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CAIRNS SHIPPING DEVELOPMENT PROJECT

Revised Draft Environmental Impact Statement

Chapter B2: Nature Conservation Areas

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B2.1 Introduction

B2.1.1 Scope

This chapter describes the existing conditions and potential impacts associated with the proposed CSD Project to natural values within areas with formal conservation status. These areas, collectively referred to as Nature Conservation Areas, are protected by a range of Commonwealth, state, and local legislation as described in **Section B2.3.1**.

It is a recognised that other stakeholder groups (e.g traditional owners, environmental groups, commercial or recreational fishermen, and tour operators) may also value conservation areas for a variety of reasons that are not recognised by law. These are considered in **Chapter B13** (Cultural Heritage) and **Appendix E** (Stakeholder Engagement Report).

This chapter specifically describes:

- the location and nature of Nature Conservation Areas in the study area, and associated values
- potential impacts to the values of Nature Conservation Areas arising from the CSD Project
- recommended mitigation and management measures designed to avoid, and where not practicable, reduce the impact of the project on Nature Conservation Areas, with reference to other applicable technical chapters in Part B
- any necessary changes to the boundaries of current Nature Conservation Areas required as a result of the project
- any offsets that may be required should a significant residual impact on existing Nature Conservation Areas be identified.

B2.1.2 The Study Area and Project Areas

The ‘study area’ for the EIS varies depending on the issue at hand while the ‘project area’ is the immediate footprint of the proposed works. For the consideration of Nature Conservation Areas, the following definitions apply.

The Study Area is shown variously on **Figure B2-1** and **Figure B2-2** and encompasses:

- The whole of WHA scale (not mapped) – this scale can be defined as the Great Barrier Reef World Heritage Area (GBRWHA) including both nearshore and offshore areas as well as the Wet Tropics (of Queensland) World Heritage Area (WTWHA). This scale of assessment is relevant in the context of the project affecting, for example, a key aspect of the Outstanding Universal Value (OUV) of a world heritage property as a whole or otherwise causing impacts that could result in the property no longer meeting its nomination criteria. The concept of OUV is described in **Section B2.3.3.b**.
- The regional scale (**Figure B2-1**):
  - In terms of marine issues, this is defined as being a subset of the Wet Tropics region of the GBRWHA, extending north of Cairns to the Bloomfield River and south to Mission Beach (Dunk Island). This regional classification has been chosen on the basis that the condition of water quality, seagrass, and coral within this region is reported as part of the Great Barrier Reef Report Card 2012/2013 within the ‘Reef Water Quality Protection Plan – Marine Results’ published by the Australian and Queensland Governments. [GBR Outlook Report 2014 (GBRMPA 2014b)]
  - For terrestrial issues, the regional scale includes areas between the WTWHA and the ocean.

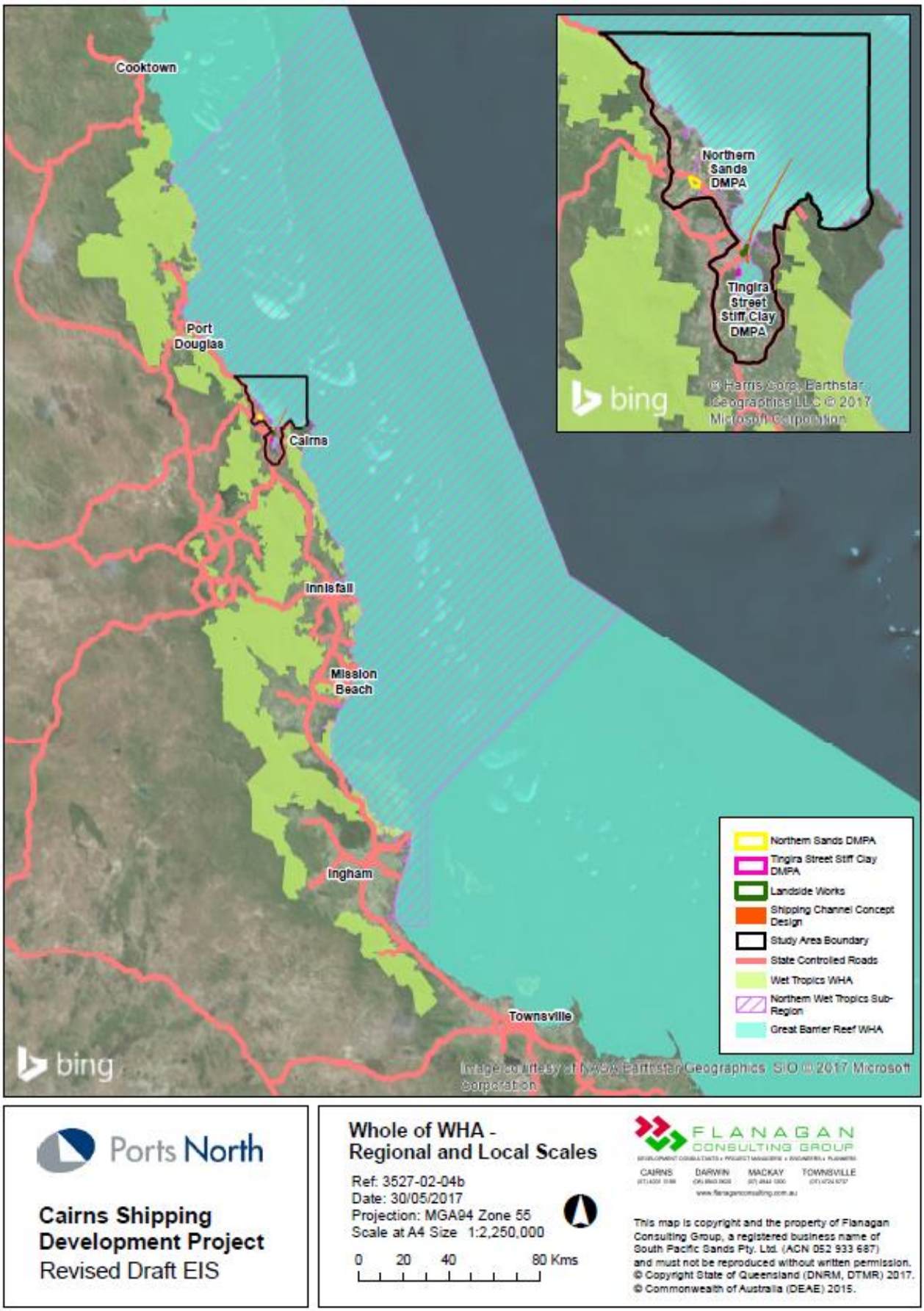


Figure B2-1 Whole of WHA, Regional and Local Scales.

- The local scale (**Figure B2-2**):
  - The township of Cairns.
  - The marine environment including the Trinity Inlet, Trinity Bay and surrounding waters including:
    - all waters of Trinity Bay
    - the tidal waters of Trinity Inlet, including landward areas to the boundary of the Fish Habitat Area
    - Double Island
    - the coastline and nearshore waters of Cairns' Northern Beaches
    - Mission Bay
    - the coastline extending to Cape Grafton.

Project areas are also shown on **Figure B2-2** and encompass:

- Channel Project Area including the shipping channel and the route to the pump out point at the seaward end of the pipeline to the Northern Sands DMPA.
- Landside Works Project Area for wharf upgrades and berthing of cruise ships.
- Northern Sands Project Area (includes the DMPA, delivery pipeline corridor, tailwater ponds, and tailwater outlet works).
- Tingira Street Project Area (essentially the Tingira Street DMPA).

This chapter focuses on potential impacts on Nature Conservation Values at all of these scales, noting that further discussion of impacts at regional and whole of WHA scale are outlined in **Chapter B18** (Cumulative Impacts Assessment).

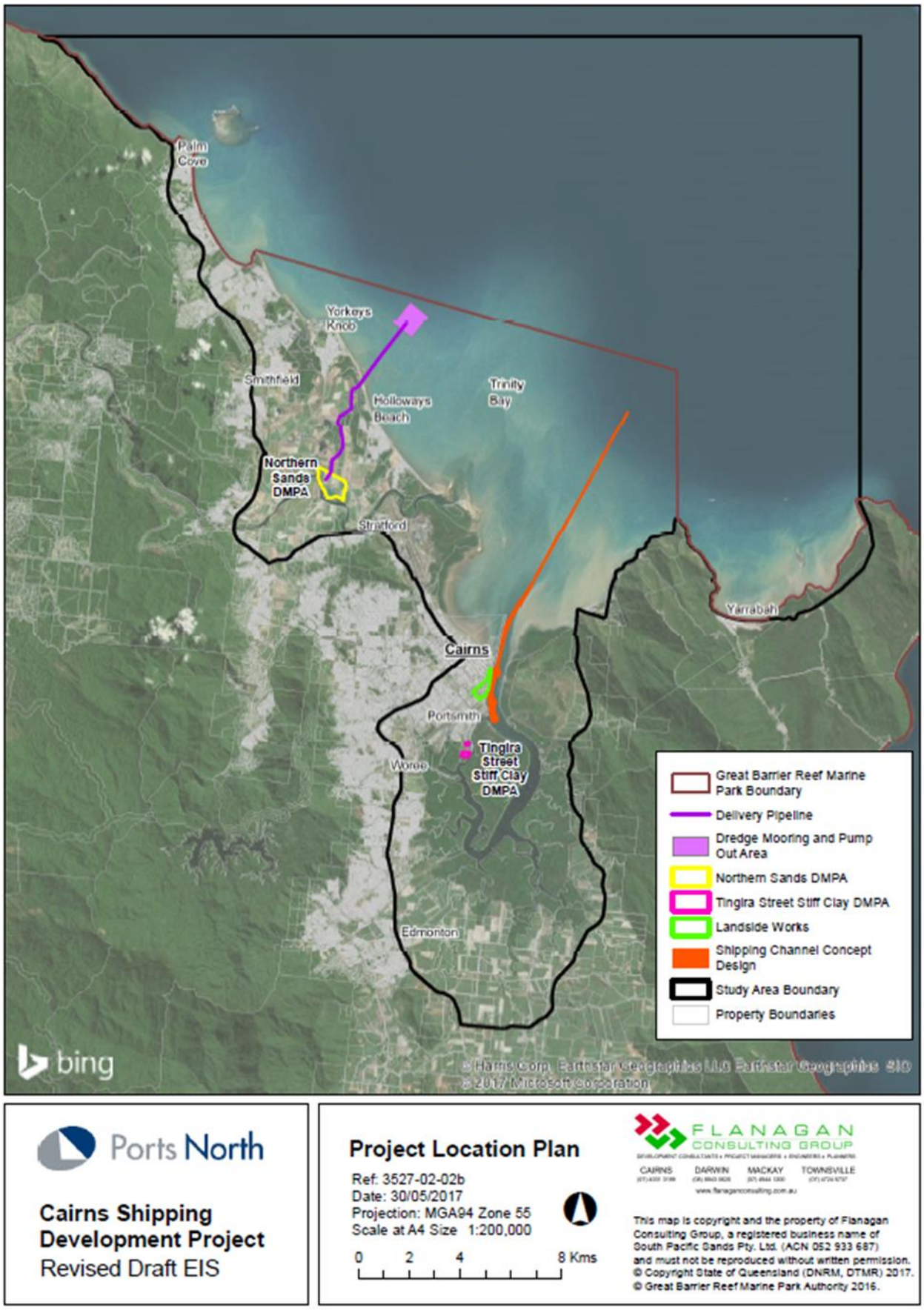


Figure B2-2 Study Area and Project Areas.

B2.2 Methodology

B2.2.1 Detailed Technical Assessments

This chapter has been prepared at a desktop level, with reference to publically available information on the extent and values of Nature Conservation Areas, including government policies and plans, reports, literature, and GIS information. It also references results from technical studies and field surveys undertaken as part of this Revised Draft EIS as described in detail in the following chapters:

- **Chapter B5** (Marine Water Quality)
- **Chapter B7** (Marine Ecology)
- **Chapter B8** (Terrestrial Ecology)
- **Chapter B19** (EPBC Act Issues) – as agreed with the Department of the Environment and Energy (Commonwealth), all *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) issues (including Nature Conservation Areas under the EPBC Act) are described in a dedicated chapter.

These chapters are referred to where appropriate. While all relevant findings have been incorporated into this chapter, readers are referred to the original chapters and any referenced technical studies for further details if required.

B2.2.2 Impact Assessment

The assessment of potential impacts on the values of Nature Conservation Areas is described in **Section B2.4**. This involves a combination of references to other relevant technical chapters as described above and new work where necessary.

B2.3 Existing Situation

B2.3.1 Overview

The level of recognised significance and protection afforded to the nature conservation value of an area is determined by its designation under relevant Commonwealth and Queensland law. The protection of internationally recognised Nature Conservation Areas is controlled largely (but not exclusively) by the EPBC Act as what are termed Matters of National Environmental Significance (MNES). The key area-based MNES present in the CSD Project Study Area are the Great Barrier Reef World Heritage Area and the Great Barrier Reef Marine Park. The latter also has its own act (the *Great Barrier Reef Marine Park Act 1975* (Cwlth) (GBRMP Act) for management purposes. This Act is overseen by the Great Barrier Reef Marine Park Authority (GBRMPA).

At the state level, Nature Conservation Areas are generally included as a subset of what are termed Matters of State Environmental Significance (MSES) and these are principally (but not exclusively) covered by the *Nature Conservation Act 1992* (Qld) (NC Act), the *Marine Parks Act 2004* (Qld) (MP Act), and the *Fisheries Act 1994* (Qld) (Fisheries Act.

Nature Conservation Areas protected at the local government level in most cases reflect those already protected under state legislation. In general, these are mapped on CairnsPlan 2016's Natural Areas Overlay.

B2.3.2 Values of the Nature Conservation Areas

The values of the various Nature Conservation Areas depend largely on the legislation under which they have been declared. However, it is fair to say that without exception these include one or more of the following:

- habitat for species of conservation significance (plants and animals)
- habitat for species of commercial (e.g. fishing) significance
- integrity and the maintenance of ecological processes (e.g. water quality, tidal flushing, nutrient cycling)
- landscape quality /scenic amenity (e.g. landforms, coastal vistas)
- various types of nature-based recreation and commercial businesses based on these.

These values are described in more detail in **Section B2.3** where impacts are assessed.

B2.3.3 Commonwealth Nature Conservation Areas

B2.3.3.a Overview

Commonwealth Nature Conservation Areas are principally declared and protected / managed under the EPBC Act and the GBRMP Act.

EPBC Act Controlling Provisions

The CSD Project (2012/6538) was referred to the then Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (SEWPaC) on 6 September 2012 to determine whether it is a 'controlled action' under the EPBC Act. The ministerial decision notice dated 4 October 2012 stated that the project is a controlled action and will require assessment and approval under the EPBC Act before it can proceed. The relevant controlling provisions (MNES) include what are considered in this chapter to be Nature Conservation Areas under the EPBC Act, namely (with reference to the relevant sections of the EPBC Act in brackets):

- World Heritage properties (sections 12 & 15A)
- National Heritage places (sections 15B & 15C)
- Commonwealth marine areas (sections 23 & 24A)
- Great Barrier Reef Marine Park (sections 24B & 24C)

- Commonwealth land (sections 26 & 27 A).

These Commonwealth Nature Conservation Areas are described in detail **Chapter B19** (EPBC Act Issues) and summarised below.

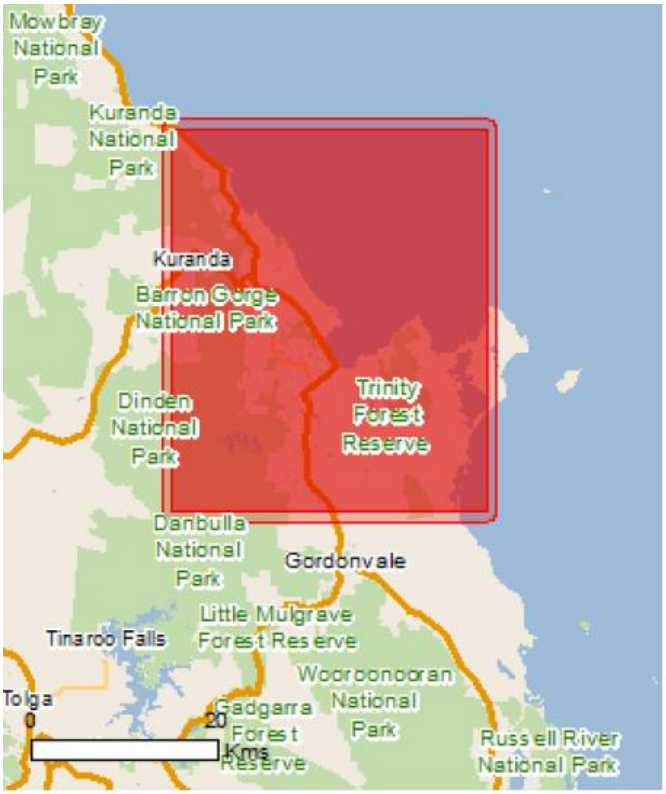
The remaining controlling provisions are not relevant to this discussion of Nature Conservation Areas as they relate to:

- Listed threatened species and communities (sections 18 & 18A)
- Listed migratory species (sections 20 & 20A).

These are described in **Chapter B7** (Marine Ecology) and **Chapter B8** (Terrestrial Ecology) and summarised in **Chapter B19** (EPBC Act Issues).

Specific EPBC Act Nature Conservation Areas

Specific Nature Conservation Areas included in the controlling provisions were identified using the EPBC Act Protected Matters Search Tool on 5 June 2017. See **Figure B2-3** for details of the search area (see **Chapter B19** (EPBC Act Issues) for the full search report).



Search area (this approximates the CSD Project Study Area):

- -16.700123, 145.613589
- -16.700123, 145.915229
- -17.052245, 145.915229
- -17.052245, 145.613589

Figure B2-3 EPBC Act Protected Matters search area.

Source: EPBC Act Protected Matters Search Tool accessed 5 June 2017.Refer **Appendix BD** for the full search report).

This search revealed the presence of the following MNES for each controlling provision (only those considered to be Nature Conservation Areas are listed).

TABLE B2-1 RELEVANT CONTROLLING PROVISIONS

CONTROLLING PROVISION	SEARCH RESULTS
World Heritage properties (sections 12 and 15A)	Great Barrier Reef (GBRWHA) Wet Tropics of Queensland (WTQWHA or WTWHA)
National Heritage places (sections 15B and 15C)	Great Barrier Reef (GBR) Wet Tropics of Queensland Wet Tropics World Heritage Area (Indigenous Values)
Commonwealth marine areas (sections 23 & 24A)	Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast
Great Barrier Reef Marine Park (sections 24B and 24C)	Great Barrier Reef Marine Park (GBRMP)
Commonwealth land (sections 26 & 27 A)	• Defence – Cairns Vacant Site • Defence – HMAS Cairns - Cairns • Defence – Kenny Street Naval Stores - Cairns • Defence – Las Palmas Motel - Cairns • Defence – Northern Heritage Motel - Cairns • Defence – Porton Training Depot - Cairns • Defence – Queerah Magazine

Source: EPBC Act Protected Matters Search Tool accessed 3 March 2017. See **Appendix BD** for the full search report.

Although Wetlands of International Importance (listed under the Ramsar Convention) are MNES under the EPBC Act, they are not included in the controlling provisions and not present locally (the closest Ramsar wetlands are Bowling Green Bay and the Coral Sea Reserves Ramsar site; both located over 250 km from the Cairns port area). These areas are well outside the project's area of influence and are not considered further.

While being MNES, listed threatened communities and species are not suitable for area-based assessment and are dealt with as species in **Chapter B7** (Marine Ecology) and **Chapter B8** (Terrestrial Ecology). A summary is included in **Chapter B19** (EPBC Act Issues).

Spatial Extent

Those MNES that are mappable are shown on **Figure B2-5**. By way of introduction to this figure, the following figure (**Figure B2-4**) and table (**Table B2-2**) – extracted from the Strategic Assessment of the GBR (GBRMPA 2014a) – are useful in interpreting local boundaries of the GBR Region, the GBRWHA, and the GBRMP as these are subtly different.

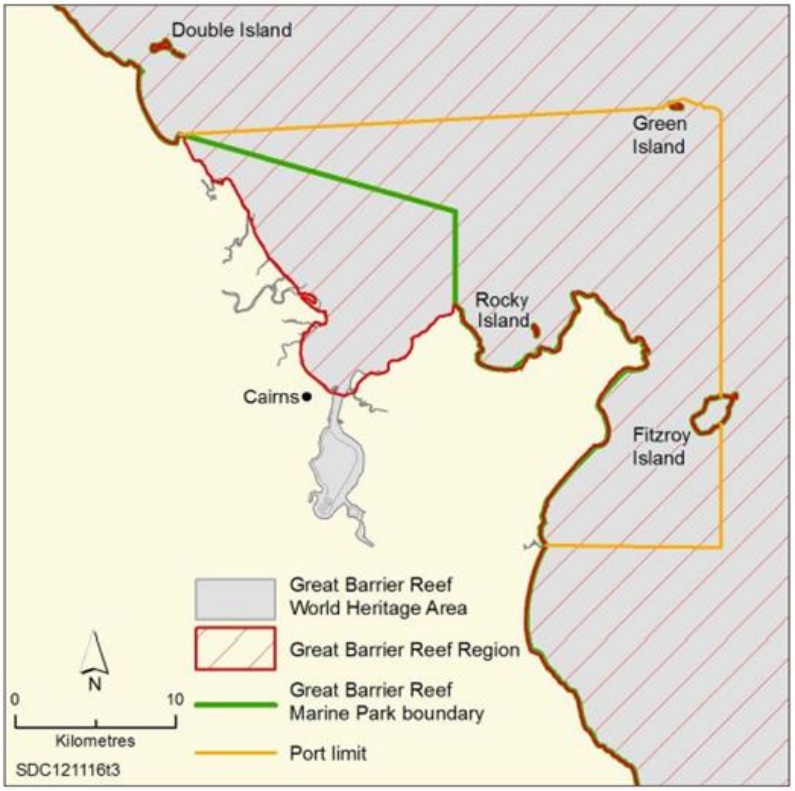


Figure 1.4 An example of the different coastal boundaries for the Great Barrier Reef World Heritage Area, Region and Marine Park

As illustrated in this map of the area around Cairns, the Great Barrier Reef World Heritage Area includes all internal waters and islands of Queensland, for example enclosed bays and estuaries, and Green and Fitzroy islands. The Great Barrier Reef Region includes all waters seaward of low water, but not the internal waters and islands of Queensland (such as Green and Fitzroy islands). The Region includes Commonwealth islands. The Great Barrier Reef Marine Park has the same boundary as the Region, except that defined areas around most trading ports are excluded. The Marine Park boundary around ports is different from the port limit which is defined in relation to operation of the port itself.

Figure B2-4 Local boundaries of the GBR region, the GBRWHA, and the GBRMP.

Source: GBRMPA (2014a) (Figure 1.4).

Table B2-2 below extracted from GBRMPA (2014a) lists the differences between the GBR World Heritage Area, GBR Region, and GBR Marine Park.

TABLE B2-2 DIFFERENCES BETWEEN THE GBR WORLD HERITAGE AREA, GBR REGION AND GBR MARINE PARK

Great Barrier Reef World Heritage Area	Great Barrier Reef Region	Great Barrier Reef Marine Park
348,000 km^2	346,000 km^2	344,400 km^2
Inscribed 1981	Established 1975	Declared in sections between 1979 and 2001; amalgamated into one section in 2003
Includes: • all islands within outer boundary (about 1050) • all waters seaward of low water mark (including internal waters of Queensland and port waters) • all 12 trading ports	Includes: • approximately 70 Commonwealth islands • all waters seaward of low water mark (excluding Queensland internal waters) Does NOT include: • internal waters of Queensland • Queensland islands (about 980)	Includes: • approximately 70 Commonwealth islands • all waters seaward of low water mark (excluding Queensland internal waters) Does NOT include: • internal waters of Queensland • Queensland islands (about 980) • 13 coastal exclusion areas

Source: GBRMPA (2014a) (Table 1.2).

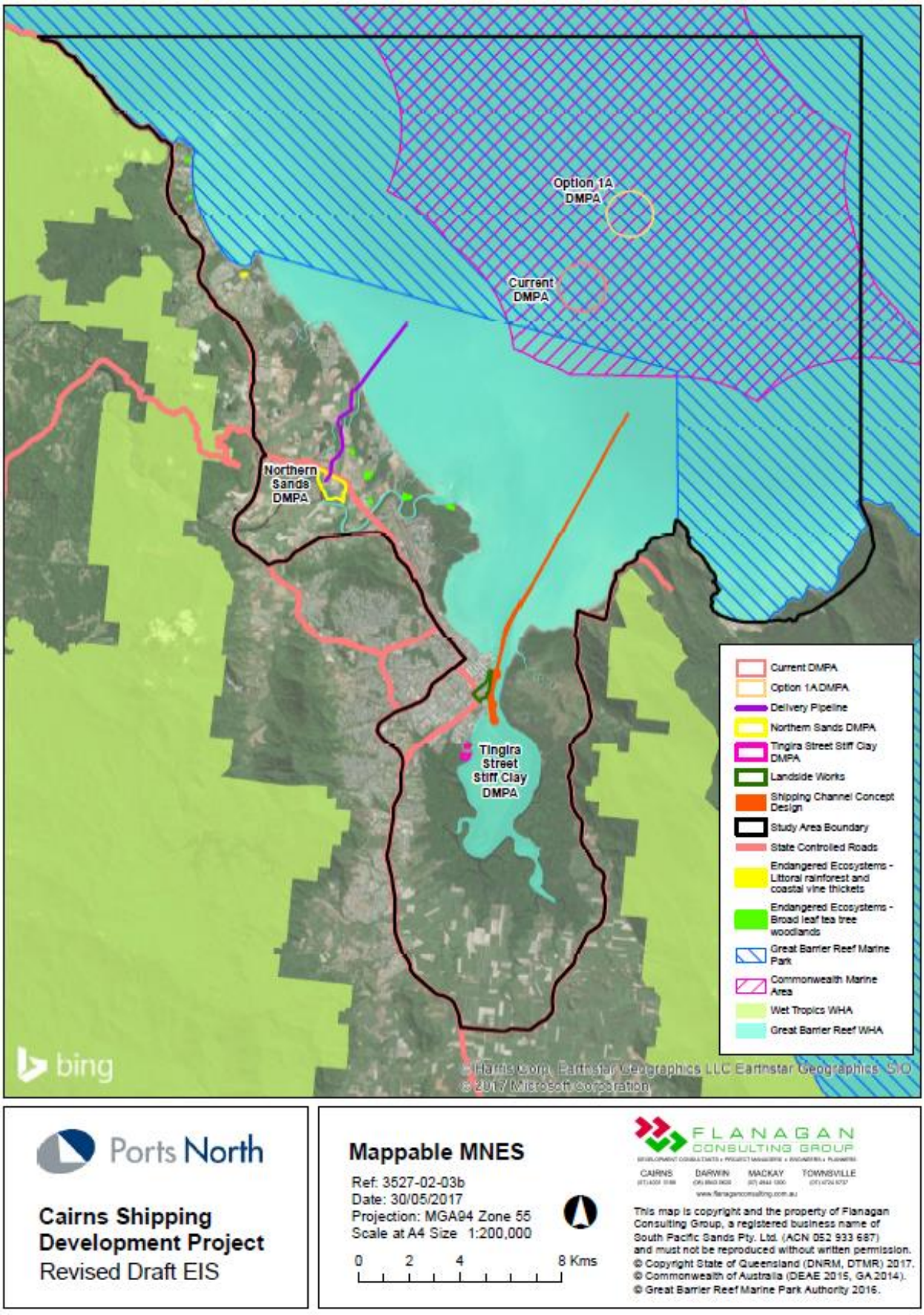


Figure B2-5 Location of mappable MNES in and near the Study Area.

B2.3.3.b World Heritage Properties (Sections 12 & 15A)

The Protected Matters Search Tool reveals that two World Heritage properties lie within the search area:

- the Great Barrier Reef World Heritage Area
- the Wet Tropics of Queensland World Heritage Area.

Great Barrier Reef World Heritage Area

In the vicinity of the project area the GBRWHA lies seaward of low water – although the WHA includes all internal waters of the state and, of relevance to the CSD Project, follows low water up Richters and Thomatis Creeks, the Barron River, and Trinity Inlet to the low water mark. Refer to **Figure B2-5**. Regarding the various Project Areas:

- Northern Sands Project Area: the WHA runs up the Barron River to just opposite the south-west corner of the site (approximately 16.863085° S 145.718511°W). The pipeline crosses the WHA at the mouth of Richters Creek and again near the confluence of Richters Creek and Thomatis Creek.
- Tingira Street Project Area: the WHA runs immediately adjacent to the site at low water. See **Figure B2-6**.

Figure B2-6 GBRWHA in the vicinity of the Tingira Street Project Area.

Source: Appendix AM.

The values of the GBRWHA are described in detail in **Chapter B19** (EPBC Act Issues) in terms of OUV and integrity as required by the then Department of the Environment's *EPBC Act referral guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area* (Department of the Environment 2014). This material is summarised below.

World Heritage properties are matters of national environmental significance under the EPBC Act, and all World Heritage properties have Outstanding Universal Value. The concept of OUV underpins the World Heritage Convention which:

> … provides the basis for listing properties on the World Heritage List and protecting and managing World Heritage properties. Broadly, the meaning of Outstanding Universal Value follows the common sense interpretation of the words:
>
> - Outstanding: For properties to be of outstanding universal value they should be exceptional, or superlative – they should be the most remarkable places on Earth.
> - Universal: Properties need to be outstanding from a global perspective. World Heritage does not aim to recognise properties that are remarkable from solely a national or regional perspective. Countries are encouraged to develop other approaches to recognise these places. Australia does this through National Heritage listing.
> - Value: What makes a property outstanding and universal is its 'value', or the natural and/or cultural worth of a property. This is based on standards and processes established under the World Heritage Convention's Operational Guidelines.' (p4).

The Operational Guidelines for the Implementation of the World Heritage Convention (UNESCO 2012) define the concept of OUV as 'cultural and/or natural significance, which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity.' The Great Barrier Reef has OUV and has been World Heritage-listed because it meets all four of the natural environment criteria. Recognition of the Great Barrier Reef's outstanding universal value was based on the natural world heritage criteria in place at the time — acknowledging the Reef's natural values, together with the strong ongoing links between Aboriginal and Torres Strait Islanders and their sea country.

The four the natural environment criteria of the World Heritage Convention are (referring to the current, rather than original listing numbers and criteria):

- (vii) contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance
- (viii) be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
- (ix) be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals
- (x) contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Current EIS methodology involves cross referencing the GBR attributes (such as Islands, Beaches and coastlines, Mangrove forests) to these four criteria and to *Integrity*. This refers in turn to *Ecological processes* (such as Cyclones, Wind, Sedimentation).

Chapter B19 (EPBC Act Issues) undertakes this task, based on the detailed assessment methodology documented in the strategic assessment of the GBR (GBRMPA 2014a). This document provides a wealth of useful information on values and threats to MNES relevant to the GBR and in particular sets the scene for a region-wide assessment of OUV which underpins World Heritage values. The GBRMPA report also provides a structure for assessing a development at a specific location within the context of the Great Barrier Reef region as a whole. This has been followed for the CSD Project.

Wet Tropics of Queensland World Heritage Area

The Protected Matters Search Tool (**Figure B2-3**) reveals that the Wet Tropics of Queensland World Heritage Area (usually simply referred to as the Wet Tropics World Heritage Area or WTWHA) is within the designated search area.

The WTWHA lies outside the Study Area as shown on **Figure B2-5**. Some statistics are relevant:

- Although at its closest, the WTWHA is 3.4 km (upstream) from the Northern Sands DMPA, this is part way up the Kuranda Range Road and there is little if any ecological connection between the two areas at this point, at least from the DMPA to the WHA.
- The WTWHA has stronger but still tenuous connection to the Northern Sands DMPA via the Barron River (it is 5.8 km upstream at its closest point).
- To the east the Grey Peaks NP comes to within 4.5 km of the Tingira Street DMPA but is separated by Trinity Inlet and the East Trinity Reserve.

The assessment documented in **Chapter B19** (EPBC Act Issues) concludes that the WTWHA is considered to be sufficiently distant and unconnected to the various project elements that it can be expected to be little impacted by the CSD Project. No further description of values is warranted.

B2.3.3.c National Heritage Places (Sections 15B & 15C)

The Protected Matters Search Tool reveals that three National Heritage Places lie within the search area:

- the Great Barrier Reef
- the Wet Tropics of Queensland
- the Wet Tropics World Heritage Area (Indigenous Values).

The Great Barrier Reef

The Great Barrier Reef is one of 15 Australian World Heritage places included in the National Heritage List on 21 May 2007. The place has the same boundary as the World Heritage Area. According to GBRMPA (2014a), while there are specific criteria that apply to the listing of national heritage places, the national heritage listing of the world heritage properties was done on the basis of those values identified by the World Heritage Committee.

The national heritage criteria identified as corresponding to those for which the property was world heritage listed are:

- the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history
- the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history
- the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history
- the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:
  - a class of Australia's natural or cultural places or
  - a class of Australia's natural or cultural environments
- the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.

As was the case for the strategic environmental assessment of the GBR (GBRMPA 2014a), for the purposes of this assessment, the values of the GBR national heritage place are taken to correspond to those of the GBRWHA. As a result, these two matters of national environmental significance are addressed together under the discussion on the GBRWHA.

The Wet Tropics of Queensland

The Wet Tropics of Queensland is also one of 15 Australian World Heritage places included in the National Heritage List on 21 May 2007.

For the purposes of this assessment the Wet Tropics of Queensland national heritage place is dealt with together with the WTWHA.

The Wet Tropics World Heritage Area (Indigenous Values)

On 9 November 2012 the Wet Tropics World Heritage Area's Indigenous heritage values were included as part of the existing Wet Tropics of Queensland National Heritage listing. The listing recognises that rainforest Aboriginal heritage is unique to the Wet Tropics and is a remarkable and continuous Indigenous connection with a tropical rainforest environment. To quote the Australian Government website (DoTE 2014a):

> The Aboriginal Rainforest People of the Wet Tropics of Queensland have lived continuously in the rainforest environment for at least 5,000 years and this is the only place in Australia where Aboriginal people have permanently inhabited a tropical rainforest environment.
>
> The Aboriginal Rainforest People developed a distinctive cultural heritage determined by their dreamtime and creation stories and their traditional food gathering, processing and land management techniques. Reliance on their traditions helped them survive in this at times inhospitable environment. The distinctiveness of the traditions and technical innovation and expertise needed to process and prepare toxic plants as food and their uses of fire is of outstanding heritage value to the nation and are now protected for future generations under national environmental law.

This amendment added a fifth national heritage criterion to the listing, namely:

> … the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.

As described in **Section B2.3.3.b**, the WTWHA is remote from the site and will not be affected by the development. This applies equally to Indigenous values.

B2.3.3.d Commonwealth Marine Areas (Sections 23 & 24A)

The Protected Matters Search Tool reveals that the Commonwealth Marine Areas (CMA) is within the designated search area.

The CMA includes any part of the sea, including water, seabed and airspace within Australian exclusive economic zone and/or the continental shelf of Australia. They do not include state waters. The CMA stretches from 3 to 200 nautical miles from the coast. Marine protected areas are marine areas which are recognised to have high conservation value.

The only project element included within the CMA is the existing offshore DMPA and the proposed DMPA Option 1A (**Figure B2-5**). The assessment for the GBRMP and GBRWHA applies to this area and covers the relevant criteria for this jurisdictional MNES under the EPBC Act.

B2.3.3.e Great Barrier Reef Marine Park (Sections 24B & 24C)

The Protected Matters Search Tool reveals that the Great Barrier Reef Marine Park (GBRMP) is within the designated search area.

The *Great Barrier Reef Marine Park Act 1975* (Cwlth) (GBRMP Act) provides for the establishment, control, care and development of the GBRMP. The Great Barrier Reef Marine Park Authority (GBRMPA) is responsible for the management of the GBRMP.

The GBRMP Act establishes the GBRMPA and its functions. The primary functions of GBRMPA include:

- developing and implementing zoning and management plans
- environmental impact assessment and permitting of use
- research, monitoring and interpreting data
- providing information, educational services and marine environmental management advice.

The GBRMP has different boundaries and management intent from that of the GBRWHA (refer to **Figure B2-4** and Figure B2-7). In simple terms, the GBR Region and the GBR Marine Park cover the same area, with the exception of 13 coastal exclusion areas that are not within the Marine Park. Cairns is one such exclusion area (see **Figure B2-4**). The Marine Park covers 344 400 square kilometres and includes the subsoil beneath the seabed extending to a depth of 1000 metres and the airspace above extending to a height of 915 metres.

Under the GBRMP Act, GBRMPA administers the framework for planning and management of the GBRMP, including through the implementation of zoning plans, plans of management and a system of permissions. The GBRMP is managed as a multiple use area, meaning that the Zoning Plan (GBRMPA 2003) provides for a range of recreational, commercial and research opportunities, and traditional activities whilst also considering conservation of the GBRMP. The GBRMP's Zoning Plan (GBRMPA 2003) also takes account of the world heritage values, despite the differing management boundaries.

Zoning provides protection for areas critical to maintaining a healthy environment and sets a broad framework for the management of human use by designating where specific types of activities can be undertaken. Zoning also defines what activities can occur in various parts of the GBRMP. There is no direct relationship between zoning and values, although in most cases the higher value areas are afforded higher levels of protection via zoning.

There are four primary sections of the GBRMP that have a Zoning Plan as a basis for management. These are:

- the Far Northern Section
- the Cairns Section
- Central Section
- Mackay/Capricorn Section.

These sections are further broken down into locations near regional centres (e.g, Townsville, Innisfail, etc.). The parts of the GBRMP used most by cruise ships are the Cairns Area and the Whitsundays.

The protected matters report (**Appendix BD**) lists five zoned areas of the GBRMP, namely:

- Conservation Park CP-16-4033 IV
- Conservation Park CP-16-4037 IV
- General Use GU-16-6004 VI
- Habitat Protection HP-16-5131 VI
- Habitat Protection HP-16-5130 VI.

Figure B2-7 shows the GBRMP Zoning Plan map for Trinity Bay which is part of the Cairns Section.

Note that **Figure B2-7** shows zones covered by the GBRMP Act (listed above) as well as zones under Queensland's Great Barrier Reef Coast Marine Park (see below). Under the existing zoning plan:

- Most of the foreshore of Cairns Harbour, the eastern section of Cairns Harbour between the shipping channel and Yarrabah, and the southern sections of Trinity Inlet (including Admiralty Island) is zoned Estuarine Conservation (only applies to Great Barrier Reef Coast Marine Park – see **Section B2.3.4.b**).
- The western section of Cairns Harbour and areas immediately adjacent are zoned General Use.
- The closest areas zoned Habitat Protection are located north of Trinity Beach, and east of Mission Bay.
- Mission Bay located to the east of Cairns Harbour (i.e. east of False Cape) is zoned Conservation Park.
- The closest areas zoned Marine National Park occur at Wide Bay (located east of Cape Grafton, approximately 15 km from the study area) and waters adjacent to Green Island, approximately 20 km from the study area.

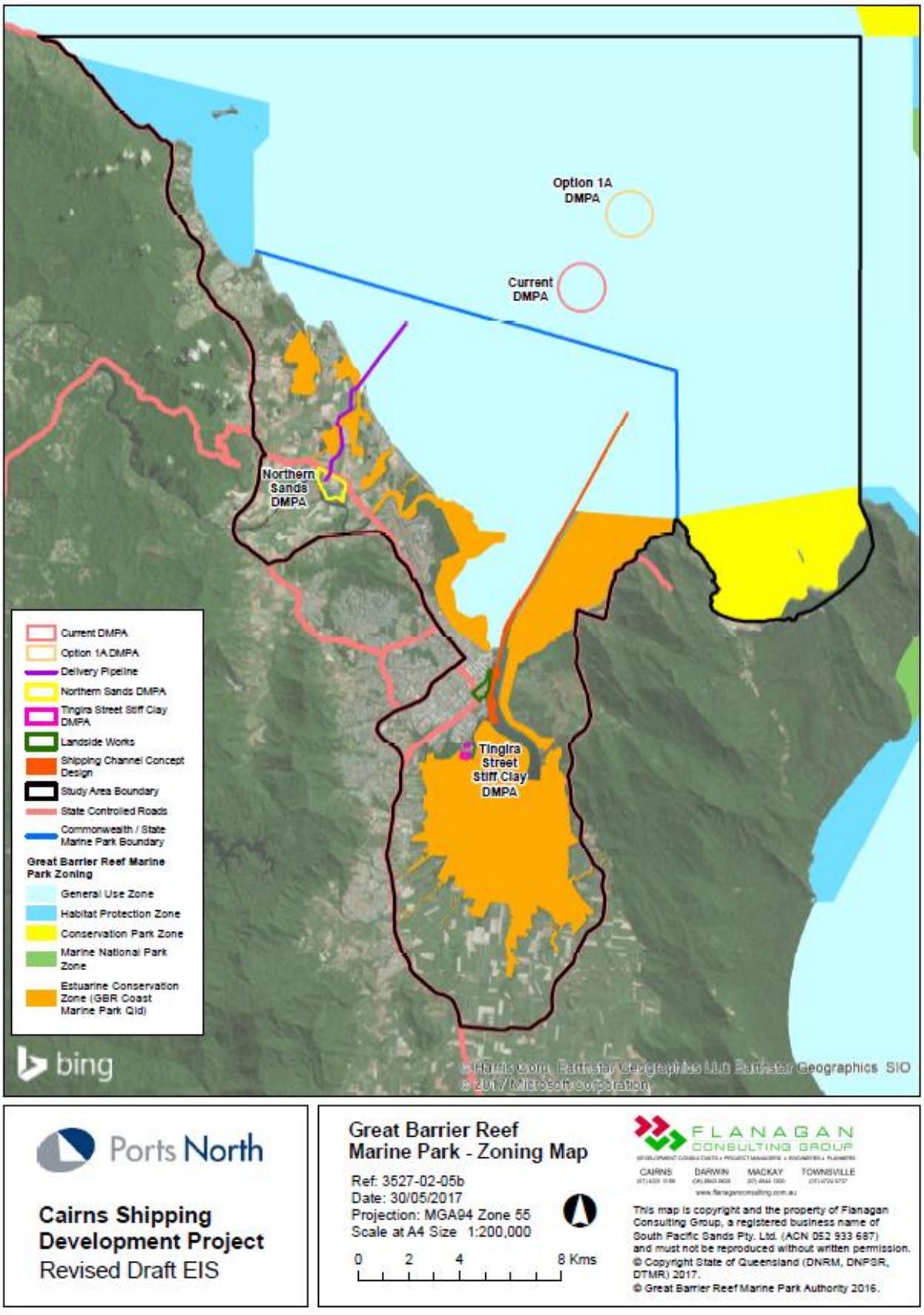


Figure B2-7 Great Barrier Reef Marine Park – Zoning Map.

Note that all zones landward of the GBRMP boundary are declared as part of the GBR Coast Marine Park (Qld).

Chapter B7 (Marine Ecology) and **Chapter B8** (Terrestrial Ecology) describe these values in detail.

B2.3.3.f Commonwealth Land (Sections 26 & 27 A)

The Protected Matters Search Tool reveals that there are seven listed areas of Commonwealth land within the search area. The search report notes that, due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision.

Commonwealth land is defined under the EPBC Act as including:

- land owned by the Commonwealth or a Commonwealth agency (including land owned in Norfolk Island) and airspace over the land
- an area of land held under lease by the Commonwealth or a Commonwealth agency (including an area held under lease in Norfolk Island) and airspace over the land
- land in:
  - an external Territory (except Norfolk Island); or
  - the Jervis Bay Territory;
- and airspace over the land.

It is concluded in **Chapter B19** (EPBC Act Issues) that all of the sites listed in the protected matters search are developed land within the urban footprint. None of these is in the footprint of the CSD Project and none is considered to be Nature Conservation Areas.

B2.3.3.g Nationally Important Wetland

Wetlands of International Importance or Ramsar wetlands are recognised as a matter of national environmental significance under the EPBC Act. None are present in the or near the Study Area and this MNES was not declared to be a controlling provision.

Although not specifically protected under Commonwealth legislation, another class of wetlands described as Nationally Important Wetlands can be considered to be Nature Conservation Areas as they give an indication of an area's environmental value and are often considered during development assessment.

The Commonwealth has developed a Directory of Nationally Important Wetlands in Australia. A wetland may be considered to be a nationally important if it meets at least one of the following criteria:

- it is a good example of a wetland type occurring within a biogeographic region in Australia
- it is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex
- it is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail
- the wetland supports one percent or more of the national populations of any native plant or animal taxa
- the wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level
- the wetland is of outstanding historical or cultural significance.

Two Nationally Important Wetlands occur within or adjacent to the study area at a local scale (see **Figure B2-11**):

- Port of Cairns and Trinity Inlet (PCTI) Wetland (QLD157)
- GBRMP (QLD100).

These are described below.

PCTI Wetland

The PCTI Wetland is a coastal wetland aggregation that covers an area of 6410 ha. It is predominantly located on Quaternary alluvium, with a small area of old beach sands at Ellie Point. Sediments are still accumulating and the coastline is prograding (expanding seaward), resulting in an expansion in mangrove forests (Perry 1995). It includes the wetlands of Trinity Inlet and the intertidal sand and mud banks adjacent to the Cairns Esplanade.

The PCTI Wetland forms a continuous, complex wetland aggregation that includes shallow marine waters comprised of seagrass meadows, 'unvegetated' sediments and intertidal wetlands, palustrine and lacustrine wetlands, and numerous drainages. The freshwater wetlands that once fringed Trinity Inlet have largely been cleared, and remaining areas are highly modified and degraded. The seagrass meadows, mangroves and tidal flats systems represent important feeding and nursery habitat for species of commercial significance. The PCTI Wetland is also an important habitat for vegetation and fauna of conservation significance, and wader birds (Perry 1995). According to the PCTI Information Sheet (see **Chapter B8** (Terrestrial Ecology)):

> Although the site is adjacent to a major urban area the critical energy pathways and food chains of the wetlands remain essentially intact. Their overall water quality remains fairly good and they support large populations of birds, fish and prawns. They represent an extremely valuable resource for the city of Cairns, as an area providing research opportunities, an area of recruitment for commercial fish stocks and as a natural area that increases the quality of life in the region. The tidal flat off the Cairns Esplanade is regarded as one of four main wader sites between Townsville and Cairns. Easy access and habituation of waders to the presence of people here makes it one of the best wader viewing areas in Queensland. The wetlands of the inlet provide a valuable sediment and nutrient sink for runoff from Cairns and surrounding agricultural areas. The fish population of the inlet has been found to contain a relatively high proportion of juvenile fish and a low proportion of piscivores. It therefore appears that the inlet is a sanctuary for juvenile fish. This value may be increased by factors that reduce predation by birds (e.g. turbidity and water depth). Although it is adjacent to a city, the upper inlet shows little evidence of human activity and has been described as a quasi-wilderness. This area fits the criteria for a Fish Habitat Area and is of significance both to residents of the city and to visitors.

In terms of the CSD Project, this wetland covers:

- most of Trinity Inlet (including the swing basin and Tingira Street Project Area)
- part of the main channel to just seaward of the Marlin Marina.

Chapter B7 (Marine Ecology) and **Chapter B8** (Terrestrial Ecology) describe these values in detail.

GBRMP Wetland

The GBRMP Wetland has the same boundary as the GBRMP (see **Figure B2-11**) and is assessed as part of the GBRMP.

B2.3.4 Queensland Nature Conservation Areas

B2.3.4.a Overview

Matters of State Environmental Significance Areas

The Queensland Government's state interest in Nature Conservation Areas as defined for this chapter are considered to be covered by many Matters of State Environmental Significance (MSES). These are established for different purposes under both the *Environmental Offsets Act 2014* (Qld), and in the context of the single State Planning Policy, under the *Sustainable Planning Act 2009* (Qld). The discussion below does not distinguish between these different purposes, rather it uses the various definitions as indicating that an area has value for biodiversity conservation.

The MSES described in this chapter (i.e. relevant as Nature Conservation Areas) are:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* (NC Act).
- 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 (FHA) that are management A areas or management B areas under the *Fisheries Regulation 2008*.
- Regulated vegetation under the *Vegetation Management Act 1999* (VM Act) 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
    - Areas of essential habitat on the essential habitat map for wildlife prescribed as 'endangered wildlife' or 'vulnerable wildlife' under the NC Act
    - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse map
    - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map.
- Wetlands in a wetland protection area or wetlands of high ecological significance shown on the Map of Referable Wetlands under the *Environmental Protection Regulation 2008.*
- Wetlands and watercourses in high ecological value waters as defined in the *Environmental Protection (Water) Policy 2009*, Schedule 2.
- Legally secured offset areas.

The MSES structure is shown schematically on **Figure B2-8** below.

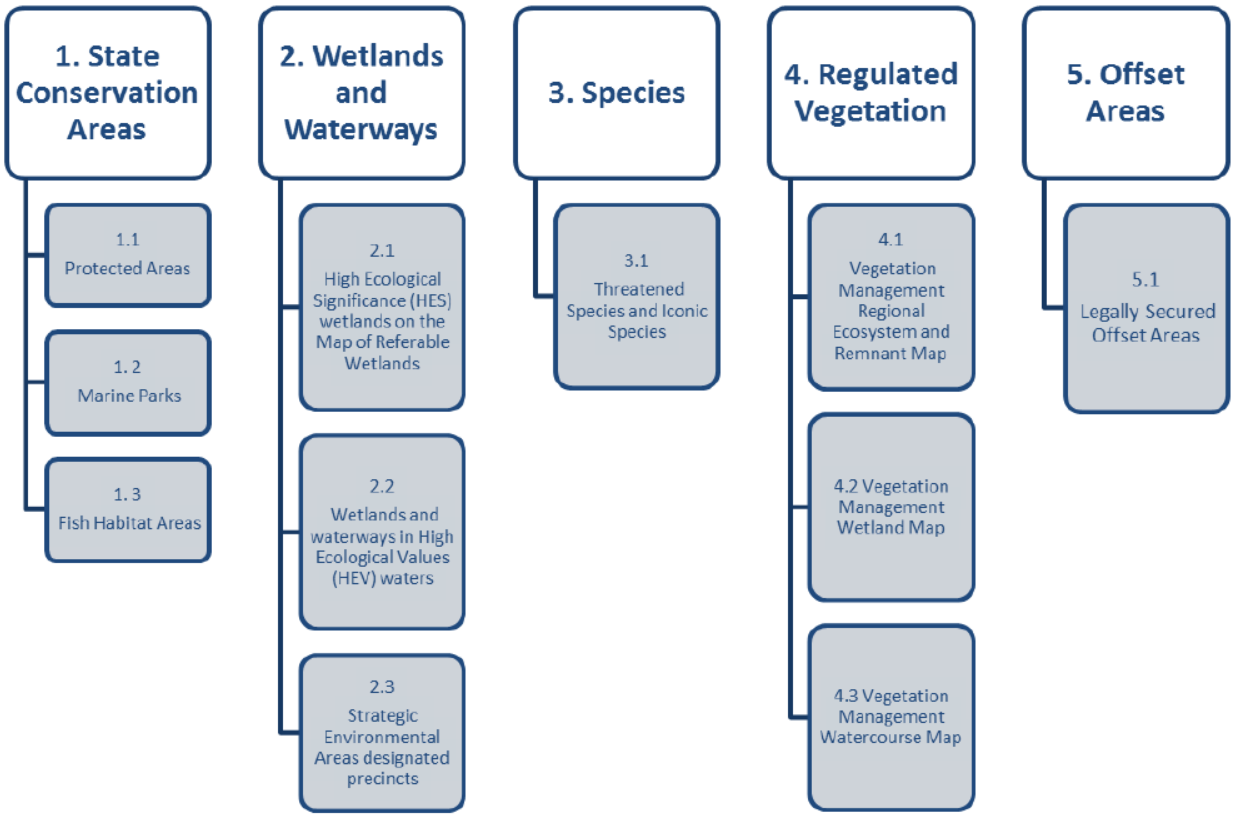


Figure B2-8 MSES Themes and map layers.

Source: https://www.ehp.qld.gov.au/management/planning-guidelines/pdf/mses-mapping-fact-sheet.pdf accessed 16 March 2017.

Spatial Extent

The key area-based MSES areas in the study area are shown on **Figure B2-9**, **Figure B2-11**, **Figure B2-14**, and **Figure B2-12** and include:

- The state marine park (GBR Coast Marine Park) (see **Section B2.3.4.b**).
- Protected estate including coastal national parks and other declared areas under the NC Act (see **Section B2.3.4.c**).
- FHAs declared under the *Fisheries Act 1994* (see **Section B2.3.4.d**).
- Trinity Inlet which is mapped as a wetland of High Ecological Significance (HES), and shown on a Map of Referable Wetlands under the *Environmental Protection Regulation 2008* (see **Section B2.3.4.d**).
- Regional Ecosystems and Essential Habitat (see **Section B2.3.4.g** and **Section B2.3.4.h**). These areas are discussed in the following sections.

While being MSES, threatened wildlife under the NC Act and special least concern animals under the *Nature Conservation (Wildlife) Regulation 2006* are not suitable for area-based assessment and are dealt with as species in **Chapter B7** (Marine Ecology) and **Chapter B8** (Terrestrial Ecology). However, mapped essential habitat for some listed threatened species is considered below.

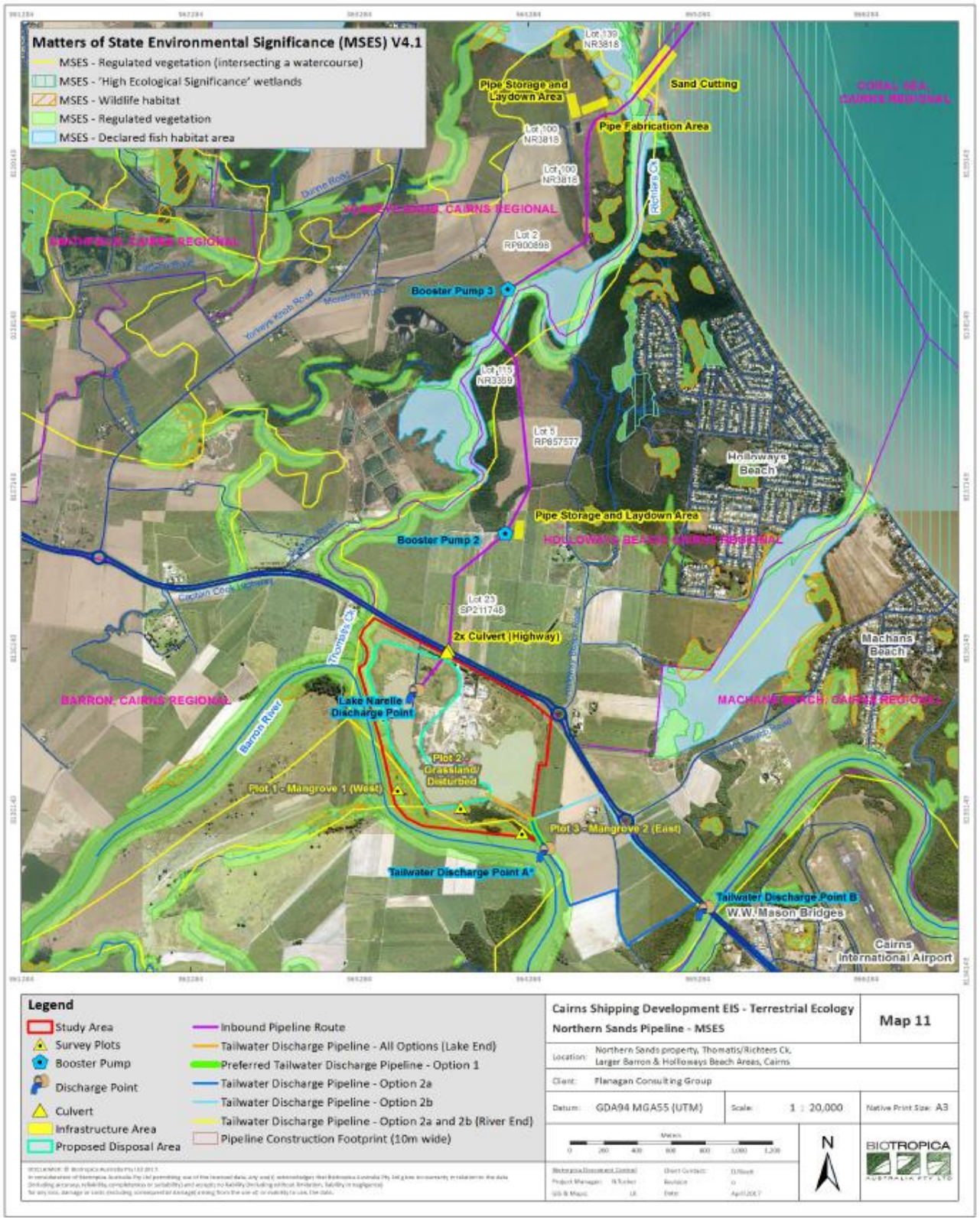


Figure B2-9 Mappable MSES (Northern Sands Project Area).

Source: Appendix AM.

B2.3.4.b Great Barrier Reef Coast Marine Park

The Great Barrier Reef Coast Marine Park is a state marine park that runs the full length of the GBRMP but differs in its boundary. Refer **Figure B2-7**. It provides protection for Queensland tidal lands and tidal waters. The Great Barrier Reef Coast Marine Park is managed under provisions in the *Queensland Marine Parks Act 2004* and sub-ordinate *Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004*.

The Great Barrier Reef Coast Marine Park (GBRCMP) adopts similar zoning and management objectives to the GBRMP, although some Queensland-specific provisions apply. **Figure B2-7** shows GBRCMP zones as well as zones under the GBRMP Act. **Figure B2-10** below is a detailed plan of the Northern Sands Project Area.

These figures show that:

- parts of the Channel Project Area and the offshore part of the delivery pipeline and the landfall point are located within the Estuarine Conservation and General Use zones
- the delivery pipeline crosses the Estuarine Conservation zone when it crosses Richters Creek between Boosters 2 and 3 (this is referred to on **Figure B2-10** as a 'sand cutting' although the final construction methodology has not been confirmed)
- the Tingira Street Project Area is immediately adjacent to the Trinity Inlet part of the Estuarine Conservation zone.

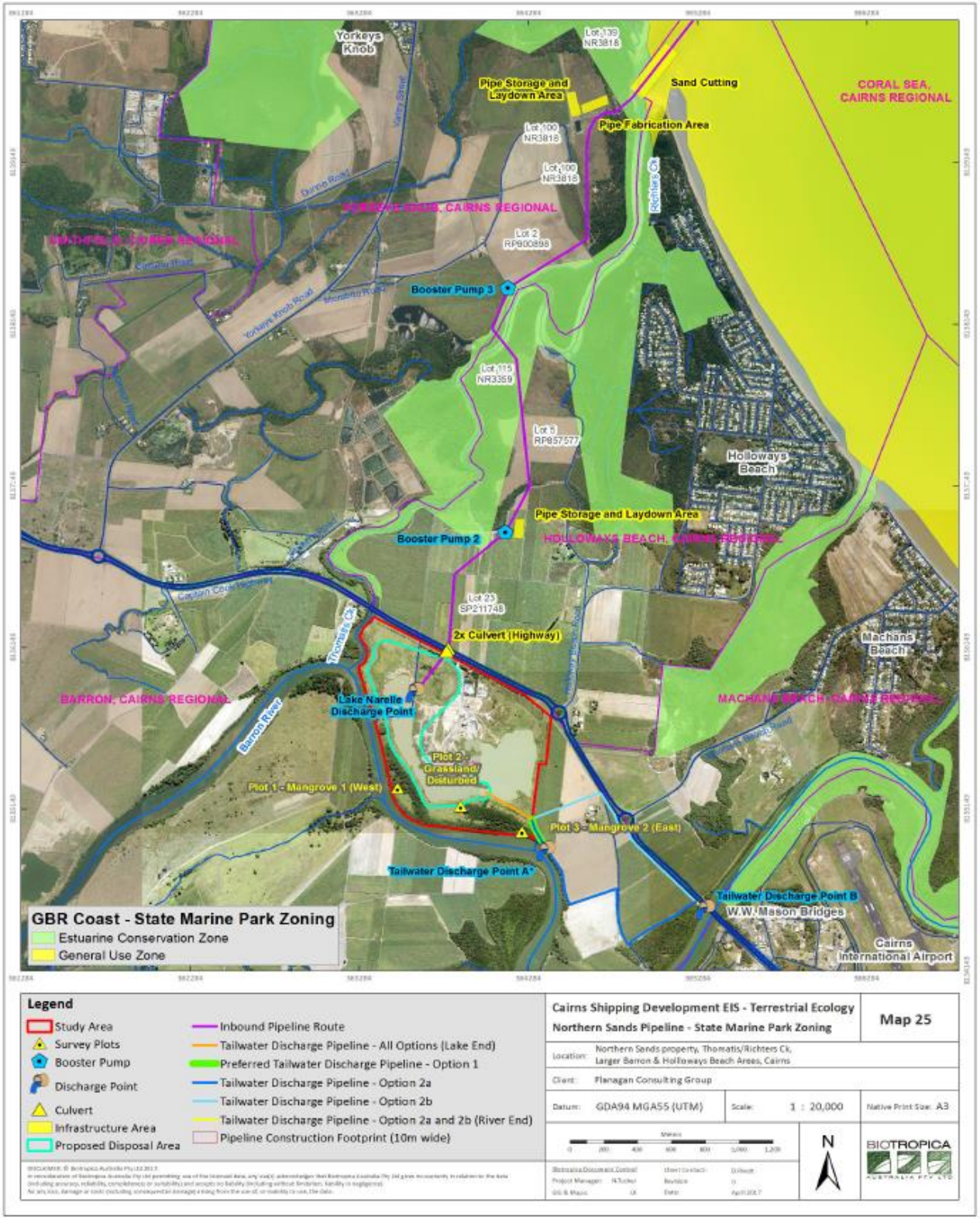


Figure B2-10 GBR Coast MP – Zoning Map (Northern Sands Project Area).

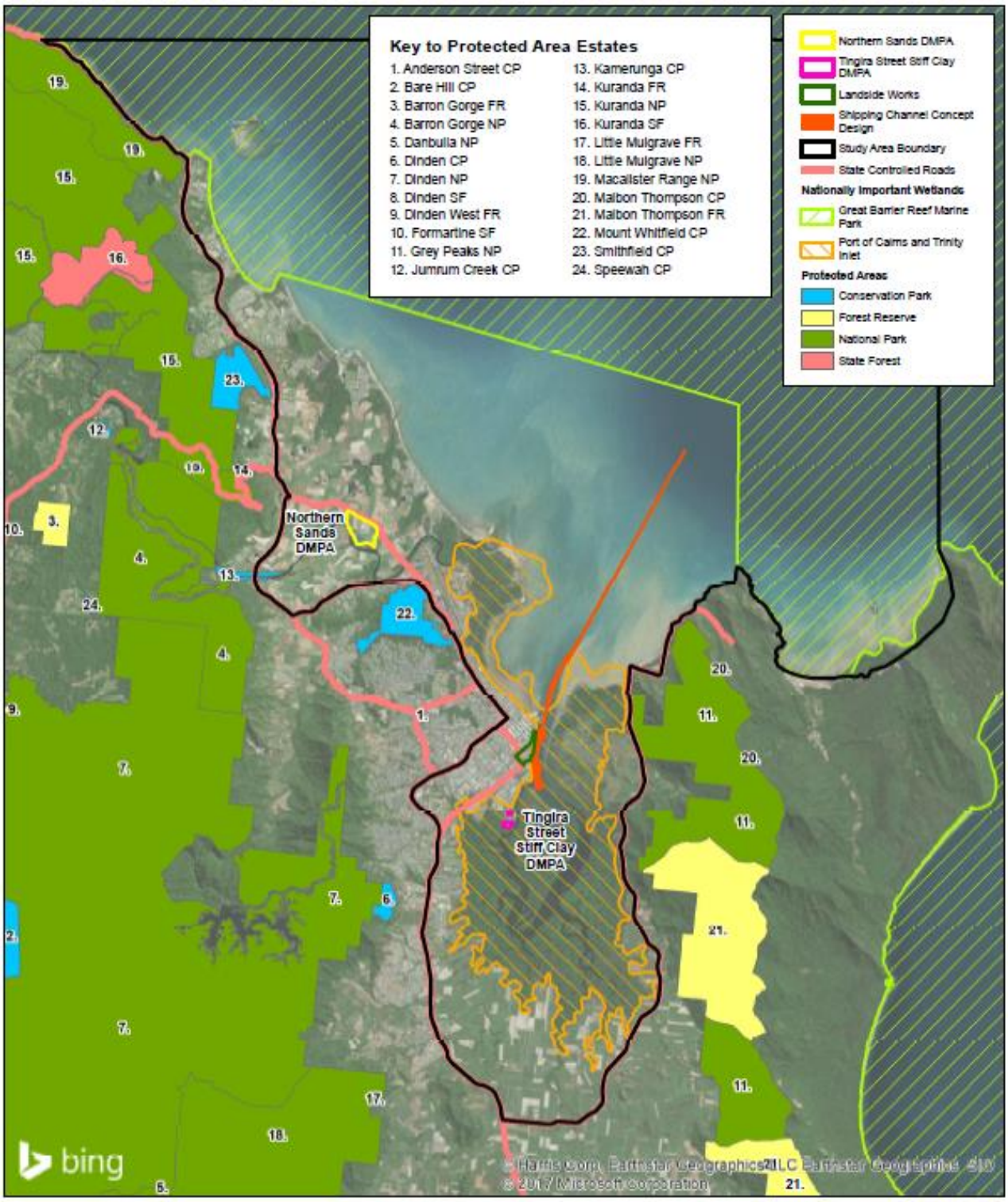
Source: Appendix AM.

B2.3.4.c Protected Estate

Protected estate includes National Parks, Conservation Parks, Forest Reserves, Resource Reserve, Nature Refuges, Wilderness Areas, State Forests or Timber Reserves. These are established variously under the *Forestry Act 1959 (Qld)* and the NC Act. As shown on **Figure B2-11**, the closest protected estates to the Port of Cairns are (numbers in brackets are as shown on the legend of **Figure B2-11**):

- Anderson Street Conservation Park (1), approximately 4 km to the west of the Port of Cairns
- Barron Gorge National Park, approximately 3.7 km to the west of the Northern Sands DMPA
- Dinden National Park (7), approximately 6.5 km to the south-east of the Port of Cairns
- Greys Peak National Park (11), approximately 3.5 km east of the Port of Cairns. A portion of this park abuts to Study Area
- Kamerunga Conservation Park (13), approximately 2.8 km to the south-west of the Northern Sands DMPA
- Malbon Thompson Conservation Park (20), approximately 7 km to the east of the Port of Cairns
- Malbon Thompson Forest Reserve (21), approximately 6 km to the south-east of the Port of Cairns
- Mount Whitfield Conservation Park (22), approximately 5 km to the north-west of the Port of Cairns and 1.8 km south of the Northern Sands DMPA.

It is considered that all of these areas are too remote to be affected by the CSD Project.



Ports North

Cairns Shipping Development Project
Revised Draft EIS

Nationally Important Wetlands and Protected Area Estates

Ref: 3527-02-06b
Date: 30/05/2017
Projection: MGA94 Zone 55
Scale at A4 Size 1:200,000

0 2 4 8 Kms

FLANAGAN CONSULTING GROUP
CAIRNS DARWIN MACKAY TOWNSVILLE

Figure B2-11 Protected Estate and Nationally Important Wetlands.

B2.3.4.d Fish Habitat Areas

Fish Habitat Areas (FHAs) are managed under the *Fisheries Act 1994* (Qld) and represent a form of multiple use marine protected area that limit certain activities that may affect fisheries habitat values. The following FHAs occur in the various project areas (see **Figure B2-12**):

TABLE B2-3 FHAS IN THE VARIOUS PROJECT AREAS

PROJECT AREA	FHA	DETAILS
Channel	Trinity Inlet FHA-003	Area A Area B
Land-side Works Area	N/A	N/A
Northern Sands DMPA	N/A	N/A
Northern Sands Pipeline	Yorkeys Creek FHA-034	Area B (two crossings)
Tingira Street DMPA	N/A	N/A

Other FHAs in the proximity of the various Project Areas are Barr Creek (FHA-035) and Half Moon Creek FHA-033. These FHAs are located with estuarine creeks that support well developed mangrove forests and saltmarsh/saltpan areas. As they are unlikely to be affected by the CSD Project they are not discussed further.

Trinity Inlet FHA

The Trinity Inlet FHA covers a large proportion of the Channel Project area. It is the largest FHA in the Cairns region, covering 7212 ha. It also contains both 'Management Area A' (6042 ha) and 'Management Area B' (1170 ha) areas – see **Figure B2-12**) as outlined below:

- Management Area A areas impose stricter management measures to protect key fish habitats.
- Management Area B areas are declared to protect important fish habitat while allowing for less stringent regulation. They also provide a buffer to Management Area A areas.

During declaration of the Trinity Inlet FHA, an exclusion and buffer distance to allow for future expansion of the entrance channel was included. Preliminary phases of the CSD Project have been informed by this constraint and the channel design adjusted to avoid or minimise the need for changes to the FHA.

As a declared FHA, key habitat features include extensive mangrove zones, seagrass beds off the Cairns Esplanade area, patchy saltmarsh areas and intertidal flats. The FHA is an important fishing location and nursery area supporting commercial, recreational and indigenous fishing. Refer to **Chapter B7** (Marine Ecology) and **Chapter B9** (Socio-economic) for further details regarding these values.

Adjacent to the Tingira Street DMPA (see **Figure B2-13**). This figure shows the FHA and other MSES.

Yorkeys Creek FHA

The Yorkeys Creek FHA (Management Area B) covers Yorkeys Creek and Richters Creek at Yorkeys Knob as well as some of Thomatis Creek. It will be crossed twice by the Northern Sands Pipeline.

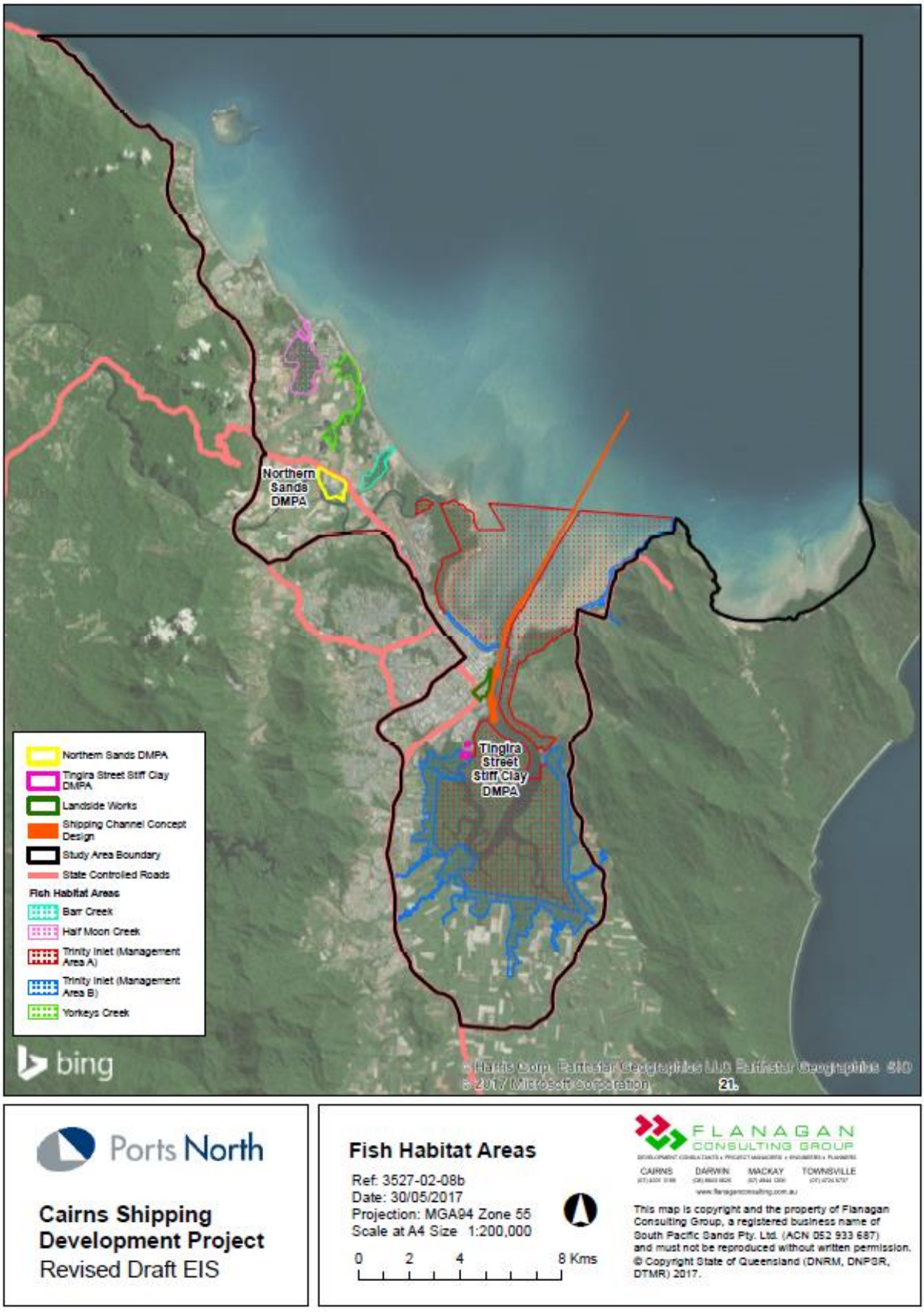


Figure B2-12 Fish Habitat Areas.

Note that the FHAs are Management Area B unless noted otherwise.

B2.3.4.e Other Fisheries Act Protected Areas

The Fisheries Act (in concert with the NC Act) also establishes a system of dugong protection areas. The nearest of these to the Study Area is approximately 150 km south at Hinchinbrook.

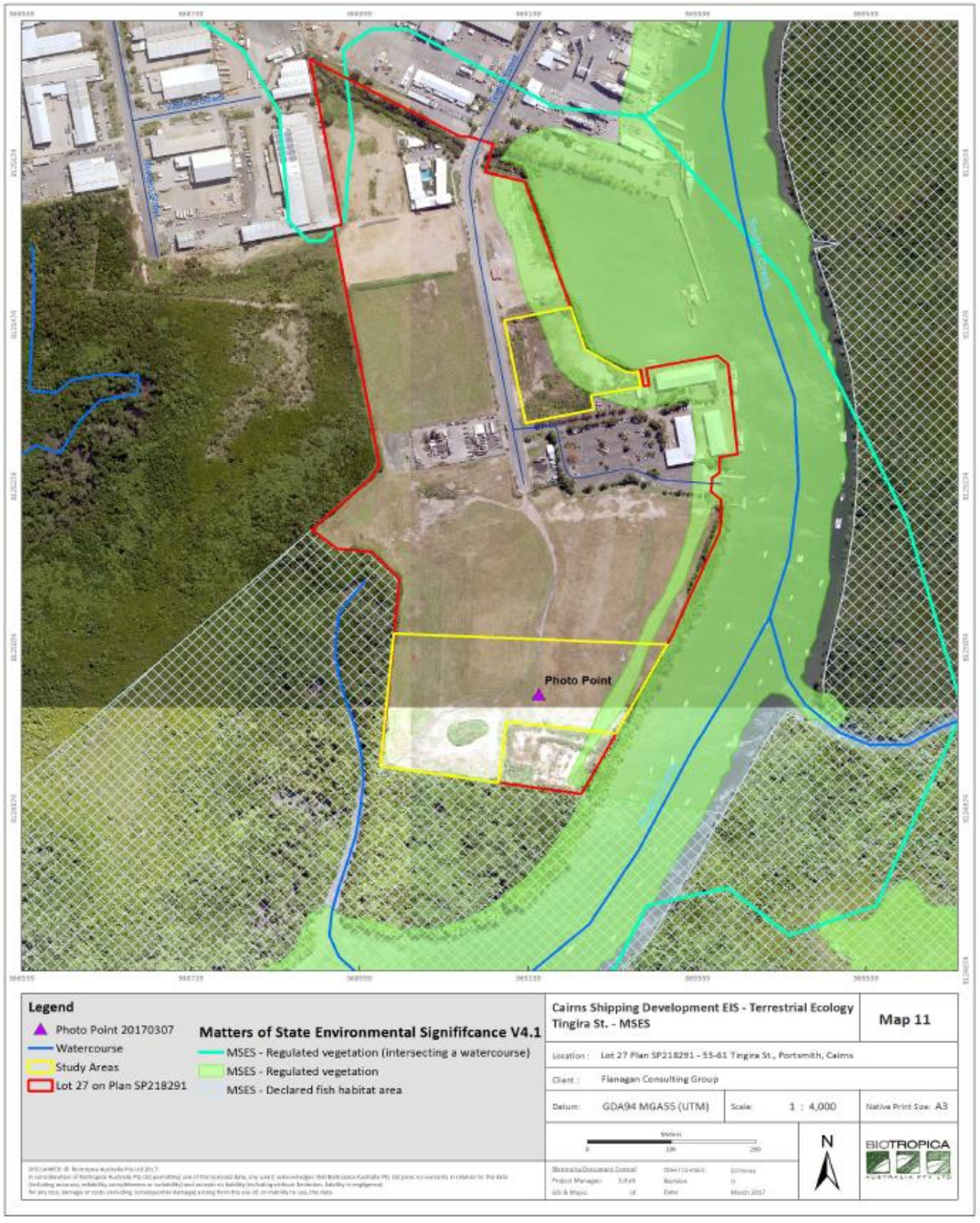


Figure B2-13 MSES at Tingira St DMPA.

Source: Appendix AM.

B2.3.4.f Wetland Protection Areas and High Ecological Value Wetlands

The Queensland Government is committed to the statutory protection of wetlands in catchments adjoining the Great Barrier Reef lagoon via the SP Act. This seeks to ensure that development is planned, designed, constructed and operated so as not to cause harm to the hydrology of wetlands in wetland protection areas that protect matters national and state environmental significance including the outstanding universal values of the Great Barrier Reef.

The map of referable wetlands (adapted for **Figure B2-14**) identifies the location of wetland protection areas (WPA) in Great Barrier Reef catchments. WPAs include a wetland surrounded by a 100 m trigger area within urban areas and a 500 m trigger area within rural areas. **Figure B2-14** shows that there are no WPA or associated trigger areas within or near any project area. The nearest WPA trigger area is approximately 85 m east of part of the Northern Sands inlet pipeline.

Wetlands are also assessed for ecological significance using the environmental values for wetlands in Section 81A of the EPR. Wetlands are considered either High Ecological Significance (HES) or of General Ecological Significance (GES) for the purposes of the environmental values. There are no trigger areas associated with these wetlands.

Figure B2-14 and **Figure B2-15** together show that GES WMA wetlands exist in the following areas:

- across the remnant vegetation communities that border Smiths Creek at the Tingira Street Project Area
- within the vegetation associated with the Barron River at the Northern Sands Project Area:
  - where the delivery pipeline corridor crosses wetlands associated with Richters Creek
  - at the mouth of Richters Creek
  - in a small area crossed by the Discharge Option 2 pipeline (Discharge Option 1 does not cross any mapped GES wetlands).

Trinity Inlet is mapped as a High Ecological Value (HEV) wetland due to its declaration as a Nationally Important Wetland (see **Section B2.3.3.g** and **Figure B2-14**). On that basis, the description of its value as outlined above are also relevant to its significance under Queensland legislation including the *Environmental Protection Regulation 2008* as a referrable wetland.

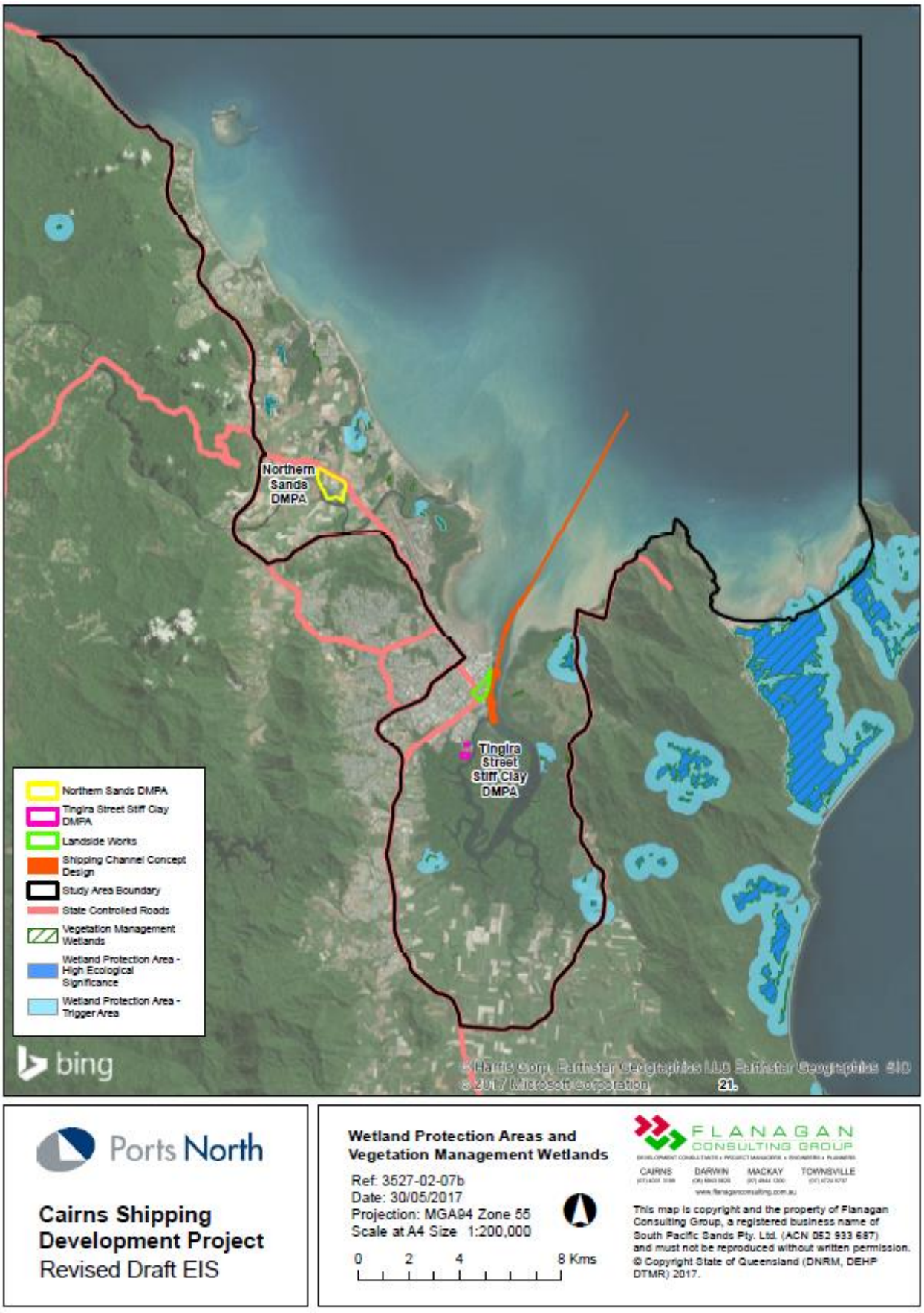


Figure B2-14 Wetland Protection Areas.

Map also shows Vegetation Management Wetlands – none occur in the vicinity of any project area.

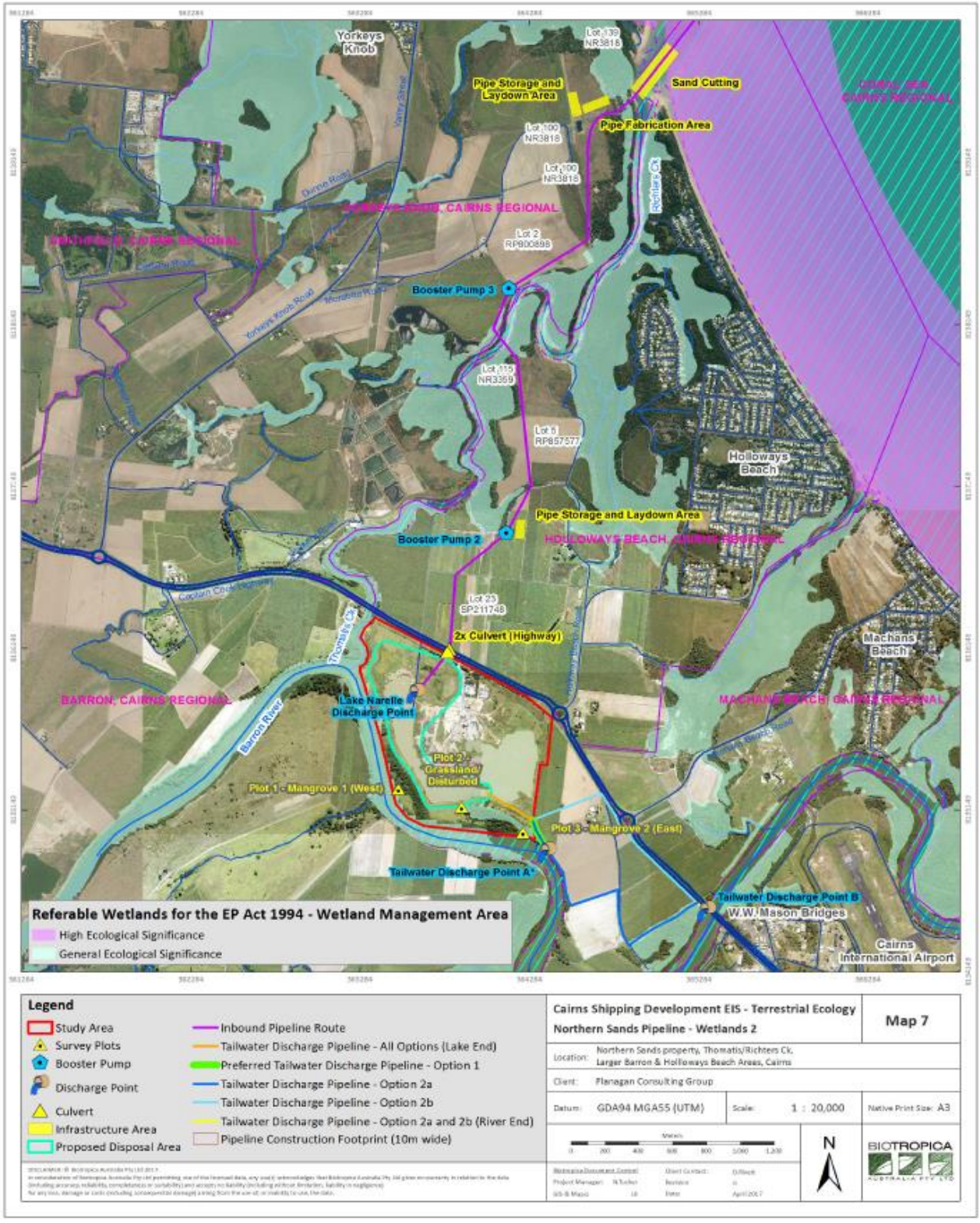


Figure B2-15 Wetland Protection Areas and High Ecological Value Wetlands (Northern Sands DMPA).

Source: Appendix AM.

B2.3.4.g Remnant and Regrowth Regional Ecosystems

Remnant and Regrowth Regional Ecosystems (RE) are regulated under the *Vegetation Management Act 1999* (Qld) (VM Act). RE types are described based on a combination of geology, landform, soil and flora. As an example, mapping shows the project area contains RE 7.1.2a, which is described as estuarine wetlands comprised of Samphire flats with open forbland to sparse forbland of *Tecticornia* spp. (Samphire) and *Suaeda australis* (Sea Blite).

Within the VM Act, REs are also classified into Endangered, Of Concern, and Least Concern conservation classes based on the extent of previous clearance of each RE type.

Chapter B8 (Terrestrial Ecology) further discusses the extent of REs in the study area and concludes that:

- The Northern Sands DMPA is mapped as Freehold land and Lake Narelle has no remnant vegetation associated with it. However, there is some remnant vegetation located between the Lake and the Barron River.
- The delivery pipeline corridor and tailwater pipelines corridor are variously mapped as Freehold, Lands Lease, State Land and Reserve. There are several categories of remnant vegetation located along the proposed pipeline routes.
- There is no remnant vegetation within the Tingira Street Project Area.
- There are no good representative examples of remnant REs or REs that are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database.
- There are no sites containing near-threatened or bio-regionally significant species or essential, viable habitat for near-threatened or bio-regionally significant species.

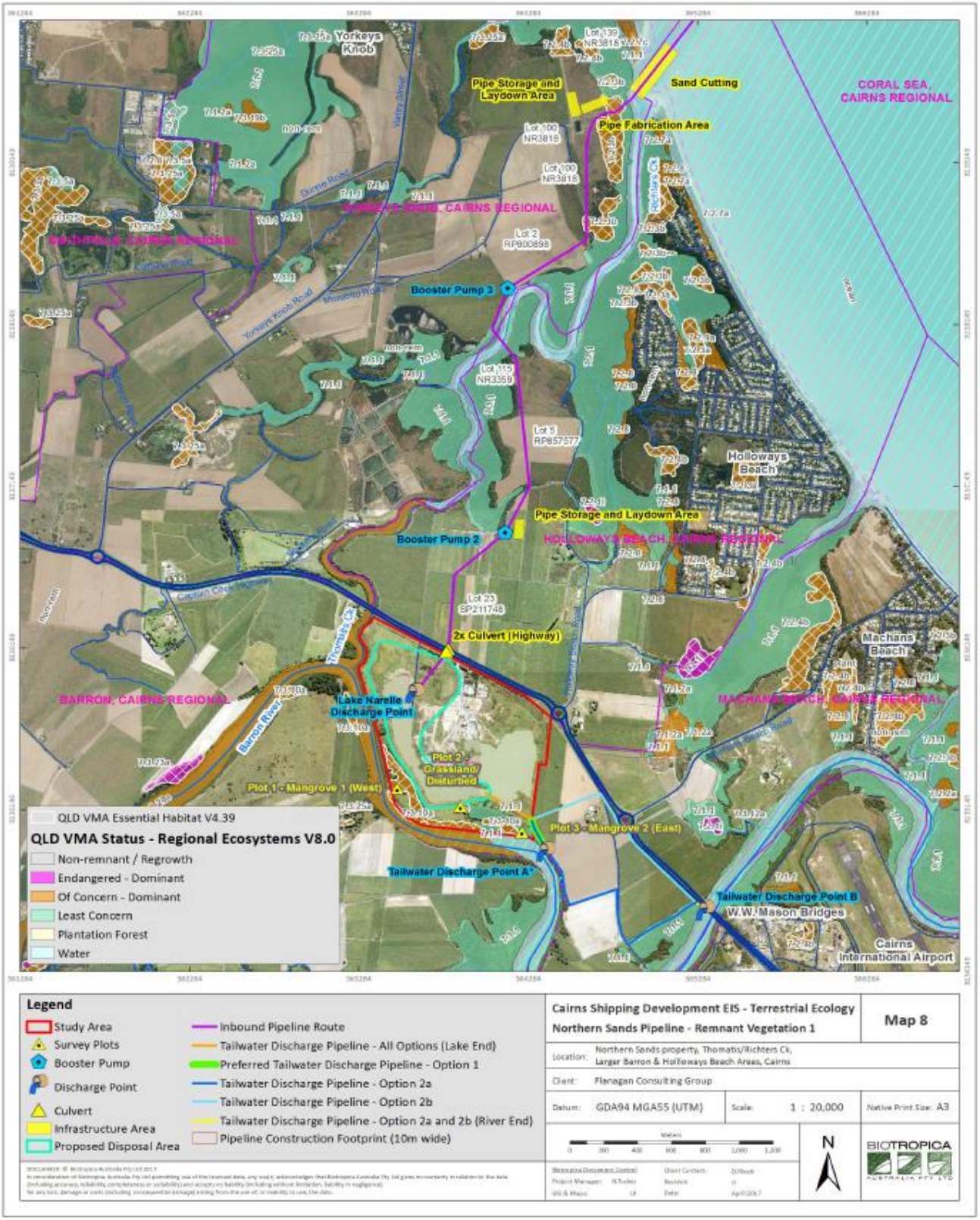


Figure B2-16 Remnant vegetation.

Source: Appendix AM.

B2.3.4.h Essential Habitat

Essential habitat mapping identifies sites and locations considered to contain important habitat for flora and fauna species of conservation significance. The State uses these essential habitat maps to determine the habitat status of the vegetation when assessing applications to clear. This enables them to fulfil obligations under the VM Act to regulate vegetation clearing in such a way as to prevent the loss of biodiversity.

Essential habitat is only mapped over remnant or regrowth vegetation and is based on one of the following criteria:

- confirmed sightings or records of a species of conservation significance breeding or utilising major habitat resources in that location
- known suitable habitat or resources for a species of conservation significance occurring at a location
- habitat that forms part of a potentially important corridor for a species of conservation significance.

Northern Sands DMPA

Within the Northern Sands project area, the vegetation between Lake Narelle and the Barron River and vegetation that is crossed by the delivery pipeline near the mouth of Richters Creek are partially mapped as essential habitat for the Southern cassowary (*Casuarius casuarius johnsonii).* See **Figure B2-9**.

Tingira Street DMPA

There is no essential habitat mapped on the Tingira Street site.

B2.3.4.i Coastal Management District

The Coastal Management District (CMD) is declared under the *Coastal Protection and Management Act 1995* (Qld) (CPM Act). It defines an area where the Department of Infrastructure, Local Government and Planning (DILGP) has assessment manager or referral agency powers and responsibilities to assess certain development applications under the *Sustainable Planning Act 2009*. While it is not a Nature Conservation Area, the CMD is shown in mapping prepared for this chapter on the basis that it is a relevant management area for coastal development. No assessment of impacts is made on the CMD.

This is mapped on **Figure B2-17** below, along with the Commonwealth Marine Area. These two areas share a common boundary where state and Commonwealth interests adjoin.

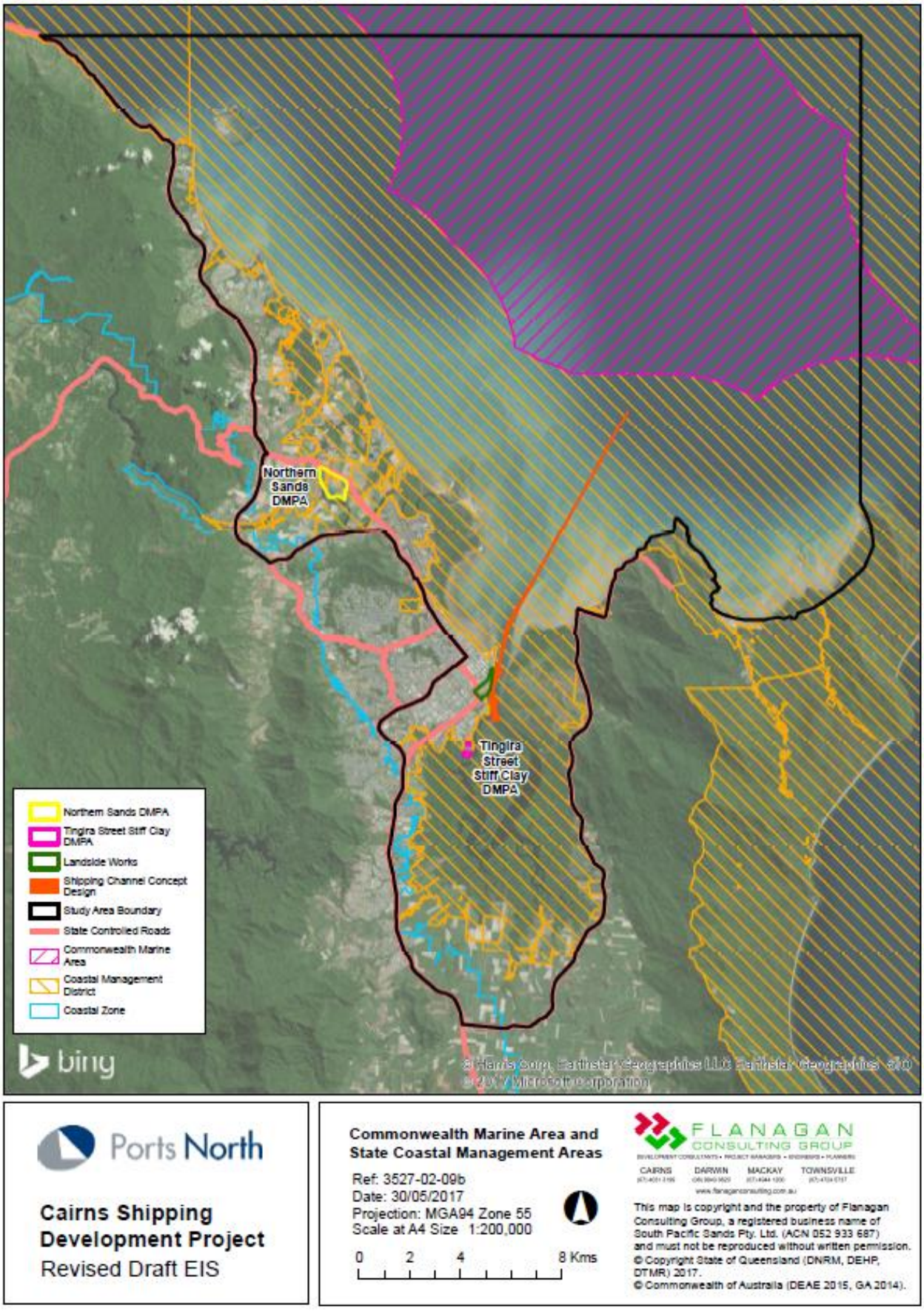


Figure B2-17 Commonwealth Marine Area and State Coastal Management Areas.

B2.3.5 Local Nature Conservation Areas

At a local government level, the CairnsPlan 2016 includes Planning Area and Overlay Codes that directly relate to the conservation of environmental values. The application of the CairnsPlan 2016 is discussed in **Chapter A1** (Introduction) and **Chapter** B1 (Land). In terms of the Natural Areas Overlay, the only area affected by the CSD Project is Richters Creek which is crossed twice by the Northern Sands Pipeline. As noted above, at these locations Richters Creek is a FHA and the CairnsPlan mapping reflects this value.

In general, the Natural Areas Overlay of a Planning Scheme mirrors protected areas declared under Queensland legislation and this is the case in CairnsPlan. Accordingly, no additional Nature Conservation Areas are applicable.

B2.4 Assessment of Potential Impacts

B2.4.1 Impact Assessment Methodology

B2.4.1.a Risk-based Assessment

The impact assessment has been undertaken with reference to the EIS process outlined in **Chapter A1** (Introduction) and includes an assessment of the following:

- the magnitude of impacts (consequence) (**Table B2-4**)
- the duration of impact
- the likelihood of impact.

These are considered together to determine the final level of impact risk, which is described in **Table B2-4**. It should be noted that the assessment of impacts presented in this chapter relies heavily on the findings of other EIS chapters presented in Part B including **Chapter B3** (Coastal Processes), **Chapter B5** (Marine Water Quality), **Chapter B7** (Marine Ecology) and **Chapter B8** (Terrestrial Ecology) among others. Further description and justification of specific assessment findings are contained within these supporting chapters.

B2.4.1.b Impact Significance / Consequence Criteria

Impact consequence criteria are different for each matter under discussion. **Table B2-4** shows the criteria used for this chapter.

TABLE B2-4 IMPACT CONSEQUENCE CRITERIA

IMPACT CONSEQUENCE	DESCRIPTION OF CONSEQUENCE
Very High	Value/s of a Commonwealth Nature Conservation Area suffer/s permanently damaged serious or irreversible environmental damage to the extent that the area requires reclassification, or where value/s is/are permanently lost. E.g. If the OUV of the GBRWHA suffered serious or irreversible environmental damage or a key attribute underpinning listing of the site is lost or permanently modified. The boundary of a Nature Conservation Area requires significant revocation.
High	Value/s of a Queensland Nature Conservation Area is/are lost to the extent that the area requires reclassification and/or where values are permanently lost. E.g. If a project resulted in substantial clearing within a Queensland-protected wetland resulting in significant and permanent impacts. Value/s of a nationally protected Nature Conservation Area is/are damaged or diminished in a way over the medium to long term; although the impact is recoverable over time. The boundary of a Nature Conservation Area requires major amendment.
Moderate	Value/s of a Nature Conservation Area is/are damaged over the short to medium term; although the impact/s is/are recoverable over time. The boundary of a Nature Conservation Area requires moderate amendment.
Minor	Impact/s to the value/s of a Nature Conservation Area is/are recognisable/ detectable; however are considered acceptable. Impact/s are short term/ temporary and/or occur at a local scale. The boundary of a Nature Conservation Area requires temporary amendment. As an example, a minor impact would occur if a project resulted in the temporary disturbance of wildlife values within a Nature Conservation Area during construction.
Negligible	No identifiable change to the existing environment. This could include for example, impact/s which are beneath the levels of detection, impact/s that is/ are within the normal bounds of natural variation or impact/s that is/are within the margin of forecasting error.
Beneficial	The value/s of a Nature Conservation Area is/are improved.

B2.4.1.c Duration

Table B2-5 shows the general approach to classifying the duration of identified impacts.

TABLE B2-5 CLASSIFICATIONS OF THE DURATION OF IDENTIFIED IMPACTS

Relative duration of impacts	
Temporary	Days to months
Short Term	Up to one year
Medium Term	From one to five years
Long Term	From five to 50 years
Permanent / Irreversible	In excess of 50 years

B2.4.1.d Likelihood of Impact

Likelihood of impact is described in **Table B2-6** below.

TABLE B2-6 LIKELIHOOD OF IMPACT

LIKELIHOOD OF IMPACTS	RISK PROBABILITY CATEGORIES
Highly Unlikely	Highly unlikely to occur but theoretically possible
Unlikely	May occur during construction of the project but probability well below 50%; unlikely, but not negligible
Possible	Less likely than not but still appreciable; probability of about 50%
Likely	Likely to occur during construction or during a 12 month timeframe; probability greater than 50%
Almost Certain	Very likely to occur as a result of the proposed project construction and/or operations; could occur multiple times during relevant impacting period

B2.4.1.e Risk Matrix

Risk is described as the product of likelihood and consequence as shown in **Table B2-7** below.

TABLE B2-7 RISK MATRIX

LIKELIHOOD	CONSEQUENCE				
	Negligible	Minor	Moderate	High	Very high
Highly Unlikely/ Rare	Negligible	Negligible	Low	Medium	High
Unlikely	Negligible	Low	Low	Medium	High
Possible	Negligible	Low	Medium	Medium	High
Likely	Negligible	Medium	Medium	High	Extreme
Almost Certain	Low	Medium	High	Extreme	Extreme

B2.4.1.f Risk Rating

The rating of risk as assessed above is as shown in **Table B2-8** below.

TABLE B2-8 RISK RATING LEGEND

Extreme Risk	An issue requiring change in project scope; almost certain to result in a 'significant' impact on a Matter of National or State Environmental Significance
High Risk	An issue requiring further detailed investigation and planning to manage and reduce risk; likely to result in a 'significant' impact on a Matter of National or State Environmental Significance or other Nature Conservation Area
Medium Risk	An issue requiring project specific controls and procedures to manage
Low Risk	Manageable by standard mitigation and similar operating procedures
Negligible Risk	No additional management required

B2.4.2 Summary of Directly Affected Areas

Table B2-9 below shows a summary of Nature Conservation Areas directly affected by the CSD Project.

TABLE B2-9 SUMMARY OF DIRECTLY AFFECTED AREAS

CONSERVATION ZONE TYPE	CURRENT CHANNEL DESIGN (E.G. EXISTING AREA AFFECTED)	AREA DIRECTLY AFFECTED BY THE NEW CHANNEL DESIGN (E.G. WIDENING)	AREA DIRECTLY AFFECTED BY TEMPORARY DREDGE PIPELINE
GBRWHA	253.8 ha	94.9 ha	0.77 ha
GBR Marine Park	0 ha	0 ha	0 ha
GBRCMP (State)	253.8 ha	94.9 ha	1.814 ha
FHA	0 ha (channel is excluded from FHA)	9.21 ha	0.30 ha

These areas are referred to later in this section where appropriate.

B2.4.3 Commonwealth Nature Conservation Areas

B2.4.3.a World Heritage Properties (Sections 12 & 15A)

Great Barrier Reef World Heritage Area

As outlined in **Section B2.3.3.b**, the OUVs of the GBRWHA recognise the ecological, cultural heritage, and visual amenity values of the property. The significance criteria (Department of the Environment 2013) state that a significant impact is one that:

- causes one or more of the 'Attributes' of the WHA to be lost
- causes one or more of the 'Attributes' of the WHA to be degraded or damaged
- causes one or more of the 'Attributes' of the WHA to be notably altered, modified, obscured or diminished
- causes impact on the 'Integrity' of the property.

Works in the following project areas will be undertaken in or adjacent to the GBRWHA as detailed:

- Channel Project Area including:
  - dredging of soft clay and stiff clay for the widening of the shipping channel and inner harbour works
  - motoring to the pump out point at the seaward end of the delivery pipeline and pumping through the pipeline to the Northern Sands DMPA
  - installation and demobilisation of the dredge mooring point off the coast, and delivery pipeline via at the mouth of Richters Creek
- Landside Works Project Area for wharf upgrades and berthing of cruise ships – adjacent to the WHA.
- Northern Sands Project Area Project Area:
  - installation and demobilisation of the delivery pipeline at the mouth of Richters Creek and crossing of Richters Creek
  - discharge of tailwater at the Barron River bridge
- Tingira Street Project Area – barging stiff clay to the DMPA (in the WHA) and offloading (adjacent to the WHA).

The key impacting processes from the project that have the greatest potential to impact the GBRWHA's OUV attributes and integrity include:

- direct loss and/or disturbance of marine habitat and biota within the project footprint primarily within the dredge footprint area and that of the delivery pipeline at the landfall point at the mouth of Richters Creek and the upstream crossing
- the creation of turbid plumes during dredging, which can increase both turbidity within the water column and sediment deposition on the seabed
- temporary water quality impacts associated with discharge of tailwater from the Northern Sands DMPA.

These factors provide the main basis for assessing potential impacts to the WHA as a geographic area noting the project may also directly or indirectly affect marine megafauna, avifauna and other species and populations (e.g. interactions with vessels, noise and lighting) that underpin listing of the WHA.

These species and populations are considered in **Chapter B7** (Marine Ecology) and **Chapter 8** (Terrestrial Ecology) respectively. In this context, the findings of several chapters of the Revised Draft EIS are also relevant:

- **Chapter B3** (Coastal Processes)
- **Chapter B5** (Marine Water Quality).

These chapters include detailed consideration of the matters relevant to the GBRWHA in terms of values, impacts, mitigation, and residual impacts. For clarity, the results of this work are best described in terms of residual impacts. Accordingly, the assessment is presented in this chapter in **Section B2.6.2** (**Table B2-12**).

Wet Tropics of Queensland World Heritage Area

As described in **Section B2.3.3.b**, the WTWHA is remote from the site and will not be affected by the development.

B2.4.3.b National Heritage Places (Sections 15B & 15C)

The Great Barrier Reef

For the purposes of this assessment the Great Barrier Reef national heritage place is dealt with together with the GBRWHA.

The Wet Tropics of Queensland

For the purposes of this assessment the Wet Tropics of Queensland national heritage place is dealt with together with the WTWHA.

The Wet Tropics World Heritage Area (Indigenous Values)

As described in **Section B2.3.3.b**, the WTWHA is remote from the site and will not be affected by the development. This applies equally to Indigenous values.

B2.4.3.c Commonwealth Marine Areas (Sections 23 & 24A)

As stated in **Section B2.3.3.d**, the CMA is outside the footprint of the CSD Project and impacts are not specifically assessed. The assessments of the GBRWHA and the GBRMP are considered to adequately cover the CMA.

B2.4.3.d Great Barrier Reef Marine Park (Sections 24B & 24C)

The CSD Project does not involve any works in the GBRMP. Possible indirect impacts involve some of those assessed for the GBRWHA (**Section B2.4.3.a**), namely:

- the creation of turbid plumes during dredging, which can increase both turbidity within the water column and sediment deposition on the seabed
- temporary water quality impacts associated with discharge of tailwater from the Northern Sands DMPA
- directly or indirect effects on marine megafauna, avifauna and other species and populations arising from interactions with vessels, noise and lighting.

The CSD Project will also lead to an increased volume of material from maintenance dredging of the new channel (2-6% extra) and placement at the approved marine DMPA in the GBR Marine Park.

Chapter B18 (Cumulative Impacts Assessment) assesses these and other impacts in the context of cumulative and consequential impacts based on the methodology derived for the strategic assessment of the GBR (GBRMPA 2014).

The indirect impacts from dredging on the GBRMP are addressed in the discussion of World Heritage Values above, noting that the attributes underpinning World Heritage listing also underpin marine park listing and management objectives.

Further assessment against the key criteria for assessment of impacts for the GBRMP as identified in relevant Significant Impact Guidelines (DEWHA 2009) are identified in **Table B2-10** below

TABLE B2-10 ASSESSMENT OF IMPACTS TO GBR MARINE PARK

Significance Criterion	Assessment
Modify, destroy, fragment, isolate or disturb an important, substantial, sensitive or vulnerable area of habitat or ecosystem component such that an adverse impact on marine ecosystem health, functioning or integrity in the GBRMP results	Refer **Chapter B3** (Coastal Processes), **Chapter B5** (Water Quality), **Chapter B7** (Marine Ecology). The zones of impact and influence from dredging water quality impacts are largely contained within the exclusion area to the Commonwealth Marine Park. Only the zones of influence extend beyond the boundary. Water quality impacts in these areas will not have an ecological effect on corals, seagrass, soft bottom benthos or other marine habitats that underpin the health, functioning and integrity of the Park. Additional dredge material placement in the Marine Park from maintenance dredging will be minor with only a 2 – 6 % increase in annual volume from the revised channel design. This volume can be accommodated in the existing approved DMPA or at the alternative deeper marine DMPA that was investigated as part of the previous Draft EIS, if greater retention of placed sediments is desirable within the Park. Reactive and validation monitoring programmes are proposed to ensure impacts are avoided or minimised as set out in **Chapter C2** (Dredge Management Plan).

Significance Criterion	Assessment
Have a substantial adverse effect on a population of a species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution	Refer **Chapter B7** (Marine Ecology). While marine fauna are known to utilise the waters regionally in proximity to the project, the project is not expected to result in a significant impact on any important megafauna species, critical habitat or other habitat important for the life cycle of these species.
Result in a substantial change in air quality or water quality (including temperature) which may adversely impact on biodiversity, ecological health or integrity or social amenity or human health	Refer **Chapter B5** (Marine Water Quality) and **Chapter B11** (Air Quality). Substantial changes to these environmental values are not expected as the result of the implementation of appropriate mitigation measures. For water quality this includes dredge management strategies such as reducing dredge overflow and placement in the new, retentive DMPA (not part of CSD Project).
Result in a known or potential pest species being introduced or becoming established in the GBRMP	Refer **Chapter B7** (Marine Ecology) and **Chapter C2** (Dredge Management Plan). Vessels that undertake dredging will be required to be inspected for marine pests and manage ballast and exchange waters in accordance with International Maritime Organisation procedures and Department of Agriculture and Water Resources requirements as outlined in **Chapter C2** (Dredge Management Plan).

Risk Assessment (Impact summary prior to mitigation)

Consequence: Negligible

Likelihood: Almost certain

Duration: Short term

Level of risk: Low

Mitigation: **Chapter C2 (**Dredge Management Plan).

B2.4.3.e Commonwealth Land (Sections 26 & 27 A)

As stated in **Section B2.3.3.f**, all of the Commonwealth land sites listed in the protected matters search are developed land within the urban footprint, none of these is in the footprint of the CSD Project, and none is considered to be Nature Conservation Areas.

B2.4.3.f Nationally Important Wetlands

PCTI Wetland

In terms of the CSD Project, this wetland covers:

- most of Trinity Inlet (including the swing basin and Tingira Street Project Area)
- part of the main channel to just seaward of the Marlin Marina.

Chapter B7 (Marine Ecology) and **Chapter B8** (Terrestrial Ecology) describe these values in detail.

Trinity Inlet (QLD 157

In terms of the nationally important wetland values of Trinity Inlet (QLD 157 as a separate management unit to the broader Trinity Bay) the following key findings from the Draft EIS are relevant:

- The volume of dredging to be undertaken in the inner port area (extending from the proposed Smith Wharves Turning Basin to the area of channel outside Marlin Marina) is a small component of the overall volume of capital dredging (up to100 000 m^3).
- The dredge material in these areas generally consists of firmer clays that will likely be dredged by a mechanical (backhoe) dredge which produces less suspension of sediment or turbidity generation.

- The combination of the lower volume of material and the type of plant to be used limits the expected water quality impacts during dredging operations as described in **Chapter B5** (Marine Water Quality). This includes both turbidity and sedimentation impacts from dredging operations.
- Impacts from dredging the inner port area (including Trinity Inlet) therefore are not expected to result in significant impacts on key wetland values of the Inlet including mangrove and saltmarsh habitats, seagrass known to be present in areas upstream of the port in the Inlet, and unvegetated tidal flats and banks and associated habitats that are important to migratory birds, fisheries or megafauna
- There will be no direct impact to nearshore or landward environments of the Trinity Inlet Wetland.

Risk Assessment (Impact summary prior to mitigation)

Consequence: Negligible

Likelihood: Almost certain

Duration: Short term

Level of risk: Low

Mitigation: **Chapter C2 (**Dredge Management Plan).

GBRMP Wetland

The GBRMP Wetland has the same boundary as the GBRMP and is assessed as part of the GBRMP.

B2.4.4 Queensland Nature Conservation Areas

B2.4.4.a Great Barrier Reef Coast Marine Park

Dredging

Dredging will encroach on the General Use Zone of the GBR Coast Marine Park, within the 'local scale' study area. Capital dredging, trawling and similar bed disturbances are permitted within the General Use Zone subject to assessment.

The boundaries between the General Use Zone and the Estuarine Conservation Zone of the GBR Coast State Marine Park along the shipping channel contain a similar buffer to that of the FHA (see **Section B2.4.4.c**) and would need to be addressed with an 'exchange' solution similar to that described above, noting the intention to have identical boundaries and complementary management of these areas within Trinity Inlet is highly desirable.

As outlined in **Chapter B7** (Marine Ecology), this extension area is unvegetated substrate and is not known to support seagrass, coral or any hard substrate that would provide additional habitat value to the soft benthos.

The change in habitat conditions in the dredge channel is predicted to have highly localised effects to soft sediment habitat and associated biota within the dredge footprint. This is, however, not expected to result in significant flow-on effects to other biological components such as fish and megafauna.

Temporary Mooring

The temporary mooring for the dredge pump out and the marine section of the delivery pipeline to the Northern Sands DMPA will be situated in the State marine park and require a works permit to be installed. The details of the structural solution is outlined in **Chapter C2** (Dredge Management Plan) and may involve either piled dolphin structures or an anchored vessel or blocks. The marine component of the dredge pipeline will consist of a floating pipeline (connected to the mooring) and then placement of the steel pipeline on the seabed.

Impacts from the temporary mooring and marine pipeline are not expected on coastal processes (refer **Chapter** B3 (Coastal Processes)), or water quality (refer **Chapter B5** (Marine Water Quality)) and only minor impacts are predicted to soft bottom benthos (refer **Chapter B7** (Marine Ecology)). There are no seagrass or corals found in or adjacent to the mooring or pipeline alignment. All works are temporary and will be fully removed following completion of the dredging and placement.

Impacts from the crossings are discussed in **Chapter B5** (Water Quality), **Chapter B7** (Marine Ecology) and **Chapter B8** (Terrestrial Ecology). In summary, impacts will likely involve a minor temporary impact on soft bottom benthos (the pipeline will be laid on the foreshore at the mouth and on the riverbed) and will likely have a minor impact on fringing marine plants as a result of clearing and stabilisation. These impacts will be temporary (6 months) and all vegetation and landforms rehabilitated following completion of the works.

The operation of the pipeline and boosters involves some risk from spills and leaks and these are discussed in **Chapter B17** (Hazard and Risk).

Tingira Street DMPA

The GBRCMP in the vicinity of the Tingira Street DMPA follows the boundary of Lot 27. Works in this area involve barging stiff clay to the DMPA (in the GBRCMP) and offloading (adjacent to the GBRCMP).

Placement at Tingira Street will not involve the removal of marine plants or other vegetation communities as it is already a modified site. The placement will be undertaken mechanically (using a Backhoe dredge and barges) and as a result, no supernatant dredge tailwater will be generated or need to be managed.

Runoff from the site will be controlled via bunds. As discussed in Chapter C1 (Construction Environmental Management Plan), additional sediment and erosion controls will be in place to limit the release of sediments and other contaminants during and post-placement from stormwater runoff.

Risk Assessment (Impact summary prior to mitigation)
Consequence: Negligible
Likelihood: Almost certain
Duration: Short term
Level of risk: Low
Mitigation: **Chapter C1** (Construction Environmental Management Plan) **Chapter C2 (**Dredge Management Plan).

B2.4.4.b Protected Estate

It is concluded in **Section B2.3.4.c** that all of these areas are too remote to be affected by the CSD Project.

B2.4.4.c Fish Habitat Areas

Several fish habitat areas have been declared in the Cairns region including:

- Trinity Inlet (separated between an FHA A and FHA B area)
- Half Moon Creek
- Barr Creek
- Yorkeys Creek

The values underpinning these areas include extensive mangrove zones, seagrass beds (off the Cairns Esplanade and potentially at the mouths of the creeks), patchy areas of saltmarsh and intertidal flats (refer www.npsr.qld.gov.au/managing/area-sumaries).

Fisheries values include commercial, recreational and Indigenous fishing; including a crab fishery, important nursery area for several species of fish and penaeid prawns, barramundi, blue salmon, bream, estuary cod, flathead, garfish, grey mackerel, grunter, mangrove jack, queenfish, whiting, tiger prawns and mud crabs.

The Trinity Inlet FHA is also one of only two areas on the east coast of Queensland where chenopod (succulent saltmarsh shrub) species *Pachycomia tenuis* has been reported

Capital Dredging

The current shipping channel in Cairns is within a 200 m wide exclusion area from the Trinity Inlet declared FHA. The exclusion area was put in place at the time of declaration of the FHA in 1998 to cater for possible future expansions of the channel. However, this assumed equidistant expansion of both sides of the channel, whereas the current design of the project prefers widening of the channel on the western margin (over a portion of the channel centred around the channel bend) to take advantage of:

- the less firm (e.g. more dredgeable) material present on the western side of the channel
- widening the outside of the bend is a more efficient enhancement of ship maneuverability, resulting in minimal overall widening
- maintaining the existing buffer between the channel and more valuable fish habitats to the east that are located along the eastern coast of Trinity Inlet (seagrass, mangroves and shallow tidal flats) to False Cape.

The proposed widening of the channel and bend will still extend outside of the 100 m exclusion area (from the channel centre line) along the western portion over an area of approximately 9.21 ha. To overcome the impact of this minimal encroachment, an amendment to the current FHA boundary is proposed to accommodate the proposed channel widening and approval of a FHA 'exchange' is sought. The exchange will involve providing an additional portion of port area for inclusion as FHA on the eastern side of the channel to offset the encroachment into the western side of the channel, resulting in a no-net loss of FHA from the project.

While this concept has in-principle support from the Queensland Government, the change of boundary will be subject to a separate statutory revocation and boundary amendment process under the *Fisheries Act 1994*. This process would be contingent on the approval of the project by the Coordinator General and would occur subsequent to consideration of the EIS.

In considering the values of the FHA that could be impacted by capital dredging, it should be noted that only the Trinity Inlet FHA could be affected.

A summary of impact assessment conclusions from **Chapter B7** (Marine Ecology) are as follows:

- Mangroves: Low risk of impact – predicted impacts on hydrodynamics, sedimentation rates and water quality are not expected to adversely affect mangroves in areas such as Trinity Inlet with rates and deposition levels well within the range of natural variability.
- Seagrass: Medium – Low risk of impact (with mitigation) – seagrass is not presently found in the dredge footprint; water quality modelling predicts that adjacent seagrass areas are either in the zone of low to moderate impacts (immediately adjacent to the channel) or zone of influence but that dredging turbidity plumes are not expected to adversely impact these areas in terms of turbidity and sedimentation. A reactive monitoring program will be implemented during the dredging to control impacts to these communities with corrective actions as outlined in **Chapter C2** (Dredge Management Plan).
- Soft Sediment Benthic Habitats: Low risk of impact – unvegetated soft bottom benthic habitats will recover following disturbance by dredging (widening and deepening). Recovery will occur progressively but full recovery is not expected for periods of months (e.g. 6 – 24 months) – short to medium term.
- Fisheries Resources: Low risk of impact – impacts on fisheries species of significance are not expected other than temporary impacts on fish movement during dredging.

Northern Sands

The Yorkeys Creek FHA (FHA-034 – Type B) covers the mouth of Yorkeys Creek and Richters Creek and runs up Richters Creek for several kilometres. It is crossed on two occasions by the delivery pipeline corridor (i.e. at the mouth of Richters Creek and further upstream at the creek crossing). A small area (0.3 ha) of this FHA will be temporarily affected by the construction of the delivery pipeline.

Impacts from the crossings are discussed in **Chapter B5** (Water Quality), **Chapter B7** (Marine Ecology) and **Chapter B8** (Terrestrial Ecology). This will likely involve a minor temporary impact on soft bottom benthos (the pipeline will be laid on the foreshore at the mouth and on the riverbed) and will likely have a minor impact on

fringing marine plants as a result of clearing and stabilisation. These impacts will be temporary (6 months) and all vegetation and landforms rehabilitated following completion of the works.

Tingira Street

The Trinity Inlet FHA (FHA-003 – Type B) covers Admiralty Island and areas to the east up much of Trinity Inlet for several kilometres. The DMPA abuts the FHA on its southern and western boundary.

Works in this area involve mechanical dredging and barging stiff clay to the DMPA (which is located adjacent to the Trinity Inlet FHA). Placement at Tingira Street will not involve the removal of marine plants or other vegetation communities as it is already a modified site. The placement will be undertaken mechanically (using a backhoe dredge and barges) and as a result, no supernatant dredge tailwater will be generated or need to be managed.

Runoff from the site will be controlled via bunds. As discussed in **Chapter C1** (Construction Environmental Management Plan), additional sediment and erosion controls will be in place to limit the release of sediments and other contaminants during and post-placement from stormwater runoff.

Risk Assessment (Impact summary prior to mitigation)
Consequence: Moderate
Likelihood: Likely
Duration: Short term
Level of risk: Medium
Mitigation: Required.

B2.4.4.d Wetlands

Chapter 8 (Terrestrial Ecology) concludes that

- There are no Referable Wetlands or their 'trigger areas' likely to be affected by the CSD Project.
- However all of the remnant vegetation mangrove communities (mapped as RE7.1.1.1) within both of the study areas are mapped as wetlands under the EPR as being GES.
- Approximately 0.27 ha of RE7.1.1.1 (and therefore mapped GES wetland) will be directly impacted by the Northern Sands delivery and discharge pipelines. It is expected that this area will take greater than five years to become a functioning wetland with values similar to those pre-disturbance.
- Mitigation is not required. However, the in-scope rehabilitation will take several years to have effect and therefore the impact will have a long term duration as defined for this Revised Draft EIS.

Risk Assessment (Impact summary prior to mitigation)
Consequence: Minor
Likelihood: Likely
Duration: Long term
Level of risk: Medium
Mitigation: Not required.

B2.4.4.e Remnant and Regrowth Regional Ecosystems

In **Section B2.3.4.g** it is concluded that there is a small area of remnant vegetation located between the Lake and the Barron River and several categories of remnant vegetation located along the proposed pipeline routes.

Chapter 8 (Terrestrial Ecology) concludes the following:

- Some disturbance to the remnant mangrove vegetation (RE7.1.1 – LC) associated with Richters Creek will be unavoidable where the pipeline crosses the creek. Based on the alignment as currently proposed, it is estimated that approximately 0.16 ha of mangrove vegetation will require clearing in this location. This is a medium term impact and rehabilitation of cleared areas is in-scope.
- The delivery pipeline will also require the clearing of the remnant vegetation adjacent to the mouth of Richters Creek, although this will be minimised by using the already cleared path where possible. This vegetation is described as Melaleuca wetland (REs 7.2.9a (OC) and 7.1.1 (LC) /7.3.25a (OC)). Based on the alignment as currently proposed, it is estimated that approximately 0.14 ha of this habitat will require clearing. This is a medium term impact and rehabilitation of cleared areas is in-scope.
- The laydown areas for the delivery pipeline are located in cleared agricultural areas. Construction on these (cleared) laydown areas will not have an impact on the terrestrial ecology of the project area.
- At the Tingira Street DMPA, assuming that the mangrove vegetation adjacent to the sites is not impacted, the clearing at Site 1 will consist of approximately 4.17 ha of anthropogenic grassland, while at Site 2, approximately 0.76 ha of non-remnant (tidally influenced) land will be cleared.
- Mitigation is not required. However, the in-scope rehabilitation will take several years to have effect and therefore the impact will have a long term duration as defined for this Revised Draft EIS.

Risk Assessment (Impact summary prior to mitigation)
Consequence: Negligible
Likelihood: Almost certain
Duration: long term
Level of risk: Low
Mitigation: Not required.

B2.4.4.f Essential Habitat

Chapter 8 (Terrestrial Ecology) concludes the following:

- Within the Northern Sands Project Area, the vegetation between Lake Narelle and the Barron River and vegetation that is crossed by the delivery pipe near the mouth of Richters Creek are partially mapped as essential habitat for the Southern cassowary (*Casuarius casuarius johnsonii).* Neither of the discharge options involves intersecting any essential habitat.
- There is no essential habitat mapped on the Tingira Street site.
- While some vegetation within the delivery pipeline corridor at the mouth of Richters Creek is mapped as 'essential habitat' for this species, cassowaries are extremely unlikely to be present.
- Mitigation is not required.

Risk Assessment (Impact summary prior to mitigation)
Consequence: Negligible
Likelihood: Unlikely
Duration: Short term
Level of risk: Negligible
Mitigation: Not required.

B2.4.4.g Coastal Management District

As concluded in **Section B2.3.4.i**, the CMD is not a Nature Conservation Area for the purposes of this chapter.

B2.4.5 Local Nature Conservation Areas

No further assessment local Nature Conservation Areas is made on the basis that the Natural Areas Overlay of CairnsPlan mirrors protected areas declared under Queensland legislation.

B2.5 Recommended Mitigation Measures

B2.5.1 Introduction

B2.5.1.a The Nature of Mitigation

Some comments are made above regarding the need or opportunity for mitigation. Mitigation can also be thought of as 'risk treatment'. The national standard for risk management is AS/NZS ISO 31000:2009 Risk management—Principles and guidelines. AS/NZS ISO 31000:2009 defines risk treatment as a 'process to modify risk'. It notes that risk treatment can involve:

- avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk
- taking or increasing risk in order to pursue an opportunity
- removing the risk source
- changing the likelihood
- changing the consequences
- sharing the risk with another party or parties (including contracts and risk financing)
- retaining the risk by informed decision.

It also notes that:

- Risk treatments that deal with negative consequences are sometimes referred to as 'risk mitigation', 'risk elimination', 'risk prevention' and 'risk reduction'.
- Risk treatment can create new risks or modify existing risks.

Recommended mitigation strategies are described below for each relevant matter (those with negligible risks or outside the scope of this report are no longer considered), along with an assessment of the effect of mitigation on risk level. Risks that are unable to be mitigated are also discussed.

The mitigation measures proposed below have been applied in a number of projects of similar scale, intensity and duration within the greater Cairns area. All of these mitigation measures are considered appropriate and likely to be effective in countering the impacts described above.

B2.5.1.b Mitigation Assumed to be In-scope

The previous assessment of impacts has assumed that certain aspects that could potentially be thought of as mitigation, are project commitments (i.e. are in-scope for the CSD Project). These include:

- Rehabilitation of areas of natural vegetation to be cleared for the construction of the inlet and tailwater pipelines. This includes all associated site preparation.
- Standard soil and water management (i.e. an Erosion and Sedimentation Control Plan will be prepared to guide all earthworks).
- Other standard environmental management actions (i.e. control of construction traffic, dust, noise etc.)
- Standard measures to avoid injuries to fauna species during construction such as the covering of holes / cavities overnight, and/ or provision of ladders to enable fauna to escape the hole should they fall, together with standard responses (e.g. contact details and arrangements).
- Site inductions (during construction, commissioning and operation, all staff should undertake an environmental site induction which canvasses the flora and fauna values of the site, and actions to minimise impacts).

These measures are incorporated in **Chapter C1** (Construction Environmental Management Plan) The mitigation described below is over and above these standard responses to construction and will be added to this plan and **Chapter C2** (Dredge Management Plan) as appropriate.

B2.5.2 Management Measures and Mitigation

A range of mitigation and monitoring measures are outlined by the project to protect the values of the GBRWHA and other Nature Conservation Areas discussed in this chapter.

The proposed mitigation and monitoring measures are summarised in Part C of the EIS and apply (generally) to the Nature Conservation Areas as shown in **Table B2-11** below.

TABLE B2-11 DOCUMENTS DESCRIBING PROJECT MANAGEMENT MEASURES AND MITIGATION

RELEVANT DOCUMENT IN PART C OF THE EIS	APPLICABLE NATURE CONSERVATION AREAS
Chapter C1 (Construction Environmental Management Plan)	Great Barrier Reef World Heritage Area Fish Habitat Area – Trinity Inlet Fish Habitat Area – Yorkeys Creek Nationally Important Wetland – Trinity Inlet
Chapter C2 (Dredge Management Plan)	Great Barrier Reef World Heritage Area Great Barrier Reef Marine Park State Marine Park Fish Habitat Area – Trinity Inlet Fish Habitat Area – Yorkeys Creek Nationally Important Wetland – Trinity Inlet
Chapter C3 (Vessel Traffic Management Plan)	Great Barrier Reef World Heritage Area Great Barrier Reef Marine Park State Marine Park Fish Habitat Area – Trinity Inlet Nationally Important Wetland – Trinity Inlet
Chapter C4 (Maritime Operations Management Plan)	Great Barrier Reef World Heritage Area Great Barrier Reef Marine Park State Marine Park Fish Habitat Area – Trinity Inlet Nationally Important Wetland – Trinity Inlet

Only those matters for which mitigation is recommended are discussed in this section.

B2.5.3 Commonwealth Nature Conservation Areas

B2.5.3.a World Heritage Properties (Sections 12 & 15A)

Great Barrier Reef World Heritage Area

Specific measures in **Chapter C2** (Dredge Management Plan) that aim to protect the values of the World Heritage Area include –

- Measures related to limiting water quality impacts from TSHD dredging and tailwater discharge into the Barron River.
- Reactive monitoring programs for water quality and seagrass as well as tailwater and groundwater impacts from placement at the Northern Sands DMPA.
- Formation of an Expert Advisory Panel or Management group to oversee the reactive monitoring program and setting water quality and ecological trigger values.
- Validation monitoring programs for seagrass, corals, dredge plumes and other impact predictions from the Draft EIS.

- Measures related to protection of marine megafauna and other elements of the DMP relevant to underpinning values of the WHA.

B2.5.3.b National Heritage Places (Sections 15B & 15C)

The Great Barrier Reef

For the purposes of this assessment the Great Barrier Reef national heritage place is dealt with together with the GBRWHA.

B2.5.3.c Commonwealth Marine Areas (Sections 23 & 24A)

For the purposes of this assessment the CMA is dealt with together with the GBRMP.

B2.5.3.d Great Barrier Reef Marine Park (Sections 24B & 24C)

Mitigation is as per the GBRWHA, noting there are no direct works in the Marine Park and indirect impacts are expected to be low to negligible. Increased annual maintenance dredge material volumes can be accommodated in the existing approved DMPA and will be progressed through the sea dumping and marine park approval process if the CSD Project is approved and project constructed.

B2.5.3.e Nationally Important Wetlands

PCTI Wetland

For the purposes of this assessment the PCTI wetland is dealt with together with the GBRMP.

B2.5.4 Queensland Nature Conservation Areas

B2.5.4.a Great Barrier Reef Coast Marine Park

Mitigation is as per the GBRWHA noting the need to consider temporary impacts from the dredge mooring and dredge pipeline.

B2.5.4.b Fish Habitat Areas

Mitigation is as per the GBRWHA and noting the bulk of dredging proposed in Trinity Inlet will be by Backhoe Dredge (BHD) which involves minimal plume generation. The placement of stiff clay material at the adjacent Tingira Street DMPA will not impact on the wetland values noting the requirement to develop a suitable management plan for the management of stormwater runoff under **Chapter C1** (Construction Environmental Management Plan).

As noted in **Section B2.4.4.c**, the proposed widening of the channel and bend will extend outside of the 100 m exclusion area (from the channel centre line) along the western portion over an area of approximately 9.21 ha. To overcome the impact of this minimal encroachment, an amendment to the current FHA boundary is proposed to accommodate the proposed channel widening and approval of a FHA 'exchange' is sought. The exchange will involve providing an additional portion of port area for inclusion as FHA on the eastern side of the channel to offset the encroachment into the western side of the channel, resulting in a no-net loss of FHA from the project.

B2.5.5 Local Nature Conservation Areas

Any mitigation of protected areas declared under Queensland legislation will be reflected in local Nature Conservation Areas on the basis that the Natural Areas Overlay of CairnsPlan mirrors the state areas.

B2.6 Residual Impacts and Assessment Summary

B2.6.1 Introduction

The previous sections have documented the assessment of impacts on Nature Conservation Areas using the project's risk-based approach and assuming that certain in-scope environmental management measures are in place. Where relevant, mitigation opportunities are recommended and a revised impact assessment undertaken. This section summarises the findings of this work and discusses the project implications, along with recommendations for offsets and monitoring as required.

B2.6.2 Great Barrier Reef World Heritage Area

Material described in various technical chapters and elsewhere has been used to prepare **Table B2-12** below which summarises the assessment of potential impacts on World Heritage values against relevant criteria and requirements set out in the Commonwealth's Referral Guidelines for OUV of the GBR World Heritage Area at a regional and local scale. The World Heritage criteria listed in the first column are described in **Section B2.3.3.b**.

TABLE B2-12 SUMMARY OF RESIDUAL RISK ON THE GBRWHA

RELEVANT WORLD HERITAGE CRITERION	ATTRIBUTE	EXAMPLES OF THIS ATTRIBUTE IN THE LOCAL OR REGIONAL STUDY AREA	PREDICTED RISKS OF IMPACT FROM IMPACTING PROCESSES (SUMMARISED FROM OTHER EIS CHAPTERS)
vii, viii, ix	Islands	Green Island, Fitzroy Island, Double Island	Negligible – changes to coastal processes such as shoreline erosion, accretion and associated changes to island morphology are not expected from the project.
vii, x	Mangrove forests	Trinity Inlet, Admiralty Island, Mainland coastal areas	Low – predicted impacts on hydrodynamics, sedimentation rates and water quality are not expected to adversely affect mangroves in areas such as Trinity Inlet with rates and deposition levels well within the range of natural variability.
vii, viii, ix, x	Hard coral communities	Double Island reefs, Green Island reefs Fitzroy Island reefs Mission Bay reefs	Low – Negligible (with mitigation) – water quality modelling predicts that coral communities are in the zone of influence of dredging turbidity plumes but are not expected to be adversely impacted.
vii	Soft coral communities	Offshore soft coral communities (isolated and sparse)	Low – Negligible (with mitigation) – these communities are generally situated outside of direct impact zones (dredging footprint) and indirect water quality impacts are not expected to cause adverse impacts.

(Continued over)

RELEVANT WORLD HERITAGE CRITERION	ATTRIBUTE	EXAMPLES OF THIS ATTRIBUTE IN THE LOCAL OR REGIONAL STUDY AREA	PREDICTED RISKS OF IMPACT FROM IMPACTING PROCESSES (SUMMARISED FROM OTHER EIS CHAPTERS)
x	Seagrass meadows	Trinity Bay seagrass Trinity Inlet Seagrass at Double Island	Medium – Low (with mitigation) – seagrass is not presently found in the dredge footprint; water quality modelling predicts that adjacent seagrass areas are either in the zone of low to moderate impacts (immediately adjacent to the channel) or zone of influence but that dredging turbidity plumes are not expected to adversely impact these areas in terms of turbidity and sedimentation. A reactive monitoring programme will be implemented during the dredging to control impacts to these communities with corrective actions as outlined in Chapter C2 Dredge Management Plan.
ix	Diversity of benthic invertebrates (soft bottom benthos)	Soft bottom benthic environments within Trinity Bay	Low – unvegetated soft bottom benthic habitats will recover following disturbance by dredging (widening and deepening). Recovery will occur progressively but full recovery is not expected for periods of months (e.g 6 – 24 months) – short to medium term.
x	Cetaceans (dolphins)	Inshore dolphins (Indo Pacific and Snubfin dolphins)	Medium – Low (with mitigation) – impacts on soft bottom benthic habitat as above; impacts from underwater noise not expected to be significant with mitigation and monitoring proposed to reduce impacts from marine piling in the inner port.
vii, x	Cetaceans (whales)	Humpback whales	Low – Trinity Bay is not an important or highly utilised habitat for these species; impacts from underwater noise not expected to be significant.
vii, x	Marine turtles	Green turtles, Loggerhead turtles and other species	Medium – Low (with mitigation) – impacts on seagrass habitat as above; mitigation and monitoring proposed to reduce impacts from dredging (turtle exclusion devices, etc.). Impacts from underwater noise not expected to be significant with mitigation and monitoring proposed to reduce impacts from marine piling in the inner port.
x	Dugongs	Dugongs	Medium – Low (with mitigation) – impacts on seagrass habitat as above; impacts from underwater noise not expected to be significant with mitigation and monitoring proposed to reduce impacts from marine piling in the inner port.

(Continued over)

RELEVANT WORLD HERITAGE CRITERION	ATTRIBUTE	EXAMPLES OF THIS ATTRIBUTE IN THE LOCAL OR REGIONAL STUDY AREA	PREDICTED RISKS OF IMPACT FROM IMPACTING PROCESSES (SUMMARISED FROM OTHER EIS CHAPTERS)
vii, x	Migratory waterbirds	Wading birds Sea birds	Low – impacts on soft bottom and mangrove habitat as above. Residual impacts on these species is predicted to be low.
ix	Diversity of fish species	Commercially and recreationally important fisheries	Low – impacts on fisheries species of significance are not expected other than temporary impacts on fish movement during dredging.
viii	Seascapes and landscapes	Trinity Inlet, Trinity Bay, Islands	Low – impacts will be temporary during the period of dredging and not result in permanent changes to the landscape.

B2.6.3 Summary

Table B2-13 shows a summary of impacts, mitigation, and residual impact on all Nature Conservation Areas.

TABLE B2-13 ASSESSMENT SUMMARY TABLE – NATURE CONSERVATION AREAS

NATURE CONSERVATION AREA	SUMMARY OF IMPACT	MITIGATION MEASURES	RESIDUAL RISK RATING WITH MITIGATION MEASURES IN PLACE
Commonwealth Nature Conservation Areas			
World Heritage properties			
GBRWHA and Great Barrier Reef Marine Park – Whole of Property Scale	Consideration of impacts from the project on Key Attributes as listed in **Table B2-12** No significant impacts are predicted at the Whole of Property Scale	Dredge Management Plan and other plans outlined in Part C	Negligible
GBRWHA and Great Barrier Reef Marine Park – Regional Scale	Consideration of impacts from the project on Key Attributes as listed in **Table B2-12** No significant impacts are predicted at the Regional Scale	Dredge Management Plan and other plans outlined in Part C	Low – Negligible
GBRWHA and Great Barrier Reef Marine Park – Local Scale	Consideration of impacts from the project on Key Attributes as listed in **Table B2-12** No significant impacts are predicted at the Local Scale Low residual risks are predicted with respect to soft bottom benthic habitat in the dredge footprint (with full recovery in six-24 months) Low residual risks are predicted with respect to temporary water quality impacts to recovering seagrass areas in Trinity Bay and in the context of tailwater discharge from the Northern Sands DMPA	Dredge Management Plan and other plans outlined in Part C	Low
Wet Tropics World Heritage Area	No impact will occur to this area	None identified	Negligible
National Heritage places			
GBR NHP	As per GBRWHA (applies at all scales as appropriate)	As per GBRWHA	Low – Negligible
Wet Tropics NHP	No impact will occur to this area	None identified	Negligible
WTWHA (Indigenous Places) NHP	No impact will occur to this area	None identified	Negligible
Other			

NATURE CONSERVATION AREA	SUMMARY OF IMPACT	MITIGATION MEASURES	RESIDUAL RISK RATING WITH MITIGATION MEASURES IN PLACE
Commonwealth Marine Area	No significant impacts are predicted in the Commonwealth Marine Area	Dredge Management Plan and other plans outlined in Part C	Negligible
Great Barrier Reef Marine Park	As per GBRWHA	As per GBRWHA	Low – Negligible
DIWA – Trinity Inlet	No significant impacts are predicted at the Local Scale to wetland values within Trinity Inlet	Dredge Management Plan and other plans outlined in Part C	Low
Queensland Nature Conservation Areas			
Great Barrier Reef Coast Marine Park	No significant impact to the GBRCMP are predicted. Temporary impacts will occur to benthic habitats associated with channel widening and deepening Internal zone boundaries of the State marine park will require minor amendment to accommodate the extension of the channel into what is currently the Estuarine Conservation Zone. No significant impact to the GBRCMP at Richters Creek are predicted	Dredge Management Plan and other plans outlined in Part C	Low
Trinity Inlet Fish Habitat Area (FHA) Yorkeys Creek FHA	No significant impact to the Trinity Inlet FHA are predicted. Temporary impacts will occur to benthic habitats associated with channel widening and deepening Boundaries of the Trinity Inlet FHA will require minor amendment to accommodate the extension of the channel No significant impact to the Yorkeys Creek FHA are predicted	Dredge Management Plan and other plans outlined in Part C Implementation of a FHA exchange that will result in a no net loss of FHA areas	Low
National Parks and other protected Estate	No impact will occur to these areas	None identified	Negligible
Trinity Inlet HES Wetland	No significant impact to MSES (see DIWA above)	Dredge Management Plan and other plans outlined in Part C	Low
Vegetation management (REs)	No impact will occur to these areas	None identified	Negligible
Essential habitat	No impact will occur to these areas	None identified	Negligible

NATURE CONSERVATION AREA	SUMMARY OF IMPACT	MITIGATION MEASURES	RESIDUAL RISK RATING WITH MITIGATION MEASURES IN PLACE
WPAs and HEV wetlands	No impact will occur to these areas	None identified	Negligible
Local Nature Conservation Areas			
Not assessed separately	As per Queensland Nature Conservation Areas	As per Queensland Nature Conservation Areas	As per Queensland Nature Conservation Areas

B2.7 References

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