ²	PMST 10 km radius	WO Records 10 km radius	ALA Records ³ 50 km radius	Modelled Potential Habitat	Likelihood
Fregatidae	Great Frigatebird	<i>Fregata minor</i>	SL	Ma, M	Yes	0	Yes	No	Possible
Charadriidae	Greater sand plover	<i>Charadrius leschenaultii</i>	V	V, Ma, M	Yes	0	Yes	No	Unlikely
Falconidae	Grey falcon	<i>Falco hypoleucos</i>	V	V	Yes	0	No	No	Unlikely
Charadriidae	Grey plover	<i>Pluvialis squatarola</i>	SL	Ma, M	No	1	Yes	No	Unlikely
Scolopacidae	Grey-tailed tattler	<i>Tringa brevipes</i>	SL	Ma, M	No	2	Yes	No	Unlikely
Procellariidae	Kermadec petrel (western)	<i>Pterodroma neglecta neglecta</i>	LC	V	Yes	0	No	No	Unlikely
Scolopacidae	Latham's Snipe	<i>Gallinago hardwickii</i>	SL	Ma, M	Yes	0	Yes	No	Possible
Fregatidae	Lesser frigatebird	<i>Fregata ariel</i>	SL	Ma, M	Yes	1	Yes	No	Possible
Charadriidae	Lesser sand plover	<i>Charadrius mongolus</i>	E	E, Ma, M	No	1	Yes	No	Unlikely
Laridae	Little Tern	<i>Sternula albifrons</i>	SL	Ma, M	Yes	0	Yes	No	Unlikely
Anseranatidae	Magpie Goose	<i>Anseranas semipalmata</i>	LC	Ma	Yes	0	Yes	No	Possible
Tytonidae	Masked owl (northern)	<i>Tyto novaehollandiae kimberli</i>	V	V	Yes	0	No	No	Unlikely
Cuculidae	Oriental Cuckoo	<i>Cuculus optatus</i>	SL	M	Yes	0	Yes	No	Unlikely
Scolopacidae	Pectoral sandpiper	<i>Calidris melanotos</i>	SL	Ma, M	Yes	0	No	No	Unlikely
Meropidae	Rainbow Bee-eater	<i>Merops ornatus</i>	LC	Ma	Yes	0	Yes	No	Possible
Accipitridae	Red goshawk	<i>Erythrotriorchis radiatus</i>	E	V	Yes	0	No	Yes	Unlikely
Scolopacidae	Red knot	<i>Calidris canutus</i>	E	E, Ma, M	Yes	0	Yes	No	Unlikely
Rhipiduridae	Rufous fantail	<i>Rhipidura rufifrons</i>	SL	Ma, M	Yes	36	Yes	No	Likely
Monarchidae	Satin Flycatcher	<i>Myiagra cyanoleuca</i>	SL	Ma, M	Yes	0	Yes	No	Possible
Scolopacidae	Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	SL	Ma, M	Yes	0	Yes	No	Unlikely
Procellariidae	Southern giant-petrel	<i>Macronectes giganteus</i>	E	E, Ma, M	Yes	0	No	No	Unlikely
Monarchidae	Spectacled monarch	<i>Symposiachrus trivirgatus</i>	SL	Ma, M	Yes	51	Yes	No	Likely
Columbidae	Squatter pigeon (southern)	<i>Geophaps scripta scripta</i>	V	V	Yes	0	Yes	Yes	Unlikely
Estrildidae	Star finch (eastern)	<i>Neochmia ruficauda ruficauda</i>	E	E	Yes	0	No	No	Unlikely
Scolopacidae	Terek sandpiper	<i>Xenus cinereus</i>	SL	Ma, M	No	1	Yes	No	Unlikely


Family	Common Name	Scientific Name	Status NCA ¹	Status EPBC ²	PMST 10 km radius	WO Records 10 km radius	ALA Records ³ 50 km radius	Modelled Potential Habitat	Likelihood
Scolopacidae	Western Alaskan bar-tailed godwit	<i>Limosa lapponica baueri</i>	V	V	Yes	3	No	No	Unlikely
Scolopacidae	Whimbrel	<i>Numenius phaeopus</i>	SL	Ma, M	No	8	Yes	No	Possible
Accipitridae	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	LC	Ma	Yes	0	Yes	No	Possible
Oceanitidae	White-bellied storm-petrel (Tasman Sea), White-bellied storm-petrel (Australasian)	<i>Fregetta grallaria grallaria</i>	LC	V	Yes	0	No	No	Unlikely
Phaethontidae	White-tailed Tropicbird	<i>Phaethon lepturus</i>	SL	Ma, M	Yes	0	No	No	Unlikely
Apodidae	White-throated needletail	<i>Hirundapus caudacutus</i>	V	V, Ma, M	Yes	2	Yes	No	Unlikely
Mammals (n = 8)									
Emballonuridae	Coastal sheath-tail bat	<i>Taphozous australis</i>	NT	NL	No	5	Yes	Yes	Possible
Megadermatidae	Ghost bat	<i>Macroderma gigas</i>	E	V	Yes	0	No	Yes	Unlikely
Pseudocheiridae	Greater glider (southern and central)	<i>Petauroides volans</i>	E	E	Yes	0	No	No	Unlikely
Phascolarctidae	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)	E	E	Yes	5	Yes	No	Possible
Dasyuridae	Northern quoll	<i>Dasyurus hallucatus</i>	LC	E	Yes	8	Yes	Yes	Possible
Macropodidae	Proserpine rock-wallaby	<i>Petrogale persephone</i>	E	E	Yes	109	Yes	Yes	Likely
Tachyglossidae	Short-beaked echidna	<i>Tachyglossus aculeatus</i>	SL	NL	No	10	Yes	No	Possible
Muridae	Water mouse	<i>Xeromys myoides</i>	V	V	Yes	2	Yes	No	Unlikely
Reptiles (n = 1)									
Scincidae	Yakka skink	<i>Egernia rugosa</i>	V	V	Yes	0	No	No	Unlikely


¹NCA Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered.


²EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

³ALA Records within 50 km of the AOI – Yes represents records less than 20 years old.

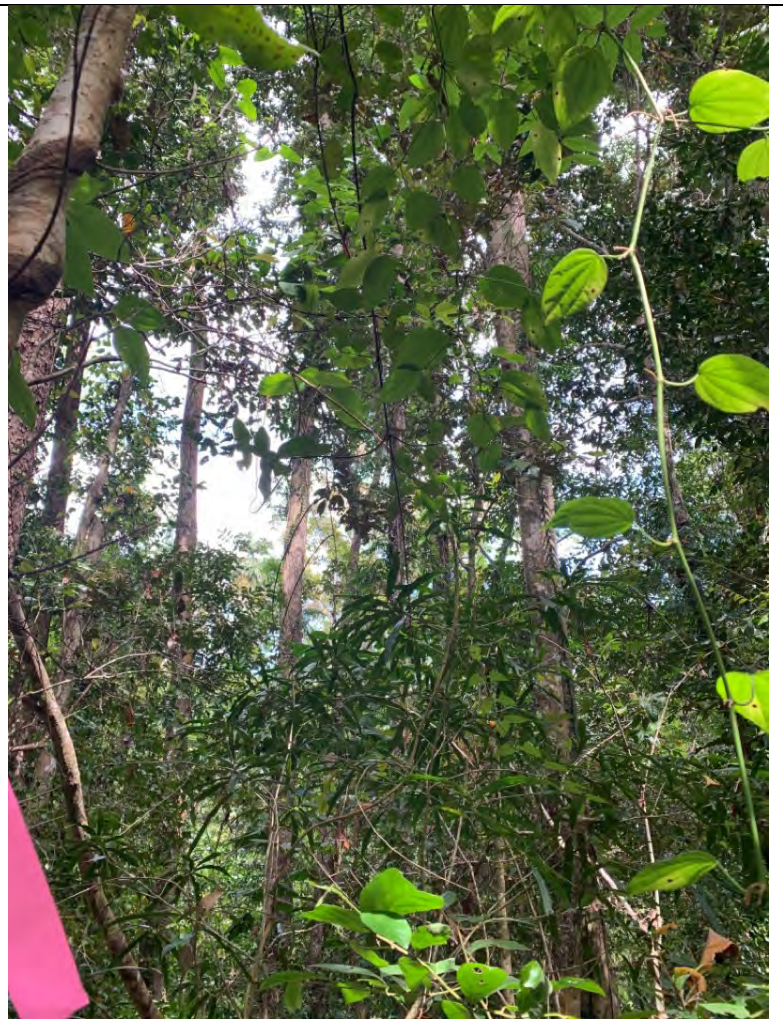
Appendix E. BioCondition Site Data.

Site Name	WB1	
Regional ecosystem	8.12.18	
Location	Conway National Park	
Latitude	-20.274873	
Longitude	148.712780	
Tree species richness	4	
Shrub species richness	17	
Grass species richness	3	
Forb and other species richness	2	
Emergent canopy height (m)	23.5	
Tree canopy height (m)	9	
Tree subcanopy height (m)	6	
Large eucalypt benchmark DBH (cm)	n/a	
Large non-eucalypt benchmark DBH (cm)	39	
Total number of large eucalypts above benchmark DBH (ha)*	n/a	
Total number of large non-eucalypts above benchmark DBH (ha)*	40	
Emergent canopy cover %	23	
Tree canopy cover %	87	
Tree subcanopy cover %	59.8	
Shrub canopy cover %	0	
Native perennial grass cover %	0	
Litter ground cover%	70	
Non-native plant cover%	5	
Recruitment %	100	
Woody debris length (ha)	435	
Total score	60/70	
BioCondition Class	1	
Site Description/Notes	Semi-evergreen microphyll vine thicket.	
Tree species	<i>Falcataria toona</i> , <i>Flindersia schottiana</i> , <i>Argyrodendron polyandrum</i> , <i>Euroschinus falcatus</i>	
Shrub species	<i>Smilax australis</i> , <i>Mallotus phillipensis</i> , <i>Polyscias elegans</i> , <i>Drypetes deplanchei</i> , <i>Cynanchum bowmannii</i> , <i>Alyxia ruscifolia</i> , <i>Cupaniopsis wadsworthii</i> , <i>Cupaniopsis anacardioides</i> , <i>Ganophyllum falcatum</i> , <i>Atalaya rigida</i> , <i>Jagera pseudorhus</i> , <i>Tabernaemontana pandacaqui</i> , <i>Melodorum leichhardtii</i> , <i>Cissus oblonga</i> , <i>Cryptocarya bidwillii</i> , <i>Cryptocarya triplinervis</i> , <i>Alchornea thozetiana</i>	
Grass species	<i>Cleistochloa subjunca</i> , <i>Oplismenus aemulus</i> , <i>Gahnia aspera</i>	
Forbs and other species	<i>Jasminum didymum</i> , <i>Dianella caerulea</i>	


Site Name	WB2	
Regional ecosystem	8.12.12d	
Location	Conway National Park	
Latitude	-20.282685	
Longitude	148.709054	
Tree species richness	6	
Shrub species richness	14	
Grass species richness	2	
Forb and other species richness	3	
Emergent canopy height (m)	20	
Tree canopy height (m)	10	
Tree subcanopy height (m)	5	
Large eucalypt benchmark DBH (cm)	49	
Large non-eucalypt benchmark DBH (cm)	24	
Total number of large eucalypts above benchmark DBH (ha)*	25	
Total number of large non-eucalypts above benchmark DBH (ha)*	40	
Emergent canopy cover %	63	
Tree canopy cover %	71	
Tree subcanopy cover %	53.6	
Shrub canopy cover %	0	
Native perennial grass cover %	0	
Litter ground cover%	63.8	
Non-native plant cover%	5	
Recruitment %	100	
Woody debris length (ha)	420	
Total score	55/80	
BioCondition Class	2	
Site Description/Notes	Semi-closed eucalypt forest with <i>Lophostemon suaveolens</i> dominant and with a subcanopy of rainforest species	
Tree species	<i>Lophostemon suaveolens</i> , <i>Drypetes deplanchei</i> , <i>Jagera pseudorus</i> , <i>Alectryon tomentosus</i> , <i>Terminalia porphyrocarpa</i> , <i>Flindersia schottiana</i>	
Shrub species	<i>Alectryon connatus</i> , <i>Ganophyllum falcatum</i> , <i>Mallotus phillipensis</i> , <i>Maclura cochinchinensis</i> , <i>Atalaya rigida</i> , <i>Cissus oblonga</i> , <i>Alyxia rucifolia</i> , <i>Cycas media</i> , <i>Polyscia elegans</i> , <i>Trema orientalis</i> , <i>Acronychia laevis</i> , <i>Tabernaemontana pandacaqui</i> , <i>Xanthorrhoea johnsonii</i> , <i>Pandorea jasminoides</i> , <i>Scolopia braunii</i> , <i>Marsdenia glandulifera</i> , <i>Psychotria</i> sp. 'Shute Harbour'?	
Grass species	<i>Gahnia aspera</i> , <i>Oplismenus</i> sp.	
Forbs and other species	<i>Drynaria sparsisora</i> , <i>Doryopteris concolor</i> , <i>Dianella caerulea</i>	


Site Name	WB3	
Regional ecosystem	8.12.12d	
Location	Conway National Park	
Latitude	-20.279073	
Longitude	148.710171	
Tree species richness	7	
Shrub species richness	12	
Grass species richness	2	
Forb and other species richness	3	
Emergent canopy height (m)	23	
Tree canopy height (m)	12	
Tree subcanopy height (m)	5	
Large eucalypt benchmark DBH (cm)	49	
Large non-eucalypt benchmark DBH (cm)	24	
Total number of large eucalypts above benchmark DBH (ha)*	5	
Total number of large non-eucalypts above benchmark DBH (ha)*	20	
Emergent canopy cover %	21	
Tree canopy cover %	76.6	
Tree subcanopy cover %	58.5	
Shrub canopy cover %	0	
Native perennial grass cover %	0	
Litter ground cover%	52	
Non-native plant cover%	5	
Recruitment %	100	
Woody debris length (ha)	245	
Total score	50/80	
BioCondition Class	2	
Site Description/Notes	Semi-closed <i>E.drepanophylla</i> forest with thickened with rainforest species in understorey	
Tree species	<i>Eucalyptus drepanophylla</i> , <i>Flindersia schottian</i> , <i>Acacia spirobis subsp. Solandri</i> , <i>Alectryon tomentosus</i> , <i>Sterculea quadrifida</i> , <i>Gossipium bidwillii</i> , <i>Terminalia porphyrocarpa</i>	
Shrub species	<i>Cryptocaria triplinervis</i> , <i>Alyxia rucifolia</i> , <i>Polyscias elegans</i> , <i>Large leaf opposite</i> , <i>Scolopia braunii</i> , <i>Alchornea thozetiana</i> , <i>Drypetes deplanchei</i> , <i>Tabernaemontana pandacaqui</i> , <i>Mallotus Phillip</i> , <i>Aglaia sapindina</i> , <i>Acronychia laevis</i> , <i>Rubiaceae sp.? domatia</i> , <i>Jasminum didymum</i>	
Grass species	<i>Gahnia aspera</i> , <i>Oplismenus sp narrow</i>	
Forbs and other species	<i>Adiantum hispidulum</i> , <i>Doryopteris concolor</i> , <i>Drynaria rigidula</i>	

Site Name	WB4
Regional ecosystem	8.12.18
Location	Conway National Park
Latitude	-20.288024
Longitude	148.712503
Tree species richness	15
Shrub species richness	6
Grass species richness	3
Forb and other species richness	7
Emergent canopy height (m)	n/a
Tree canopy height (m)	26
Tree subcanopy height (m)	12
Large eucalypt benchmark DBH (cm)	n/a
Large non-eucalypt benchmark DBH (cm)	39
Total number of large eucalypts above benchmark DBH (ha)*	n/a
Total number of large non-eucalypts above benchmark DBH (ha)*	85
Emergent canopy cover %	0
Tree canopy cover %	86.7
Tree subcanopy cover %	90.8
Shrub canopy cover %	0
Native perennial grass cover %	0
Litter ground cover%	61
Non-native plant cover%	10
Recruitment %	100
Woody debris length (ha)	220
Total score	67.5/70
BioCondition Class	1



Site Description/Notes	Semi-closed rainforest with <i>Argyrodendron</i> emergents and vines
Tree species	<i>Aphananthe philippinensis</i> , <i>Argyrodendron polyandrum</i> , <i>Polycias elegans</i> , <i>Argyrodendron whitsundays</i> , <i>Alstonia scholaris</i> , <i>Flindersia schottiana</i> , <i>Litsea leefiana</i> , <i>Euroschinus falcatus</i> , <i>Diploglotus ovata</i> , <i>Ficus fraserii</i> , <i>Bosistoa medicinalis</i> , <i>Baloghia inophylla</i> , <i>Dissiliaria baloghioides</i> , <i>Myristica globosa</i> subsp. <i>muelleri</i> , <i>Dysoxylum rufum</i>
Shrub species	<i>Phyllanthus novae-hollandiae</i> , <i>Trema tomentosa</i> var. <i>aspera</i> , <i>Gossia bidwillii</i> , <i>Lophostemon confertus</i> , <i>Eugenia reinwardtiana</i> , <i>Cycas media</i>
Grass species	<i>Cleistochloa subjunca</i> , <i>Oplismenus aemulus</i> , <i>Gahnia aspera</i>
Forbs and other species	<i>Doryopteris concolor</i> , <i>Gahnia aspera</i> , <i>Dianella caerulea</i> , <i>Eustrephus latifolius</i> , <i>Jasminum didymum</i> , <i>Asplenium australasicum</i> , <i>Cymbidium madidum</i> , <i>Drynaria sparsiora</i>

Site Name	WB5	
Regional ecosystem	8.12.12d	
Location	Conway National Park	
Latitude	-20.283664	
Longitude	148.708814	
Tree species richness	7	
Shrub species richness	9	
Grass species richness	2	
Forb and other species richness	8	
Emergent canopy height (m)	28	
Tree canopy height (m)	14	
Tree subcanopy height (m)	7	
Large eucalypt benchmark DBH (cm)	49	
Large non-eucalypt benchmark DBH (cm)	24	
Total number of large eucalypts above benchmark DBH (ha)*	30	
Total number of large non-eucalypts above benchmark DBH (ha)*	45	
Emergent canopy cover %	56.3	
Tree canopy cover %	75.4	
Tree subcanopy cover %	73.6	
Shrub canopy cover %	0	
Native perennial grass cover %	0	
Litter ground cover%	56.4	
Non-native plant cover%	5	
Recruitment %	100	
Woody debris length (ha)	740	
Total score	55/80	
BioCondition Class	2	
Site Description/Notes	Semi-closed eucalypt forest with a subcanopy of rainforest species	
Tree species	<i>Corymbia intermedia</i> , <i>Eucalyptus tereticornis</i> , <i>Lophostemon suaveolens</i> , <i>Euroschinus falcatus</i> , <i>Dysoxylum rufum</i> , <i>Ficus fraseri</i> , <i>Argyrodendron polyandrum</i>	
Shrub species	<i>Hypoestes floribunda</i> , <i>Acronychia laevis</i> , <i>Cryptocaria bidwillii</i> , <i>Cryptocaria triplinervis</i> , <i>Tabernaemontana pandacaqui</i> , <i>Cycas media</i> , <i>Euroschinus falcata</i> , <i>Jagera pseudorus</i> , <i>Falcataria toona</i> , <i>Lophostemon Suaveolens</i>	
Grass species	<i>Gahnia aspera</i> , <i>Oplismenus sp.</i>	
Forbs and other species	<i>Trophis scandens</i> , <i>Vine like peanut tree leaf</i> , <i>Smilax australis</i> , <i>Eustrephus latifolius</i> , <i>Doryopteris concolor</i> , <i>Adiantum hispidulum</i> , <i>Smilax sp. Long leaf</i>	

Site Name	WB6	
Regional ecosystem	8.12.18	
Location	Conway National Park	
Latitude	-20.278315	
Longitude	148.712745	
Tree species richness	4	
Shrub species richness	5	
Grass species richness	3	
Forb and other species richness	4	
Emergent canopy height (m)	21	
Tree canopy height (m)	16	
Tree subcanopy height (m)	9	
Large eucalypt benchmark DBH (cm)	n/a	
Large non-eucalypt benchmark DBH (cm)	39	
Total number of large eucalypts above benchmark DBH (ha)*	n/a	
Total number of large non-eucalypts above benchmark DBH (ha)*	20	
Emergent canopy cover %	23	
Tree canopy cover %	36.8	
Tree subcanopy cover %	92.4	
Shrub canopy cover %	0	
Native perennial grass cover %	0	
Litter ground cover%	47.8	
Non-native plant cover%	5	
Recruitment %	100	
Woody debris length (ha)	50	
Total score	57/70	
BioCondition Class	1	
Site Description/Notes	Semi-closed microphyll vine forest adjacent to walking track. Drier area with <i>Brachychiton</i> spp. Including <i>B. compactus</i> in adjacent community	
Tree species	<i>Argyrodendron polyandrum</i> , <i>Alectryon connatus</i> , <i>Polyscias elegans</i> , <i>Aphananthe hilippinensis</i>	
Shrub species	<i>Phyllanthus novae-hollandiae</i> , <i>Pittosporum revolutum</i> , <i>Murraya ovatifoliolata</i> , <i>Atalaya rigida</i> , <i>Trema tomentosa</i> var. <i>aspera</i>	
Grass species	<i>Gahnia aspera</i> , <i>Oplismenus imbecillis</i> , <i>Oplismenus aemulus</i>	
Forbs and other species	<i>Dianella caerulea</i> , <i>Eustrephus latifolius</i> , <i>Jasminum didymum</i> , <i>Clematis glycinoides</i>	

Appendix F. Observed flora species list (n = 390).

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Acanthaceae	Harnieria hygrophiloides	White karambal	C	NL
Acanthaceae	Hypoestes floribunda	Musk-scented Plant	C	NL
Amaranthaceae	Achyranthes aspera		C	NL
Amaranthaceae	Alternanthera denticulata	Lesser joyweed	C	NL
Amaranthaceae	Alternanthera nana	Hairy joyweed	C	NL
Amaranthaceae	Deeringia amaranthoides	Redberry	C	NL
Amarylidaceae	Crinum pedunculatum	River lily	SL	NL
Anacardiaceae	Euroschinus falcatus var. falcatus		C	NL
Anacardiaceae	Pleiogynium timorense	Burdekin plum	C	NL
Annonaceae	Fitzalania heteropetala		C	NL
Annonaceae	Melodorum leichhardtii		C	NL
Annonaceae	Miliusa brahei		C	NL
Annonaceae	Xylopia maccraeae		C	NL
Apiaceae	Centella asiatica		C	NL
Apiaceae	Mackinlaya macrosciadea	Mackinlaya	C	NL
Apocynaceae	Alstonia scholaris	White cheesewood	C	NL
Apocynaceae	Alyxia ruscifolia		C	NL
Apocynaceae	Cynanchum bowmanni		C	NL
Apocynaceae	Leichhardtia micradenia		C	NL
Apocynaceae	Marsdenia glandulifera		C	NL
Apocynaceae	Melodinus australis	Southern melodinus	C	NL
Apocynaceae	Neisosperma poweri		C	NL
Apocynaceae	Ochrosia elliptica	Northern ochrosia	C	NL
Apocynaceae	Parsonsia longipetiolata		C	NL
Apocynaceae	Parsonsia plaesiophylla		C	NL
Apocynaceae	Parsonsia rotata	Veinless silkpod	C	NL
Apocynaceae	Parsonsia velutina	Hairy silkpod	C	NL
Apocynaceae	Tabernaemontana orientalis		C	NL
Apocynaceae	Tabernaemontana pandacaqui	Banana bush	C	NL
Apocynaceae	Vincetoxicum polyanthum		C	NL
Araceae	Philodendron hederaceum		I*	NL
Araceae	Syngonium podophyllum		I*	NL
Araceae	Alocasia brisbanensis		C	NL
Araliaceae	Polycias elegans		C	NL
Araliaceae	Polyscias australiana	Ivory basswood	C	NL
Araliaceae	Polyscias nodosa		C	NL
Araliaceae	Schefflera actinophylla		C	NL
Arecaceae	Ptychosperma microcarpum		I*	NL
Arecaceae	Sabal minor	Sabal palm	I*	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Arecaceae	Sabal palmetto	Sabal palm	I*	NL
Arecaceae	Syagrus romanzoffiana	Queen Palm	I*	NL
Arecaceae	Archontophoenix alexandrae	Alexander Palm	C	NL
Arecaceae	Livistona decora	Cabbage palm	C	NL
Arecaceae	Ptychosperma elegans	Solitaire palm	C	NL
Aspleniaceae	Asplenium australasicum	Basket Fern	C	NL
Aspleniaceae	Asplenium paleaceum	Scaly asplenium	C	NL
Asteraceae	Ageratum conyzoides	Billygoat weed	I*	NL
Asteraceae	Ageratum conyzoides subsp. conyzoides		I*	NL
Asteraceae	Bidens alba var. radiata		I*	NL
Asteraceae	Bidens pilosa		I*	NL
Asteraceae	Pterocaulon ciliosum		C	NL
Balanophoraceae	Balanophora fungosa subsp. fungosa		C	NL
Bignoniaceae	Pandorea jasminoides		C	NL
Bignoniaceae	Pandorea pandorana		C	NL
Boraginaceae	Cordia dichotoma		C	NL
Boraginaceae	Heliotropium sarmentosum		C	NL
Burseraceae	Canarium australasicum	Mango bark	C	NL
Byttneriaceae	Commersonia bartramia	Brown kurrajong	C	NL
Cannabaceae	Aphananthe philippinensis		C	NL
Capparaceae	Capparis arborea	Brush caper berry	C	NL
Capparaceae	Capparis lucida		C	NL
Capparaceae	Capparis sepiaria		C	NL
Casuarinaceae	Casuarina equisetifolia subsp. incana		C	NL
Celastraceae	Celastrus subspicata	Large-leaved staffvine	C	NL
Celastraceae	Elaeodendron melanocarpum		C	NL
Combretaceae	Terminalia porphyrocarpa		C	NL
Combretaceae	Terminalia sericocarpa	Damson	C	NL
Commelinaceae	Aneilema acuminatum		C	NL
Commelinaceae	Pollia macrophylla		C	NL
Convolvulaceae	Ipomoea quamoclit	Star of Bethlehem	I*	NL
Convolvulaceae	Evolvulus alsinoides		C	NL
Cornaceae	Alangium polyosmoides subsp. tomentosum		C	NL
Cucurbitaceae	Momordica charantia	Balsam pear	I*	NL
Cyatheaceae	Alsophila rebecca		C	NL
Cycadaceae	Cycas media		C	NL
Cyperaceae	Carex indica		C	NL
Cyperaceae	Cyperus cyperinus		C	NL
Cyperaceae	Cyperus difformis	Rice sedge	C	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Cyperaceae	<i>Cyperus enervis</i>		C	NL
Cyperaceae	<i>Cyperus gymnocaulos</i>	Spiny flatsedge	C	NL
Cyperaceae	<i>Cyperus polystachyos</i> var. <i>polystachyos</i>		C	NL
Cyperaceae	<i>Cyperus stoloniferus</i>		C	NL
Cyperaceae	<i>Cyperus tetracarpus</i>		C	NL
Cyperaceae	<i>Cyperus trinervis</i>		C	NL
Cyperaceae	<i>Gahnia aspera</i>		C	NL
Cyperaceae	<i>Schoenoplectus tabernaemontani</i>		C	NL
Cyperaceae	<i>Schoenus sparteus</i>		C	NL
Cyperaceae	<i>Scleria lithosperma</i> var. <i>linearis</i>		C	NL
Cyperaceae	<i>Scleria mackaviensis</i>		C	NL
Cyperaceae	<i>Scleria sphacelata</i>		C	NL
Dioscoreaceae	<i>Dioscorea transversa</i>	Native yam	C	NL
Dryopteridaceae	<i>Arachniodes aristata</i>	Prickly shield fern	SL	NL
Dryopteridaceae	<i>Lastreopsis poecilophlebia</i>		SL	NL
Dryopteridaceae	<i>Lastreopsis tenera</i>		SL	NL
Ebenaceae	<i>Diospyros compacta</i>		C	NL
Ebenaceae	<i>Diospyros fasciculosa</i>	Grey ebony	C	NL
Ebenaceae	<i>Diospyros geminata</i>	Scaly ebony	C	NL
Ebenaceae	<i>Diospyros hebecarpa</i>		C	NL
Elaeagnaceae	<i>Elaeagnus triflora</i>		C	NL
Elaeocarpaceae	<i>Elaeocarpus grandis</i>		C	NL
Elaeocarpaceae	<i>Elaeocarpus largiflorens</i> subsp. <i>largiflorens</i>		C	NL
Elaeocarpaceae	<i>Elaeocarpus obovatus</i> subsp. <i>obovatus</i>		C	NL
Elaeocarpaceae	<i>Sloanea langii</i>		C	NL
Euphorbiaceae	<i>Alchornia thozetiana</i>		C	NL
Euphorbiaceae	<i>Baloghia inophylla</i>	Scrub bloodwood	C	NL
Euphorbiaceae	<i>Croton arnhemicus</i>		C	NL
Euphorbiaceae	<i>Dissilaria baloghioides</i>		C	NL
Euphorbiaceae	<i>Macaranga involucrata</i> var. <i>mallotoides</i>		C	NL
Euphorbiaceae	<i>Macaranga tanarius</i>	Macaranga	C	NL
Euphorbiaceae	<i>Mallotus mollissimus</i>		C	NL
Euphorbiaceae	<i>Mallotus nesophilus</i>		C	NL
Euphorbiaceae	<i>Mallotus philippensis</i>	Red kamala	C	NL
Fissidentaceae	<i>Fissidens linearis</i>		C	NL
Hemerocallidaceae	<i>Dianella bambusifolia</i>		C	NL
Hemerocallidaceae	<i>Dianella caerulea</i>		C	NL
Hemerocallidaceae	<i>Geitonoplesium cymosum</i>	Scrambling lily	C	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Hernandiaceae	Gyrocarpus americanus subsp. americanus		C	NL
Lamiaceae	Callicarpa longifolia		C	NL
Lamiaceae	Clerodendrum longiflorum var. glabrum		C	NL
Lamiaceae	Premna dallachyana		C	NL
Lamiaceae	Vitex acuminata		C	NL
Lauraceae	Beilschmiedia obtusifolia	Hard bolly gum	C	NL
Lauraceae	Cassytha filiformis	Dodder laurel	C	NL
Lauraceae	Cryptocarya bidwillii	Yellow laurel	C	NL
Lauraceae	Cryptocarya grandis		C	NL
Lauraceae	Cryptocarya hypospodia	North Queensland purple laurel	C	NL
Lauraceae	Cryptocarya triplinervis		C	NL
Lauraceae	Cryptocarya vulgaris		C	NL
Lauraceae	Endiandra muelleri subsp. bracteata		C	NL
Lauraceae	Litsea fawcettiana		C	NL
Lauraceae	Litsea glutinosa		C	NL
Lauraceae	Litsea leefiana		C	NL
Lauraceae	Neolitsea dealbata	White bolly gum	C	NL
Laxmanniaceae	Cordyline manners-suttoniae	Palm lilly	SL	NL
Laxmanniaceae	Cordyline murchisoniae		SL	NL
Laxmanniaceae	Eustrephus latifolius	Wombat berry	C	NL
Leguminosae	Cassia fistula	Indian laburnum	I*	NL
Leguminosae	Centrosema molle		I*	NL
Leguminosae	Crotalaria pallida var. obovata		I*	NL
Leguminosae	Desmodium tortuosum	Florida beggar-weed	I*	NL
Leguminosae	Schotia brachypetala	Kaffir bean	I*	NL
Leguminosae	Acacia decora	Pretty wattle	C	NL
Leguminosae	Acacia flavescens	Toothed wattle	C	NL
Leguminosae	Acacia maidenii	Maiden's wattle	C	NL
Leguminosae	Aeschynomene brevifolia		C	NL
Leguminosae	Albizia procera		C	NL
Leguminosae	Archidendron grandiflorum	Lace flower tree	C	NL
Leguminosae	Archidendron hendersonii	White lace flower	C	NL
Leguminosae	Austrosteenisia blackii var. blackii		C	NL
Leguminosae	Canavalia papuana	Wild jack bean	C	NL
Leguminosae	Cassia sp. (Paluma Range G.Sankowsky+ 450)		C	NL
Leguminosae	Falcataria toona		C	NL
Leguminosae	Flemingia lineata		C	NL
Leguminosae	Indigofera hirsuta	Hairy indigo	C	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Leguminosae	<i>Intsia bijuga</i>		C	NL
Leguminosae	<i>Macuna gigantea</i>		C	NL
Leguminosae	<i>Millettia pinnata</i>		C	NL
Leguminosae	<i>Mucuna gigantea</i>	Burny bean	C	NL
Leguminosae	<i>Pycnospora lutescens</i>	Pycnospora	C	NL
Loganiaceae	<i>Strychnos psilosperma</i>	Strychnine tree	C	NL
Loranthaceae	<i>Amyema congener</i>		C	NL
Loranthaceae	<i>Dendrophthoe glabrescens</i>		C	NL
Loranthaceae	<i>Dendrophthoe vitellina</i>	Long-flowered mistletoe	C	NL
Lygodiaceae	<i>Lygodium microphyllum</i>	Snake fern	C	NL
Malvaceae	<i>Hibiscus heterophyllus</i>		C	NL
Malvaceae	<i>Thespesia populnea</i>		C	NL
Melastomataceae	<i>Melastoma malabathricum</i>		C	NL
Meliaceae	<i>Aglaia brownii</i>		C	NL
Meliaceae	<i>Aglaia sapindina</i>		C	NL
Meliaceae	<i>Dysoxylum gaudichaudianum</i>		C	NL
Meliaceae	<i>Dysoxylum klanderi</i>		C	NL
Meliaceae	<i>Dysoxylum rufum</i>		C	NL
Meliaceae	<i>Toona ciliata</i>	Red cedar	C	NL
Meliaceae	<i>Turraea pubescens</i>	Native honeysuckle	C	NL
Memecylaceae	<i>Memecylon pauciflorum</i>		C	NL
Menispermaceae	<i>Hypserpa laurina</i>		C	NL
Menispermaceae	<i>Legnephora moorei</i>		C	NL
Menispermaceae	<i>Tinospora smilacina</i>	Snakevine	C	NL
Mimosaceae	<i>Acacia spirobis</i> subsp. <i>solandri</i>		C	NL
Monimiaceae	<i>Wilkiea macrophylla</i>	Large-leaved wilkiea	C	NL
Moraceae	<i>Ficus adenosperma</i>		C	NL
Moraceae	<i>Ficus copiosa</i>		C	NL
Moraceae	<i>Ficus fraseri</i>	White sandpaper fig	C	NL
Moraceae	<i>Ficus fraserii</i>		C	NL
Moraceae	<i>Ficus hispida</i>		C	NL
Moraceae	<i>Ficus septica</i>		C	NL
Moraceae	<i>Ficus virens</i>		C	NL
Moraceae	<i>Maclura cochinchinensis</i>	Cockspur thorn	C	NL
Moraceae	<i>Trophis scandens</i>		C	NL
Myristicaceae	<i>Myristica globosa</i> subsp. <i>muelleri</i>	Native nutmeg	C	NL
Myrtaceae	<i>Archirhodomyrtus beckleri</i>	Rose myrtle	C	NL
Myrtaceae	<i>Backhousia citriodora</i>	Lemon ironwood	C	NL
Myrtaceae	<i>Corymbia intermedia</i>	Pink bloodwood	C	NL
Myrtaceae	<i>Eucalyptus drepanophylla</i>		C	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Myrtaceae	<i>Eucalyptus portuensis</i>		C	NL
Myrtaceae	<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>		C	NL
Myrtaceae	<i>Eugenia reinwardtiana</i>	Beach cherry	C	NL
Myrtaceae	<i>Gossia bidwillii</i>		C	NL
Myrtaceae	<i>Gossia pubiflora</i>		C	NL
Myrtaceae	<i>Lophostemon confertus</i>	Brush box	C	NL
Myrtaceae	<i>Lophostemon suaveolens</i>	Messmate	C	NL
Myrtaceae	<i>Rhodamnia spongiosa</i>		C	NL
Myrtaceae	<i>Rhodomyrtus macrocarpa</i>	Finger cherry	C	NL
Myrtaceae	<i>Syzygium australe</i>	Scrub cherry	C	NL
Myrtaceae	<i>Syzygium fibrosum</i>	Fibrous satinash	C	NL
Myrtaceae	<i>Syzygium johnsonii</i>	Johnson's satinash	C	NL
Oleaceae	<i>Chionanthus ramiflorus</i>	Northern olive	C	NL
Oleaceae	<i>Jasminum didymum</i>		C	NL
Oleaceae	<i>Olea paniculata</i>		C	NL
Onagraceae	<i>Ludwigia octovalvis</i>	Willow primrose	C	NL
Orchidaceae	<i>Cestichis nugentiae</i>		C	NL
Orchidaceae	<i>Cymbidium madidum</i>	Cymbidium	C	NL
Orchidaceae	<i>Cymbidium suave</i>	Cymbidium	C	NL
Orchidaceae	<i>Dendrobium canaliculatum</i>	Onion orchid	C	NL
Orchidaceae	<i>Dendrobium discolor</i>	Golden orchid	C	NL
Orchidaceae	<i>Dendrobium speciosum</i>	King orchid	C	NL
Orchidaceae	<i>Dendrobium tetragonum</i>	Spider orchid	C	NL
Orchidaceae	<i>Dockrillia calamiformis</i>	Rats tail orchid	C	NL
Orchidaceae	<i>Dockrillia nugentii</i>	Toung orchid	C	NL
Orchidaceae	<i>Geodorum densiflorum</i>	Shepards crook orchid	C	NL
Orchidaceae	<i>Nervilia holochila</i>		C	NL
Orchidaceae	<i>Oberonia crateriformis</i>		C	NL
Orchidaceae	<i>Plectorrhiza brevilabris</i>	Tangle root	C	NL
Pandanaceae	<i>Pandanus brookei</i>	Pandanus	C	NL
Papaveraceae	<i>Argemone mexicana</i>	Mexican poppy	I*	NL
Passifloraceae	<i>Passiflora foetida</i>	Stinking passion flower	I*	NL
Passifloraceae	<i>Passiflora pallida</i>	Pale passion flower	I*	NL
Passifloraceae	<i>Passiflora suberosa</i>	Corky passion flower	I*	NL
Passifloraceae	<i>Passiflora aurantia</i>	Red passionfruit	C	NL
Petiveriaceae	<i>Rivina humilis</i>		I*	NL
Phyllanthaceae	<i>Actephila sessilifolia</i>		C	NL
Phyllanthaceae	<i>Cleistanthus dallachyanus</i>		C	NL
Phyllanthaceae	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>		C	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Phyllanthaceae	Glochidion apodogynum		C	NL
Phyllanthaceae	Glochidion sumatranum	Umbrella cheese tree	C	NL
Phyllanthaceae	Phyllanthus novae-hollandiae		C	NL
Phyllanthaceae	Phyllanthus virgatus		C	NL
Phyllanthaceae	Synostemon albiflorus		C	NL
Picrodendraceae	Dissiliaria baloghioides		C	NL
Piperaceae	Peperomia tetraphylla		C	NL
Piperaceae	Piper hederaceum		C	NL
Piperaceae	Piper interruptum		C	NL
Pittosporaceae	Auranticarpa rhombifolia		C	NL
Pittosporaceae	Pittosporum revolutum		C	NL
Plantaginaceae	Scoparia dulcis	Scoparia	I*	NL
Poaceae	Bothriochloa insculpta	Stink grass	I*	NL
Poaceae	Bothriochloa pertusa	Indian couch	I*	NL
Poaceae	Cenchrus ciliaris	Buffell Grass	I*	NL
Poaceae	Cenchrus echinatus	Mossman River grass	I*	NL
Poaceae	Chloris gayana		I*	NL
Poaceae	Chloris inflata		I*	NL
Poaceae	Chloris virgata		I*	NL
Poaceae	Cynodon dactylon		I*	NL
Poaceae	Digitaria ciliaris		I*	NL
Poaceae	Eleusine indica	Crowsfoot grass	I*	NL
Poaceae	Eragrostis unioides		I*	NL
Poaceae	Hyparrhenia rufa subsp. rufa		I*	NL
Poaceae	Megathyrsus maximus		I*	NL
Poaceae	Melinis minutiflora	Molasses grass	I*	NL
Poaceae	Paspalum paniculatum	Russell River grass	I*	NL
Poaceae	Paspalum virgatum		I*	NL
Poaceae	Perotis rara		I*	NL
Poaceae	Phalaris aquatica		I*	NL
Poaceae	Poa annua		I*	NL
Poaceae	Setaria palmifolia		I*	NL
Poaceae	Sporobolus fertilis		I*	NL
Poaceae	Sporobolus jacquemontii		I*	NL
Poaceae	Sporobolus natalensis / pyramidalis		I*	NL
Poaceae	Themeda quadrivalvis		I*	NL
Poaceae	Urochloa humidicola		I*	NL
Poaceae	Urochloa mosambicensis		I*	NL
Poaceae	Urochloa mutica		I*	NL
Poaceae	Ancistrachne uncinulata	Hooky grass	C	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Poaceae	<i>Chrysopogon filipes</i>		C	NL
Poaceae	<i>Cleistochloa subjuncea</i>		C	NL
Poaceae	<i>Digitaria minima</i>		C	NL
Poaceae	<i>Enteropogon unispiceus</i>		C	NL
Poaceae	<i>Ischaemum australe</i> var. <i>australe</i>		C	NL
Poaceae	<i>Lepturus repens</i>	Stalky grass	C	NL
Poaceae	<i>Mnesithea rottboellioides</i>		C	NL
Poaceae	<i>Oplismenus compositus</i>		C	NL
Poaceae	<i>Oplismenus imbecillis</i>		C	NL
Poaceae	<i>Panicum mitchellii</i>		C	NL
Poaceae	<i>Panicum robustum</i>		C	NL
Poaceae	<i>Paspalidium gausum</i>		C	NL
Poaceae	<i>Phragmites australis</i>		c	NL
Poaceae	<i>Setaria oplismenoides</i>		C	NL
Poaceae	<i>Sporobolus sessilis</i>		C	NL
Poaceae	<i>Thuarea involuta</i>	Tropical beachgrass	C	NL
Polygonaceae	<i>Persicaria barbata</i>		C	NL
Polypodiaceae	<i>Drynaria rigidula</i>		SL	NL
Polypodiaceae	<i>Drynaria sparsisora</i>		SL	NL
Polypodiaceae	<i>Microsorium punctatum</i>		SL	NL
Polypodiaceae	<i>Platynerium bifurcatum</i>		SL	NL
Proteaceae	<i>Banksia integrifolia</i> subsp. <i>compar</i>		C	NL
Pteridaceae	<i>Adiantum hispidulum</i>		SL	NL
Pteridaceae	<i>Doryopteris concolor</i>		SL	NL
Pteridaceae	<i>Pteris ensiformis</i>	Slender bracken	SL	NL
Pteridaceae	<i>Cheilanthes nudiusscula</i>		C	NL
Putranjivaceae	<i>Drypetes deplanchei</i>		C	NL
Ranunculaceae	<i>Clematis glycinoides</i>		C	NL
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap tree	C	NL
Rhamnaceae	<i>Alphitonia oblata</i>		C	NL
Rhamnaceae	<i>Ventilago ecorollata</i>		C	NL
Rhizophoraceae	<i>Carallia brachiata</i>	Carallia	C	NL
Rosaceae	<i>Rubus moluccanus</i>		C	NL
Rosaceae	<i>Rubus probus</i>		C	NL
Rubiaceae	<i>Aidia racemosa</i>		C	NL
Rubiaceae	<i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i>		C	NL
Rubiaceae	<i>Ixora timorensis</i>		C	NL
Rubiaceae	<i>Larsenaikia jardinei</i>		C	NL
Rubiaceae	<i>Nauclea orientalis</i>	Leichhardt tree	C	NL
Rubiaceae	<i>Psychotria loniceroides</i>	Hairy psychotria	C	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Rubiaceae	<i>Psydrax odorata</i>		C	NL
Rubiaceae	<i>Timonius timon</i> var. <i>timon</i>		C	NL
Rutaceae	<i>Acronychia acidula</i>		C	NL
Rutaceae	<i>Acronychia laevis</i>	Glossy acronychia	C	NL
Rutaceae	<i>Bosistoa medicinalis</i>		C	NL
Rutaceae	<i>Bosistoa pentacocca</i>		C	NL
Rutaceae	<i>Flindersia schottiana</i>	Bumpy ash	C	NL
Rutaceae	<i>Geijera salicifolia</i>	Brush wilga	C	NL
Rutaceae	<i>Glycosmis trifoliata</i>		C	NL
Rutaceae	<i>Melicope elleryana</i>		C	NL
Rutaceae	<i>Melicope xanthoxyloides</i>		C	NL
Rutaceae	<i>Murraya ovatifoliolata</i>		C	NL
Rutaceae	<i>Zanthoxylum brachyacanthum</i>		C	NL
Salicaceae	<i>Scolopia braunii</i>	Flintwood	C	NL
Santalaceae	<i>Exocarpos cupressiformis</i>		C	NL
Santalaceae	<i>Exocarpos latifolius</i>		C	NL
Sapindaceae	<i>Cardiospermum grandiflorum</i>	Heart seed vine	I*	NL
Sapindaceae	<i>Alectryon connatus</i>	Grey birds-eye	C	NL
Sapindaceae	<i>Alectryon tomentosus</i>		C	NL
Sapindaceae	<i>Arytera divaricata</i>	Coogera	C	NL
Sapindaceae	<i>Atalaya rigida</i>		C	NL
Sapindaceae	<i>Cupaniopsis anacardioides</i>	Tuckeroo	C	NL
Sapindaceae	<i>Cupaniopsis foveolata</i>	Narrow-leaved tuckeroo	C	NL
Sapindaceae	<i>Cupaniopsis wadsworthii</i>		C	NL
Sapindaceae	<i>Diploglottis obovata</i>		C	NL
Sapindaceae	<i>Elatostachys bidwillii</i>		C	NL
Sapindaceae	<i>Ganophyllum falcatum</i>		C	NL
Sapindaceae	<i>Harpullia hillii</i>		C	NL
Sapindaceae	<i>Jagera pseudorhus</i> var. <i>pseudorhus</i>		C	NL
Sapindaceae	<i>Lepiderema punctulata</i>		C	NL
Sapindaceae	<i>Sarcopteryx martyana</i>		C	NL
Sapotaceae	<i>Planchonella myrsinodendron</i>		C	NL
Sapotaceae	<i>Pleioluma queenslandica</i>		C	NL
Sapotaceae	<i>Sersalisia sericea</i>		C	NL
Simaroubaceae	<i>Ailanthus triphysa</i>	White siris	C	NL
Simaroubaceae	<i>Brucea javanica</i>		C	NL
Smilacaceae	<i>Smilax australis</i>	Barbed-wire vine	C	NL
Smilacaceae	<i>Smilax glycyphylla</i>	Barbed-wire vine	C	NL
Solanaceae	<i>Capsicum annuum</i>		I*	NL
Solanaceae	<i>Datura stramonium</i>		I*	NL

Family	Scientific Name	Common Name	Status NCA ¹	Status EPBC ²
Solanaceae	<i>Petunia axillaris</i>		I*	NL
Solanaceae	<i>Physalis peruviana</i>		I*	NL
Solanaceae	<i>Physalis pubescens</i>		I*	NL
Solanaceae	<i>Solanum americanum</i>		I*	NL
Solanaceae	<i>Solanum seafortianum</i>	Brazilian nightshade	I*	NL
Solanaceae	<i>Solanum torvum</i>	Devil's fig	I*	NL
Solanaceae	<i>Duboisia myoporoides</i>		C	NL
Solanaceae	<i>Lycianthes shanesii</i>		C	NL
Sparrmanniaceae	<i>Grewia australis</i>		C	NL
Sparrmanniaceae	<i>Grewia oxyphylla</i>		C	NL
Sterculiaceae	<i>Brachychiton acerifolius</i>	Flame tree	SL	NL
Sterculiaceae	<i>Brachychiton compactus</i>		NT	NL
Sterculiaceae	<i>Argyrodendron actinophyllum</i>		C	NL
Sterculiaceae	<i>Argyrodendron polyandrum</i>	Brown tulip oak	C	NL
Sterculiaceae	<i>Argyrodendron</i> sp. (Whitsundays)		C	NL
Sterculiaceae	<i>Sterculia quadrifida</i>	Peanut tree	C	NL
Tectariaceae	<i>Tectaria confluens</i>		C	NL
Thymelaeaceae	<i>Pimelea latifolia</i>		C	NL
Ulmaceae	<i>Trema tomentosa</i>		C	NL
Ulmaceae	<i>Trema tomentosa</i> var. <i>aspera</i>		C	NL
Urticaceae	<i>Dendrocnide moroides</i>	Gympie stinger	C	NL
Urticaceae	<i>Dendrocnide photiniphylla</i>	Shiny-leaved stinging tree	C	NL
Urticaceae	<i>Pipturus argenteus</i>	White nettle	C	NL
Verbenaceae	<i>Lantana camara</i>	Lantana	I*	NL
Verbenaceae	<i>Stachytarpheta cayennensis</i>		I*	NL
Verbenaceae	<i>Stachytarpheta jamaicensis</i>		I*	NL
Verbenaceae	<i>Verbena bonariensis</i>		I*	NL
Verbenaceae	<i>Verbena litoralis</i>		I*	NL
Violaceae	<i>Viola banksii</i>		C	NL
Vitaceae	<i>Cissus cardiophylla</i>		C	NL
Vitaceae	<i>Cissus hastata</i>		C	NL
Vitaceae	<i>Cissus oblonga</i>		C	NL
Vitaceae	<i>Clematicissus opaca</i>		C	NL
Vitaceae	<i>Leea novoguineensis</i>		C	NL
Vitaceae	<i>Tetrastigma thorsborneorum</i>		C	NL
Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>		SL	NL
Zingiberaceae	<i>Alpinia caerulea</i>		C	NL

¹NCA Status – Nature Conservation Act (1992) Status. LC – Least Concern, SL – Special Least Concern, NT – Near Threatened, V – Vulnerable, E – Endangered, CR – Critically Endangered, I* - Introduced.

²EPBC Status – Environment Protection and Biodiversity Conservation Act (1999) Status. V – Vulnerable, E – Endangered, CE – Critically Endangered, NL – Not Listed, M – Migratory, Ma - Marine.

APPENDIX C – WHITSUNDAY TRAILS CONCEPT PLAN (DIRTART, 2020)



Whitsunday Trails Concept Plan

Client- Whitsunday Regional Council (WRC)

November 2020



DIRTART

WORLD LEADERS IN TRAILS

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1 Document Overview

Version	Date	Author	Notes
Draft 1	30 th June 2020	Simon French	Internal use only
Draft 2	23 rd July 2020	Jason Lam	Internal use only
Draft 3	3 rd September 2020	Jason Lam	Internal use only
Final Draft	16 th October 2020	Jason Lam	Internal use only
Final Report	12 th November 2020	Simon French	For release

2 Executive Summary

Dirt Art has been engaged by the Whitsunday Regional Council (WRC) to develop a mountain bike trail concept plan for the region. The purpose of the plan is to explore the potential for development of a nationally-significant mountain bike destination in the WRC area. The project aims to invigorate the tourism industry, particularly during the current shoulder and off seasons. The project will also play an important role in assisting the region's economic recovery following the COVID-19 pandemic.

The Whitsundays area has a strong tourism industry, which until recent COVID-19 disruptions attracted visitors from across Australia and around the world. The existing visitor market is largely motivated by the beaches, islands and reef, along with the warm climate. The current tourism industry is largely seasonal, with the majority of visitors traveling to the area between the months of April and November, with the wet season seeing comparatively lower visitation.

The past five years has seen exponential growth in destination-focused trail development across Australia. Developments such as Blue Derby, Maydena Bike Park and Thredbo Resort are bringing tens of thousands of visiting riders to mountain bike destinations each year and delivering tens of millions of dollars in annual economic impact. During this period, trail design and construction, along with bike technology advancements has fed a rapidly evolving mountain bike market, which has significantly changed rider behaviours.

Over the past several years, the sport of mountain bike riding has continued to experience exponential growth across the world, including significant growth in mountain bike tourism across Australia. Despite this growth, formal mountain bike infrastructure development has failed to keep up with demand, resulting in many riders turning to informal trail development as a way of accessing the volume and style of trails they wish to ride close to their home. When compared to many other states, Queensland has a limited mountain bike destination market, with limited large-scale formal mountain bike destinations operational in the state.

The target area has strong potential for development as a mountain bike trail destination. Key strengths of the area include;

- Location: proximal to the major tourist town of Airlie Beach, major airports and other attractions
- Climate: the local climate is appealing for year-round riding
- Coastal location: the coastal location of the area will appeal to visiting riders
- Topography, terrain and elevation: the target area has generally moderate slopes and good elevation opportunities
- Urban infrastructure: the target area provides strong connectivity into townships for a genuine ride-in, ride-out opportunities
- Soil type: the acid to intermediate volcanic rocks in the target area provide excellent year-round riding potential and wear characteristics

- Strong existing tourist market: the area already receives significant visitation, proving good potential for complementary rider markets

The new trail developments proposed by *Dirt Art* aim to achieve the following high-level strategic objectives;

- Maximise visitation potential across a range of rider markets
- Cater to the wants and needs of local riders
- Maximise economic development and business opportunities
- Minimise implementation costs and complexity
- Minimise operational costs and complexity
- Consider and allow for development staging opportunities

Dirt Art has proposed a number of new trail and infrastructure developments, including but not limited to;

- A total of 183km of new trails across the project target area
 - o Primary Trail Development Areas: 120.8km
 - o Secondary Trail Development Areas: 62.5km
- Major entry hub
- Pump Track

The new proposed developments will provide strong appeal for visiting riders, as well as catering to the wants and needs of local and regional riders. Catering for a broad cross section of riders, the project has a strong focus on intermediate riders.

The proposed primary trail concept capitalises on over 440m of vertical elevation opportunity, directly behind the town of Airlie Beach. A large network of proposed trails will cater for riders of all abilities, through a world-class trail network of genuine national significance. The proposed trail network includes an iconic network of trails on South Molle Island, providing a very unique tropical island riding experience.

The proposed secondary trail concept covers areas such as Collinsville, Bowen, Dingo Beach, and Lake Proserpine. These trail zones complement the primary proposed mountain bike trail zone proposed at Airlie Beach and South Molle Island.

The project will have a significant impact on the local and regional economy, with an anticipated year-one total ride days/visitors of 20,000, and a year-one indirect economic impact of over \$6.7m. The project will create approximately 10 new jobs during construction and is expected to create 15FTE new jobs once operational, across an anticipated 4+ new mountain bike-specific businesses.

The Whitsundays MTB Project offers a very strong opportunity for development as one of Australia's leading mountain bike destinations. A stunning coastline, excellent elevation opportunity, and the conveniences of a major tourist centre, the project will have strong appeal for visitors from across Australia and around the world.

3 Introduction

3.1 Project Overview

Dirt Art has been engaged by the WRC to develop a trails concept plan ('the plan') that will guide the development of a major mountain bike trail network within the local municipality.

The plan has a strong tourism and economic development focus, with the view to utilising mountain biking as a major component of the economic revival of the region post COVID-19, and to address the seasonal fluctuations in current visitor markets.

3.2 Key Objectives

The key objective of this project is to develop a mountain bike plan that;

- Defines the key strengths of the target area as a mountain bike destination
- Positions the project within the broader mountain bike destination industry
- Considers the social and community values of the target area
- Is environmentally sensitive and sustainable
- Provides cost-effective construction conditions
- Minimises land tenure complexity, and streamlines assessments and statutory approvals
- Maximises direct and indirect economic opportunities and benefits
- Provides maximal community benefit and engagement
- Provides a clear pathway for pursuing the project through to construction and operation

3.3 Methodology

The project has engaged the following methodology;

3.3.1 Literature Review

A summary of all reports and relevant literature reviewed can be found at **4.2**.

3.3.2 Consultation

Dirt Art has undertaken significant consultation through the project. A list of groups, organisations and individuals consulted with can be found below. A detailed consultation summary can be found at **Section 10**.

3.3.3 Field investigation

Dirt Art undertook field investigations for the project in October 2020.

3.3.4 Concept trail development

Using a comprehensive opportunities and gap analysis, a number of concept trail alignments have been prepared for future potential trails. These alignments aim to address key network gaps, as well as opportunities for establishment of high-quality trail experiences. Concept trail alignments have been developed in areas that provide the lowest possible conflicts with environmental, historical and cultural values.

3.3.5 Detailed trail design

Detailed trail design does not form part of this project.

4 Background Analysis

4.1 Overview

Dirt Art has undertaken a comprehensive background analysis for the project. This analysis has included review of a wide range of existing documents, plans and survey data.

4.2 Previous Reports

4.2.1 Queensland MTB Strategy 2018

Report title	Queensland MTB Strategy 2018
Author/s	Common Ground Trails
Date	2018

In 2018 a mountain bike strategy for the state of Queensland was developed for the Queensland Government by Common Ground Trails, contracted by Mountain Bike Australia (MTBA).

The report considers a range of 'regions' for prioritised development, with the Mackay region prioritised as 'high' and the Whitsundays region prioritised as 'low'. The rationale for this prioritisation is a multi-factor analysis, including criteria such as scale, opportunity and deliverability. Given the extensive state-wide scope of the project, it can reasonably be assumed that consultants did not consider the true potential for each region beyond a high-level analysis. Notably the report does state that the Whitsundays region should potentially be considered part of another region such as Mackay. *Dirt Art* do not support the lower prioritisation of the Whitsundays region, and believe the area has significant potential for development as a nationally-significant destination.

4.2.2 Mackay Regional MTB Strategy 2018

Report title	Mackay Regional MTB Strategy
Author/s	Otium/World Trail
Date	February 2019

In 2019, the Mackay Regional Council (MRC) commissioned Otium to develop a regional mountain bike strategy. The aim of the strategy was to investigate potential to develop a significant mountain. Bike destination, housing at least 50-100km of trails, which would encourage multi-day visitation. The top priority noted in the strategy is the development of the Eungella/Finch Hatton Trail Town Project, which aims to capitalise on a significant elevation opportunity between the two inland towns.

The strategy provides a significant opportunity to work collaboratively with the Whitsundays project to develop a regionally consistent development across both municipal areas. There is a high likelihood that riders will visit both areas.

5 The Mountain Bike Market Overview

5.1 The Mountain Bike Market - National and Local

5.1.1 Overview

The following market profile draws upon research and anecdotal observations from a range of sources. The information draws heavily upon the Australian Mountain Bike Market Profile Survey, undertaken by *Dirt Art* in 2014, 2016 and 2018.

5.1.2 History

Mountain biking has been well established in Australia since the early 90's, though the sport really began to prosper in the mid-late 90's, which saw a period of some of the first purpose-built mountain bike infrastructure in Australia. In 2004 some of Australia's first large-scale mountain bike parks were developed, namely Glenorchy Mountain Bike Park in Tasmania and Mount Stromlo in Canberra. Prior to these developments, mountain biking was taking place largely on existing walking trails and on informal trails created by the riders themselves.

Between 2005 and present day there have been significant advances in mountain bike technology, which is contributing to defining the type of riding experience achievable for and desired by riders. While some trends in riding have come and gone, the disciplines of downhill and cross-country have remained albeit with some blurring between these styles of riding with the emergence of the all-mountain bicycle.

5.1.3 Current market

The current mountain bike market is dominated by longer travel, dual suspension mountain bikes, broadly referred to as all-mountain, trail, or enduro bicycles. This style of bike is incredibly capable at both climbing and descending and has effectively increased the capability of the average rider.

Currently riders are seeking a broad range of experiences from local urban and peri-urban trails through to remote wilderness-style longer distance riding experiences. Generally speaking, the mountain bike tourist market is seeking these destinations and adventure experiences in more remote natural environments, involving longer distance loops or point-to-point trails. Trails proximate to urban areas are typically most popular with local riders because of their accessibility and convenience, though may be ridden by visitors drawn to an area for other experiences.

Research indicates that the current demographic of riders is predominately male, with an age of 25-45 years and a high disposable income.¹ This market is a key target for tourism as they are seeking longer, destination-based' stays and typically seek out high quality dining and accommodation options.

5.1.4 Current participation and economic data- Australia

Current participation data for mountain biking in Australia is distinctly lacking due, in the main, to the nature of the activity itself. However, as new commercial venues emerge more data is becoming available. Traditionally the recording of trail usage numbers has been a relatively rare practice, though in a current climate often characterised by particularly frugal government and corporate investment this practice is increasingly being used to justify investment in trails. Sample data from some of Australia's key mountain bike destinations can be found below;

Maydena Bike Park (Tasmania) Maydena Bike Park is Australia's largest gravity-focused bike park, with 75+km of trails suiting a predominantly enduro market. The park has hosted 25,000 uplift days and brought an estimate total 30,000 visitors to the town in its first year of operation. With a broadening focus towards trail-based riding and beginner friendly trails, visitation at the park is likely to increase significantly through later years.

Blue Derby (Tasmania) Blue Derby is Australia's highest profile mountain bike trail destination, with a focus on intermediate trail riding with limited up-lift opportunities. Derby has been in operation for close to 5 years, and reportedly hosted over 30,000 riders in 2018. The town is seeing a dramatic transformation, with several new business opening across tour, retail and food and beverage sectors.

Mount Buller (Victoria) have invested over \$2m over a four-year period in developing predominantly all-mountain and cross-country mountain bike trails. Data for the resort (as of June 2014) recorded a total rider count of 40,000 – 50,000 visitors over a nine-month period.²

You Yangs (Victoria) have recorded rider numbers of approximately 150,000 per annum in 2011, though a higher true count is expected due to the various entry points used for the park.³

¹ Koepke, J. (2005) Exploring the Market Potential for Yukon Mountain Bike Tourism, Cycling Association of Yukon, Canada, page 5.

² September to May, private communication

³ Data provided by Parks Victoria staff July 2011.

5.1.5 Current Participation and economic data - Southern Hemisphere

Internationally, New Zealand is Australia's closest competitor in the mountain bike tourism market. While New Zealand offers a significant volume of trails, not all trails are necessarily of a world-class standard, often involving poorly constructed volunteer-built trails, fire trails and access roads to add volume to trail distances. Examples of participation in an international context can be seen below;

Rotorua (North Island) is perhaps New Zealand's most recognised and loved mountain bike destination. The 150km+ trail network is regarded around the world for its fast, flowing trails through a working pine forest. Research by APR consulting found that approximately 33% of visitors to the forest in 2007 were Australian.⁴ It was recently reported that mountain bike activity in Rotorua is generating \$10.2m per annum, as opposed to the \$4.6m (one time) in export revenue potentially generated by logging the forest.⁵

Queenstown (South Island) is one of the Southern Hemisphere's leading mountain bike destination. Queenstown has a gravity-based bike park (Skyline Queenstown), along with a number of other regional cross country and all mountain trails. The region is renowned for its iconic long-format descending trails, such as Rude Rock, Corrotown and Skippers Canyon.

A 2017 report by TRC Tourism found that mountain biking contributed over \$25m per year to the local economy.

5.1.6 Current participation and economic data - Northern Hemisphere

Whistler Mountain Bike Park (Canada) is arguably the world's most recognised mountain bike park, offering one of the highest volumes of trail in one venue anywhere in the world. The Whistler Bike Park received approximately 200,000 riders per year (through its green season), but it is estimated that a similar volume of users rides the surrounding valley trail network annually.

A 2016 report commissioned by the Whistler Off Road Cycling Association (WORCA) found that mountain biking contributed over \$79m p.a. to the regional economy of British Columbia. The report also found that over 500,000 individual rides were undertaken in the region in 2016.⁶

Park City, Utah (United States of America) offers hundreds of miles of single-track across a number of riding areas. All riding styles are catered for across public trails, and commercial gravity-based bike parks. This IMBA Gold level mountain bike destination received over 1m visits in 2014.

⁴ Recreational Use and Economic Impact of Whakarewarewa Forest (2009 Update), APR Consultants

⁵ The New Zealand Herald January 17th 2012, Bikes bring more money than wood from Rotorua forest

⁶ CSTA Economic Impact of Mountain Biking 2016

Oregon (United States of America) has a significant cycle tourism industry. Cycle tourism (predominantly mountain biking) was worth over \$400m to the state in 2013, with cycle tourist spending on average 20% more than general tourists.⁷

5.1.7 The future

5.1.7.1 General

The sport of mountain biking has continued to see sustained and exponential growth both in Australia and overseas. With current demand for high-quality riding opportunities still far exceeding supply, there exists significant potential to see excellent return on investment when developing world-class mountain bike trails and facilities.

Dirt Art suggest that the all–mountain category of riding will continue to grow, resulting in an increasing demand for more challenging, descending-focused riding. *Dirt Art* suggests that the next five years will see a huge increase in demand for chairlift or shuttle accessed descending cross–country and all–mountain trail experiences. Many of the major recent and underway mountain biking trail developments focus on these experiences (e.g. Mt Buller Epic, Hollybank Juggernaut, Blue Tier, Derby’s Black Stump Shuttle Trails, Thredbo AM Descent and Valley Trail) which are reflective of the increasing demand for this style of descending cross–country / all–mountain trail.

5.1.7.2 E-bikes

While traditional bike technology is likely to continue to stabilise, the rapid emergence of the E-bike is likely to have a significant impact on the sport. In *Dirt Art’s* view, E-bikes will never replace the traditional mountain bike, but as technology improves the bikes will become a much more common feature on the trails. E-bikes make the sport more accessible to newer and less-capable riders and increase the ride duration and the accessible elevation range for more experienced riders.

E-bikes are of particular relevance at a destination such as the Whitsundays, where there is strong potential for complementary visitor markets. These riders will benefit from E-bikes as the bikes largely remove the fitness component of the sport, making trails more accessible for many riders.

It is important to recognise the distinction in E-bikes between high-powered throttle assisted bikes and lower-powered pedal-assisted bikes. Pedal assisted bikes have no additional impacts on trails, whereas throttle powered bikes are illegal in most public areas and will cause significant additional damage to trails.

⁷ Information provided by Destination Oregon.

5.2 Mountain bike tourism

5.2.1 Mountain bike tourism markets

Tourists engaging in mountain biking can be divided into two distinct categories, the 'complementary market'; those who engage in mountain biking as a complementary activity (not as a primary motivator or sole purpose for travel), and the 'enthusiast market' those who have travelled with mountain biking being the primary or sole reason for their trip.

5.2.2 Complementary mountain bike tourism markets

Mountain bike riding as a complementary activity has risen dramatically in popularity in recent years, as the sport has moved beyond the 'extreme sport' image of the past, and more towards the accurate perception of the sport as a safe, inclusive and fun 'adventure' activity.

Complementary visitation is a key component of a successful government-backed mountain bike destination as it allows the capture of a much larger target audience, and promotes longer stays, and increased travel party size. Complementary tourists include valuable family markets, who will often stay longer and spend more than solo and small group tourists.

The emergence of mountain biking as a commercially viable complementary activity has been driven largely through the development of safer, more beginner-friendly trails, and by the growing number of commercial operators including the sport in their activity programs. Commercial viability of mountain biking as a complementary activity requires a lower volume of trail than for the enthusiast market, though the required quality and maintenance demand of trails will be higher. As a complementary activity, mountain biking offers genuine avenues for commercial return, while also potentially lengthening the duration of stay for existing guests. In addition to this, targeted marketing may draw in guests that may otherwise have travelled to an alternative location.

Successfully targeting the complementary tourism market involves careful consideration and delivery against the following key areas;

- High-quality beginner-friendly trails
- A structured progression in difficulty through trail types
- A good volume of smoother flow style trails
- Access to high-quality hire bikes
- Comprehensive and easily interpreted trail signage
- Access to a variety of formal and informal non-riding activities
- Access to a good range of accommodation and food and beverage opportunities
- High quality supporting infrastructure

The Whitsundays project has strong potential to attract complementary visitor markets, with significant general tourism already established in the area. Capitalising on this market will require development of a network of very accessible, fun trails, which strongly leverage the views and local environments.

5.2.3 Enthusiast tourist market

The enthusiast market is defined as mountain bike tourists for whom mountain biking is the primary motivator/purpose for their travel. The enthusiast market seeks out new and exciting mountain bike destinations, and typically travel multiple times annually to engage in mountain biking.

The mountain bike enthusiast market is typically populated by 25-45-year-old males with a high disposable income, who are seeking opportunities to travel to destinations with the primary purpose of going mountain bike riding.

While mountain bike riding may be the primary travel motivator, the availability of alternative activities will still influence this traveler as they will often look for destinations where they can viably travel with family, their spouse or non-enthusiast travelling companion/s.

The mountain bike enthusiast is typically travelling for multi-day stays and is seeking unique and high-quality trail experiences. These users will typically seek higher volumes of trail, as they will often ride 30-40km+ per day.

Successfully targeting the enthusiast tourism market involves careful consideration and delivery against the following key areas;

- High quality trails
- Unique and iconic environments
- Iconic signature trail experiences
- High volumes of trails
- A good supply of intermediate to advanced trails

The Whitsundays project has strong potential to attract the enthusiast rider market, with limited high-quality options located in the northern regions of Australia making the destination very appealing for riders during winter months.

6 The Queensland Mountain Bike Market

Queensland currently has limited destination mountain bike infrastructure development, with all but two destinations (Atherton Forest MTB Park and Hiddenvale Adventure Park) essentially developed with a focus on servicing a predominantly local and regional audience.

The South East of Queensland is one of the largest continuous urban developments in Australia, housing a population of approximately 3.6m people. Despite this large and growing population base, the development of high-quality riding destinations a servicing this intrastate market remains minimal.

When looking to a potential audience outside of Queensland, the state has a number of appealing attributes for the visiting rider, including but not limited to;

- Climate
- Proximity to major population areas (ease of access on eastern seaboard)
- Mountainous areas
- High quality natural environments

The state is currently lacking high-quality, destination-focused developments, providing a key opportunity to capture regional, state, national and potentially international rider visitation.

6.1 Key Destinations

6.1.1 Nerang

Location	Nerang, Queensland
Development status	Open
Trail volume	~60km (~20km formal/40km informal)
Trail types	Trail, enduro
Estimated visitation	75,000

Nerang is one of the busiest trail networks in South East Queensland, servicing a large audience of riders with a relatively minimal trail volume, which remains largely driven through volunteers.

Trail quality and consistency in the area varies greatly, and generally becomes even less consistent the further trails are away from the main entry portal at Hope Street.

A general lack of elevation (~180m maximum, but less than 90m uninterrupted) limits the potential future development of the area as a major trail destination, though the area does possess a number of areas that would facilitate high quality trail development.

6.1.2 Atherton

Location	Atherton, Queensland
Development status	Open
Trail volume	60km
Trail types	Trail, enduro
Estimated visitation	20,000

Atherton is Queensland's first and only public mountain bike destination that has been developed with a primary focus on tourism and economic development. The destination was developed as a nationally-significant trail destination, though appears to be achieving a more regional level of visitation. The reasons for this visitation result are likely; relatively generic environments and natural values, general lack of utilisation of maximum uplift opportunities, lack of trail volume.

6.1.3 Daisy Hill

Location	Daisy Hill Brisbane
Development status	Open
Trail volume	24km
Trail types	Trail, enduro
Estimated visitation	55,000

Daisy Hill is the primary trail network servicing the Greater Brisbane area, with a population of 3m. The trail network at Daisy Hill focuses on a beginner to intermediate trail riding audience and is generally lacking the style and difficulty of trails to attract a regional or state audience.

6.1.4 Boomerang Bike Park

Location	Mudgeeraba
Development status	Open
Trail volume	11km
Trail types	Downhill, jump, enduro
Estimated visitation	Uknown

Boomerang Bike Park is Queensland's most recognised gravity-focused commercial bike park. The park is open periodically on a pay-for-use basis, and also includes a commercial uplift service. The park caters for a predominantly advanced audience and is renowned for its large jump features.

6.1.5 Smithfield

Location	Smithfield, Cairns
Development status	Open
Trail volume	20km
Trail types	Trail, enduro, downhill
Estimated visitation	20,000

Smithfield MTB Park is one of Australia's original formal mountain bike destinations. The park has been developed utilising a combination of volunteer and professional construction. The network is difficult to navigate for visiting riders and suffers from inconsistencies in trail quality and grading. While offering a number of fantastic riding trails, the park lacks the trail volume and general quality to operate a state-significant level.

Further development potential at Smithfield is limited somewhat by the high value world heritage area rainforest surrounding much of the site.

6.1.6 Hiddenvale Adventure Park

Location	Grandchester
Development status	Open
Trail volume	110km
Trail types	Trail, enduro
Estimated visitation	20,000

Hiddenvale Adventure Park is one of Queensland's most recognised and high-profile commercial bike parks. Offering a mix of enduro and trail focused riding, the park also provides an uplift service for some trails.

6.1.7 Mount Joyce

Location	Wyaralong Dam, Queensland
Development status	Open
Trail volume	60km
Trail types	Enduro, trail, downhill
Estimated visitation	10,000

Mount Joyce was developed as part of the Wyaralong Dam Project and includes a large network of trails catering to a broad riding audience. The destination appears popular with local and regional riders, though does not have the trail volume, and quality, nor the ancillary facilities required to attract a state-significant audience

6.2 Proposed Destinations

6.2.1 Mackay Mountain Bike Trails Project

A large mountain bike trail destination proposing over 100km of new trails is being pursued in the Mackay region. Located in the Eungella region, the project aims to invigorate small towns with a large trail network, with approximately 800m available elevation.

The project has strong council support and is current progressing through the design and approvals phase.

7 Defining Mountain Bike Destinations

7.1 Overview

Mountain biking has been driving visitation into small regional areas for several years now, though the focus on mountain biking as an effective driver of tourism and economic development is relatively new. Destinations such as Blue Derby (Tasmania) have proven that small towns can be reinvigorated with mountain biking spearheading this change.

The below hierarchy has been developed by *Dirt Art* to assist in positioning trail developments to an appropriate audience, providing clarity on funding and operational models for land managers.

Notably, the benchmarks for mountain bike destinations is not a static or quantitative measure and will be affected by regional nuances along with a range of other factors. Also, of note, with some \$100m+ set to be invested in mountain bike trail development across the next 2-3 years, the benchmark is set to increase.

Dirt Art suggest recognition of the following key considerations;

- Trail quality will always be more important than trail quantity
- Gravity-based trail networks are a rarer commodity and as such, the benchmarks for these trail destinations is lower
- Travelling riders have a strong preference for riding in high-quality natural environments
- Elevation opportunities are extremely important, and often provide an insurmountable point-of-difference against other more urban trail opportunities

7.2 Nationally-Significant Destination

The idea of a nationally-significant mountain bike destination is relatively new, with the first destinations notionally meeting this benchmark only in the past three years. A nationally-significant mountain bike destination generally possesses the following key characteristics;

- 80+km trail volume
- Trails catering for green circle to double black diamond difficulty
- Capacity to host national and/or world-level events
- High-quality, comprehensive trail signage system
- A high-quality entry gateway (quality signage, pump track etc.)
- 300m+ elevation opportunity
- Uplift opportunity
- Very high-quality natural environments
- A local bike store/s
- A minimum of two market-appropriate food outlets within 10 min drive from trails
- Market-appropriate accommodation meeting supply demands during peak season

- A funded formal trail maintenance program with specific, trained human resources

7.3 State-Significant Destination

State-significant trail destinations cater for an intrastate audience, though notably will generally attract national visitation, particularly when other regional or other high-quality trail opportunities are available nearby. A regionally-significant mountain bike destination generally possesses the following key characteristics;

- 50+km trail volume
- Capacity to host national or regional level events
- Uplift opportunity
- Trails catering for green circle to black diamond difficulty
- High-quality, comprehensive trail signage system
- 200m+ elevation opportunity
- Good quality natural environments

7.4 Regionally-Significant Destination

Regionally-significant trail destinations cater for a more regionally-focused audience, though notably will generally attract national visitation, particularly when other regional or other high-quality trail opportunities are available nearby. A regionally-significant mountain bike destination generally possesses the following key characteristics;

- 20+km trail volume
- Capacity to regional level events
- Trails catering for green circle to black diamond difficulty
- High-quality, comprehensive trail signage system
- 100m+ elevation opportunity

7.5 Local-Level Destination

A local-level mountain bike destination services a smaller, local market, and will generally hold low appeal for visiting riders. These destinations are generally constructed utilising primarily local volunteer labour. A locally-significant mountain bike destination generally possesses the following key characteristics;

- <20km of trails
- Capacity to hold local-level (club) events
- A functional signage system

8 Defining the Whitsundays Region as a Mountain Bike Destination

8.1 Overview

The Whitsundays area has strong potential for the establishment of a mountain bike destination of national-level significance. Excellent topography and terrain characteristics, a coastal location and appealing climate, along with proximity to popular tourist towns contribute strongly to the appeal of the destination for mountain bike riding. With thousands of Australia's traveling to the northern hemisphere each winter, there is significant potential for Airlie Beach to become a destination of choice for many in this visitor market. With COVID-19 creating an even stronger focus on domestic tourism, there is a particularly strong opportunity for the region to become a mountain bike holiday destination of choice during the autumn to spring period.

The below report section will detail the opportunity for mountain biking in the area.

8.2 Current Trails Situation

There is currently minimal mountain bike trail infrastructure in the region, with the nearest larger trail network located in Mackay, which has a trail network across multiple areas of approximately 20km. Mountain bikes are able to utilise some trails in QPWS land nearby to Airlie Beach, though no purpose-built trails are available.

There are currently no trail destinations in the region that conflict or compete with the project.

8.3 Current Tourism Situation

In March 2017 Tropical Cyclone Debby caused significant damage to areas of North Queensland, with the Whitsundays the hardest hit region. In 2019 domestic tourism visitation numbers have for the first time surpassed tourism numbers seen prior to the cyclone event.

As at December 2019, the Whitsundays region saw 631,000 annual domestic visitors, with the interstate market representing 63% of these visitors. The area saw international visitation of 220,000 through 2019, which represents a 5.9% decline on 2018 visitation numbers.

In recent months the tourism industry in the region has been severely impacted by the COVID-19 pandemic, with the industry essentially completely closed for several months, and only opening up to a limited domestic market in July 2020. At the time of completing this draft report, the Queensland border remains effectively closed to residents of Victoria and parts of New South Wales. Tasmanian and Western Australian visitation is also

severely impacted due to the states' policies around returning visitors from mainland Australia.

Despite the disruptions caused by TC Debby and more recently COVID-19, the Whitsundays region has a very strong tourism industry, which will act as an excellent platform to launch the Whitsundays mountain bike project. The mountain bike project will also act as a significant drive for new tourist markets, with a strong domestic tourism focus. Importantly, the project is not reliant on international tourists, with international visitation estimates of <10% expected.

8.4 Key Strengths

The target area offers strong potential for mountain bike destination development, with the following key strengths;

8.4.1 Destination Location

The target area is located in North Queensland, a popular holiday destination, with particularly strong existing visitation during the winter months. The location offers a wide range of tourism amenities and activities, with a strong focus on aquatic activities.

Notwithstanding current COVID-19 airline flight schedule reductions, Airlie Beach is typically easily accessed via flights to Whitsunday Coast Airport, Mackay Airport or Hamilton Island Airport. Pre COVID-19 direct flights were available from Brisbane, Sydney and Melbourne.

At the time of preparing this draft report, airlines have begun adding additional flight capacity back into the Whitsundays region.

8.4.2 Coastal Location

The Whitsundays region is renowned for its coastal location, stunning islands, beaches and the Great Barrier Reef. *Dirt Art* believes it is important to leverage the coastal reputation of the region with the proposed trail network, by locating the proposed trails directly adjacent to the coast. This coastal positioning also provides a key point-of-difference from the major proposed trail network at Mackay (Eungella), which is located an hour inland from the coast. Australia has a distinct lack of major coastal mountain bike destinations, which will significantly add to the appeal of this project for an interstate audience.

8.4.3 Elevation Opportunity

The target area has a strong elevation opportunity, with 440m uninterrupted vertical elevation available. In an Australian context this is greater elevation opportunity than many leading mountain bike trail destinations, with Maydena Bike Park and Thredbo Resort the only major destinations with greater elevation opportunity (820m and 600m respectively).

This elevation will provide for uninterrupted descending trails up to 9-10km in length, along with significant climbing and trail riding opportunities.

8.4.4 Climate

The climate in the Whitsundays is suitable for year-round riding. While the wet season does typically result in periods of heavy rainfall, the local soil will allow for year-round riding.

The majority of Australia's leading mountain bike destinations are located in the southern parts of Australia and/or in alpine areas, making them unappealing or unfeasible during winter months. There is a significant opportunity to establish a year-round riding destination in the Whitsundays, with a focus on winter mountain bike tourism. This opportunity is stronger due to the COVID-19 pandemic, with the possibility of international travel to the Northern Hemisphere not currently available.

8.4.5 Urban Infrastructure

The proposed location of the trail network is directly behind the township of Airlie Beach, providing genuine ride in/ride out potential. The location of the trail network proximal to the town maximises economic opportunities, while creating an optimal experience for visitors. Airlie Beach is a major tourist town, with the majority of the required services and amenities in place. While there is no bike shop in place, it is anticipated that the market will respond to this issue very quickly.

The target area provides strong connectivity into the township of Airlie Beach and surrounding areas. This area is already strongly geared towards the tourist market, with a range of accommodation, hospitality and related businesses already in place.

Notably, some new urban infrastructure developments will assist in supporting the project, including but not limited to;

- Bike parking/racks
- Drinking water stations
- Urban cycle paths

8.4.6 Soil type

The predominant soil type throughout the proposed trail network is acid to intermediate volcanic rocks. This material will provide for excellent year-round riding potential, while also providing low maintenance needs.

8.4.7 Regional positioning

The project is positioned very well regionally, with no competition in the surrounding area. While there are other riding opportunities in the surrounding area, none possess the key strengths of the Whitsundays project.

The project will provide a different riding experience to the trail. Network proposed at Mackay, which is notably located a 2-hour drive from Airlie Beach. The location of the two projects creates a strong regional opportunity, with enough distance between destinations to avoid competition.

8.5 Key Weaknesses

The following are key weaknesses of the project. *Dirt Art* has worked to offset these weaknesses by leveraging the strengths and competitive advantages of the project.

8.5.1 Wet Season Attractiveness

The region will undoubtedly have stronger appeal for visitors during the winter months, as is the case with general tourism in the Whitsundays. Unlike aquatic-based activities, the mountain bike trail network will still provide a high-quality experience during the wet season. *Dirt Art* has worked to ensure that the trail network maximises the potential for year-round riding.

8.6 Key Opportunities

The project has a number of key opportunities, which relate to the landscape, infrastructure and mountain bike destination market. These key opportunities have provided the basis for developing the concept designs for the trail network.

8.6.1 Uplift Opportunity

The proposed trail network has strong potential for uplift-assisted riding. While there is no access road all the way to the summit of the trail network yet, a road exists partially up the desired route. A route to the summit could be established as part of the project (subject to approvals).

It is understood that a private developer has plans in place to develop a gondola system in the area, which would be well-suited to uplifting riders.

8.6.2 High Quality Trail Riding

The area provides excellent potential for high-quality trail and enduro riding. The rolling hills and high-quality soils will allow for establishment of highly-enjoyable network of trails that cater to a trail and enduro audience. The natural topography is conducive to creating

trails of interest and unique in respects to the development area's proximity to the coastline.

8.6.3 Family-friendly Riding Opportunities

The proposed trail network offers a number of opportunities for family and beginner-friendly mountain bike riding. The proposed trail network includes an opportunity to travel by boat to South Molle Island, where a large beginner trail loop is proposed, circumnavigating the whole island. This particular trail will have very strong appeal with complementary visitor markets as an iconic day trip.

8.7 Key Potential Threats

8.7.1 Mackay MTB Trail Destination

A large-scale destination-focused trail network has been proposed at Mackay, by the MAD Mountain Bike Club.

While the proposed trail network at Mackay may be seen as a potential threat, in reality there is significant potential to view the project as complimentary to the Whitsunday trail project. If developed appropriately, there is significant potential for both projects work together to create an appealing regional mountain bike destination.

8.7.2 Wangetti Trail

The Wangetti Trail is a ~100km trail project stretching from Palm Beach in Cairns through to Port Douglas. Works are intended to begin on the trail late 2020. The trail provides a beginner-friendly point-to-point ride and offers a very different experience to that proposed by this project. *Dirt Art* do not see the Wangetti Project as a threat to this project.

8.7.3 Gladstone and Curtis Island

Gladstone has a relatively small mountain bike facility in operation, with approximately 26km of trails. The current trail area lacks any significant elevation or quality environments that would entice significant out of area visitation.

Curtis Island off the coast of Gladstone has an existing network of shared-use trails, with a further 20km of trails set to be added to the network within the next several months. The project features relatively minimal elevation, and a different style of riding, which is not perceived as a threat to this project.

8.7.4 Rockhampton

Rockhampton has an established mountain bike trail network located at First Turkey Reserve. The current trail network features approximately 35km of trails, and 200m of vertical elevation. While there are some high-quality trails in the network, the destination currently features minimal elevation and lacks iconic environments or viewpoints that will provide strong appeal to visiting riders. While there is plans to develop trails featuring a greater elevation range, the destination lacks many of the key positive attributes of the Whitsundays trail project.

9 Site Analysis

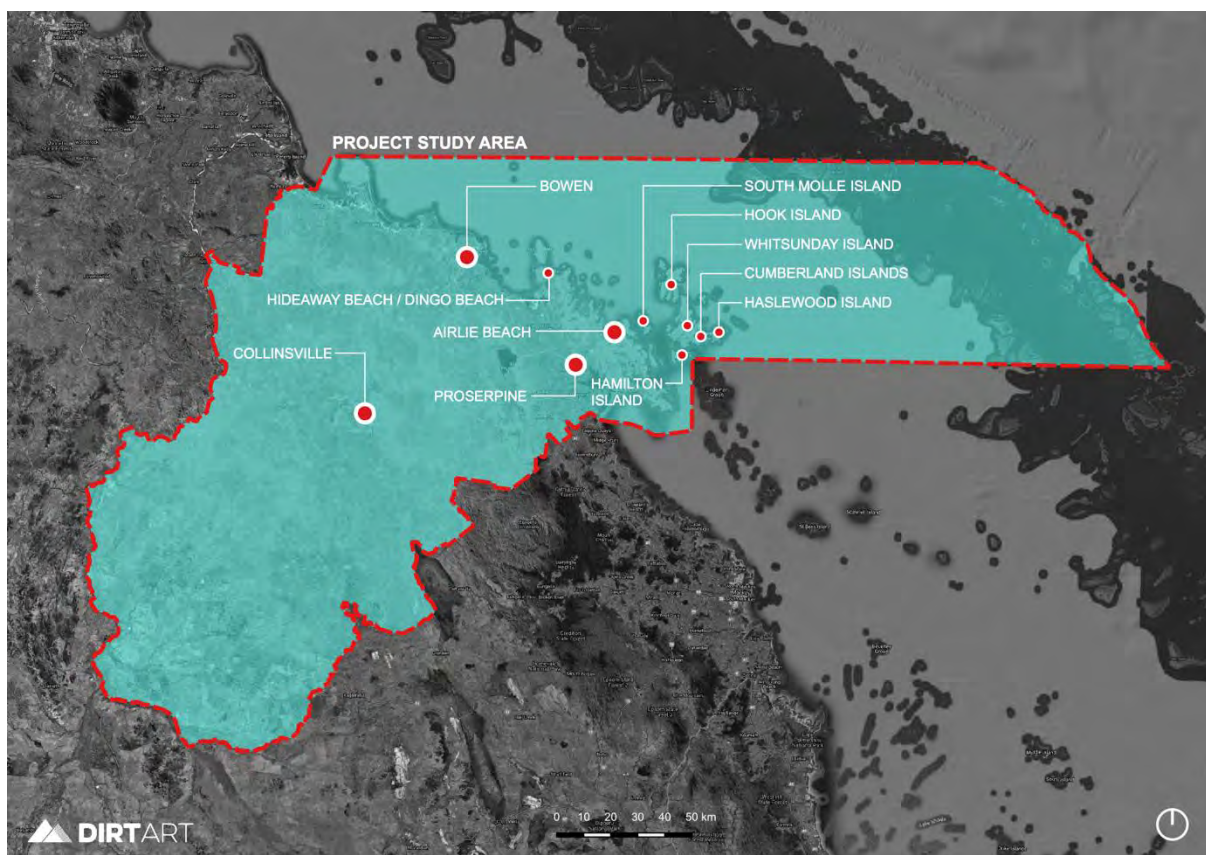
9.1 Location

Dirt Art utilised the entire Whitsundays Regional Council municipal area as a target area for the project. An overview of this area can be found below. The final project locations have been determined following extensive analysis of the entire municipality; detail of this process can be found in Section 9.2 below.

Areas identified for proposed trail development are listed below:

- Primary Areas:
 - Airlie Beach
 - South Molle Island
- Secondary Areas:
 - Bowen
 - Collinsville
 - Hideaway Bay / Dingo Beach
 - Lake Proserpine

9.1.1 Location Map



9.2 Land Analysis

9.2.1 Overview

Dirt Art has undertaken a comprehensive land analysis for the entire WRC region. This land analysis has sought to determine the optimal trail network location, based on the following strategic objectives;

- Land tenure: a trail development area should be located on crown land, with a single management authority where possible.
- Elevation: a trail development area should provide the maximum possible elevation opportunity.
- Connectivity with town/s: a trail development area should be located directly adjacent to a town/s, providing a ride in/out opportunity. The town/s should provide the basic level of servicing required for the new visitor market.
- Coastal location: the trail development area should capitalise on the coastal opportunity provided by the region, providing coastal views and potential beach connections.
- Soil type and geology: the trail development area should feature a geology that provides for high quality trails and minimal ongoing maintenance.

While the municipal area has a number of sites possessing significant elevation opportunities, these areas are generally located in extremely remote areas, with no serviceable town within riding distance.

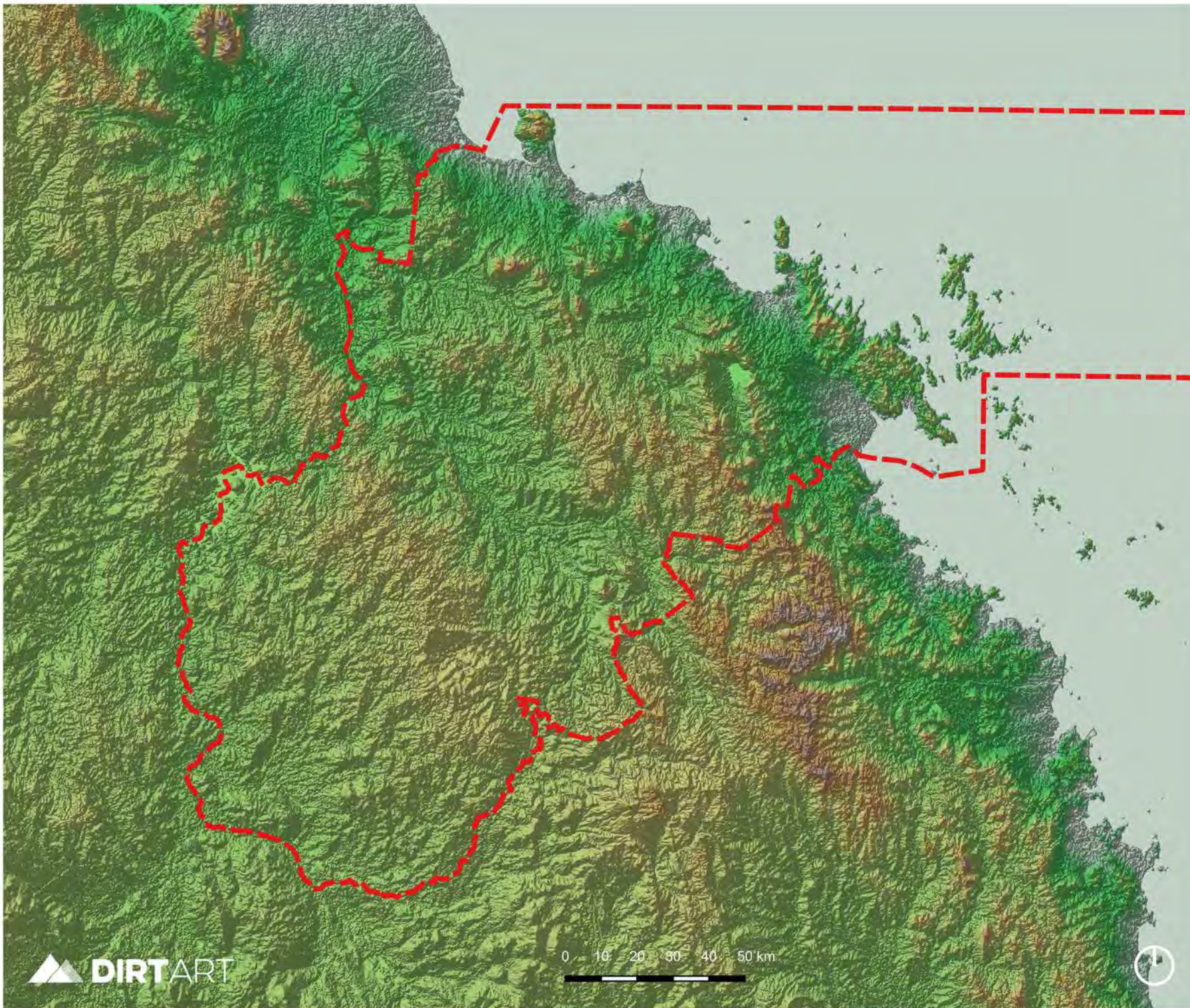
Dirt Art has proposed a land area that delivers potential for high quality trails, that offer a world-class visitor experience, while maximising tourism and economic development opportunities.

An overview of the elevation opportunities in the region can be found over the page.

Whitsunday Trails Concept Plan

STUDY AREA -
TERRAIN MAP

16.10.20



9.2.2 Suggested Development Area

The preferred primary development area is located to the west of Airlie Beach. While a number of smaller, more regional towns were considered, none possessed the combination of existing infrastructure, elevation opportunity and coastal location offered by the preferred target area.

The proposed primary development area features an elevation opportunity of over 440m, providing excellent potential for the development of sustained climbing and descending trail opportunities.

With direct connectivity into the tourist hub of Airlie Beach, the proposed development area provides a genuine ride in/ride out experience, with the potential to bring descending trails straight into the back of the town. This opportunity allows riders to finish with a sustained descent, with their ride concluding directly in the township. The development area also offers genuine potential to create positive economic impacts to the suburbs of Cannonvale and Jubilee Pocket.

To supplement the network proposed at Airlie Beach, a beginner and family-friendly focused network is proposed on South Molle Island. The island is already a popular tourist destination with access via an established ferry service. The undulating terrain lends itself well to creating an interesting mountain bike experience.

A summary of the proposed development area can be found over the page.

9.2.3 Other Development Areas

Several smaller regional network opportunities were identified throughout the study area with proposed trail developments suggested in these cases to cater for a local demographic as well as those in neighboring areas.

The following areas are proposed for trail development:

- Bowen
- Collinsville
- Hideaway Bay / Dingo Beach
- Lake Proserpine

9.3 Topography

Average slopes	20-40%
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The lower slopes of the target area are predominantly composed of rolling hills (20-40% slopes), though higher elevations feature some steep slopes (40%+).

9.4 Geology

The geology on site is predominantly acid to intermediate volcanic rocks, which suited to mountain bike trail development. The unique soils on site will provide good potential for year round riding and will require minimal ongoing maintenance.

Areas of rock outcrops are evident across the site, particularly at higher elevations. These rocky areas are unlikely to impact the trail network negatively, and in many cases will add to the quality and diversity of the network by creating a range of natural technical trail features. Areas of bedrock will in some cases dictate the final trail alignments during the detailed design process.

9.5 Climate

Average annual rainfall	1,366mm (www.bom.gov.au)
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The target area features a subtropical climate, which typically results in a wet season between November and March. Despite the pronounced wet season, the total annual rainfall for the area is not particularly high. Winters in the area typically see temperatures average approximately 23-24 degrees, with summer temperatures averaging approximately 31-32 degrees. While humidity is typically very high during summer, the provision of a potential uplift service will assist in managing rider fatigue.

9.6 Values Analysis

The target area has a range of social, environmental and cultural values. The below report section will provide a summary and analysis of these values.

9.6.1 Natural Values

A comprehensive analysis of the natural values of the proposed development area will be undertaken during the next phase of the project.

9.6.2 Social Values

The target area has limited existing trail infrastructure in place, and as such there is limited existing use of the area. The Conway Circuit is an existing shared-use trail, which is not

proposed for inclusion into the new trails network as a formal trail offering. There is scope to provide shared-use on ascending mountain bike trails, which would significantly add to the existing use of the area.

9.6.3 Cultural Values

9.6.3.1 *Indigenous Cultural Values*

While assessments for cultural heritage values has yet to be undertaken, it is anticipated that there will be cultural values across some areas of the site. Notably, all current proposed trail alignments are conceptual only. Final trail alignments should be determined with liaison with the local indigenous community.

9.6.3.2 *European Cultural Values*

No known European cultural values have been encountered during the concept design process. Further investigation will be required during the detailed design process.

10 Consultation

10.1 Overview

Consultation for the project will be undertaken in three stages;

- Stage 1: Needs Analysis
- Stage 2: Concept Review
- Stage 3: Targeted Consultation

Needs Analysis provides context for the project, setting the tone for the development of project concepts. Concept Review is the major opportunity for a wide range of stakeholders and the broader community to provide input into the proposed master plan for the project. The final consultation stage, Targeted Consultation involves targeted consultation on more detailed aspects of the project as required.

During the development of this project, a number of groups, organisations, individuals and the broader community have been consulted with. Consultation included the below key groups;

- Community groups
- Key stakeholder groups

Consultation has been undertaken in face-to-face meetings, via phone and email, and via online survey. A summary of consultation can be found below.

10.2 Consultation Session Summary

10.2.1 Whitsunday Regional Council

Dirt Art has liaised continued to liaise with the WRC as the client for the project. WRC are strong supporters of the project and see significant potential for the trail network to drive tourism and economic development in the region.

10.2.2 Queensland Parks and Wildlife Service

As the primary land manager, QPWS will be liaised with during the next phase of the project.

10.2.3 Mackay Mountain Bike Club

Dirt Art has liaised with Mackay Mountain Bike Club to gain an understanding of the club's project in the Mackay region. The club expressed strong support for the project and see significant regional potential from both projects.

10.2.4 Stakeholder Groups

This consultation will occur during the next phase of the project.

10.2.5 Commercial operators and bike stores

This consultation will occur during the next phase of the project.

11 Existing Trails Overview

11.1 Overview

There are currently very limited existing formal trails in the area suitable for mountain bike riding. The Conway Circuit is the primary trail opportunity in the area, though appears relatively unpopular with mountain bike riders. A limited number of trails also exist but lack the volume or connectivity to make them major destinations for visiting riders.

Given the lack of appropriate existing trails, *Dirt Art* has not proposed any existing trails be incorporated into the new trails network. Rather, the proposed trail networks are listed below:

- Major Trail Network
 - Airlie Beach
 - South Molle Island

- Minor Trail Network
 - Bowen
 - Collinsville
 - Hideaway Bay / Dingo Beach
 - Lake Proserpine

12 New Development Concepts

12.1 Primary Trail Head

Dirt Art has proposed a primary trail head within the township of Airlie Beach. This trail head location provides riders with optimal connectivity into the town, while proving existing and new businesses with maximum opportunities for economic benefit.

The proposed trail head is located off Waterson Way, providing riders with direct access into and out of the Airlie Beach main street (Shute Harbour Road).

Facility	Current	New Proposed
Toilets		
Parking		
Bike wash		
Beginner trails		
Pump Track		

Pending the final design of this trail head, *Dirt Art* suggests that the addition of a pump track would be a highly-valuable addition.

Concept plans for the proposed Primary Trail Head will be developed during the next stage of the project, following further consultation.

12.2 Secondary Trail Heads

Secondary trail heads are proposed at Cannonvale and Jubilee Pocket. These are proposed as satellite entry/exit points, which will not require significant infrastructure development.

Final locations and concept plans for these trail heads will be developed during the next stage of the project, following further consultation.

12.3 Existing Trail Heads

An existing informal trailhead is currently located near Discovery Parks Airlie Beach, with access via Currawong Road. This trailhead services a short informal trail loop, which has not been included in the proposed trail concept plan. The primary reason for excluding it from the proposed concept plan is due to its distance from the main zone marked for trail development to the west due to the availability of significant elevational opportunities. The isolated location does not offer the proposed trail concept any major benefits in creating links this far to the east. Furthermore, an established residential zone sits between the existing trailhead at Discovery Parks and the proposed trail network to the west.

12.4 Proposed Primary Trail Development Areas

12.4.1 Overview

Approximately 120.8km of new trails have been proposed in the primary trail development area, which seek to address key trail network gaps, while capitalising on areas with generally low development constraints. The new proposed trails provide a diverse range of trail experiences, which cater for riders of all abilities.

New trail concepts have focused on addressing local wants and needs but have also considered the attributes required for creating trail experiences that will appeal to visiting riders.

Development budgets for all proposed new trails can be found at **Appendix 1**.

12.4.2 Key Objectives

Key objectives when analysing priority new trail developments were as follows;

1. Develop a stacked loop trail system where possible
2. Provide opportunities for a wide range of riding styles, including shuttle uplift riding
3. Increase trail diversity
4. Place trails in areas with lower environmental values
5. Place trails in areas with reduced social conflicts
6. Place trails in areas that eliminate or reduce heritage conflicts
7. Place trails in areas that provide cost effective construction conditions

12.4.3 Trail Summaries- New Trails

Green	Blue	Black	Double Black
36.5km	66.3km	16.8km	1.3km
55%	100%	25%	2%

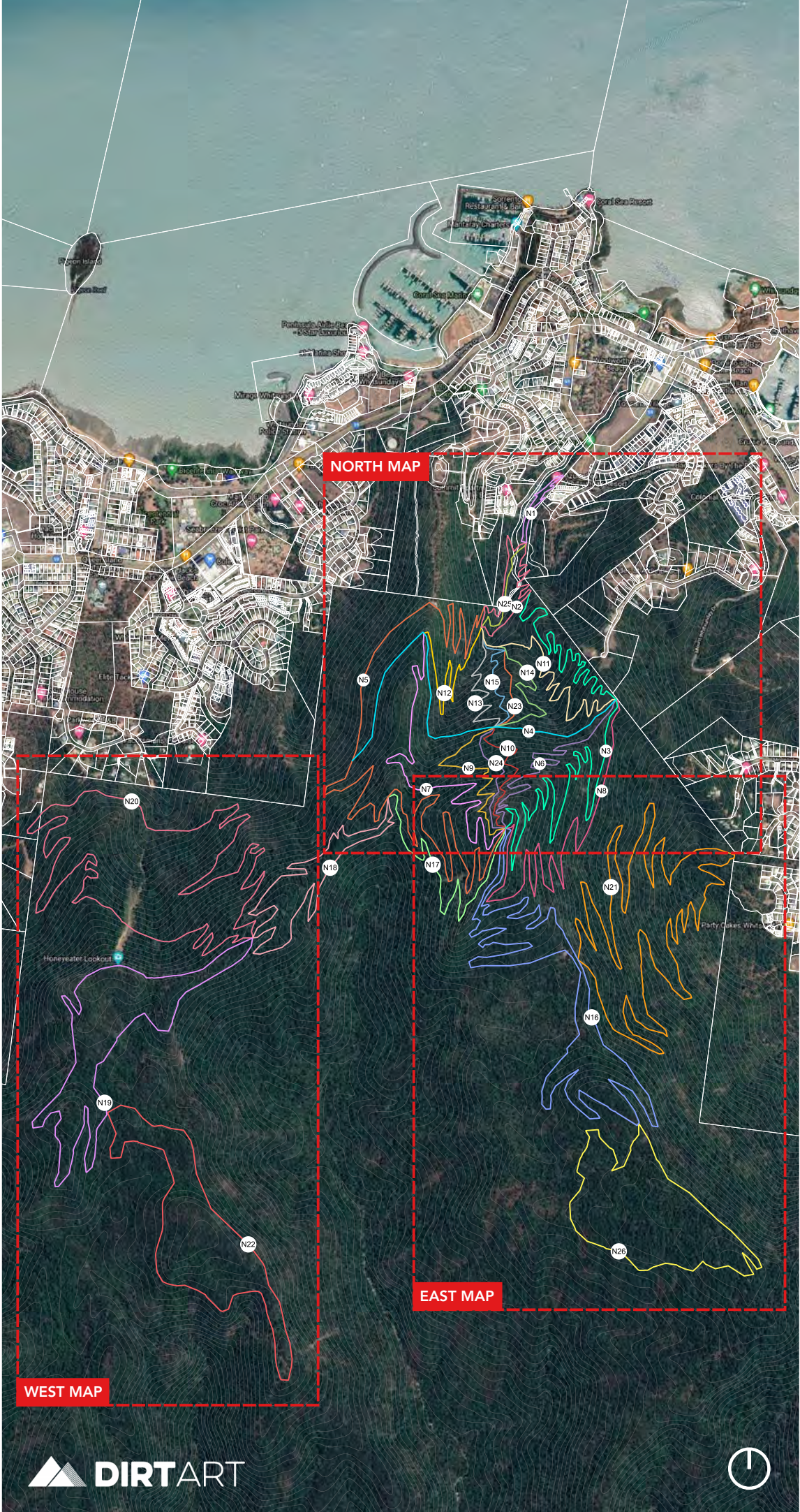
12.4.4 Proposed New Trails Maps

Trail maps for all proposed new trails can be found over the page.

Whitsunday Trails Concept Plan

TRAIL CONCEPT OVERVIEW MAP: AIRLIE BEACH

16.11.20



PROPOSED TRAILS

- N1
- N2
- N3
- N4
- N5
- N6
- N7
- N8
- N9
- N10
- N11
- N12
- N13
- N14
- N15
- N16
- N17
- N18
- N19
- N20
- N21
- N22
- N23
- N24
- N25
- N26

Existing Trails

Existing Trails

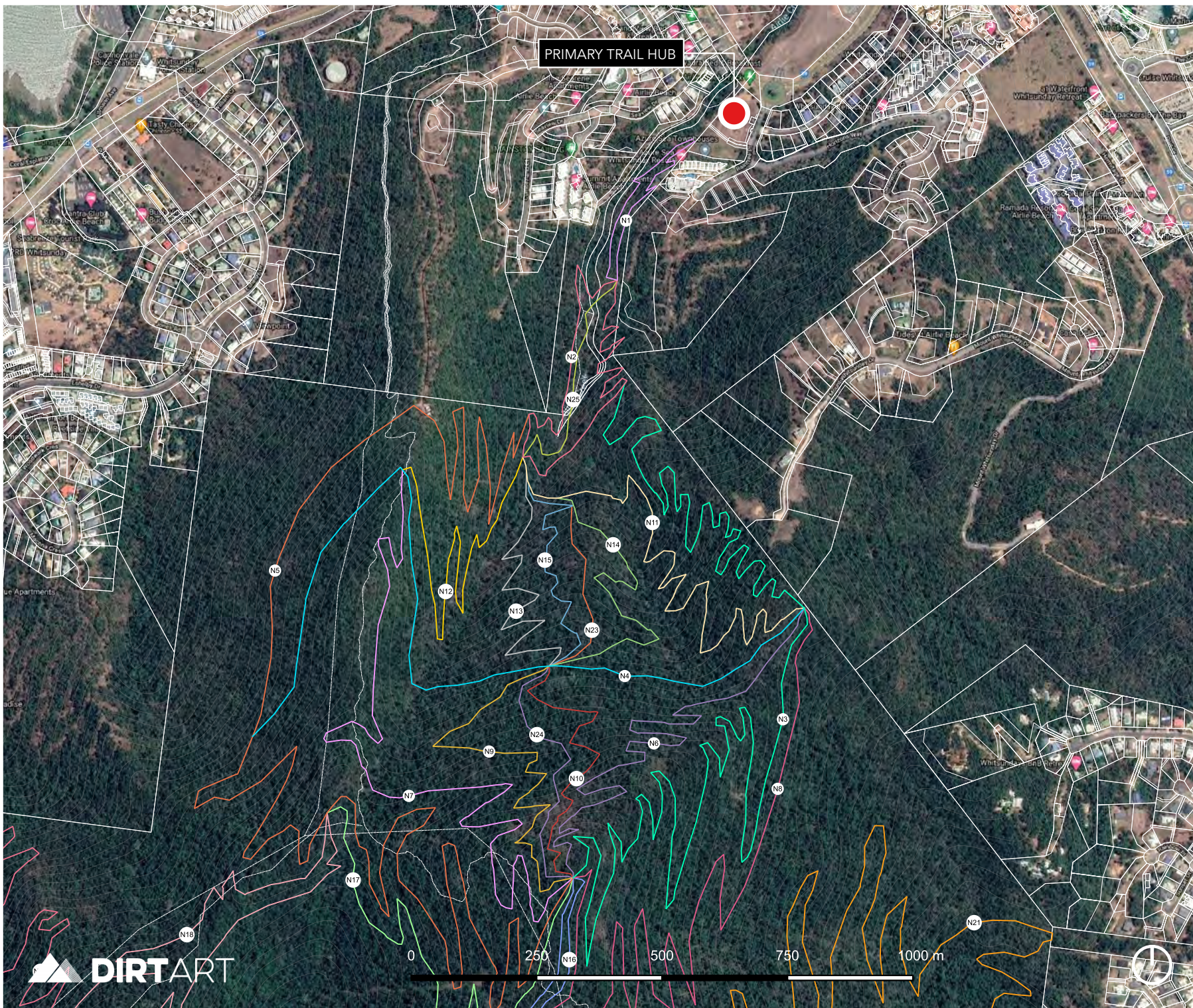
10m Contours



Whitsunday Trails Concept Plan

AIRLIE BEACH NORTH

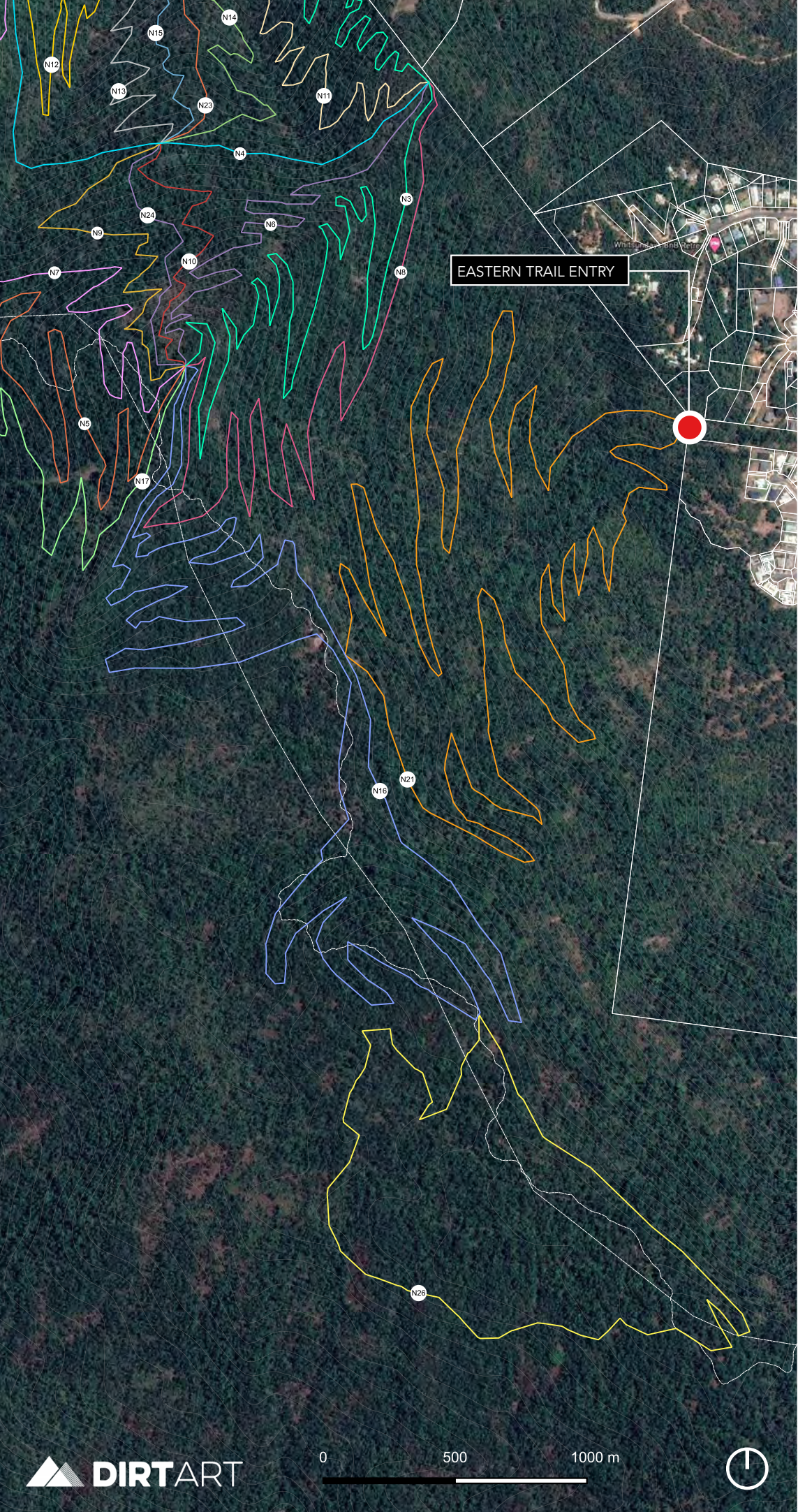
16.10.20



Whitsunday Trails Concept Plan

AIRLIE BEACH EAST

16.10.20



PROPOSED TRAILS

Airlie Beach

- N1
- N2
- N3
- N4
- N5
- N6
- N7
- N8
- N9
- N10
- N11
- N12
- N13
- N14
- N15
- N16
- N17
- N18
- N19
- N20
- N21
- N22
- N23
- N24
- N25
- N26

Existing Trails

- Existing Trails
- 10m Contours

Whitsunday Trails Concept Plan

AIRLIE BEACH WEST

16.11.20



PROPOSED TRAILS

N18

N19

N20

N22

Existing Trails

Existing Trails

10m Contours

12.5 Airlie Beach

12.5.1 Trail One

Key Stats	
Length	1,000m
TDRS	Green Circle
Construction Style	Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail One is a short introductory beginner-friendly loop. The trail features minimal elevation change and is designed to suit riders of all abilities. The short, 1km loop provides a distance that will be suitable for most rider abilities.</p> <p>A larger tread width, and gentle gradient ensure the trail will be accessible and enjoyable for all riders. Notably, the wider trail tread will also be accessible by adaptive mountain bikes.</p>	

12.5.2 Trail Two

Key Stats	
Length	2,500m
TDRS	Green Circle
Construction Style	Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail Two is designed as a gentle progression from Trail One, offering a similar loop trail format but with a greater elevation range. The trail takes riders further up the elevation range, finishing with a fun, open and flowing descent, suitable for all riding abilities.</p> <p>Notably, the wider trail tread will also be accessible by adaptive mountain bikes.</p>	

12.5.3 Trail Three

Key Stats	
Length	9,000m
TDRS	Green Circle
Construction Style	Flow
Format	Climb
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail Three is the main arterial climb through the proposed trail network. The trail offers a halfway termination point, which allows riders to form multiple loop options without ascending the full elevation range of the area. An average gradient <5% ensures that the climb will be achievable by moderately fit riders, despite its large elevation range.</p> <p>The trail has been designed to capture a range of viewpoint aspects, and features numerous breaks in elevation gain, making it achievable by moderately fit riders.</p> <p>The trail has some shared-use potential, with capacity to allow walkers if desired.</p>	

12.5.4 Trail Four

Key Stats	
Length	2,500m
TDRS	Green Circle
Construction Style	Flow
Format	Point-to-point
Width	2,000mm
Surface	Natural
Trail Overview	
<p>Trail Four is designed as an arterial contouring trail, which divides the gravity focused trails area essentially in half. The trail allows riders to maximise their riding loop and descending combinations, by creating a link into multiple trail loops. For trail riders, the trail allows rider to terminate their climb without ascending the full elevation range.</p> <p><i>Dirt Art</i> suggest that the trail be developed as a wider format trail tread, to improve emergency access as required.</p>	

12.5.5 Trail Five

Key Stats	
Length	7,000m
TDRS	Green Circle
Construction Style	Flow
Format	Descent
Width	2,000mm
Surface	Natural
Trail Overview	
<p>Trail Five is one of the hero trails of the proposed trail network, providing a world-class beginner mountain bike flow trail descent. The trail will be suitable for a most abilities, and will features large, gently sloping turns and rollers, creating a genuinely engaging trail experience. Featuring an average gradient of approximately 5%, the trail will suit most rider abilities, and will feature minimal braking.</p> <p>The trail will be accessible via a climb, or via uplift (pending approvals).</p>	

12.5.6 Trail Six

Key Stats	
Length	3,500m
TDRS	Blue Square
Construction Style	Flow
Format	Descent
Width	2,000mm
Surface	Natural
Trail Overview	
<p>Trail Six is an intermediate flow trail that descends halfway through the elevation range of the trail area, before providing connectivity into a number of other descending trails. Proposed as a larger-scale flow trail, the trail will feature taller, steeper corners, with scope to develop a number of smaller jump features.</p>	

12.5.7 Trail Seven

Key Stats	
Length	3,750m
TDRS	Blue Square
Construction Style	Flow/Jump
Format	Descent
Width	2,000mm
Surface	Natural
Trail Overview	
<p>Trail Seven is designed as an intermediate flow/jump trail, providing riders with a gentle progression in difficulty from Trail Six. The trail will feature a larger tread width, and frequent tabletop jump features, and larger bermed corners.</p>	

12.5.8 Trail Eight

Key Stats	
Length	3,500m
TDRS	Blue Square
Construction Style	Flow/Technical
Format	Descent
Width	1,000mm
Surface	Natural
Trail Overview	
<p>Trail Eight is designed as a technical intermediate trail, with some flow features. The trail is proposed to be constructed via excavator, though will feature some natural trail features.</p> <p>The trail is designed as an introduction to the more demanding technical trails proposed in the network.</p>	

12.5.9 Trail Nine

Key Stats	
Length	2,500m
TDRS	Black Diamond
Construction Style	Flow/Jump
Format	Descent
Width	2,500mm
Surface	Natural
Trail Overview	
<p>Trail Nine is designed as a black diamond jump trail, feature a range of more progressive jumps and large bermed corners. The trail provides riders with an avenue to safely progress their jumping skills. The trail will become one of the signature trails of the network for more advanced riders.</p>	

12.5.10 Trail Ten

Key Stats	
Length	2,250m
TDRS	Black Diamond
Construction Style	Technical
Format	Descent
Width	900mm
Surface	Natural
Trail Overview	
<p>Trail 10 is designed as a black diamond technical trail, feature a range of more progressive rock technical trail features, and steeper trail sections. The trail provides riders with an avenue to safely progress their technical trail skills.</p>	

12.5.11 Trail Eleven

Key Stats	
Length	2,500m
TDRS	Blue Square
Construction Style	Technical/Flow
Format	Descent
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 11 is a machine-built trail with a range of technical trail features, and more natural trail sections. The trail provides intermediate riders with opportunities to progress towards more challenging black diamond technical trails in the network.</p>	

12.5.12 Trail Twelve

Key Stats	
Length	2,500m
TDRS	Blue Square
Construction Style	Technical/Flow
Format	Descent
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 12 is an intermediate flow trail, designed as a gentle progression from beginner flow trails in the network. The trail descends from the midpoint of the mountain, providing opportunities to create a loop format ride.</p>	

12.5.13 Trail Thirteen

Key Stats	
Length	1,500m
TDRS	Black Diamond
Construction Style	Technical/Flow
Format	Descent
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 13 is a black diamond jump/flow trail, which is designed as a natural extension from Trail Nine. The trail will feature the same style as Trail Nine, with larger, more progressive tabletop jumps, and large bermed corners.</p>	

12.5.14 Trail Fourteen

Key Stats	
Length	1,500m
TDRS	Black Diamond
Construction Style	Flow
Format	Descent
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 14 is a black diamond flow trail, designed as a progression from blue square flow trails in the network. The trail will feature steeper trail sections, and falling turns, creating a fast-flowing trail experience.</p>	

12.5.15 Trail Fifteen

Key Stats	
Length	1,000m
TDRS	Black Diamond
Construction Style	Technical
Format	Descent
Width	900mm
Surface	Natural
Trail Overview	
<p>Trail 15 is designed as a progression from Trail 10 and will feature the same steeper more technical trail style. The trail will include a range of technical rock features, and more natural trail sections.</p>	

12.5.16 Trail Sixteen

Key Stats	
Length	7,500m
TDRS	Blue Square
Construction Style	Technical/Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 16 is a longer format, high elevation trail loop, that provides riders with an extended trail riding experience. The trail will provide stunning views through a range of forest types and connects to a number of other proposed trails.</p>	

12.5.17 Trail Seventeen

Key Stats	
Length	2,500m
TDRS	Green Circle
Construction Style	Flow
Format	Climb
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 17 is a short, beginner friendly climb, which allows rider to utilise the first section of Trail Five in a loop format, which also provides a stacked loop connection into other trails in the network.</p>	

12.5.18 Trail Eighteen

Key Stats	
Length	4,500m
TDRS	Blue Square
Construction Style	Technical/Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 18 is an intermediate trail loop taking riders to the summit of Cape Conway. The trail provides an opportunity for riders to descend all the way down to Cannonvale via Trail 20. The trail is proposed as a flow style, with scope for addition of some natural technical features.</p>	

12.5.19 Trail Nineteen

Key Stats	
Length	6,000m
TDRS	Blue Square
Construction Style	Technical/Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 19 is designed as a natural extension from Trail 18, with a similar style of construction, catering to an intermediate audience. The trail capitalises on higher elevation areas of the site.</p>	

12.5.20 Trail Twenty

Key Stats	
Length	12,000m
TDRS	Blue Square
Construction Style	Technical/Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 20 is an intermediate loop ride that provides access into the trail network to/from Cannonvale, allowing riders the opportunity to undertake an extended descent with a different exit point. The trail also assists in spreading economic benefit beyond Airlie Beach township.</p> <p>The trail is proposed to be a flow style, with an opportunity for technical trail features. An average climbing gradient less than 5% will ensure that the trail is achievable by most riders.</p>	

12.5.21 Trail Twenty-One

Key Stats	
Length	12,000m
TDRS	Blue Square
Construction Style	Technical/Flow
Format	Descent
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 21 provides an optional loop from Trail 16, allowing riders to enter/exit the trail network from Jubilee Pocket. The trail ensures economic benefit is shared beyond the township of Airlie Beach.</p> <p>The trail is proposed to be a flow style, with an opportunity for technical trail features. An average climbing gradient less than 5% will ensure that the trail is achievable by most riders.</p>	

12.5.22 Trail Twenty-Two

Key Stats	
Length	4,500m
TDRS	Black Diamond
Construction Style	Technical/Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 22 provides an optional more advanced loop extension from Trail 19. The trail will provide a more technical trail experience and is one of the more remote trails in the network.</p>	

12.5.23 Trail Twenty-Three

Key Stats	
Length	650m
TDRS	Double Black Diamond
Construction Style	Technical
Format	Descent
Width	900mm
Surface	Natural
Trail Overview	
<p>Trail 23 provides one of the most technically demanding trails in the network and is suitable only for advanced riders. The trail will feature a steep gradient, with extensive rock armoured and rock features.</p>	

12.5.24 Trail Twenty-Four

Key Stats	
Length	600m
TDRS	Double Black Diamond
Construction Style	Technical
Format	Descent
Width	900mm
Surface	Natural
Trail Overview	
<p>Trail 24 is a natural extension from Trail 23, higher up into the trail network. The trail features the same difficulty and style as Trail 23.</p>	

12.5.25 Trail Twenty-Five

Key Stats	
Length	1,000m
TDRS	Blue Square
Construction Style	Flow
Format	Descent
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail 25 is an arterial intermediate flow trail, which will capture the majority of the descending trail traffic heading down towards Airlie Beach. The trail is designed as an entry level intermediate trail and will suit riders of most abilities.</p>	

12.5.26 Trail Twenty-Six

Key Stats	
Length	3,500m
TDRS	Black Diamond
Construction Style	Technical
Format	Loop
Width	900mm
Surface	Natural
Trail Overview	
<p>Trail 26 is an optional extension from Trail 16, providing a demanding, technical trail experience. As one of the more remote and challenging trails in the network, the trail is only suitable for advanced riders.</p>	

Whitsunday Trails Concept Plan

SOUTH MOLLE ISLAND

16.10.20



Proposed Trails

- S1
- S2

Existing Trails

- Existing Trails
- 10m Contours

12.6 South Molle Island

South Molle Island has been identified as another primary network development area with good potential for new trails to complement those proposed at Airlie Beach. As the largest of the Molle Island Group, South Molle accessible via boat transfer from Shute Harbour and already attracts visitors looking to explore the grasslands, rainforests and varied beaches and inlets that are scattered throughout the beautiful island. Walking trails already exist on the island alongside an established camping ground at Sandy Bay which is located on the southern end of the island.

The island has been identified as a primary trail development zone due its proximity to the larger network of trails proposed at Airlie Beach. The hilly island provides a fantastic opportunity to create a series of beginner friendly adventure trails that cater for a more family-orientated experience; seeking out the spectacular views on offer throughout the island while enjoying the amazing natural elements on display.

Two trail loops have been proposed on the island with the longer of the two, Trail S1, designed to suit beginners and young families looking to explore the island. The second loop is catered more towards the intermediate rider and provides a more challenging riding experience. Both trail loops can be ridden in conjunction with one another to create a longer format ride for those wishing to do so.

12.6.1 Trail S1

Key Stats	
Length	12,000m
TDRS	Green Circle
Construction Style	Flow
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
Trail S1 provides riders with an iconic circumnavigation of South Molle Island and is one of the more iconic trail experiences in the network. The trail is designed to cater for families and beginners, featuring minimal elevation change and an open, flowing trail style. The trail provides a highly-appealing day trip option for riders of all abilities.	

12.6.2 Trail S2

Key Stats	
Length	7,500m
TDRS	Blue Square
Construction Style	Flow/technical
Format	Loop
Width	1,000mm
Surface	Natural
Trail Overview	
<p>Trail S2 is an optional extension from Trail S1, catering to more experienced riders. The trail provides an intermediate riding experience, which takes in a number of high points and stunning lookouts of the island. The trail ensures that the South Molle trail network has enough length and challenge to cater for more experienced riders. The trail is proposed to be a flow style, though has scope to incorporate a range of technical trail features.</p>	

12.7 Proposed Secondary Trail Development Areas

12.7.1 Overview

Approximately 66.3km of new trails have been proposed in a variety of secondary trail development locations identified in the project target area. These regional networks are generally lesser in volume than the primary development areas of Airlie Beach and South Molle Island but play a complementary role in establishing a well-rounded mountain bike offering throughout the Whitsundays region.

Development budgets for all proposed new trails can be found at **Appendix 1**.

12.7.2 Key Objectives

Key objectives when analysing priority new trail developments were as follows;

1. Develop a stacked loop trail system where possible
2. Provide opportunities for a wide range of riding styles, including shuttle uplift riding
3. Increase trail diversity
4. Place trails in areas with lower environmental values
5. Place trails in areas with reduced social conflicts
6. Place trails in areas that eliminate or reduce heritage conflicts
7. Place trails in areas that provide cost effective construction conditions

12.7.3 Trail Summaries- New Trails

Green	Blue	Black	Double Black
42.3km	18.2km	5.8km	0km
64%	27%	9%	0%

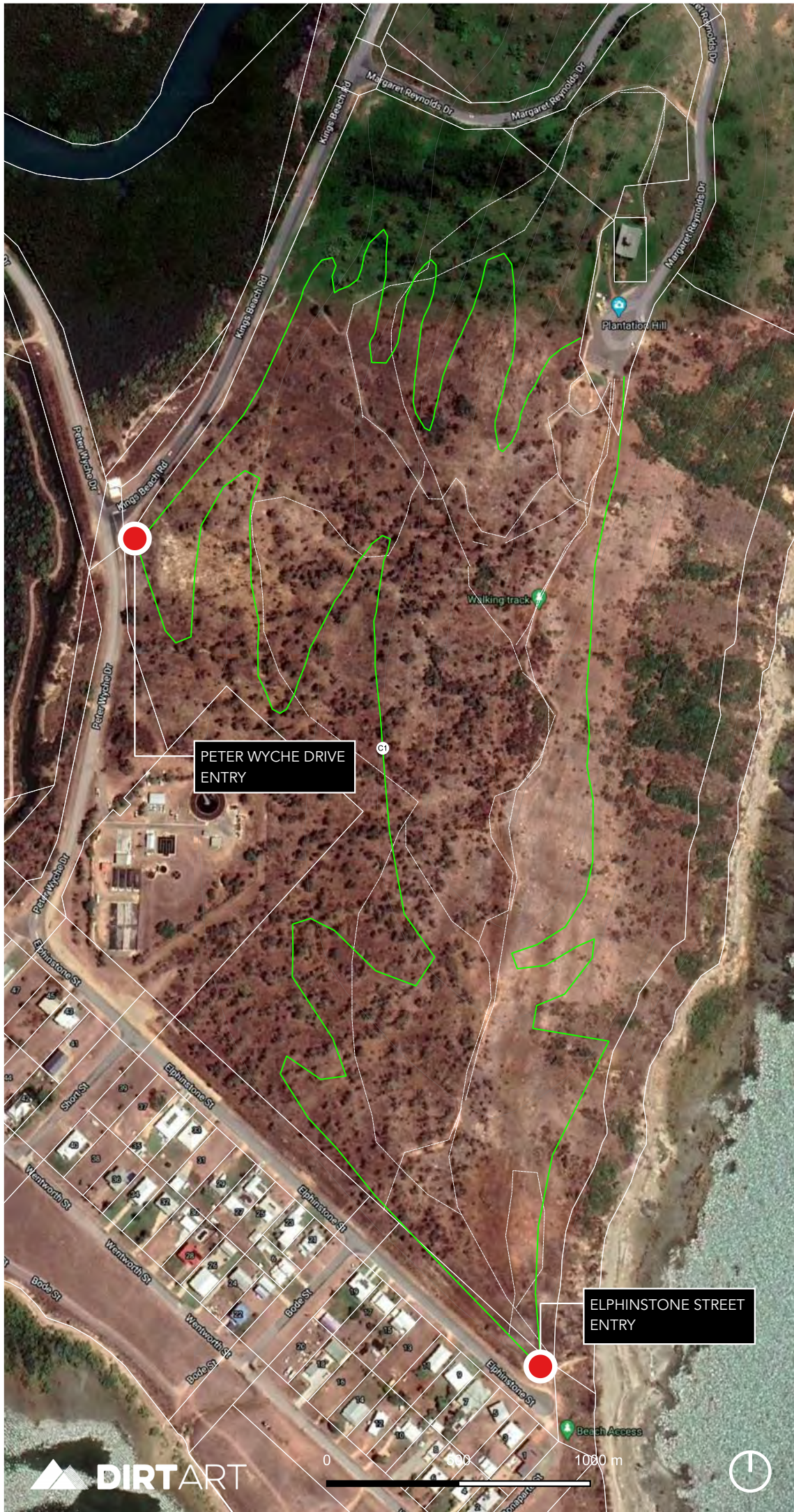
12.7.4 Proposed New Trails Maps

Trail maps for all proposed new trails can be found over the page.

Whitsunday Trails Concept Plan

TRAIL CONCEPT PLAN: BOWEN

16.10.20



- Proposed Trails
- Bowen
 - B1
- Existing Trails
 - Existing Trails

12.8 Bowen

Bowen is a popular tourist destination known for its pristine beaches as well as the iconic Big Mango. The town is situated to the northern end of The Whitsundays and has variety of accommodation offerings ranging from budget backpackers' hostels through to high end beachfront apartments.

Bowen has limited elevational opportunities for mountain biking with the exception of Flagstaff Hill, which has an established lookout and adjoining walking trail loop. A beginner's loop has been proposed on this hill to complement the existing walking trails and iconic lookout location. The proposed trail provides an active cycling connection to Peter Wyche Drive, Flagstaff Hill Lookout, and the existing beach access located at the end of Elphinstone Street.

A potential cycle path linking the various beaches of Bowen would be a great addition to the proposed mountain bike loop at Flagstaff Hill. Similarly, an asphalt pump track would be well utilised and extremely popular in the town given the lack of elevational opportunities to explore more significant mountain bike trail offerings.

12.8.1 Trail B1

Key Stats	
Length	3,810m
TDRS	Green Circle
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural

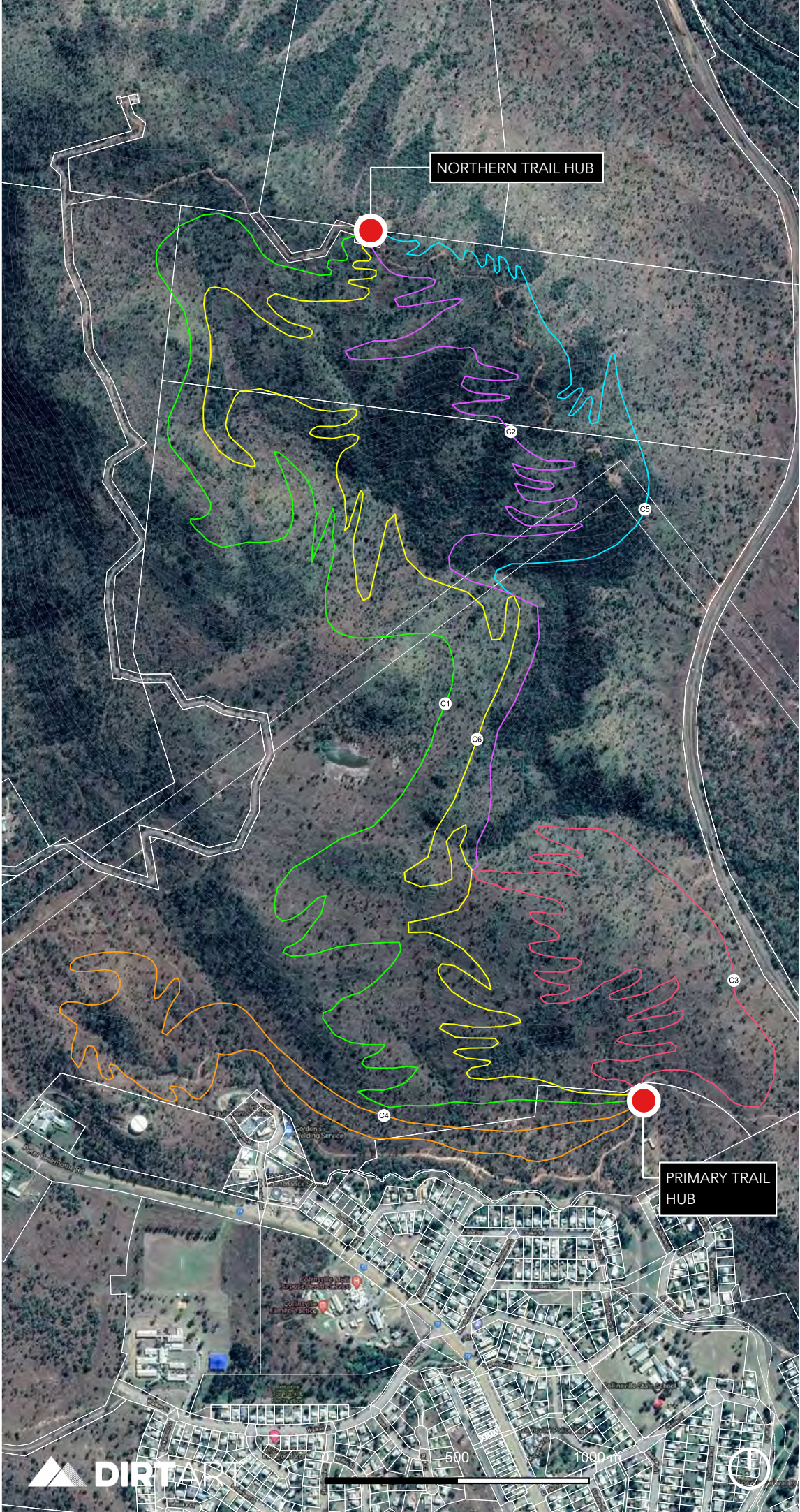
Trail Overview

Trail B1 is a beginners' loop that circumnavigates Flagstaff Hill and provides an off-road riding experience to complement the existing walking track.

Whitsunday Trails Concept Plan

TRAIL CONCEPT PLAN: COLLINSVILLE

16.10.20



Proposed Trails

Collinsville

- C1
- C2
- C3
- C4
- C5
- C6

Existing Trails

- Existing Trails
- 10m Contours

12.9 Collinsville

Collinsville is known as one of the coal-rich towns in Central Queensland with a strong history of coal mining. The area has been included in the project as the development of mountain biking in Collinsville would complement the existing tourism offering whilst providing a significant recreational asset for residents.

An area directly north of the town has been identified as holding good potential for mountain bike trail development with approximately 250m of vertical elevation available. This land parcel is owned by the Department of Natural Resources, Mines and Energy, thus any development on this land will require consultation with the landowner and relating approval. The rolling hills provide for an interesting canvas to weave trails throughout and an existing service track provides an opportunity for shuttle access to the highpoint located to the north of the proposed trail network.

A series of beginner-friendly loops are proposed close to town (C3 and C4), while two longer format beginner to intermediate trails utilize the available elevational opportunities to the north. The northern most point of the property represents the highpoint and potential shuttle drop-off point to service the three proposed descending trails: C2, C5, and C6. Alternatively,

12.9.1 Trail C1

Key Stats	
Length	6,478m
TDRS	Green Circle
Construction Style	Machine
Format	Decent
Width	1,000mm
Surface	Natural
Trail Overview	
<p>Trail C1 is the longest descent proposed in the network and catered towards beginner riders. Like many of the northern descending trails, C1 has the potential to be shuttle accessible utilising an existing unsealed access road – pending approvals from relevant landowners and stakeholders.</p>	

12.9.2 Trail C2

Key Stats	
Length	6,170m
TDRS	Blue Square
Construction Style	Machine
Format	Decent
Width	1,000mm
Surface	Natural
Trail Overview	
<p>Trail C2 is an intermediate descending trail. Like many of the northern descending trails, C2 has the potential to be shuttle accessible utilizing an existing unsealed access road – pending approvals from relevant landowners and stakeholders. After the main descent, riders have the option to utilise C6 to climb back up to the summit to repeat or choose an alternate descent.</p>	

12.9.3 Trail C3

Key Stats	
Length	4,487m
TDRS	Green Circle
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail C3 is a beginner to intermediate loop that offers more elevational gain than its Trail C4 counterpart. The trail gradually ascends to the hill directly to the north of town by heading out the east and climbing its way up the back (northern) face of the hill. Riders are rewarded with fast and flowy descent back to the trail hub on the southern face of the hill.</p>	

12.9.4 Trail C4

Key Stats	
Length	3,829m
TDRS	Green Circle
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail C4 is a beginner's loop that heads across to the western side of the property. It follows a gentle and gradually ascending alignment to the western knoll before descending back towards to the trail hub to the east. The relatively mellow grades make it well suited to young families and those seeking as less physically-demanding riding experience.</p>	

12.9.5 Trail C5

Key Stats	
Length	2,229m
TDRS	Black Diamond
Construction Style	Machine
Format	Decent
Width	900mm
Surface	Natural
Trail Overview	
<p>Trail C5 is an advanced descending trail that follows an alignment off the eastern face of the summit before re-joining C2 at the base of the main descent or alternatively, utilise C6 to climb back up to the summit to repeat or choose an alternate descent. The trail is targeted at the enthusiast market and provides a more challenging trail experience. Like many of the northern descending trails, C5 has the potential to be shuttle accessible utilising an existing unsealed access road – pending approvals from relevant landowners and stakeholders.</p>	

12.9.6 Trail C6

Key Stats	
Length	7,122
TDRS	Green Circle
Construction Style	Machine
Format	Climb
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail C6 is the primary climbing trail that takes riders from the primary trail hub to the highpoint located to the northern-most point of the property. The beginner-friendly trail provides multiple riding loop options/configurations and services the main descending trail to the north as a highly-functional means to repeat the various descending trails.</p>	

Whitsunday Trails Concept Plan

TRAIL CONCEPT PLAN: DINGO BEACH

16.10.20



Proposed Trails

Dingo Beach

- D1
- D2
- D3
- D4

Existing Trails

- Existing Trails

12.10 Dingo Beach

Dingo Beach is a small coastal township located to the northern side of the Whitsunday Coast next to Hydeaway Bay. The area is known for its tropical beaches and reefs with a quieter atmosphere than many of the adjoining holiday destinations. With no large resorts or excess traffic, Dingo Beach offers many visitors a secluded retreat and a chance to get away from the hustle and bustle of more well-known holiday spots in the region.

The proposed trail concept utilises a pocket of undeveloped land situated between Dingo Beach, Cape Gloucester, and Hideaway Bay. The network of trails proposed are catered towards a beginner to intermediate market and well suited to families given the variety of shorter/longer ride formats available. To the north, Trail D1 takes riders towards Blackcurrant Island and provides views and potential access to the waterfront. The trails to the south take riders to a natural highpoint at the end of Olive Street and provide a chance to incorporate a series of more fun and exciting descending opportunities.

The primary trail hub is proposed to be to the east of Hydeaway Bay Caravan and Camping Park. It utilises an existing intersection of unsealed roads and tracks that is located close enough to local properties without affecting their privacy or amenity.

12.10.1 Trail D1

Key Stats	
Length	2,064m
TDRS	Green Circle
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
Trail D1 is a beginner loop that takes riders from the primary trail hub to the north towards Blackcurrant Island. The short loop provides riders the opportunity to ride towards the foreshore and access the beaches in this area. Riders have the option of linking this trail into Trail D2 as a longer format ride.	

12.10.2 Trail D2

Key Stats	
Length	2,839m
TDRS	Green Circle
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail D2 is a beginner loop that connects Dingo Beach with Hydeaway Bay. The trail can be used in conjunction with Trail D1 to provide a longer format beginner riding experience. Alternatively, the trail takes riders out to the two intermediate trails to the south, D3 and D4.</p>	

12.10.3 Trail D3

Key Stats	
Length	2,536m
TDRS	Blue Square
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail D3 is an intermediate loop that is accessed via Trail D2 and can be linked into Trail D4. The trail gradually climbs to the saddle before crossing Olive Street and heading in a northerly direction to gain more elevation before descending back down to meet Trail D2 to the north.</p>	

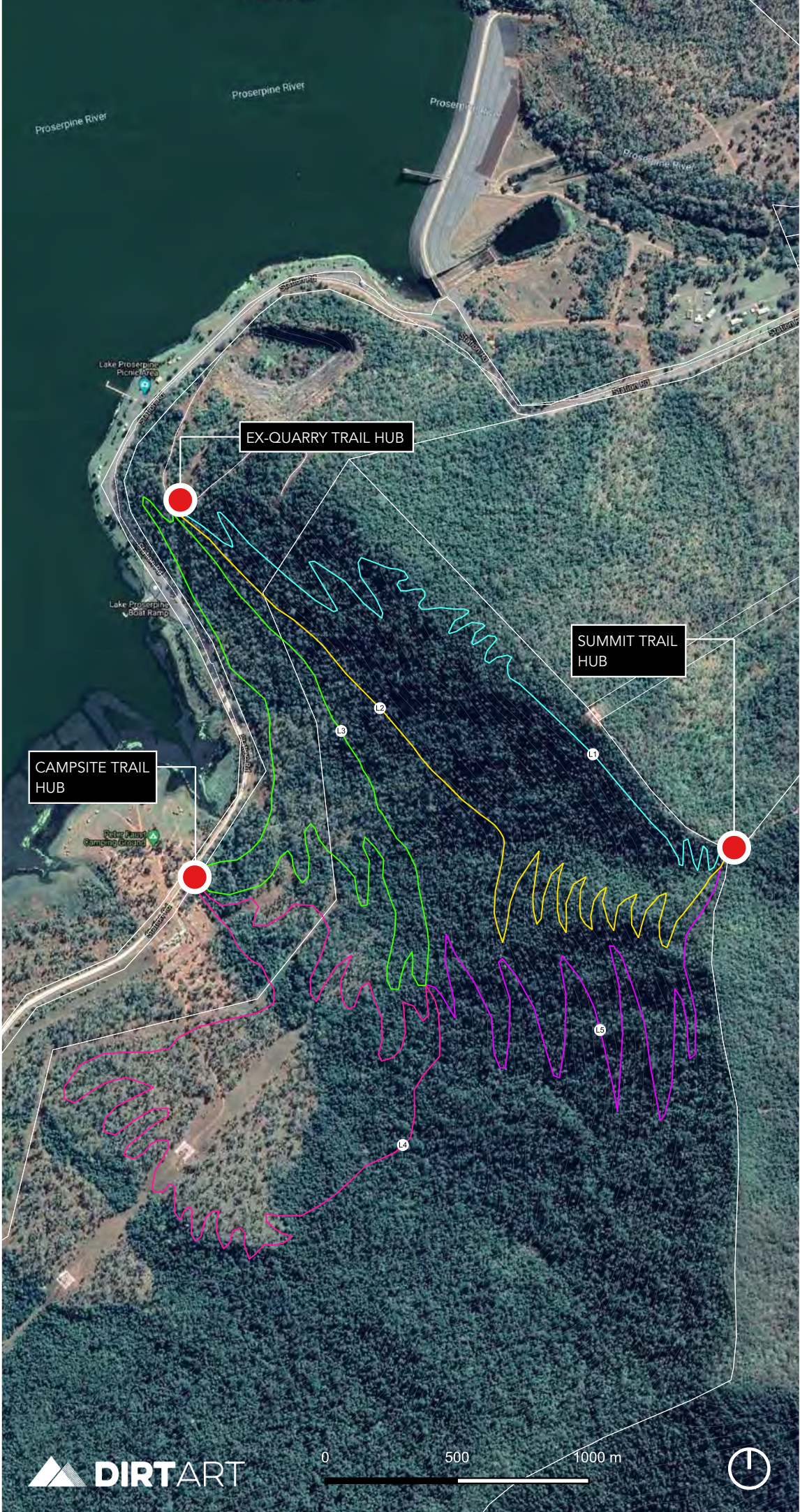
12.10.4 Trail D4

Key Stats	
Length	2,738m
TDRS	Blue Square
Construction Style	Machine
Format	Loop
Width	1,000mm
Surface	Natural
Trail Overview	
<p>Trail D4 is an intermediate loop that begins at the point where Trail D3 crosses Olive Street. From the saddle here, the trail takes a gradual climbing alignment to the west of Olive Street to the summit before crossing the lookout point and descending back down along the eastern face of the hill.</p>	

Whitsunday Trails Concept Plan

TRAIL CONCEPT PLAN: LAKE PROSERPINE

16.10.20



Proposed Trails

Lake Proserpine

- L1
- L2
- L3
- L4
- L5

Existing Trails

- Existing Trails
- 10m Contours

12.11 Lake Proserpine

Lake Proserpine is an already popular destination for a variety of watersports and freshwater fishing with the Peter Faust Dam being the primary attraction for most recreational users. The Lake Proserpine Recreational Master Plan identifies the ex-quarry site as holding potential for the gateway or primary hub to service an existing fire access trail or walking trail as well as the potential for mountain bike trails to be developed.

The following trail concepts have been developed based upon this notion and make use of the existing elevational opportunities available to the south-east of the existing quarry. An existing unsealed access road to the transmission tower could potentially be utilised as a shuttle road linking into Crystalbrook Road and Station Road to provide a gravity-orientated opportunity for riders to easily repeat the propose descending trails. Any access to this road would need to be investigated further and negotiated with the relevant landowners. Notwithstanding, the current trail concepts work as a pedal-access network, using the proposed Trail L2 as the primary climbing trail.

The trails proposed closer to Station Road provide an opportunity to connect the existing Peter Faust Camping Ground with the Lake Proserpine Boat Ramp as well as the old quarry. These trails are orientated towards beginners and well suited to young families given the flatter topography.

12.11.1 Trail L1

Key Stats	
Length	3,815m
TDRS	Blue Square
Construction Style	Machine / Hand
Format	Descent
Width	1,000mm
Surface	Natural
Trail Overview	
<p>Trail L1 is a one-way intermediate descending trail that utilises the 210m of vertical elevation available to the south-east of the old quarry site. The trail starts at an existing clearing near the transmission tower and is pedal-accessed by the L2, which is the primary climbing trail to this point. There is potential to utilise an unsealed access road for shuttle access, however, this will need to be investigated further with respective landowners as well as the practicalities of having access to this highpoint.</p>	

12.11.2 Trail L2

Key Stats	
Length	2,959m
TDRS	Blue Square
Construction Style	Machine / Hand
Format	Climb
Width	1,000mm
Surface	Natural
Trail Overview	
<p>Trail L2 is an intermediate climbing trail that provides pedal-access to Trails L1 and L5. The trail gradually ascends following a gentle alignment to the south-east from the old quarry site before a series of switchbacks take riders along a ridgeline to the summit.</p>	

12.11.3 Trail L3

Key Stats	
Length	3,394m
TDRS	Green Circle
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail L3 is a closed loop catered for beginners and young families looking for a shorter riding experience. The trail connects the Peter Faust Camping Ground with the Lake Proserpine Boat Ramp and the old quarry site.</p>	

12.11.4 Trail L4

Key Stats	
Length	4,271m
TDRS	Green Circle
Construction Style	Machine
Format	Loop
Width	1,200mm
Surface	Natural
Trail Overview	
<p>Trail L4 is a closed loop catered for beginners and young families looking for a shorter riding experience. The trail can be combined with Trail L3 to form a longer format ride.</p>	

12.11.5 Trail L5

Key Stats	
Length	3,349m
TDRS	Black Diamond
Construction Style	Machine / Hand
Format	Descent
Width	900mm
Surface	Natural
Trail Overview	
<p>Trail L5 is an advanced descending trail that is accessed via Trail L2. The steeper and more challenging trail descends to the south of Trail L2 and joins back into the lower L3 and L4 trail loops.</p>	

13

13 Economic Impact Analysis

13.1 Overview

Mountain bike destination development is a proven driver of economic activity across Australia, with a number of successful destinations now demonstrating that the development of trails can stimulate regional economies.

Destinations such as Blue Derby in Tasmania have brought tens of thousands of visitors to regional communities, establishing dozens of new jobs and a wide variety of new businesses. The mountain bike traveler typically seeks an average 7-day holiday and will spend more than the average traveller⁸.

This report section will examine some economic impact case studies and will provide a preliminary economic impact assessment for the project.

13.2 Case Studies

13.2.1 Blue Derby

Trail Volume	120
Location	Derby, Tasmania
Visitation (p.a.)	40,000
Economic impact (reported)	\$25m
Year in operation	5

Blue Derby was established in 2020 with an initial 20km of trails. Now with over 120km of trails, the destination reportedly sees visitation of over 40,000 riders per annum. Since the trail opening, the town has seen the development of multiple new restaurants and cafes, and a number of new accommodation venues have been constructed.

Widely recognised as Australia's leading trail centre, the Blue Derby trails projects has transformed the ex-tin mining town into a thriving tourist centre.

13.2.2 Rotorua

Trail Volume	225
Location	Rotorua, New Zealand
Visitation (p.a.)	250,000
Economic impact (estimated)	\$40m
Year in operation	15

⁸ Australian Mountain Bike Park Profile, Dirt Art 2018

Rotorua in New Zealand is widely recognised as one of the world’s leading trail centres. A largely community-driven trail network, the trails are located predominantly in pine plantation area.

While the town of Rotorua has a strong broader tourism industry, mountain biking is a major component of the visitor economy, with an estimated 250,000 annual rider visits.

13.2.3 Maydena Bike Park

Trail Volume	75
Location	Maydena, Tasmania
Visitation (p.a.)	25,000
Economic impact (estimated)	\$15m
Year in operation	2

Maydena Bike Park is Australia’s largest gravity-focused bike park, with 820m vertical elevation and 60+ trails. The park is privately owned and is operated as a pay-for-use facility with an uplift shuttle service.

In operation for two years, the development of the park has seen property prices in town raise by 100-200%, and the development of two new restaurants and a number of accommodation ventures.

13.3 Estimated Visitation

For the purposes of estimating projected visitation, *Dirt Art* has worked off a number of assumptions;

- Approximately 50% of the trail network is constructed during Stage 1
- Approximately 50% of the trail network is developed during year three of operation, with the entire network complete prior to year three of operation

Dirt Art has not differentiated between international and domestic visitors, given the relatively low projected international enthusiast tourist numbers.

In the interests of presenting clear and concise data, *Dirt Art* has based calculations on visitor days, rather than individual visitors. It is expected that length of stay for overnight visitors will be as below;

- Year 1: 2 nights
- Year 2: 3 nights
- Year 3: 5 nights

Notably, the below estimated are considered to be at the low/conservative end of estimates.

Visitation estimates are based on rider days rather than independent visitors. This methodology ensures a greater accuracy through removing the calculation for length of stay for riders. The use of this calculation will make visitation appear higher than if individual visitor numbers were utilised.

Visitation estimates are provided below for the first three years of operation;

Year	Visitor Type	Volume
1	Day Visitor	5,000
	Overnight Visitor	15,000
	Total Visitor Days	20,000
2	Day Visitor	6,000
	Overnight Visitor	20,000
	Total Visitor Days	26,000
3	Day Visitor	7200
	Overnight Visitors	40,000
	Total Visitor Days	47,200

13.4 Estimated Economic Impact

Dirt Art has estimated economic impact based on visitor days, rather than estimating length of stays for overnight visitors.

The below estimated economic impact has been based on the following assumptions;

- Overnight visitors spend \$214/day⁹
- Day visitor spend is estimated at \$65/day¹⁰
- A standard tourism development multiplier of x1.9 has been utilised to calculate indirect economic impact

Estimated economic impact is provided over the page.

⁹ Tourism Australia, 2019

¹⁰ Estimated daily expenditure is anecdotally based on data from mountain bike destinations across Australia

	Visitor Type	Daily Spend	Volume	Direct EI	Direct + Indirect EI
Year 1	Day	\$ 65.00	5000	\$ 325,000.00	\$ 617,500.00
	Overnight	\$ 214.00	15000	\$ 3,210,000.00	\$ 6,099,000.00
	Total			\$ 3,535,000.00	\$ 6,716,500.00
Year 2	Day	\$ 65.00	6000	\$ 390,000.00	\$ 741,000.00
	Overnight	\$ 214.00	20000	\$ 4,280,000.00	\$ 8,132,000.00
	Total			\$ 4,670,000.00	\$ 8,873,000.00
Year 3	Day	\$ 65.00	7200	\$ 468,000.00	\$ 889,200.00
	Overnight	\$ 214.00	40000	\$ 8,560,000.00	\$ 16,264,000.00
	Total			\$ 9,028,000.00	\$ 17,153,200.00

14 Uplift Considerations

14.1 Overview

Uplift assisted mountain bike riding broadly refers to mountain bike riding where riders are transported to the top of a mountain/high point, before descending down via a trail/s. The style of riding allows riders to ride for longer, as it removes much of the physical fitness requirements of lengthy climbs.

Uplift assisted mountain bike riding is rapidly growing in popularity across Australia and around the world. This growth is fed by the broadening of this style of riding to include undulating and less aggressively descending trail opportunities which cater for a broader market of rider interest and ability. The majority of Australia's top riding destinations now include an uplift opportunity.

14.2 Uplift Styles

Broadly speaking, uplift assisted riding is undertaken via a vehicle fitted with a rack or trailer system, or via a chairlift or gondola system. There are some other systems, such as ground based lifts, but these offer limited potential in most environments.

In Australia, many uplift operations rely on buses and trailers, which provide an efficient and cost-effective option, with relatively low capital set up costs. A bus system is used at two of Australia's most well-known uplift assisted sites; Blue Derby and Maydena Bike Park.

A chairlift or gondola system is an excellent method of delivering uplifts services, though the capital costs of this option are very high. Generally speaking, these costs are offset through the use of the system by sightseeing and other activities.

14.3 Benefits of Uplift

Uplift provision allows riders to ride for longer, and maximise their enjoyable time of the bike. Uplift assisted trail networks will typically achieve a longer length of stay, as fatigue is less of a factor for riders concluding their trip.

Uplift systems provide a significant, direct business development opportunity, which depending on the model, may support multiple businesses.

Operating levies from uplift provision are recommended and are a method of returning funds to the trail management entity to assist with maintenance and further development.

14.4 Whitsundays Opportunity

Dirt Art suggests that an uplift will be a significant contributor to the success of the Whitsundays MTB Project. An existing access track provides access to utilities, part way up to the high point of the trail network. This track has potential to be extended to provide an uplift opportunity. If a vehicle-based uplift opportunity is pursued, *Dirt Art* recommend establishment of an EOI/tender process to select preferred operator/s. Ideally 2-3 operators would be selected.

Alternatively, there is potential to develop a chairlift or gondola system on the site, pending commercial interest and subject to relevant approvals.

Dirt Art strongly suggest that an uplift opportunity be pursued through the next phases of the project.

15 Implementation Plan

15.1 Detailed trail design

The concepts provided within this report represent high-level concepts. The trails will require detailed design, including route flagging on the ground. While *Dirt Art* has conducted extensive field surveys, not all trails have been completely ground truthed.

15.2 Approvals

15.2.1 Queensland Parks and Wildlife Service Assessment

Approvals will be required from the Queensland Parks and Wildlife Service (QPWS). Further details will be explored during the next phase of the project.

15.2.2 Development Application

Given the nature, scale and location of the project and proposed works that compose it, it is likely that a development application (DA) will be required. Final determination of a DA requirement will rest with the ESC. A review of environmental factors (REF) will likely form part of the DA process.

15.2.3 Geotechnical Assessment

Geotechnical assessments may be required for some section of trail, particularly at higher elevations.

15.3 Construction Staging

Construction staging will be developed following conclusion of project consultation.

Dirt Art recommends launching the project with at least 50km of trails. In the current marketplace, the benchmark for trail quality and quantity in Australia is high. Launching the project with too little trail risks damaging the visitation to the facility in the short to midterm.

15.4 Construction Approach

15.4.1 Machine construction where possible

Most modern mountain bike trail construction is undertaken with mini-excavators in the size range of 0.8 to two tonnes. The use of excavators offers significant improvements in efficiency relative to hand-building in most environments. A 1.5-1.8 tonne excavator is

used for most trail applications in Australia, and a machine in this size range would be suitable for all proposed trails in this plan.

There are some areas of proposed trail that may require hand build construction methodology, particularly where high levels of ground rock are evident. Notably, *Dirt Art* has worked to minimise construction complexity and is confident that the majority of the trails are able to be constructed by excavator.

It is recommended that where possible machine construction is pursued, where this does not adversely impact the experience provided by a trail and where it does not substantially impact the character of the trail development.

15.4.2 Construction timelines

A progress output of approximately 50m per day per construction team (2-4 staff led by an excavator operator) should be expected, averaged across the site and trail styles. Larger scale jump and flow trails will deliver a much lower daily output, whereas more general trail development may approach or in places exceed 100m/day output.

It should be expected that the project be resourced with a minimum of 4-5 construction teams, which would allow weekly progress to exceed 1km. If a rapid implementation schedule was required, Australia's larger specialist trail construction companies should be able to complete all trail works inside of 12 months.

15.4.3 Volunteer construction

While there may be some opportunities to facilitate volunteer construction, ultimately, *Dirt Art* suggest that the project should be planned and budgeted on a complete commercial construction process.

15.4.4 Climatic considerations

Construction at proposed trail network should be viable year-round, with optimal build seasons being Spring and Autumn.

15.5 Signage

15.5.1 Overview

Effective signage is critical for the functionality of any destination mountain bike project, while also assisting in risk and incident management. The signage should focus on large map boards, as well as trail head and way marker signage.

Signage should be consistent with relevant council and land manager signage systems and guidelines.

Given the complex nature of the network, and lack of obvious stacked loops, *Dirt Art* suggest signage also consider showcasing a group of rides, which encompass a range of trails. These 'signature rides' should focus on clustering similar trails to create high-quality trail experiences. Showcasing these rides is an important consideration for visiting riders.

An important consideration is also main road signage, ensuring that visitors are aware of the attraction as they approach via vehicle.

15.5.2 New brand development

Dirt Art suggest that a brand/identity be developed for the trail project by a professional branding agency. This branding should be utilised along with a style guide to influence all digital presence and signage for the trails.

15.5.3 Budget

Dirt Art suggest a signage budget of 2.5% of capital investment (\$25,000/\$1m investment).

15.6 Suggested Development Budget

15.6.1 Overview

See suggested project budget at **Appendix 1**.

16 Operational Considerations

16.1 Management Models

Dirt Art suggest that the trails are managed under a single management entity. For most projects of this type this entity would be a local government agency. While this does not necessarily require the agency to accept 100% of the management responsibility, it ensures the public have a clear contact point for the trails. In most cases this type of agreement would involve the lease/license of trail corridors rather than entire land parcels. The majority of Australia's destination trail networks utilise this model, whereby a local council body leases trail corridors from typically a parks agency.

There may also be opportunities to explore commercial leasing arrangements for the trail network, particularly associated with the potential Skyway cable car development in the area.

Dirt Art suggest that the future maintenance of the trail network will likely be best delivered through a combination of paid and volunteer maintenance. The new trail development proposed is likely to bring significant additional local visitation to the park, which may provide opportunities to re-invigorate the past volunteer construction program to an extent.

16.2 Trail Maintenance

Trail maintenance is one of the key operational considerations of any trail destination. In general terms, a high -quality mountain bike destination will require regular maintenance, to ensure trails are maintained to a standard expected by the traveling mountain bike rider.

Dirt Art suggest a maintenance budget of approximately \$1.50/metre annually for trails, a higher rate of \$2.50/metre may be applicable for gravity trails utilised by higher visitation volumes (such as if serviced by a cable car).

While some volunteer maintenance may be possible, *Dirt Art* suggests that maintenance should be budgeted at the above commercial rates. While volunteers contribute meaningfully to maintenance of many trail networks, their capacity to manage larger-scale tourism focused trails networks is extremely limited.

16.3 Uplift Opportunities

Uplift-assisted riding is growing in popularity, with a number of services across Australia proving highly popular with local and visiting riders. Uplifting is generally undertaken using buses and/or 4WD vehicles using trailers or bike racks to transport bikes.

Any uplift opportunities would likely be utilising partially existing roads and require the development of potentially new sections of road to service the route. It is anticipated these uplift routes would be private rather than publicly accessible. As such, consideration would need to be given to managing the various commercial uplift providers.

16.4 Risk and Incident Management

Risk and incident management is a critically important consideration for any mountain bike trail development and should be considered continually throughout the development and construction process.

Incidents can be minimised through the following key considerations;

- Predictability in trails
- Low consequence trail features (limited gap jumps, blind drops etc.)
- Appropriate trail difficulty grading
- Appropriate signage
- High-quality trail design and construction

Incidents can be managed through the following key considerations;

- Liaison with emergency services
- Noting of key access routes
- Noting of emergency points on all trails
- Consideration of aerial rescue points

16.5 Insurance and Liability

Mountain biking is generally considered a safe sport, though as with any outdoor activity, injuries can and will occur. Quality trail construction and robust management systems will significantly reduce the likelihood and severity of injuries, while also reducing the risks associated with liability. The civil liabilities act provides some protection from liability due to the need for riders to legally wear a helmet, thus acknowledging the risk posed by the activity. Signage systems and general operational management planning will also significantly reduce liability risks.

In *Dirt Art's* experience, insurance for public trail networks has typically fallen within a government land managers general insurance cover for public open space and related facilities. This extension of cover has typically occurred with little to no premium increase.

17 Branding and Marketing

17.1 Overview

In an increasingly competitive mountain bike destination marketplace, marketing and branding are critical components of any successful trail destination.

Dirt Art strongly suggest the development of a comprehensive marketing plan prior to commencement of works developing new trails.

17.2 Key Strengths

The key strengths of the completed trail network and brand will be;

- A large network of world-class trails
- Excellent elevation opportunities
- Wide variety of loop format trails
- Uplift opportunities
- Coastal location and broader tourism opportunities
- Climate
- High-quality natural environments and viewpoints
- Challenging enthusiast trails

The above key strengths should form the basis of a new branding package.

17.3 Marketing Plan

17.3.1 Overview

The development of the Whitsundays trail destination should be backed by a comprehensive marketing plan. The plan should work across a range of formats and platforms to target existing and new audiences in the destination's key rider markets.

The marketing plan should not be enacted until significant capital works have been undertaken to ensure the strategy aligns with quality new and upgraded existing trails. Enacting the plan and 'going to market' early risks creating an inflated expectation, which may result in many visitors disappoint, with a genuine risk they may not return.

17.3.2 Marketing formats and channels

17.3.2.1 Content Creation

Quality content is a fundamental component of any marketing strategy. The Whitsundays Project should develop a large content library of photo and video media, which directly aligns with the core values and strengths of the destination.

A high-quality digital asset library is critical to the marketing strategy as it will provide the content required to drive marketing initiatives through a wide range of channels. Content creation includes self-produced photo and video content, where the destination may produce their own content for distribution through their and other channels. Self-produced and distributed content can be a cost-effective way of producing content that directly aligns with the values of the destination.

17.3.2.2 Social Media

Social media provides a marketing channel that is generally well-aligned with the mountain bike consumer and provides a simple and cost-effective marketing opportunity. While a range of platforms existing, *Dirt Art* suggest that Facebook and Instagram are the two key platforms for targeting mountain bike consumers. Facebook will generally target a slightly older audience, and Instagram a slightly younger audience. Twitter is not considered a highly relevant platform for mountain bike destinations due to its generally older demographic and journalistic and political focus. Snapchat is a challenging platform to manage relevant content through, and generally offers little scope to target key audiences due to its millennial user focus. If another platform is desired, You Tube is recommended, with scope to create a fantastic video content library. Should You Tube be pursued it must be understood that significant cost and effort will be required to produce regular video updates.

Content should generally be curated specifically to Facebook and Instagram, with the platforms suited to the below approach;

- Facebook: Written content and information (must always be shared with a high-quality image), events, article links
- Instagram: Imagery, video, shorter format written content
- The following key tips are relevant to both platforms;
- Written personality: The writing style portrayed should match the target audience (professional but light-hearted), and should be consistent across posts and platforms
- All image and video content should be high-quality, professional
- Content should not be shared identically across platforms unless it is critical news
- Ideal posting regularity is 5 times a week for Facebook and 7 times a week for Instagram (reinforcing the importance of a large content library)
- Video links will generally be downranked by Facebook unless they are directly loaded into the platform

- Web site links will generally be downranked by Facebook

17.3.2.3 Influencers

Influencers are a potentially valuable marketing methodology. When engaging influencers, care should be taken to ensure that the influencers channel and audience aligns with the values of the destination. For example, gravity-focused athletes and influencers should not be used to market a cross country-focused trail network.

When utilising influencers, *Dirt Art* recommend keeping scripting and curation to a minimum, instead relying on the influencer to control content so it may be as organic as possible. Basic key messaging notes can be provided to the influencer to ensure that their outputs are consistent with the values of the destination.

17.3.2.4 Digital Media

Digital media provides a range of potentially valuable marketing opportunities, including but not limited to; destination showcases, competitions, and standard news pieces. In Australia, the main digital news outlet specific to mountain bike is Flow Mountain Bike.

Australian destinations have also been known to utilise Pink Bike (a North American supplier, and the world's biggest mountain bike media outlet).

Dirt Art recommend the above two outlets as high-quality opportunities for content creation and distribution. Destination showcases are a particularly strong opportunity well when curated and presented so they are entirely consistent with the key strengths and values of the destination.

17.3.2.5 Print Media

Print media remains a valuable marketing opportunity, though its reach is diminishing as customers continue to shift to digital media consumption. The main print media outlets specific to mountain biking in Australia are; Australian Mountain Bike Magazine, Revolution MTB Magazine and Mountain Biking Australia Magazine. These magazines have the following key reader markets;

- Australian Mountain Bike: Broad audience with a trail riding focus
- Revolution MTB: Gravity-focused with a younger audience
- Mountain Biking Australia Magazine: Trail riding focused with an older audience

When engaging print media, content should be high-quality and consistent with the values of the destination. Paid advertising may also be used in conjunction with destination showcases, strengthening the package.

As the profile of mountain biking continues to grow further towards a mass market

activity, there are a growing number of more diverse print media opportunities. These include but are not limited to; airline magazines, travel magazines and outdoor magazines. Trail destinations with a strong beginner-intermediate focus will benefit particularly well from general print media opportunities.

17.3.2.6 Web site

A web site is a functional aid for riders but can also act as a valuable marketing tool. Mountain bike destination web sites should include the following information at a minimum;

- Location information
- Trail information and maps
- Accommodation information
- Local business information (food, beverage and services)
- Regional trail information
- Other things to do (focus on family friendly activities, and non-rider activities such as wineries etc.)

In recent years it has also become common for trail destinations to develop their own bespoke phone app. A phone app can be useful for mapping and trail information, though the public application Trail Forks has usurped the need for the mapping function in most bespoke destination apps.

17.4 Marketing Budget

When developing new trails and infrastructure, *Dirt Art* recommend a year one marketing budget of 2.5% of capital spend (\$25,000/\$1m spent). This budget provides a high-level guide, though notably if a large impact is sought from a small investment, then the percentage marketing spend may need to be 5+% of capital investment. When marketing a broader destination showcase it may also be relevant to request some support (financial and/or in-kind) from the local business community.

18 Conclusion

The Whitsundays MTB Project offers a significant opportunity to develop a mountain bike destination of national and international significance. Combining a large, world-class network of trails, with the world-renowned reef and coastline of the Whitsundays will prove extremely compelling to riders from across Australia and around the world. The project offers a chance to establish a world first combination of a significant mountain bike destination on the doorstep of the one of the world's great marine parks.

With over 187km of new trails proposed across 440m of elevation, the project is positioned as one of Australia's leading mountain bike destinations for both elevation opportunity and trail volume. *Dirt Art* has worked to create a diverse trail network that caters for a broad range of riding styles and rider abilities, focusing on both destination and complementary rider markets.

The proposed trail network will provide significant business and economic development opportunities, with a projected year three direct and indirect annual economic impact of \$17.1m. The trail network has been designed to maximise business opportunities and has potential to lead to the establishment of 6+ new businesses targeting the new visitor market.

Dirt Art believe the Whitsundays MTB Project is a significant opportunity to develop one of Australia's most unique and exciting trail destinations, which will appeal to all areas of the visitor market.

19 Appendix 1- Proposed Development Budget

Whitsundays MTB Project

Implementation Budget

3-Sep-20

Planning and Approvals			
Item	Volume	Cost	Total
Detailed trail design	183	\$ 800.00	\$ 146,400.00
Trail Design Report	1	\$ 25,000.00	\$ 25,000.00
Environmental Consultant	1	\$ 75,000.00	\$ 75,000.00
Other consultants	1	\$ 20,000.00	\$ 20,000.00
Planning Consultant	1	\$ 20,000.00	\$ 20,000.00
TOTAL =			\$ 286,400.00

Primary Trail Network - Construction			
Trail	Length	Cost	Total
AIRLIE BEACH			
1	1000	\$ 40.00	\$ 40,000.00
2	2500	\$ 40.00	\$ 100,000.00
3	9000	\$ 40.00	\$ 360,000.00
4	2500	\$ 40.00	\$ 100,000.00
5	7000	\$ 40.00	\$ 280,000.00
6	3500	\$ 40.00	\$ 140,000.00
7	3750	\$ 65.00	\$ 243,750.00
8	3500	\$ 35.00	\$ 122,500.00
9	2500	\$ 95.00	\$ 237,500.00
10	2250	\$ 55.00	\$ 123,750.00
11	2500	\$ 35.00	\$ 87,500.00
12	2500	\$ 35.00	\$ 87,500.00
13	1500	\$ 95.00	\$ 142,500.00
14	1500	\$ 65.00	\$ 97,500.00
15	1000	\$ 55.00	\$ 55,000.00
16	7500	\$ 35.00	\$ 262,500.00
17	2500	\$ 40.00	\$ 100,000.00
18	4500	\$ 35.00	\$ 157,500.00
19	6000	\$ 35.00	\$ 210,000.00
20	12000	\$ 35.00	\$ 420,000.00
21	12000	\$ 35.00	\$ 420,000.00
22	4500	\$ 55.00	\$ 247,500.00
23	650	\$ 55.00	\$ 35,750.00
24	600	\$ 55.00	\$ 33,000.00
25	1000	\$ 35.00	\$ 35,000.00
26	3500	\$ 55.00	\$ 192,500.00
SOUTH MOLLE ISLAND			
S1	12000	\$ 45.00	\$ 540,000.00
S2	7500	\$ 40.00	\$ 300,000.00
Bike Wash	1	\$ 10,000.00	\$ 10,000.00
Shelter and seating	1	\$ 25,000.00	\$ 25,000.00

Pump Track	1	\$ 250,000.00	\$ 250,000.00
		TOTAL =	\$ 5,456,250.00






Secondary Trail Network - Construction			
Trail	Length	Cost	Total
BOWEN			
B1	3810	\$ 40.00	\$ 152,400.00
COLLINSVILLE			
C1	6478	\$ 40.00	\$ 259,120.00
C2	6170	\$ 40.00	\$ 246,800.00
C3	4487	\$ 40.00	\$ 179,480.00
C4	4020	\$ 40.00	\$ 160,800.00
C5	2452	\$ 65.00	\$ 159,380.00
C6	7123	\$ 40.00	\$ 284,920.00
DINGO BEACH			
D1	2064	\$ 40.00	\$ 82,560.00
D2	2839	\$ 40.00	\$ 113,560.00
D3	2537	\$ 35.00	\$ 88,795.00
D4	2738	\$ 35.00	\$ 95,830.00
LAKE PROSERPINE			
L1	3816	\$ 55.00	\$ 209,880.00
L2	2959	\$ 55.00	\$ 162,745.00
L3	3395	\$ 40.00	\$ 135,800.00
L4	4271	\$ 40.00	\$ 170,840.00
L5	3350	\$ 65.00	\$ 217,750.00
		TOTAL =	\$ 2,720,660.00

Ancillaries			
Item	Volume	Cost	Total
Signage (1.5% of construction)	1	\$ 122,653.65	\$ 122,653.65
Marketing (1% of construction)	1	\$ 81,769.10	\$ 81,769.10
Internal Project Management	1	\$ 408,845.50	\$ 408,845.50
		TOTAL =	\$ 613,268.25

Total Project Costs	
Design and Approvals	\$ 286,400.00
Primary Trails - Construction	\$ 5,456,250.00
Secondary Trails - Construction	\$ 2,720,660.00
Ancillaries	\$ 613,268.25
TOTAL =	\$ 9,076,578.25

20 Appendix 2- IMBA TDRS

IMBA Trail Difficulty Rating System

	 VERY EASY White Circle	 EASY Green Circle	 INTERMEDIATE Blue Square	 DIFFICULT Single Black Diamond	 EXTREME Double Black Diamond
Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of obstacles. Short sections may exceed these criteria. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a single trail with moderate gradients, variable surface and obstacles. Dual use or preferred use Optional lines desirable	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles. Single use and direction Optional lines XC, DH or trials	Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles. Single use and direction Optional lines XC, DH or trials
Trail Width	2100mm plus or minus 900mm	900mm plus or minus 300mm for tread or bridges.	600mm plus or minus 300mm for tread or bridges.	300mm plus or minus 150mm for tread and bridges. Structures can vary.	150mm plus or minus 100mm for tread or bridges. Structures can vary.
Trail Surface	Hardened or smooth.	Mostly firm and stable.	Possible sections of rocky or loose tread.	Variable and challenging.	Widely variable and unpredictable.
Average Trail Grade	Climbs and descents are mostly shallow. Less than 5% average.	Climbs and descents are mostly shallow, but may include some moderately steep sections. 7% or less average.	Mostly moderate gradients but may include steep sections. 10% or less average.	Contains steeper descents or climbs. 20% or less average.	Expect prolonged steep, loose and rocky descents or climbs. 20% or greater average
Maximum Trail Grade	Max 10%	Max 15%	Max 20% or greater	Max 20% or greater	Max 40% or greater
Level of Trail Exposure	Firm and level fall zone to either side of trail corridor	Exposure to either side of trail corridor includes downward slopes of up to 10%	Exposure to either side of trail corridor includes downward slopes of up to 20%	Exposure to either side of trail corridor includes steep downward slopes or freefall	Exposure to either side of trail corridor includes steep downward slopes or freefall
Natural Obstacles and Technical Trail Features (TTFs)	No obstacles.	Unavoidable obstacles to 50mm (2") high, such as logs, roots and rocks. Avoidable, rollable obstacles may be present. Unavoidable bridges 900mm wide. Short sections may exceed criteria.	Unavoidable, rollable obstacles to 200mm (8") high, such as logs, roots and rocks. Avoidable obstacles to 600mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Unavoidable obstacles to 380mm (15") high, such as logs, roots, rocks, drop-offs or constructed obstacles. Avoidable obstacles to 1200mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Large, committing and unavoidable obstacles to 380mm (15") high. Avoidable obstacles to 1200mm may be present. Unavoidable bridges 600mm or narrower. Width of bridges is unpredictable. Short sections may exceed criteria.

APPENDIX D – CONSULTATION SUMMARY (WHITSUNDAY REGIONAL COUNCIL, 2021)



Consultation Summary

AIRLIE BEACH MOUNTAIN BIKE TRAILS

APPROACH

We recently prepared a Whitsunday Trails Concept Plan, proposing several mountain bike trails across the region.

Stage 1 of the project includes around 50km of new mountain bike trails located in the Conway National Park near Airlie Beach. The trail concepts for South Molle Island, Bowen, Proserpine and Collinsville will be considered for future stages of the project.

The consultation was open online for a period of 4 weeks on Your Say Whitsunday, between Monday 25 January and Friday 26 February 2021.

A public display was planned for the Airlie Beach markets on 20 February, however the event was rained out on the day.

Residents could have their say online, via email, post or by completing a survey at Customer Service Centres across the region.

WHO GAVE FEEDBACK?

335 submissions received

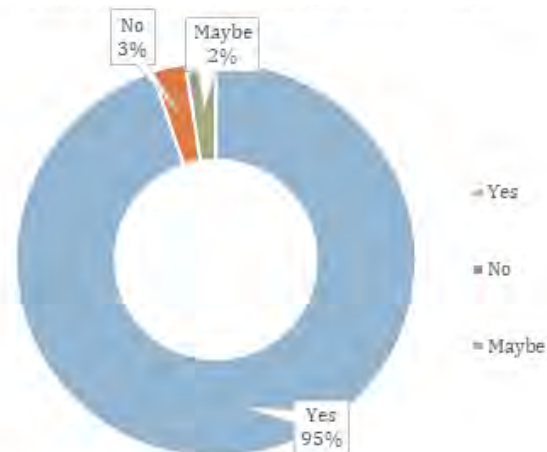
NEXT STEPS

The consultation results will be considered during the finalisation of the Whitsunday Trails Concept. The community's support and enthusiasm for our proposal is clearly demonstrated in the results.

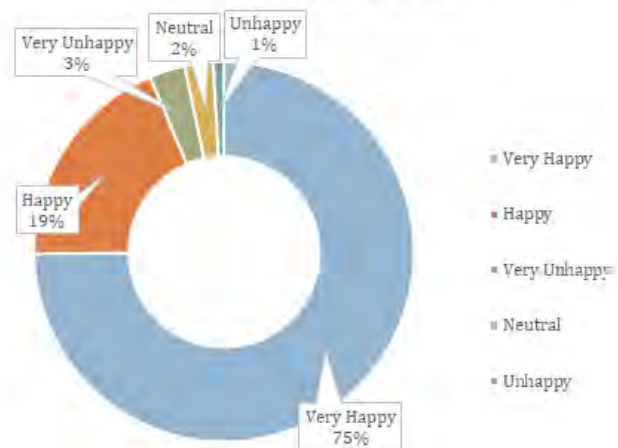
We will continue liaising with key stakeholders such as Queensland Parks & Wildlife and advocate for government funding to deliver Stage 1 of the project.

KEY RESULTS

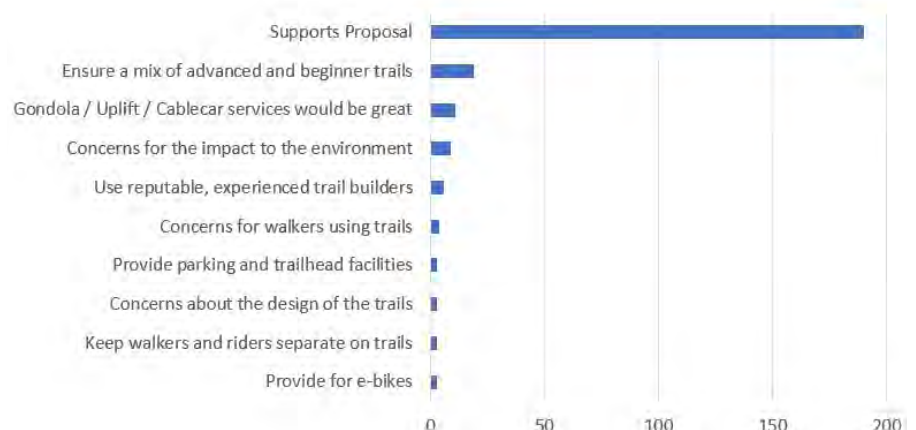
Q: *Would you be interested in riding dedicated mountain bike trails in Airlie Beach and surrounds?* **95% said 'Yes'**



Q: *Are you happy with the proposed concepts for mountain bike trails in Airlie Beach?* **94% said either 'Very Happy' or 'Happy'**



Top 10 Key Themes



APPENDIX E – SOIL AND LAND SUITABILITY ASSESSMENT (WTS, 2022)



SOIL AND LAND SUITABILITY ASSESSMENT

WHITSUNDAY SKYWAY

GAP TREECHANGE PTY LTD

NOVEMBER 2022



**WULGURU TECHNICAL
SERVICES**

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Document Control and History

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1. Introduction

The Whitsunday Skyway Project consists of a proposed cable car and mountain bike trail complex approximately 1km south of the Airlie Beach town centre. Wulguru Technical Services (WTS) has been engaged by GAP Treechange Pty Ltd (GAP) to undertake Soils and Land Suitability Assessments for the Whitsunday Skyway Project to inform components of the Site Impact Assessment Report.

This SLSA report provides a baseline understanding of soil and land resources, and their suitability. The SLSA focused on areas of previously undisturbed land, evaluating resources such as topsoil material availability, suitability for use in rehabilitation and potential constraints to plant growth.

1.1. Purpose and Objectives

The purpose of this report is to evaluate the soil mapping units and land resources available at the Whitsunday Skyway Project. The objectives of this SLSA are to:

- Identify and map soil mapping units and terrain that occurs within the ML;
- Classify and determine soil types according to observed and analysed physical and chemical characteristics;
- Validate land suitability classifications within the ML; and
- Validate topsoil resources.

1.2. Project Description

Australian Adventure Tourism Group (the Proponent) are proposing to construct the Whitsunday Skyway Project, an approximately 100 ha hectare project that will consist of 1 km cable car and 27 kms of mountain bike trails. The proposed network of mountain biking trails will be designed to position the region amongst the best mountain biking locations in Australia and Internationally with linkages to the walking trails of the wider Conway National Parks, subject to the approval of the Queensland State and Federal Governments. Mountain bike tracks are proposed to be constructed and operated within the Conway National Park and managed by Queensland Parks and Wildlife Services under the Eco-Facilities Framework with land tenure being secured under a lease for approximately 90ha of land with 3 x 30-year terms (Australian Adventure Tourism Group, 2022).

The project will result in land disturbance from the:

- Construction of cable car towers;
- Construction of access tracks;
- Construction of base stations at the base and top of the project area;
- Establishment of walking and mountain bike tracks; and
- Construction of ancillary infrastructure (car parks, power supplies, amenities etc).

The conservation of soil is critical for rehabilitation planning. It is required that the available soil resources and capping material be assessed. A soil assessment must be carried out that, at a minimum, identifies and characterises:

- the quality and quantity of available soil required to complete rehabilitation;
- the location and accessibility of cover material;
- an assessment to determine the need for ameliorants and fertilisers; and
- the relationship between soils and vegetation ecosystems for the final landform (State of Queensland,2022).

1.3. Project Location

The Whitsunday Skyway Project is located 1km from Airlie Beach town centre, north Queensland. The project is located within the Whitsunday Regional Council. Property details are included in Table 1.

Table 1. Property Description

Proponent Name – ABN	Australian Adventure Tourism Group
Lot on Plan	91 on SP201430, 90 on SP201430, 43 on NPW1144
Lot/Plan Area (ha)	~ 32,276
Project Area (ha)	102.89 ha
Local Government Area	Whitsunday Regional Council
Zoning	Environmental management and conservation, Recreation and open space & Low density residential

EPBC Act Referral Supporting Information Report – Whitsunday Skyway Project

Figure 1. Project Location

Legend

- Key Features
 - Major Roads
 - Protected Area
 - Study Area
- Google Satellite



Client: GAP Treechange Pty Ltd
Project number: 2022.08002
CRS: GDA2020 EPSG:7844
Date: 6 December 2022

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2. Existing Environment

2.1. Climate

The Whitsunday Skyway Project is situated within the Central Queensland Coast bioregion which has a sub-tropical to tropical climate with a distinct wet season and dry season. The closest weather station is the Hamilton Island Airport station (Station 033106). Mean climate data from the Hamilton Island weather station is displayed in Figure 2.

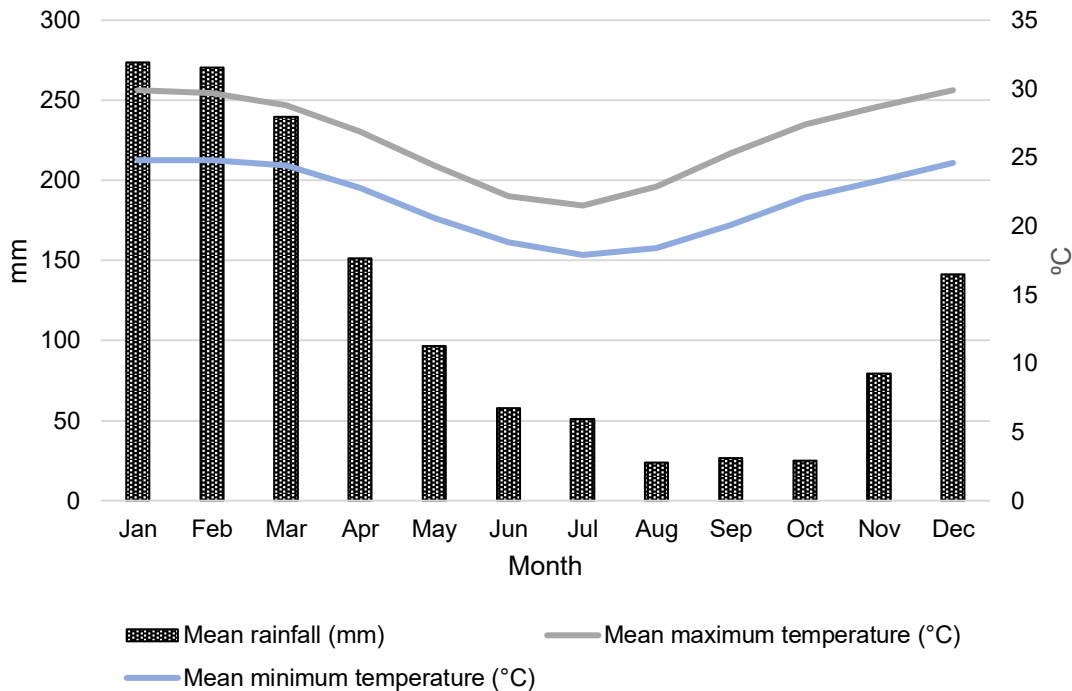


Figure 2. Mean Temperature and Rainfall at Hamilton Island Airport (033106)

2.2. Topography and Hydrology

The Whitsunday Skyway Project is characterised by steep undulated terrain of the Conway National Park, ranging from 420m AHD to 60m AHD. There is one mapped watercourse within the project area being Airlie Creek, a stream order 1 which discharges into the Coral Sea 1km north of the project area.

2.3. Geology

The Whitsunday Skyway Project is located within the Whitsunday Volcanic Province, dominated by medium- to high-grade, dacitic to rhyolitic lithic ignimbrites and intruded by gabbro/dolerite to rhyolite dykes (up to 50 m in width), sills and comagmatic granite (S.E. Bryan et al. 1999).

Site specifically, the project is underlain by two main geological units:

- Proserpine Volcanics - Rhyolite, andesite and minor volcanoclastics; and
- Airlie Volcanics - Felsic to intermediate volcanoclastics and lavas (S.E. Bryan et al. 1999).

2.4. Soils



The Whitsunday Skyway Project is situated within the Soils and Land Suitability of the Central Queensland Whitsunday Coast Area (1:50,000) survey area (S. Hardy, 2003). The soils at the site are labelled MTN which is a code used to classify areas not typically assessed in detail. No other information on soil is provided for the site under the Soils and Land Suitability of the Central Queensland Whitsunday Coast Area mapping.

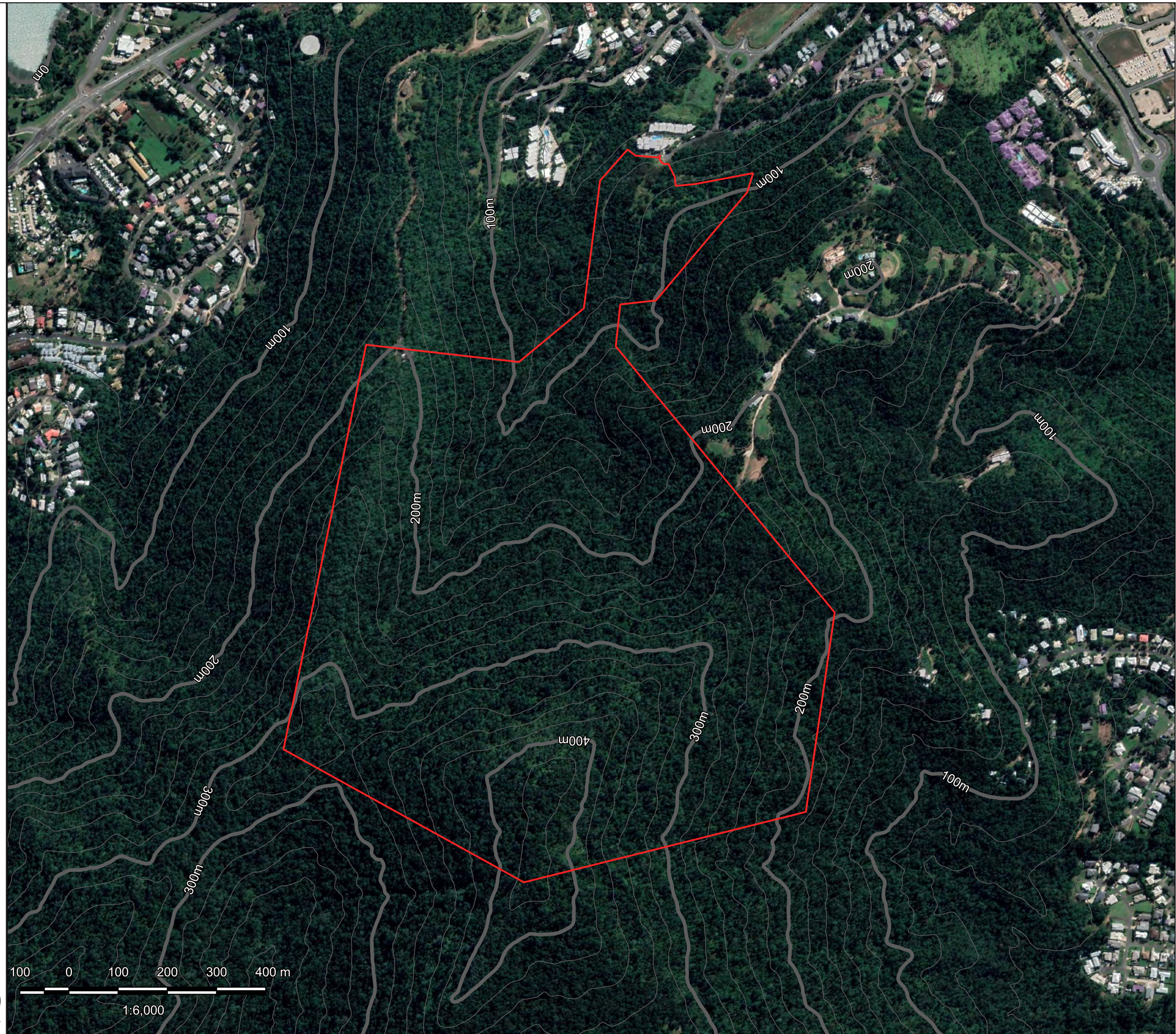
The site is also within the Atlas of Australian Soils (1:2,000,000) mapping area. The soils under this mapping are classified as ME2 - gradational brown, A2 horizon nonbleached, acid smooth-ped whole col B horizon (State of Queensland).

EPBC Act Referral Supporting Information Report – Whitsunday Skyway Project

Figure 3. Topography

Legend

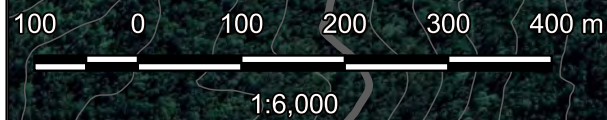
-  Study Area
-  20m Contour
- Google Satellite



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
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Figure 4. Geology

Legend

-  Study Area
- Surface Geology
 -  Airlie Volcanics
 -  Proserpine Volcanics
- Google Satellite



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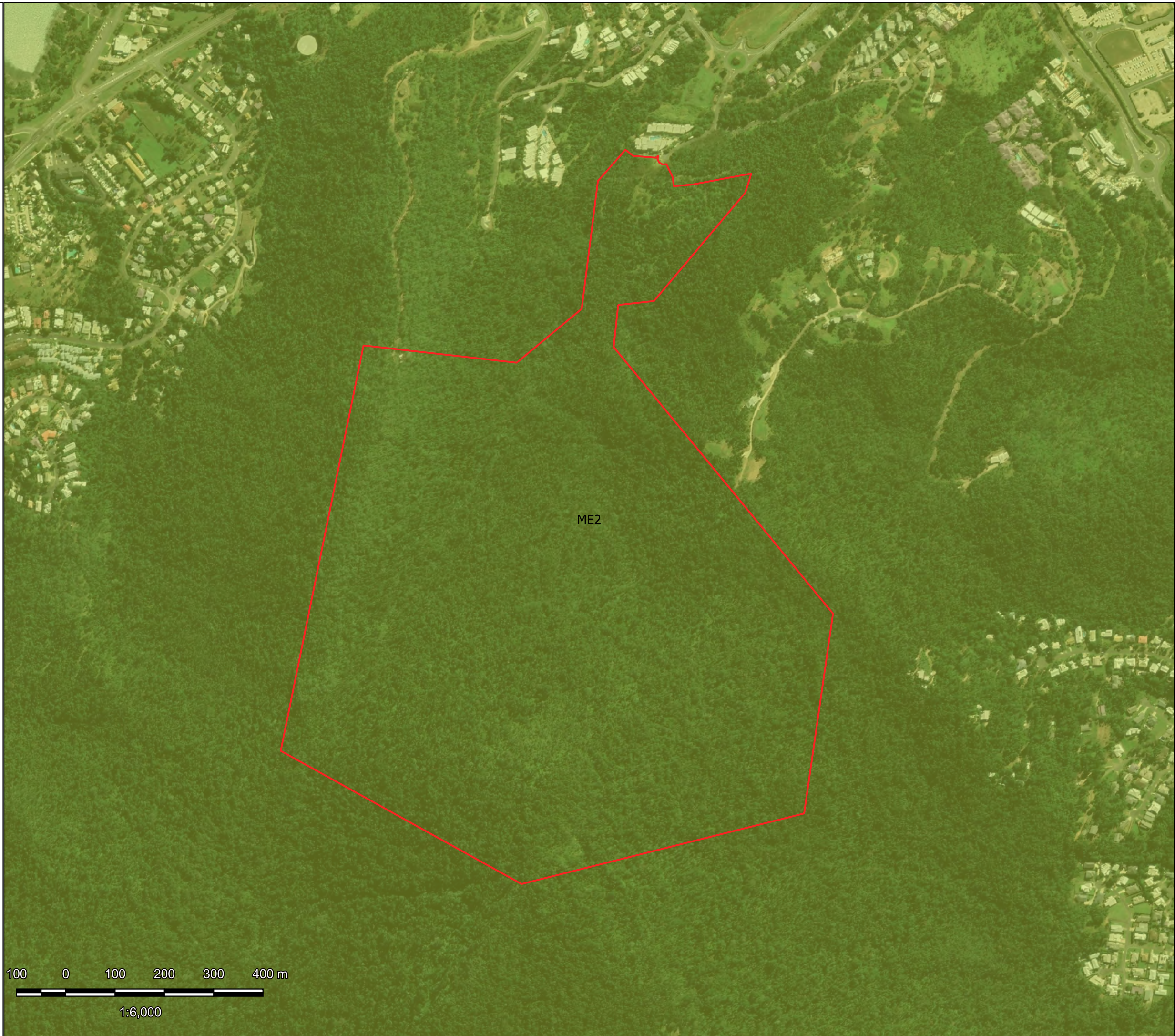


EPBC Act Referral Supporting Information Report – Whitsunday Skyway Project

Figure 5. Soils

Legend

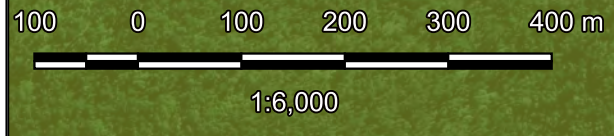
-  Study Area
- Atlas of Australian Soils
- Mapping Unit
-  Dermosol
- Google Satellite



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Project number: 2022.08002
CRS: GDA2020 EPSG:7844
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3. Soil Survey

The distribution of main soil types within the SLSA area were identified, validated and refined from the field survey, which was conducted according to land resource assessment guidelines (The National Committee on Soil and Terrain, 2009). The methods and results for the field and laboratory assessment are described herein.

3.1. Methodology

3.1.1. Background Information

Descriptions of soil types/ units and their distribution with landforms and parent material refer to the Australian Soil Resource Information System (ASRIS). Preliminary soil unit boundaries were developed from:

- Publicly available reports and data sources – Geological mapping, Qspatial databases, etc.
- Topographic mapping.

3.1.2. Field Investigations

A ‘free survey’ was adopted that complied with land suitability assessment criteria. Soil unit boundaries varied from abrupt/clear to gradual and trends were associated with variations along geological mapping units and topographic sequences. Professional judgement was utilised to identify appropriate reference and detailed observation sites, check sites were utilised to confirm soil boundaries and points of interest.

Survey design details relating to map scale and survey density were developed in accordance with McKenzie et al. (2008b) (Table 2). Two detailed observation sites were recorded with three submitted for laboratory analysis. Three check sites were sampled to determine soil boundaries and units. On this basis it is considered that the survey design was sufficiently detailed to assess soil properties and their distribution across the Assessment area.

Table 2. Field survey observations.

Class	Observations	Land Suitability	Actual for Project
	Minimum map scale	1:50,000	1:50,000
	Site density	1 Site/ 20 ha	1 Site/ 20 ha
	Total number	4	5
I	Detailed profiles	1*	2*
II	Reference profiles with laboratory data	0*	2*
III	Check Sites	3	3

*One reference site with laboratory analysis for each soil type identified.

3.1.3. Laboratory Analytes

Soils were classified from profile morphology and laboratory analyses according to the Australian Soil Classification (ASC) system. Laboratory samples were collected and submitted to a National Association of Testing Authorities (NATA) laboratory, ALS Environmental, for analysis of the following analytes:

- pH;
- Electrical conductivity;
- Moisture content;
- Particle size distribution;
- Exchangeable Cations;
- Bicarbonate Extractable Potassium;
- Sulphate;
- Chloride;
- Total metals (As, Cd, Cr, Cu, Fe, Pb, Ni, Zn, Hg);
- Nitrite plus Nitrate;
- Kjeldahl Nitrogen;
- Total Nitrogen;
- Total Phosphorus; and
- Total Organic Carbon.



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Figure 6 . Soil Sampling Locations

Legend

Study Area

Sampling Locations

Check Sites

Detailed Site

Google Satellite

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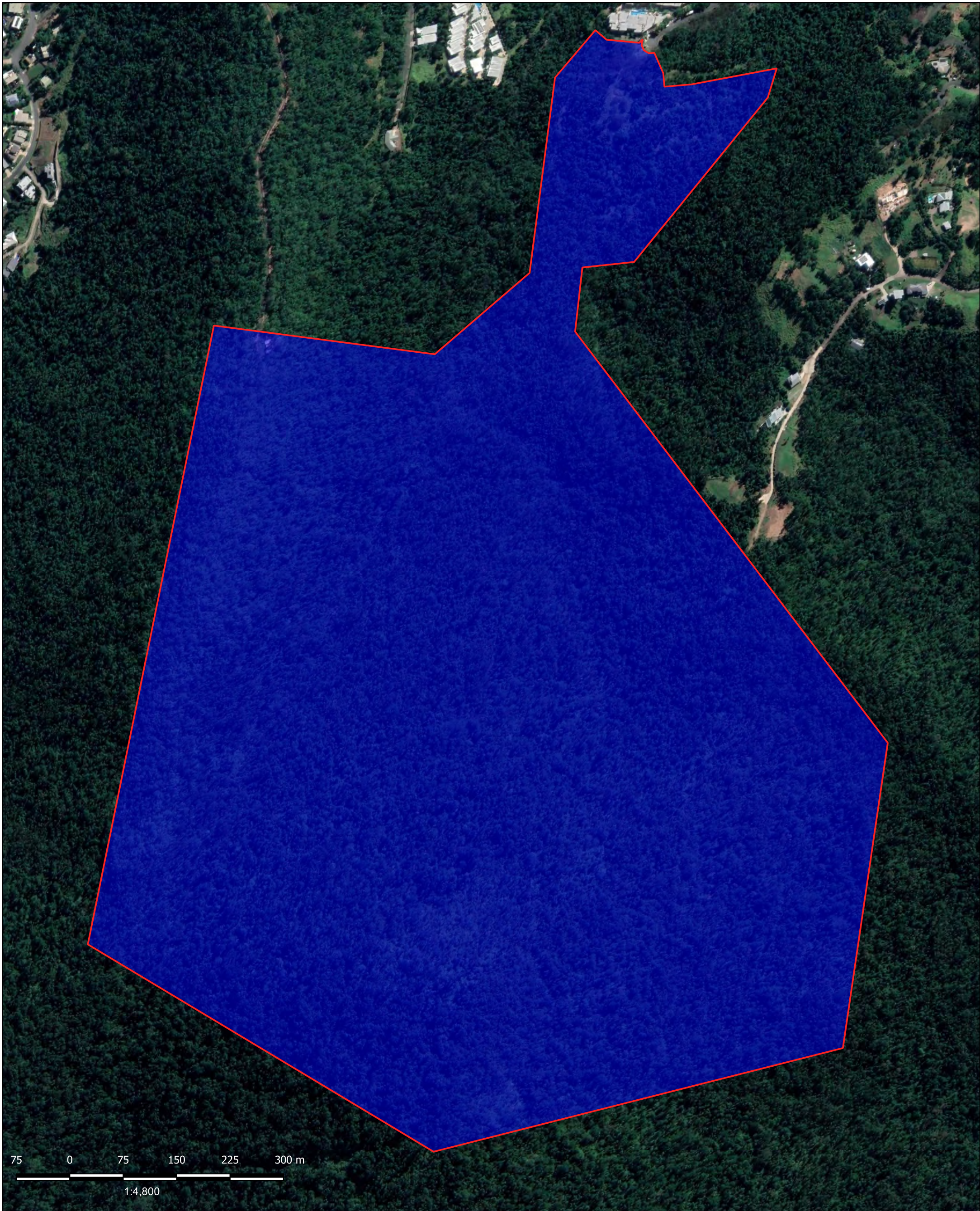
4. Results

4.1. Soil Map Units

WTS identified one soil map units across the Project. Representative soil profiles are described in Table 3 and the distribution of soils is mapped in Figure 7.

Table 3. Representative Soil Profiles Soil Management Unit Reference Site Area (ha) Area (percentage)

Soil Management Unit	Reference Site	Area (ha)	Area (%)
Brown Eutrophic Dermosol	S1, S2	100	100



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Figure 7 . Soil Mapping Units

Legend


- Study Area
- Brown Eutrophic Dermosol

Google Satellite

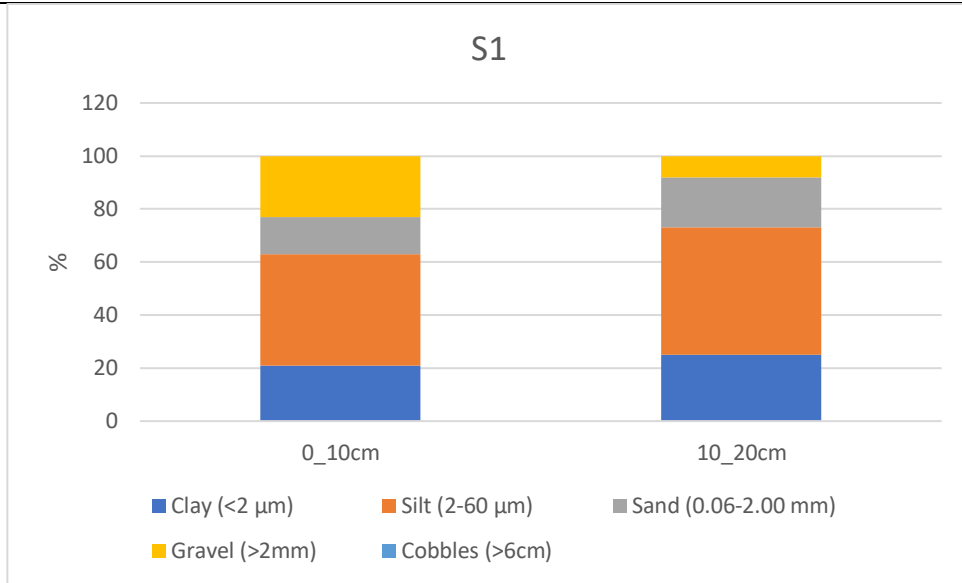
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4.2. Soil Profile 1 – Brown Eutrophic Dermosol

Project: 2022.08002		Site: S1						
Location: Airlie Beach, Qld Described by: MA Date: 19/09/2022								
Site Description Geology: Pvl Landform pattern: Mid-slope Element: - Permeability: - Microrelief: N/A Microrelief component: N/A Drainage: well Slope: 10-20% Rock outcrops: Very Rocky Surface coarse fragments: Many Surface condition: Loose Disturbances: Minimal (National Park)								
Australian Soil Classification:								
Profile Morphology								
Horizon	Depth (cm)	Description						
A1	0 – 10	Silt loam – dark redish brown (3/2 5 YR), medium to strong pedality (5-10mm, subangular blocky, earthy), few segregations (medium size, rock fragments), common to many roots (fine to coarse).						
B1	10 - 20	Silt loam –redish brown (4/3 5 YR), medium pedality (5-10mm, subangular blocky, earthy), few segregations (medium size, rock fragments), Common to many roots (fine to coarse).						
Depth (cm)	pH	EC (µS/cm)	Nitrite + Nitrate as N (NO _x)	TKN (mg/kg)	TN (mg/kg)	TP (mg/kg)	TOC (%w/w)	Colwell K (mg/kg)
0-10	7	74	25.7	4060	4080	888	6.24	670
10-20	6.7	57	21.3	2200	2220	1730	3.91	513
Depth (cm)	Exc. Na (meq/100g)	Exc. K (meq/100g)	Exc. Ca (meq/100g)	Exc. Mg (meq/100g)	Cation Exc. Capacity (meq/100g)	ESP (%)	Ca:Mg Ratio	S (mg/kg)
0-10	0.1	0.9	21.2	6.4	28.6	0.5	3.3	10
10-20	0.1	0.7	17.4	5.6	23.9	0.6	3.1	10

Particle Size Distribution



5. Land Assessment

5.1. Land Suitability Assessment

Land Suitability has been assessed using the methods and criteria provided in the Guideline for Agricultural Land Evaluation (Department of Science Information Technology and Innovation and Department of Natural Resources and Mines, 2015) and Guideline for Land Suitability Assessment Techniques (Department of Mines and Energy, 1995) and with reference to the Regional Land Suitability Frameworks for Queensland - Suitability framework for the Mackay and Whitsunday area (Department of Science, Information Technology, Innovation and the Arts , 2013). This assesses how suitable an area of land is for major rural agricultural enterprises (Groups A to F).

The Land Suitability assessment cross-references each soil unit's characteristics with suitability criteria from Department of Mines and Energy (1995). The Land Suitability assessment uses a five-class system, where Class 1 indicates that the land is most suitable for the enterprise and Class 5 the least suitable. The overall land suitability ranking for each specific soil unit is determined by the most severe limitation, or a combination of the varying limitations. Land is considered less suitable as the severity of limitations for a land use increases. The increasing limitations may reflect any combination of:

- Reduced potential for production;
- Increased inputs to achieve an acceptable level of production; and/or
- Increased inputs required to prevent land degradation.

The Land Suitability Classes are described in Table 4.

Table 4. Land Suitability Classes

Class	Suitability	Limitations	Description
1	Suitable	Negligible	Highly productive land requiring only simple management practices to maintain economic production.
2	Suitable	Minor	Land with limitations that either constrain production, or require more than the simple management practices of class 1 land to maintain economic production.
3	Suitable	Moderate	Land with limitations that either further constrain production, or require more than those management practices of class 2 land to maintain economic production.
4	Unsuitable	Severe	Currently unsuitable land. The limitations are so severe that the sustainable use of the land in the proposed manner is precluded. In some circumstances, the limitations may be surmountable with changes to knowledge, economics or technology.
5	Unsuitable	Extreme	Land with extreme limitations that preclude any possibility

			of successful sustained use of the land in the proposed manner.
--	--	--	---

WTS' analysis provides a considered approach to land suitability assessments whereby each soil management unit's characteristics have been cross-referenced against Department of Mines and Energy (1995) and Guidelines for Agricultural Land Evaluation in Queensland (Department of Science Information Technology and Innovation and Department of Natural Resources and Mines, 2015). The overall land suitability class for each SMU is determined by the most severe limitation, or a combination of varying limiting components under both the rainfed broadacre cropping and beef cattle grazing.

5.1.1. Plant Available Water Capacity and Effective Rooting Depth

The primary land suitability assessment attribute is 'moisture'. The indicator for moisture is Plant Available Water Capacity (PAWC). PAWC is an estimate of the amount of moisture stored in the soil profile that is available for plant extraction. It is generally defined as the difference between field capacity and permanent wilting point. PAWC is calculated for the soil profile by summing the available water capacity over the soil's effective rooting depth (ERD). For the purposes of this assessment, PAWC is calculated based on the soil texture methods detailed in *How to demonstrate that land in the strategic cropping area does not meet the criteria for strategic cropping land* (Department of State Development Manufacturing Infrastructure and Planning, 2014). Soil water storage based on field texture is outlined in Table 5.

Table 5. Soil Texture Table (Department of State Development Manufacturing Infrastructure and Planning, 2014)

Soil Texture	Soil Water Storage
Sand; clayey sand; loamy sand	4 mm / 100 mm
Sandy loam	5 mm / 100 mm
Loam; silty loam; sandy clay loam	6 mm / 100 mm
Clay loam; clay loam, sandy; silty clay loam	8 mm / 100 mm
Silty clay; clays with <45% clay fraction	10 mm / 100 mm
Clays with >45% clay fraction	12 mm / 100 mm

Effective rooting depth is defined as the soil depth to which 90% of the plant roots will extract water and can be estimated through observed rooting depth, soil chemical parameters or a standardised soil rooting depth (McKenzie et al., 2008a). For the purposes of this assessment methodologies employed to determine ERD, and subsequently PAWC are determined based on guideline *How to demonstrate that land in the strategic cropping area does not meet the criteria for strategic cropping land* (Department of State Development Manufacturing Infrastructure and Planning, 2014) (Table 6).

Table 6. Effective Rooting Depth Criteria

Descriptor	ERD Limitation Threshold
Electrical Conductivity	> 0.8 dS/cm
Chloride	> 800 ppm
Sodicity	> 15%
pH	<= 5.0
Soil Structure	Moderate or strong columnar structure. Sandy free draining horizons. Significant rock content.

1.1.1.1. Water Availability

PAWC thresholds for land suitability classes are as follows:

- **Class 1:** > 125 mm;
- **Class 2:** 100 – 125 mm;
- **Class 3:** 75 – 100 mm;
- **Class 4:** 50 – 75 mm;
- **Class 5:** <50 mm.

The thresholds stated are based on pasture generally, and do not account for specific pasture species. Land Suitability Classes are described in Table 7.

Table 7. Water Availability

SMU	ERD	PAWC	Land Suitability Class
Brown Eutrophic Dermosol	20cm	20cm	4

1.1.1.2. Climate

Climate restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in **Table 8**.

Table 8. Climate

SMU	Description	Land Suitability Class
Brown Eutrophic Dermosol	Mean annual rainfall 1200 to 1600 mm	1

1.1.1.3. Climate, frost

Climate (frost) restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in **Table 9**.

Table 9. Climate, frost

SMU	Description	Land Suitability Class
Brown Eutrophic Dermosol	Frost Free	1

1.1.1.4. Water erosion

Water Erosion restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in **Table 10**.

Table 10. Water Erosion

SMU	Description	Land Suitability Class
Brown Eutrophic Dermosol	Gradational and uniform soils, slope 14-20%	4

1.1.1.5. Flooding

Water Erosion restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in Table 11.

Table 11. Flooding

SMU	Description	Land Suitability Class
Brown Eutrophic Dermosol	Not flooded	1

1.1.1.6. Narrow Moisture Range

Narrow moisture range restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in **Table 12**.

Table 12. Narrow Moisture Range

SMU	Description	Land Suitability Class
Brown Eutrophic Dermosol	Firm to hard setting surface, moderate to strong subangular-blocky to angular blocky structured A horizon, usually clay loam texture	1

1.1.1.7. Surface condition

Surface condition restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in Table 13.

Table 13. Surface Condition

SMU	Description	Land Suitability Class
-----	-------------	------------------------

Brown Eutrophic Dermosol	Hard setting surface, sandy loam to clay loam	3
--------------------------	---	---

1.1.1.8. Rockiness

Rockiness for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in Table 14.

Table 14. Rockiness

SMU	Description	Land Suitability Class
Brown Eutrophic Dermosol	> 50 % surface stone (200-600 mm)	5

1.1.1.9. Salinity

Salinity restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in **Table 15**.

Table 15. Salinity

SMU	Limitation	Land Suitability Class
Brown Eutrophic Dermosol	Electrical Conductivity 1:5 < 0.6 dSm	1

1.1.1.10. Wetness

Salinity restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in **Table 16**.

Table 16. Wetness

SMU	Limitation	Land Suitability Class
Brown Eutrophic Dermosol	Well drained to depth 0.5m	1

1.1.1.11. Topographic complexity

Topographic complexity restrictions for each SMU is based on thresholds in Department of Mines and Energy (1995) and presented in Table 17.

Table 17. Topographic Complexity

SMU	Limitation	Land Suitability Class
Brown Eutrophic Dermosol	The landscape is strongly dissected by gullies	4

1.1.1.12. Summary of Land Suitability Class

Overall, SMUs were found to be limited by water erosion, rockiness and topographic complexity. These factors combined to limit agricultural productivity/suitability of the soils across the Site. Summary of Land Suitability Class is provided in Table 18.

Table 18. Summary of Land Suitability Classes

Limitation	Brown Mellic Kandosol
Climate	1
Climate, frost	1
Water Erosion	4
Flooding	1
Narrow Moisture Range	1
Surface Condition	3
Rockiness	5
Salinity	1
Wetness	1
Topographic Complexity	4
Land Suitability Class	5

5.2. Soil Resource Assessment

Topsoil resources are predominantly limited to surface soil horizons, with the upper horizons maintaining seedbank, micro-organisms, nutrients and organics necessary for plant growth and establishment. Generally, soil nutrients and micro-organism activity decrease with depth.

Soil resources are based on factors such as ERD, PAWC, nutrient availability, sodicity, etc. and represent the recommended maximum stripping depth for stockpiling and future rehabilitation. Generally, soil stripping should be timed based on favourable climatic conditions to avoid soil loss, compaction or erosion. Two stage stripping is recommended where sub soils may be encountered, unless topsoil can be recovered in a single pass. Topsoil resources should be placed directly onto rehabilitation areas as soon as possible to limit handling. Where stockpiling is required, it is recommended that stockpiles be shaped to no greater than 2 m high, and stabilised using suitable erosion and sediment controls (e.g. hydromulch, jute mesh, etc.).

Table 19 details the maximum soil resources stripping depths and potential volumes available for use.

Table 19. Maximum Soil Resource Stripping Depths and Potential Volumes Available

SMU	Stripping Depth (m)	SMU Area (m ²)	Potential Available (m ³)	Volume
Brown Eutrophic Dermosol	0.1	1028999	102,899	

Respreading of soil resources should occur on prepared, reshaped areas as soon as possible. Where soil resources allow, soils should be spread to a nominal depth of ~20cm on all re-graded spoil or disturbance areas. Soil resources should be spread with fertiliser and seed in one consecutive operation to reduce the potential for soil losses to wind and water erosion.

5.3. Land Stability

5.3.1. Erosion Hazard (Average Rainfall)

The International Erosion Control Association's (IECA) Best Practice Erosion and Sediment Control Guidelines (IECA 2008) sets erosion hazard based on average rainfalls for regions around Australia. IECA erosion hazard for the Mackay is detailed in Table 20.

Table 20. Erosion Hazard (IECA, 2008)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E	E	H	H	M	M	VL	VL	VL	M	M	H

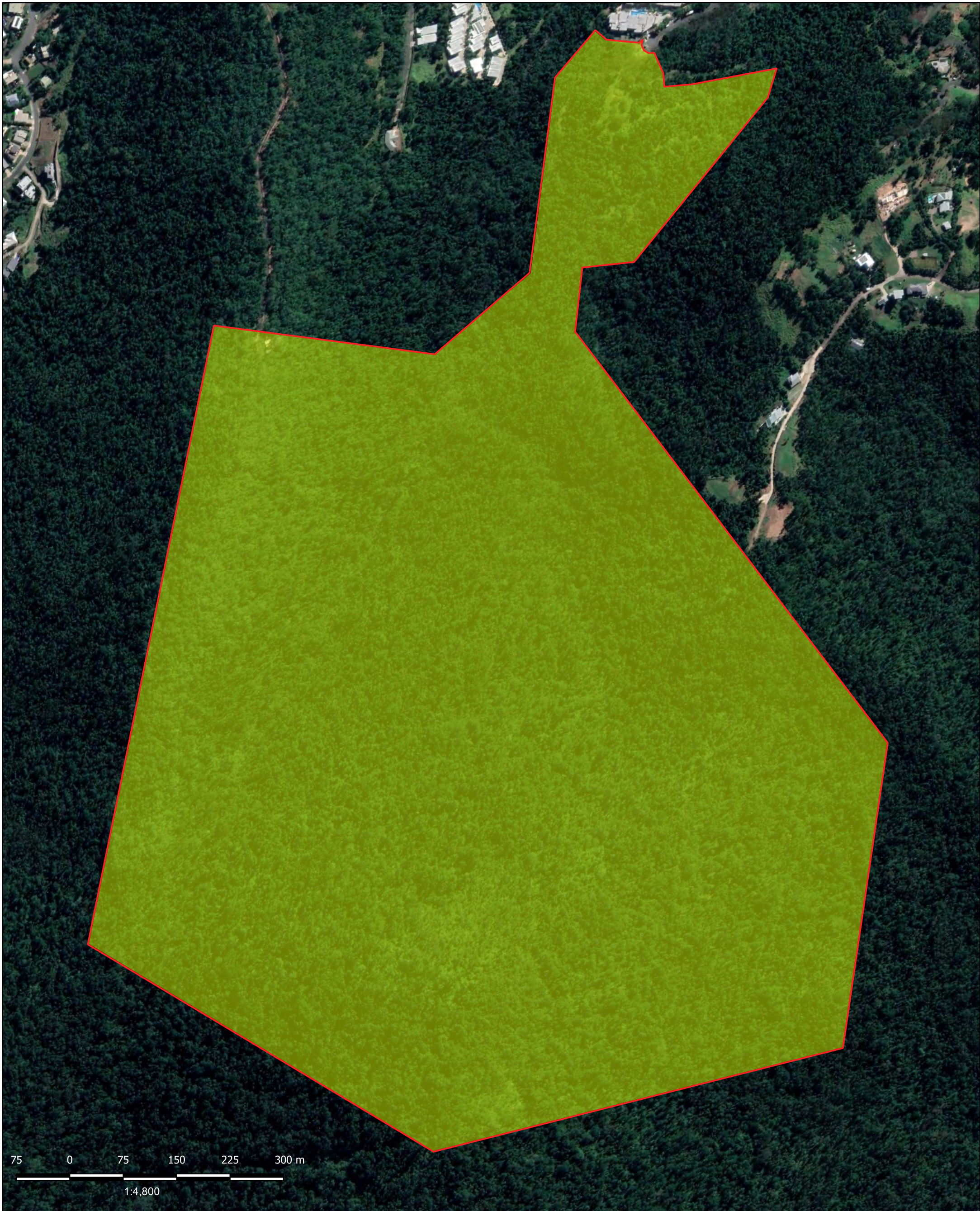
5.3.2. Soil Erosion Susceptibility

An assessment of soil erosion susceptibility is given in Table 21, which lists influencing factors for both soil types that have been identified.

Table 21. Soil Erosion Susceptibility

Soil Type	Depth (cm)	Texture	ECEC (meq/100g)	Rating	ESP (%)	Rating	Landform	Vegetation Cover	Erosion Susceptibility
Brown Eutrophic Dermosol	0-10	Silt loam	28.5	Moderate	0.5	Non sodic	Mid Slope/Upper Slope (10-20%)	<2%*	Moderate
	10-20		25.15	Moderate	0.5	Non sodic			

*Very high leaf litter cover.



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Figure 8. Erosion Hazard

Legend

- Study Area
- Low Erosion Hazard

Google Satellite

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5.3.3. Erosion and Sediment Control

The erosion risk as a part of this considered moderate given the slope of the project area. Prior to development, an Erosion and Sediment Control Plan (ESCP) will be developed to manage the erosion and sediment risks associated with construction and operational activities and moderate erosion risk. Typical Erosion and Sediment Control (ESC) management measures which may be implemented at the project are detailed below.

5.3.3.1. General Erosion and Sediment Control Principles

ESC measures are designed to control/manage erosion and sediment that may result from construction and operational activities. General ESC principles include:

- Installation of ESC measures prior to land disturbance;
- Minimising all disturbed areas and stabilisation as much as possible by conducting progressive rehabilitation/stabilisation as soon as practical;
- Maintaining vegetative buffer zones where possible;
- Delineating areas required to be disturbed and ensuring that disturbance is limited to those areas;
- Construction of diversion bunds upslope of disturbance to direct clean water runoff away from disturbed areas;
- Applying gypsum, where required to reduce the dispersibility of the subsoils that will be disturbed as required;
- Construction of drains to capture runoff from disturbed areas and direct runoff into sediment ponds (if required);
- Implementation of other type 3 ESC measures as required (sediment fences, coir logs etc.);
- Adding flocculent to basins where required to aid the settlement of entrained sediment;
- Construction of graded banks over final reshaped landforms to minimise erosion and re-direct runoff to catch drains;
- Regular maintenance of ESCs and inspection of all works will be under taken after storm events;
- Topsoil stockpiles located away from operational areas;
- Revegetation of final landforms as soon as possible; and
- Repair ESCs that are not performing adequately, as identified in field inspections.

5.3.3.2. Disturbance Minimisation

Any clearing works is to be undertaken in a manner that minimises open areas to the smallest practical areas ahead of construction activities. All clearing/land disturbances are to be conducted while implementing the following controls:

- Limiting land clearing to the area specifically required for construction activities.
- Land disturbances are to be carried out 50m from a watercourse.
- Survey of areas to be disturbed are required to be conducted prior to disturbance to ensure areas are not over cleared.
- Limiting the amount of access points to a working area

5.3.3.3. Management of Runoff

Disturbance areas are to be stripped of topsoil prior to the commencement of construction. Areas are stripped to the designated stripping depth dependant on soil type. Where possible, topsoils are to be immediately applied to rehabilitation areas for reuse. Where stockpiling is required for an extended amount of time, topsoils are to be transported to the topsoil stockpile areas. Stockpiles are to be no more than 2m in height and have a slope ratio of no more than 2 (H): 1 (V). to preserve biological viability and reduce soil deterioration. Where areas of disturbance are minimal soils are to be stockpiled as bunds on the upstream boundary of the disturbance area.

5.3.3.4. Rehabilitation

Disturbed areas of the development are to be rehabilitated where areas are no longer required for construction or operations. The basic rehabilitation steps include:

- Decommission and removal of infrastructure.
- Removal all surfaces (concrete footings, culverts road base etc.).
- Removal of any contaminated material (if any).
- Shape landform to be free draining and of similar shape to the surrounding topography.
- Rip landform parallel to landform contours.
- Apply growth media (topsoil).
- Monitor to assess revegetation establishment.

5.3.3.5. Drainage Controls

Clean Water Diversions

Clean water diversions will be constructed on the upstream perimeter of disturbance areas to convey clean water runoff away from disturbed areas and reduce the catchment of runoff requiring retention and treatment. Clean water runoff will be diverted around disturbance areas and conveyed into nearby watercourses. Clean water diversions will either consist of a bund which will concentrate flow

along the tow of the bund away from disturbance areas or catch drains can be installed upslope of the disturbance area. Where subsoils are sodic, catch drains are not recommended and bunds are preferred to be installed to limit the risk of dispersive material being exposed to runoff.

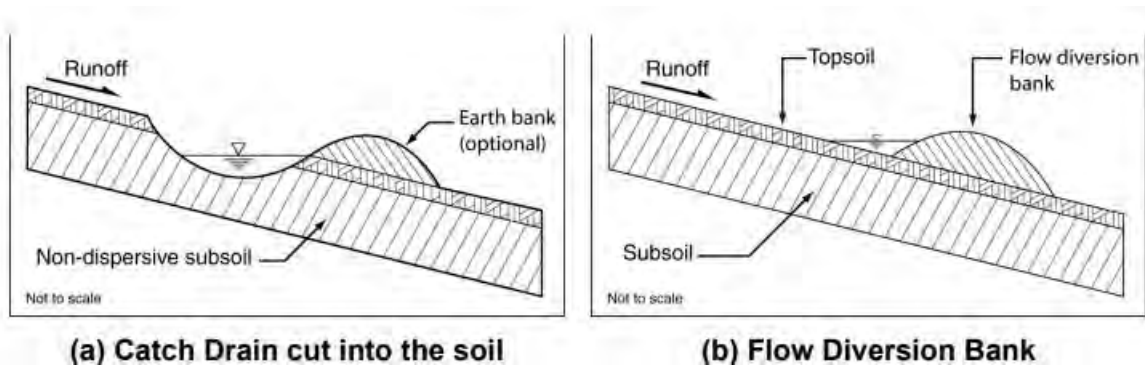


Figure 9. Diversion Bank Options (IECA,2008)

Cross Bank Drainage

Cross bank drains are to be installed on unsealed tracks to divert water mitre drains. Cross Bank drains at DRM will be formed as Whoa Boys which divert waters off the road or access track at designated intervals. Whoa boys are to be installed at a height that adequately diverts runoff while also being wide enough to allow for comfortable vehicle passage. IECA Best practice in ESC guideline (2008) outlines that Whoa Boys are to be sized dependant on Erosion Risk (Table 22).

Table 22. Whoa Boys Spacing (IECA,2008)

Road Grade	Horizontal Spacing (m)
1%	100
2%	60
3%	50
5%	40
10%	30
>14%	20

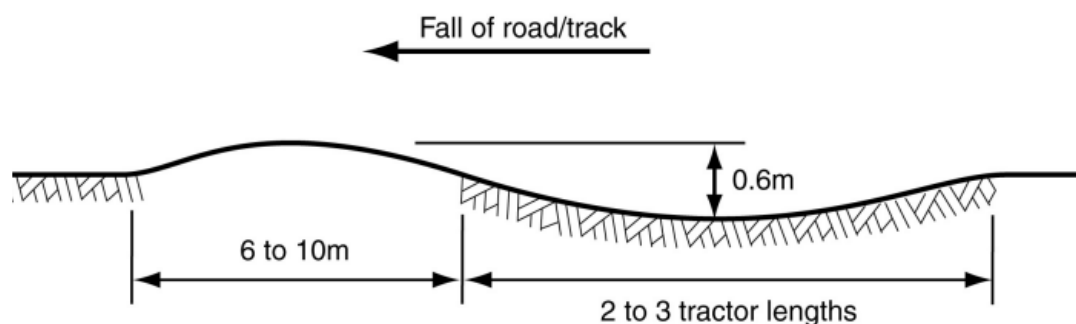


Figure 10. Typical Whoa Boy Design

Mitre Drains

Mitre drains are open channels built parallel to roads and tracks which direct runoff from Whoa boys for disposal. Mitre drains will convey waters to an energy dissipater at the mitre drain outlet which will allow waters to discharge as sheet flow into the receiving environment. The spacing of Mitre drains will be dependent on the spacing of Whoa Boys however, standard spacing for Mitre drains are detailed in Table 23.

Table 23. Mitre Drain Spacings Along Roadside Table Drains (IECA,2008)

Road Grade	Horizontal Spacing (m)
<1%	>150
2%	100
5%	60
10%	40
>10%	15

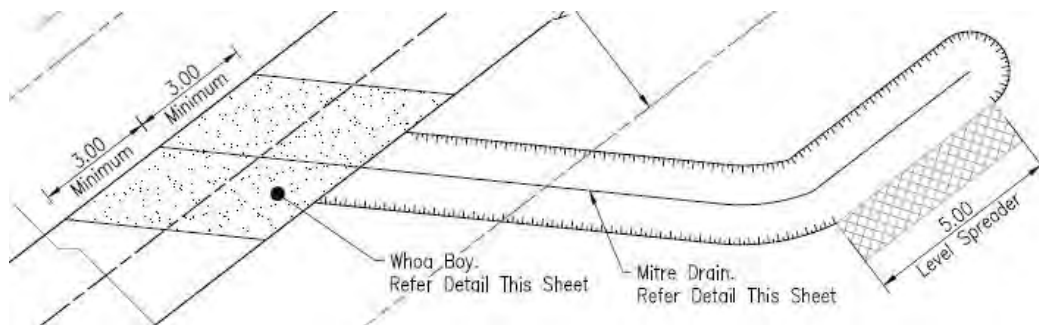


Figure 11. Typical Whoa Boy & Mitre Drain Design

Waterway Crossings

Waterway crossings are required where access tracks cross watercourses. Waterway crossings will be installed as “dry” and “wet” waterway crossings as per the schematics below. The following is to be considered when installing waterway crossings:

- Soil is not stockpile in watercourses
- Disturbance of stream bed is to be minimised as much as practical
- Disturbance of the stream bed is kept to a minimum.

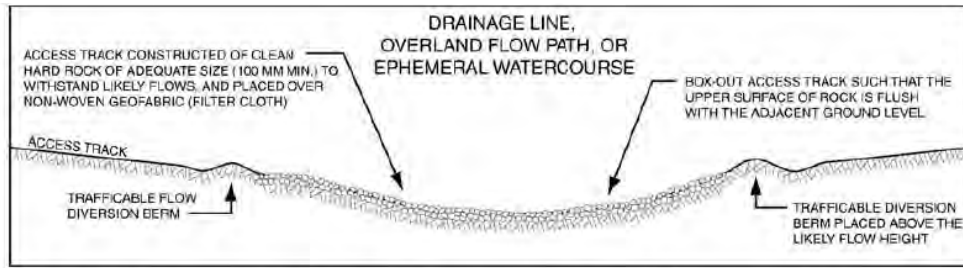


Figure 16. Typical profile of a bedlevel vehicle crossing for a 'dry' drainage line (IECA, 2015).

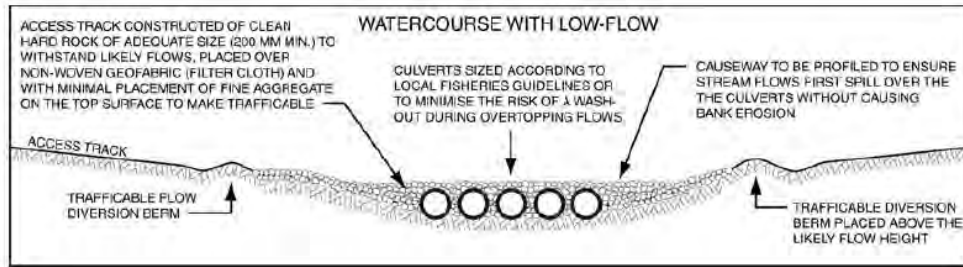


Figure 12. Bed Level Crossing Options

5.3.3.6. Sediment Controls

Sediment Basins

Sediment basins will be required where soil loss risk is moderate to high. Sediment basins will be designed to capture runoff which is then able to be treated and discharged. Sediment basins will have to be designed for IFD: 2-year, 6-hour storm. Typical Sediment Basin design is included in Figure 13.

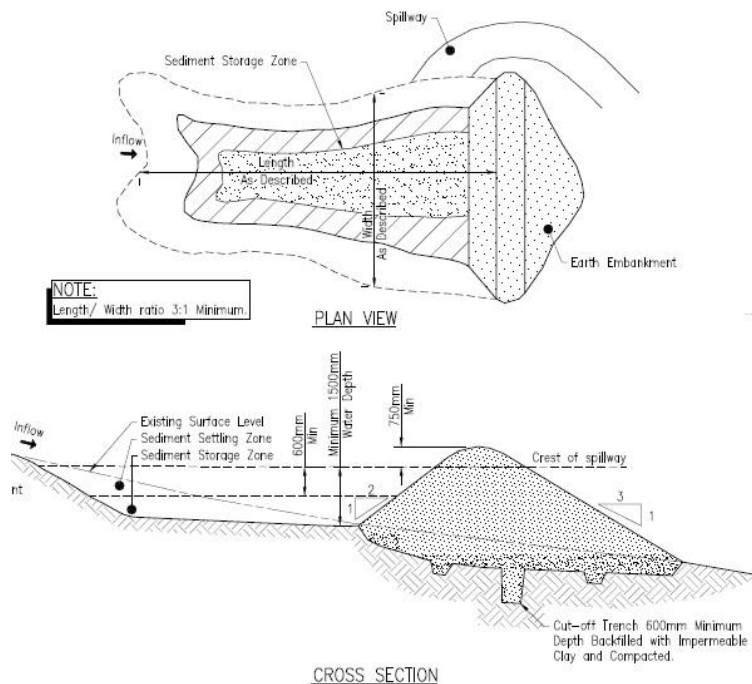


Figure 13 Typical Sediment Basin Design

Level Spreader

Where there is a low to very low erosion risk within a sub-catchment, level spreaders are to be installed. Level spreaders convert concentrated flow to sheet flow to avoid high velocity waters entering the environment and causing erosion and sediment loss. Level spreaders are to be installed at the outfall of a subcatchment. The slope of the landform must be $<1\%$ and the landform receiving discharged runoff must be stable and non-sodic. Typical Level spreader design is displayed in Figure 14.

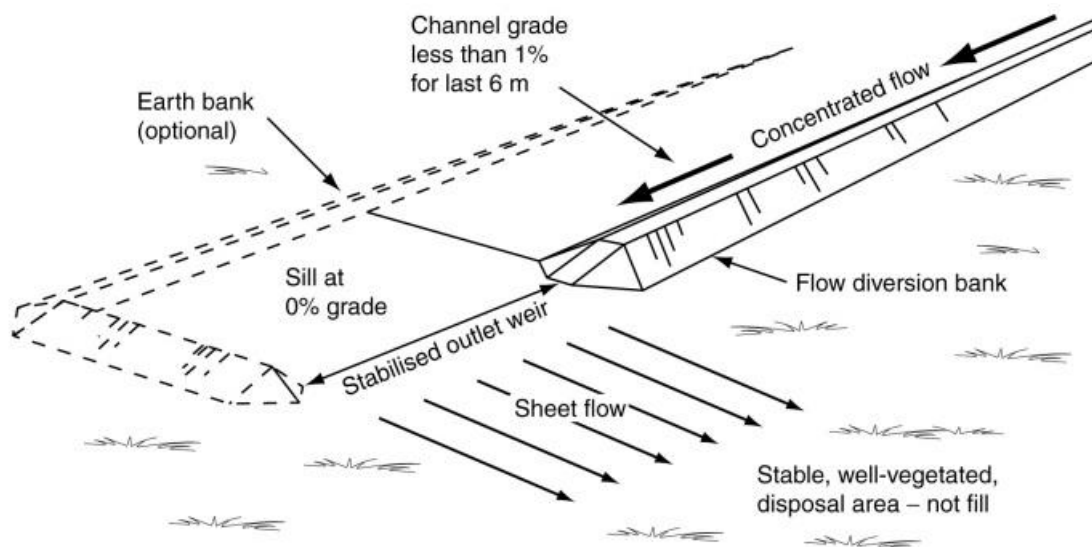


Figure 14. Typical Level Spreader

Type 3 Controls

Type 3 ESCs are to be implemented where there is a low to very low erosion hazard. Type 3 controls to be installed will predominantly be sediment fences. Sediment fences are constructed using geotextile filter fabric with steel pickets to be spaced no more than 2.5 metres apart. These are to be installed on the downstream of the areas disturbed and are to be installed parallel to the landform contours, with the upslope catchment is to grade of no more than 1V: 2H. Sediment fences are not to be installed in high velocity flows and where upstream catchments exceed 0.6 hectares. Where practicable, catchment areas are to be reduced by constructing fences with returns at 20 metres to create smaller catchments.

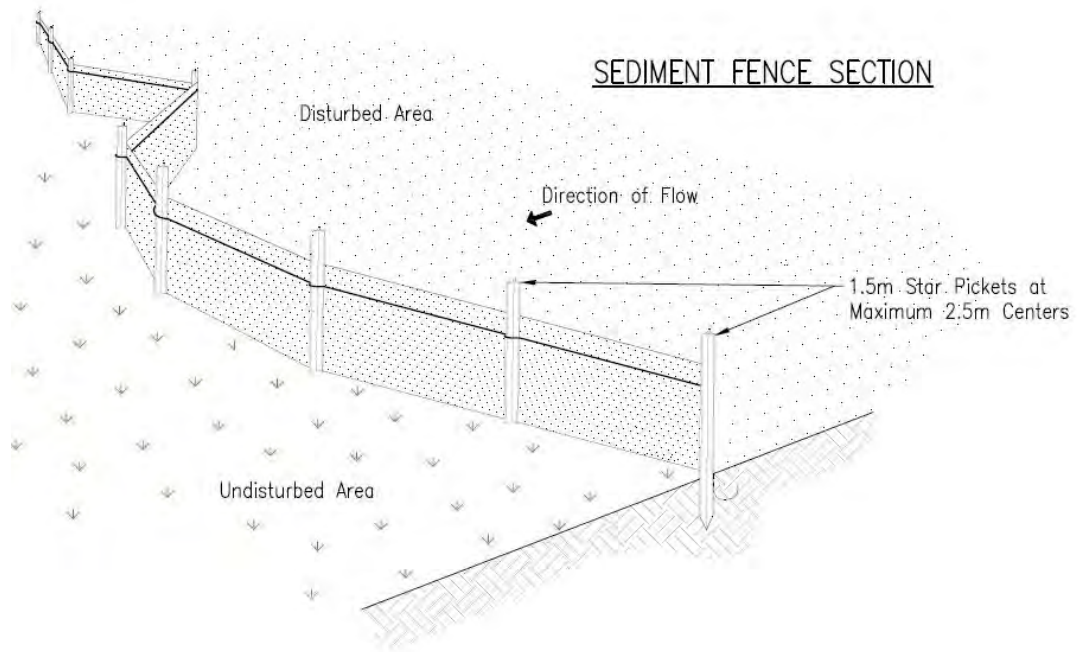


Figure 15. Typical Sed Fence Design

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Appendix A – Certificates of Analysis

CERTIFICATE OF ANALYSIS

Work Order : **EB2228892**
Client : **WULGURU TECHNICAL SERVICES PTY LTD**
Contact : MATTHEW AYRE
Address : 17 MUELLER ST WULGURU QLD
 WULGURU 4811
Telephone : ----
Project : 2022.08002_Skyway Soils
Order number : ----
C-O-C number : ----
Sampler : MATTHEW AYRE
Site : ----
Quote number : TV/140/21
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 4
Laboratory : Environmental Division Brisbane
Contact : Customer Services EB
Address : 2 Byth Street Stafford QLD Australia 4053

Telephone : +61-7-3243 7222
Date Samples Received : 23-Sep-2022 08:40
Date Analysis Commenced : 06-Oct-2022
Issue Date : 13-Oct-2022 14:56



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
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Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
∅ = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA150H: Soil particle density results fell outside the scope of AS1289.3.6.3. Results should be scrutinised accordingly.
- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- EG067G (Total Phosphorus): Sample EB2228474_001 shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H⁺ + Al³⁺).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SKY_S1_0_10	SKY_S1_10_20	SKY_C1_0_10	SKY_C1_10_20	----
				Sampling date / time	19-Sep-2022 00:00	19-Sep-2022 00:00	20-Sep-2022 00:00	20-Sep-2022 00:00	----
Compound	CAS Number	LOR	Unit		EB2228892-001	EB2228892-002	EB2228892-003	EB2228892-004	-----
				Result	Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		7.0	6.7	7.1	6.8	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		74	57	64	18	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		20.1	18.7	31.8	14.8	----
EA150: Particle Sizing									
+75µm	----	1	%		36	26	23	17	----
+150µm	----	1	%		31	21	20	14	----
+300µm	----	1	%		29	17	19	14	----
+425µm	----	1	%		28	15	19	14	----
+600µm	----	1	%		27	14	18	13	----
+1180µm	----	1	%		24	10	17	13	----
+2.36mm	----	1	%		22	7	15	12	----
+4.75mm	----	1	%		18	3	13	11	----
+9.5mm	----	1	%		13	<1	10	8	----
+19.0mm	----	1	%		<1	<1	<1	<1	----
+37.5mm	----	1	%		<1	<1	<1	<1	----
+75.0mm	----	1	%		<1	<1	<1	<1	----
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		21	25	18	9	----
Silt (2-60 µm)	----	1	%		42	48	58	73	----
Sand (0.06-2.00 mm)	----	1	%		14	19	9	5	----
Gravel (>2mm)	----	1	%		23	8	15	13	----
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	----
EA152: Soil Particle Density									
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.22	2.16	2.25	2.44	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		21.2	17.4	21.5	20.6	----
Exchangeable Magnesium	----	0.1	meq/100g		6.4	5.6	5.5	4.8	----
Exchangeable Potassium	----	0.1	meq/100g		0.9	0.7	1.3	0.8	----
Exchangeable Sodium	----	0.1	meq/100g		0.1	0.1	0.2	0.2	----
Cation Exchange Capacity	----	0.1	meq/100g		28.6	23.9	28.4	26.4	----
Exchangeable Sodium Percent	----	0.1	%		0.5	0.6	0.6	0.6	----
Calcium/Magnesium Ratio	----	0.1	-		3.3	3.1	3.9	4.3	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SKY_S1_0_10	SKY_S1_10_20	SKY_C1_0_10	SKY_C1_10_20	----
Sampling date / time				19-Sep-2022 00:00	19-Sep-2022 00:00	20-Sep-2022 00:00	20-Sep-2022 00:00	----	
Compound	CAS Number	LOR	Unit	EB2228892-001	EB2228892-002	EB2228892-003	EB2228892-004	-----	
				Result	Result	Result	Result	----	
ED007: Exchangeable Cations - Continued									
Magnesium/Potassium Ratio	----	0.1	-	6.9	7.5	4.3	6.1	----	
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	100	mg/kg	670	513	1360	670	----	
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg	10	10	20	<10	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg	<10	<10	30	10	----	
EG005(ED093)T: Total Metals by ICP-AES									
Iron	7439-89-6	50	mg/kg	29200	31700	44400	49200	----	
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	----	
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----	
Chromium	7440-47-3	2	mg/kg	29	31	62	81	----	
Copper	7440-50-8	5	mg/kg	21	22	22	26	----	
Lead	7439-92-1	5	mg/kg	5	6	<5	<5	----	
Nickel	7440-02-0	2	mg/kg	19	17	65	74	----	
Zinc	7440-66-6	5	mg/kg	52	40	75	59	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	25.7	21.3	19.0	3.2	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg	4060	2200	3840	870	----	
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg	4080	2220	3860	870	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg	888	1730	1600	1020	----	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	6.24	3.91	3.32	0.94	----	

