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Draft : Environmental Impact Statement

Chapter B2 Nature Conservation Areas

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B2.1 Introduction

This chapter describes the existing conditions and potential impacts associated with the proposed Cairns Shipping Development Project (the project) to natural values within areas that have been formally recognised through International Conventions/Treaties and protected as a Matter of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and those protected by relevant Queensland legislation. For the purposes of this chapter, these areas are collectively referred to as Nature Conservation Areas.

It is recognised that other stakeholder groups (e.g traditional owners, environmental groups or commercial fishing 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 B, Stakeholder and Community Engagement Report**.

This chapter principally addresses **Section 4.1** of the Environmental Impact Statement (EIS) Terms of Reference (The Coordinator-General 2012) and **Sections 5.6, 5.9, 5.10.1, 5.10.2** and **5.10.5** of the Commonwealth Guidelines for the Cairns Shipping Development Project Environmental Impact Statement (EIS) (DSEWPAC (now DoE)/GBRMPA 2013). This chapter specifically describes:

- The level of significance/protection afforded to the Nature Conservation Area by Commonwealth and/or Queensland legislation
- The size, location and existing values within Nature Conservation Areas in the study area
- Predicted impacts to the values of Nature Conservation Areas due to the project
- Mitigation and management measures design to remove 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 residual impact on existing Nature Conservation Areas be identified.

B2.2 Methodology

B2.2.1 Baseline Assessment

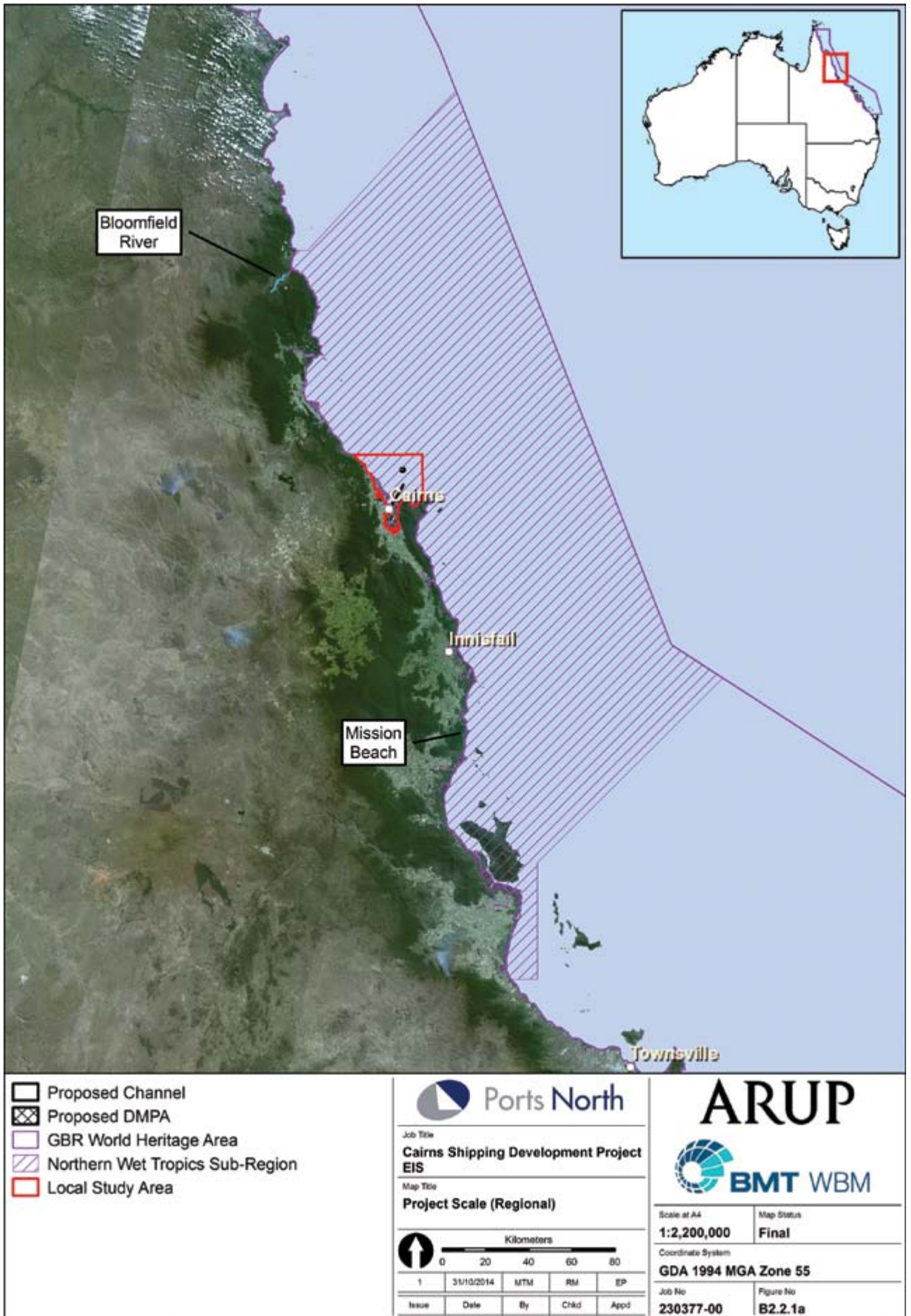
This chapter has been prepared at a desktop level, with reference to publically available information on the extent and values of Nature Conservation Areas, including government policies and plans, reports, literature, and GIS information. It also references results from technical studies and field surveys undertaken as part of this EIS, the methodology of which are described in detail in **Chapter B5, Marine Water Quality** and **Chapter B7, Marine Ecology**.

For the purposes of this chapter, the following study boundaries were drawn, as shown in **Figure B2.2.1a**:

- The whole of WHA scale – this scale can be defined as the Great Barrier Reef World Heritage Area including both nearshore and offshore areas. This scale of assessment would be relevant in the context of the project affecting, for example, a key aspect of the Outstanding Universal Value (OUV) of the world heritage property as a whole or otherwise causing impacts that could result in the property no longer meeting its nomination criteria
- The regional scale – this scale can be defined as a subset of the Wet Tropics region of the Great Barrier Reef World Heritage Area (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
- The local scale – this scale can be defined as the project area (where works are proposed) and adjacent areas of Trinity Inlet, Trinity Bay and surrounding waters. The primary focus of data collection, the identification and description of baseline condition of sensitive receptors and impact assessment has been done at this scale. In this context, the local scale includes:
 - 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.

This chapter focuses on potential impacts to 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 B2.2.1a Whole of WHA, Regional and Local Scales



B2.2.2 Impact Assessment Methodology

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

- The magnitude of impacts (significance/consequence) (**Table B2.2.2a**)
- 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 B2.2.2a**. 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** amongst others. Further description and justification of specific assessment findings are contained within these supporting chapters.

Table B2.2.2a Impact Significance Criteria

Impact Significance/ Consequence	Description of Significance
Very High	<p>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.</p> <p>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.</p> <p>The boundary of a Nature Conservation Area requires significant revocation.</p>
High	<p>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.</p> <p>E.g. If a project resulted in substantial clearing within a Queensland-protected wetland resulting in significant and permanent impacts.</p> <p>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.</p> <p>The boundary of a Nature Conservation Area requires major amendment.</p>
Moderate	<p>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.</p> <p>The boundary of a Nature Conservation Area requires moderate amendment.</p>
Minor	<p>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.</p> <p>The boundary of a Nature Conservation Area requires temporary amendment.</p> <p>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.</p>
Negligible	<p>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.</p>
Beneficial	<p>The value/s of a Nature Conservation Area is/are improved.</p>

Table B2.2.2b Risk Matrix

Likelihood	Significance				
	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

Table B2.2.2c 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
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

B2.3 Existing Nature Conservation Values

B2.3.1 Overview

The level of recognised significance and protection afforded to the nature conservation value of an area is determined by their designation under relevant Commonwealth and Queensland law. The protection of internationally recognised Nature Conservation Areas is controlled by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). These areas are included as Matters of National Environmental Significance (MNES) in Chapter Two, Part Three of the EPBC Act. For the purposes of this section of the chapter, the existing values of MNES under the EPBC Act are followed by a discussion of intergovernmental arrangements for the protection of Nature Conservation Areas. Finally, a discussion is provided of those Nature Conservation Areas protected by Queensland law.

B2.3.2 Commonwealth Nature Conservation Areas

B2.3.2.1 Matters of National Environmental Significance

The EPBC Act seeks to protect the environment, particularly MNES. The matters of MNES protected under the Act that are relevant to the assessment of nature conservation areas include:

- World Heritage properties (as described in **Section B2.3.2.2**)
- National heritage places (as described in **Section B2.3.2.4**)
- Wetlands of International Importance (listed under the Ramsar Convention) (as described in **Section B2.3.2.5**)
- Commonwealth Marine Areas (as described in **Section B2.3.2.3**)
- The GBRMP (as described in **Section B2.3.2.2**).

B2.3.2.2 World Heritage Areas

The GBRWHA covers the study area. The Wet Tropics World Heritage Area (WTWHA) also occurs in the region, though is not directly or indirectly impacted by the project. These are mapped in **Figure B2.3.2.2a**.

The WTWHA will not be affected by the project and is not considered further in this chapter.

GBRWHA Management and Threats

The primary management objectives for World Heritage properties are part of Australia's general obligations under the World Heritage Convention (UNESCO 1972), which are to:

- *Protect, conserve and present the World Heritage values of the property*
- *Integrate the protection of the area into a comprehensive planning program*
- *Give the property a function in the life of the Australian community*
- *Strengthen appreciation and respect of the property's World Heritage values, particularly through educational and information programs*
- *Keep the community broadly informed about the condition of the World Heritage values of the property*
- *Take appropriate scientific, technical, legal, administrative and financial measures necessary for achieving the foregoing objectives.*

The 25 Year Strategic Plan (GBRMPA 1994) sets out the vision for the GBRWHA. This plan sets out the short (five year) and long-term (25 year) management objectives and approach to achieve the vision. The most relevant long term objectives relevant to the management of biodiversity values are:

- **Conservation:** *To ensure the persistence of the Great Barrier Reef World Heritage Area as a diverse, resilient, and productive ecological system, while retaining opportunity for a diverse range of experiences and uses consistent with Australia's obligations under the World Heritage Convention*
- **Resource management:** *To facilitate the sustainable multiple use of the resources of the Great Barrier Reef World Heritage Area, through integrated management systems which are complementary with the management of the adjacent regions. This should be done in a manner consistent with the maintenance of World Heritage, ecological, social and economic values, recognising that the economic viability of many activities relies on the maintenance of the ecosystem.*

The primary tool used to manage the GBRWHA is zoning as controlled by the GBRMP Act and its regulations (for sections of the GBRWHA contained within the GBRMP – See Section 0). The Outlook Report 2009 (GBRMPA 2009) and Outlook Report 2014 (GBRMPA 2014) provide an assessment of the overall condition, pressures and management responses for the GBRWHA.

At a local scale, the existing integrity of aquatic ecosystems and habitats varies throughout the study area. The western shoreline of Cairns Harbour and sections of Trinity Inlet adjacent to the Cairns wharf districts have been modified by clearing, urban and industrial development for more than a century due to the establishment and growth of the City of Cairns. The eastern shoreline of Cairns Harbour is comparatively less modified, although parts of the adjacent catchment have been cleared for agricultural and low impact residential development.

Nearshore areas around operational port facilities are generally in the most modified condition. Construction of the present day port facilities, most notably reclamation and dredging of intertidal and sub tidal areas, have resulted in localised changes to habitats at the mouth and western shoreline of Trinity Inlet. Furthermore, a range of ongoing catchment pressures continue to affect the environmental values of nearshore areas, including agricultural inputs to the eastern and upper catchment, urban and industrial area inputs from the city, and general disturbance associated with day to day port operations and maintenance activities.

A substantial proportion of the Trinity Inlet catchment comprises agricultural lands (mainly sugar cane farming). Runoff from such lands during harvest periods, when plants are removed and the soil exposed may have elevated suspended sediment levels. This was more of an issue in the past but has reduced due to improved farming practices and a reduction in farmland due to urban encroachment. There was a strong influence of sediment inputs from urban development in the 1970s to 1990s but those impacts have reduced due to stricter erosion and sediment control requirements and a reduction in large scale land clearing during the wet season. At a local scale, the study area experiences freshwater flows and ongoing inputs of sediments and contaminants derived from human activities in the catchment (i.e. urban development, agriculture, industrial land uses, etc.), as well as minor acid sulfate soil impacts. Water quality monitoring indicates that some sections of upstream reaches of Trinity Inlet have degraded water quality (high nutrients and sediments; low pH), whereas Cairns Harbour, while generally turbid, has good water quality. Refer to **Chapter B5, Marine Water Quality**.

In terms of broad-scale pressures, the 2009 and 2014 Outlook Reports identify multiple climate change processes as the dominant future threats to the GBRWHA. The reports also recognise a range of other key pressures including declining water quality from catchment sources, loss of coastal habitats from coastal development, and impacts from fishing and poaching as key issues for the long-term management of the GBR. Further, proposed port expansions, increased shipping activity, coastal and catchment development, marine debris and extreme weather events were also acknowledged in the 2009 Outlook Report as emerging issues and further articulated as potential threats in the 2014 Outlook Report. The 2014 Report states that,

‘the risk level of high for [dredge material] disposal and resuspension reflects increases in the likely future trends in volume of material requiring disposal, uncertainty of its potential effects on the ecosystem, and the need for strengthened monitoring of the effects of this threat’ (page 258).

The UNESCO has also recently undertaken a reactive monitoring mission at the request of the World Heritage Committee at its 35th session in Paris. The mission assessed the state of conservation of the GBRWHA and the resulting report (UNESCO 2012) concluded that the environmental quality of parts of the Great Barrier Reef ecosystem have declined since the time of inscription in 1981. This is particularly relevant for inshore areas of the reef south of Cooktown. The mission outlined that climate change, catchment runoff, coastal development, ports and shipping and direct extractive use are the most significant threats to conservation of the GBRWHA.

The *EPBC Act Referral Guidelines for the outstanding universal value of the Great Barrier Reef World Heritage Area* (SEWPAC 2014) also notes that port development and/or expansion (e.g dredging, shipping, etc) is an example of an action with potential to have significant impact on the OUV of the GBRWHA.

In response to the threats posed to the GBRWHA, the Queensland State Government has drafted the Great Barrier Reef Ports Strategy (2014) to guide future port development and planning in the region. The strategy aims to find a balance between economic development and maintenance of the GBRWHA’s OUV. The Strategy aims to improve Queensland’s cruise ship capacity as part of Queensland’s tourism strategy, to double visitor expenditure by 2020. The strategy will inform the strategic assessment of the Great Barrier Reef Coastal Zone as well as the Queensland Ports Strategy.

Outstanding Universal Value (OUV) of the GBRWHA

The GBRWHA extends from the low water mark on the Queensland coast to the edge of the continental shelf, and from the tip of Cape York Peninsula to just north of Fraser Island, an area of approximately 348,000km². The GBRWHA, like other Australian World Heritage Properties, is protected as a MNES under sections 12 to 15A of the EPBC Act. The Great Barrier Reef is also listed as a Natural Heritage Place (NHP), which is listed as a MNES under sections 15B and 15C of the EPBC Act while the Great Barrier Reef Marine Park (GBRMP - this area does not include, for example, port limits) is protected under sections 24B and 24C of the EPBC Act.

The local study area is located within the GBRWHA, and comprises approximately 0.08 percent of the total area of the GBRWHA.

The GBRWHA was listed under the World Heritage Convention in 1981 on the basis that it met a range of criteria which are considered an OUV, including all four natural criteria at the time of its listing:

- ***Outstanding example representing a major stage of the earth’s evolutionary history.*** The GBRWHA is the largest single collection of coral reefs in the world
- ***Outstanding example representing significant ongoing geological processes, biological evolution and man’s interaction with its natural environment.*** The GBRWHA supports the most diverse ecosystem known to man
- ***Contains unique, rare and superlative natural phenomena, formations and features and areas of exceptional natural beauty.*** The GBRWHA is recognised for the exceptional natural beauty of its reef, island and coastal systems
- ***Provides habitats where populations of rare and endangered species of plants and animals still survive.*** The GBRWHA supports over 2900 coral reefs, 600 continental islands, over 5000 square kilometres (km²) of seagrass beds and over 2070km² of mangroves which support numerous plants and animals of conservation significance.

¹ United Nations Education Scientific and Cultural Organisation (UNESCO), *Convention Concerning the Protection of the World Cultural and Natural Heritage. Proceedings of General Conference – 17th Session* (United Nations Education Scientific and Cultural Organisation, United Nations, Paris, November, 1972)

Since the original listing, the wording and numbering of these criteria have been amended. Their environmental concepts remain similar; however, the interactions with people are now recognised as ‘cultural’ criteria rather than natural.

Attachment A of the OUV Guideline (2014) provides the updated Statement of Outstanding Universal Value for the Great Barrier Reef (Property Id 154). Key criterion of the Convention under which the property has been listed are confirmed to include:

- **Criterion vii** - Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance
- **Criterion 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
- **Criterion 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
- **Criterion x** - Contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of OUV from the point of view of science or conservation.

The referral guideline for OUV of the GBRWHA (DOE 2014) outlines that ‘outstanding universal value is the key reference point for the protection and management of world heritage properties and is the central idea of the World Heritage Convention’. Broadly, the meaning of OUV is:

- **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 listing does not aim to recognise properties that are remarkable from solely a national or regional perspective
- **Value:** What makes a property outstanding and universal is its “value”, or the natural and/or cultural worth of a property. This value is determined based on standards and processes in the Operational Guidelines for the Implementation of the World Heritage Convention (the Operational Guidelines).

While the original GBRWHA listing information (UNESCO, 2013) and updated Statement of Outstanding Universal Value (DoE 2014) identify specific examples of the value/attributes underpinning each OUV, with few exceptions, the examples of value/attribute identified in the GBRWHA listing information are not location specific, and therefore do not specifically define marine ecological values/assets supported in the study area.

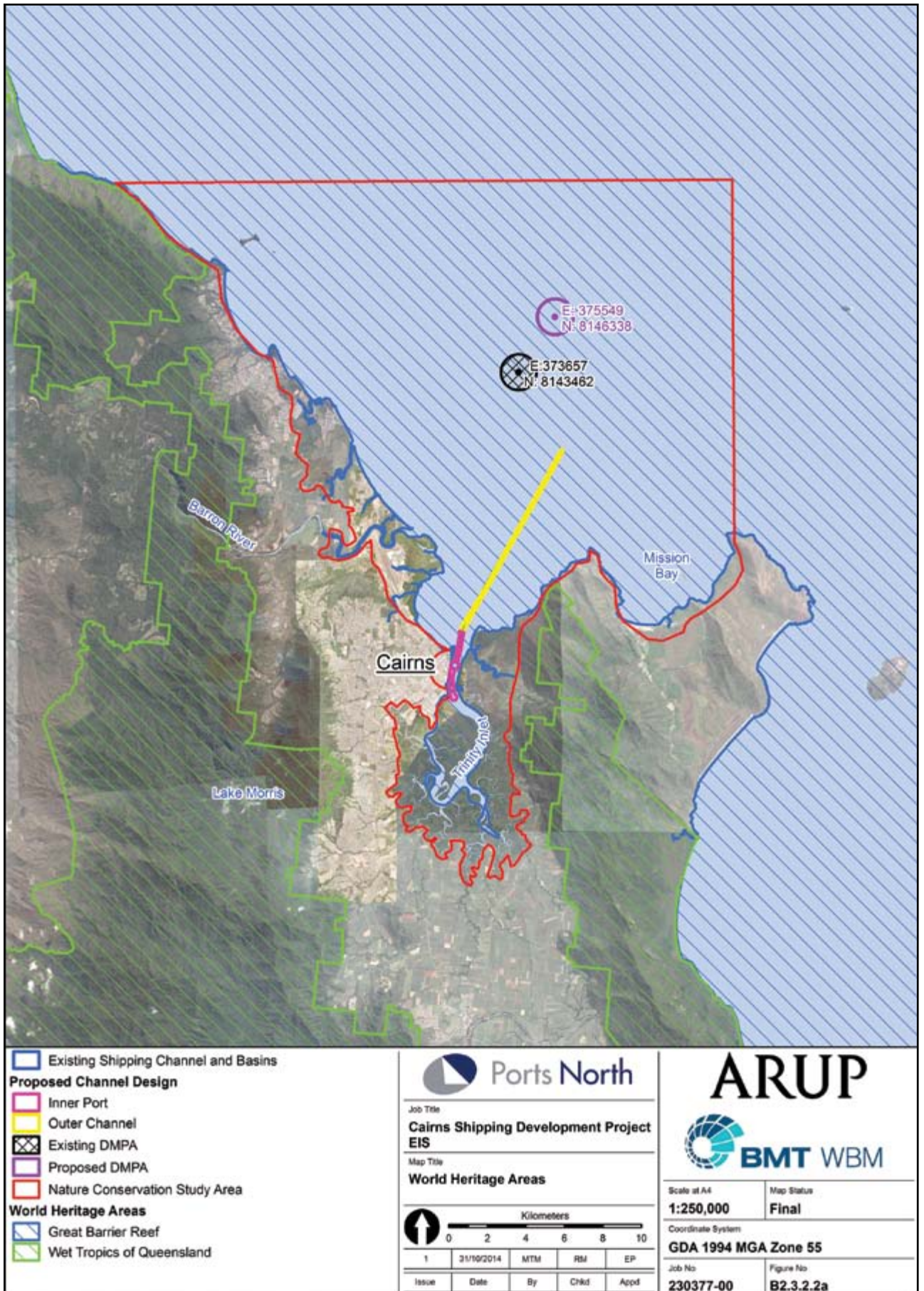
To address this, **Table B.2.3.2.2a** identifies the key Attributes of OUV that are supported by the study area (at the local and regional scale). These habitats, species and values specifically contribute to and define the OUV of the GBRWHA at the local and regional scale. Potential impacting processes on these attributes from the project are identified also in **Table B2.3.2.2a** noting, the impact assessment findings with respect to these issues are addressed in other technical chapters of the EIS.

Table B2.3.2.2a Attributes supported by the Study Area at a local or regional scale that contribute to the OUV of the GBRWHA and other nature conservation areas and how the project may affect them

Relevant World Heritage Criteria	Attribute	Examples of this Attribute in the Local or Regional Study Area	Potential impacting processes on this attribute from the CSD project and relevant EIS chapter
vii, viii, ix	Islands	Green Island, Fitzroy Island, Double Island	<ul style="list-style-type: none"> • Shoreline response - Chapter B3, Coastal Processes and Appendix D, Technical Modelling Report • Sedimentation - Chapter B3, Coastal Processes and Appendix D, Technical Modelling Report • Impacts on coastal habitat values - Chapter B7, Marine Ecology
vii, x	Mangrove forests	Trinity Inlet, Admiralty Island, Mainland coastal areas	<ul style="list-style-type: none"> • Impacts on habitat values - Chapter B7, Marine Ecology • Sedimentation - Chapter B3, Coastal Processes and Appendix D, Technical Modelling Report • Turbidity - Chapter B5, Marine Water Quality
vii, viii, ix, x	Hard coral communities	Double Island reefs Green Island reefs Fitzroy Island reefs Mission Bay reefs	<ul style="list-style-type: none"> • Impacts on habitat values - Chapter B7, Marine Ecology • Turbidity and light availability - Chapter B5, Marine Water Quality • Sedimentation - Chapter B3, Coastal Processes and Appendix D, Technical Modelling Report
vii	Soft coral communities	Offshore soft coral communities (isolated and sparse)	<ul style="list-style-type: none"> • Impacts on habitat values - Chapter B7, Marine Ecology • Turbidity - Chapter B5, Marine Water Quality • Sedimentation and changes to substrate - Chapter B3, Coastal Processes and Appendix D, Technical Modelling Report
x	Seagrass meadows	Trinity Bay seagrass Trinity Inlet seagrass Seagrass at Double Island	<ul style="list-style-type: none"> • Impacts on habitat values - Chapter B7, Marine Ecology • Sedimentation and changes to substrate - Chapter B3, Coastal Processes and Appendix D, Technical Modelling Report • Turbidity and light availability - Chapter B5, Marine Water Quality
ix	Diversity of benthic invertebrates (soft bottom benthos)	Soft bottom benthic environments within Trinity Bay	<ul style="list-style-type: none"> • Impacts on habitat values - Chapter B7, Marine Ecology • Sedimentation and changes to substrate - Chapter B3, Coastal Processes and Appendix D, Technical Modelling Report

Relevant World Heritage Criteria	Attribute	Examples of this Attribute in the Local or Regional Study Area	Potential impacting processes on this attribute from the CSD project and relevant EIS chapter
x	Cetaceans (dolphins)	Inshore dolphins (Indo Pacific and Snubfin dolphins)	<ul style="list-style-type: none"> Impact on feeding habitat - soft bottom benthos – Chapter B7, Marine Ecology Underwater noise - Chapter B7, Marine Ecology Collisions or other harmful interactions - Chapter B7, Marine Ecology
vii,x	Cetaceans (whales)	Humpback whales	<ul style="list-style-type: none"> Disruption to migration patterns - Chapter B7, Marine Ecology Underwater noise - Chapter B7, Marine Ecology Collisions or other harmful interactions - Chapter B7, Marine Ecology
vii, x	Marine turtles	Green turtles, Loggerhead turtles and other species	<ul style="list-style-type: none"> Impact on feeding habitat - soft bottom benthos - Chapter B7, Marine Ecology Collisions or other harmful interactions - Chapter B7, Marine Ecology
x	Dugongs	Dugongs	<ul style="list-style-type: none"> Impact on feeding habitat - seagrass - Chapter B7, Marine Ecology Underwater noise - Chapter B7, Marine Ecology Collisions or other harmful interactions - Chapter B7, Marine Ecology
vii, x	Migratory waterbirds	Wading birds Sea birds	<ul style="list-style-type: none"> Impact on feeding habitat - soft bottom benthos - Chapter B7, Marine Ecology Impact on roosting habitat - mangroves - Chapter B7, Marine Ecology and Chapter B8, Terrestrial Ecology Noise and light impacts - Chapter B8, Terrestrial Ecology
ix	Diversity of fish species	Commercially and recreationally important fisheries	<ul style="list-style-type: none"> Impact on habitat value - Chapter B7, Marine Ecology Impact on key fish stocks and fish movement patterns - Chapter B7, Marine Ecology Impact on fishing usage - Chapter B9, Socio Economic
viii	Seascapes and landscapes	Trinity Inlet, Trinity Bay, Islands	<ul style="list-style-type: none"> Impacts on landscape and seascape visual amenity - Chapter B12, Landscape and Visual

Figure B2.3.2.2a World Heritage Areas (as defined by the Commonwealth Protected Matters Search Tool mapping layers)



Ramsar Wetlands

The *Convention on Wetlands of International Importance* (the Ramsar Convention) was signed in Ramsar (Iran) in 1971. Member countries are encouraged to nominate sites containing representative, rare or unique wetlands to the List of Wetlands of International Importance (the Ramsar List).

No Ramsar Wetlands are located within the study area, with the closest being Bowling Green Bay south of Townsville. As no impacts will occur to Ramsar Wetlands, they are not considered further in this assessment.

Great Barrier Reef Marine Park

The *Great Barrier Reef Marine Park Act 1975* (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 to that of the GBRWHA (refer to **Figure B2.3.2.2b**). 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 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 and 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.

Figure B2.3.2.2b represents the GBRMP Zoning Plan map for Trinity Bay. Some of the project area is located within the General Use Zone, which is identified as being suitable for uses such as boating, diving, fishing, and trawling. Although the approach channel does not fall within the GBRMP, the existing maintenance dredging placement area is located within the General Use Zone. The area to the immediate east of the access channel is part of the Estuarine Conservation Zone. This area allows for the maintenance of fisheries production and use and traditional hunting and gathering. Ecological aspects of this zone are described in **Chapter B7, Marine Ecology and Chapter B8, Terrestrial Ecology**.

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)
- 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 20km from the study area.

The Port's facilities and existing channels are located outside the GBRMP but the existing and preferred DMPA sites are located within it.

The management objectives for zones are set out in the *Great Barrier Reef Marine Park Zoning Plan* (GBRMPA 2003) and *Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004*. Objectives of GBRMP zones within and adjacent to the study area are outlined in **Table B2.3.2.2b**. Under the Cairns GBRMP Cairns Zoning Plan, only the General Use Zone may be used or entered without a permit for the navigation of ships.

Table B2.3.2.2b Management Objectives of Marine Park Zones

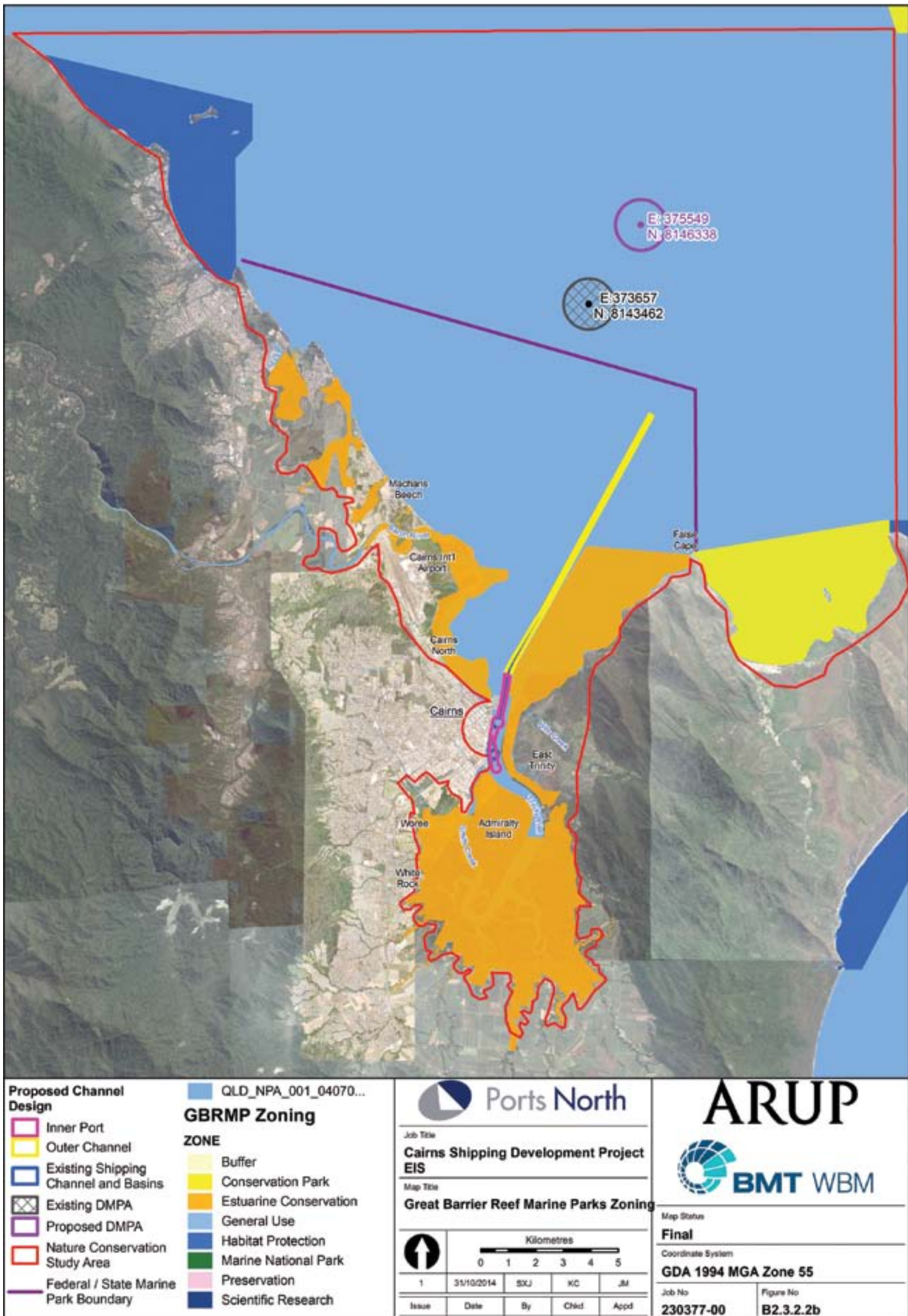
Zone	Objectives
General Use	To provide for the conservation of areas of the GBRMP, while providing opportunities for reasonable use.
Conservation Park	To provide for the conservation of areas of the GBRMP, while providing opportunities for reasonable use and enjoyment, including limited extractive use.
Habitat Protection	To provide for the conservation of areas of the GBRMP within this zone through the protection and management of sensitive habitats, generally free from potentially damaging activities, while providing opportunities for reasonable use.
Marine National Park	To provide for the protection of the natural integrity and values of areas of the GBRMP, generally free from extractive activities, while providing opportunities for certain activities, including the presentation of the values of the GBRMP, to be undertaken in relatively undisturbed areas.
Estuarine Conservation*	To provide for the protection of the natural integrity and values of the areas of the GBRMP within the zone, while providing opportunities for the <ul style="list-style-type: none"> • Presentation of the values of the relatively undisturbed areas of the GBRMP within the zone • Continuation of existing fishing use in the area.

*relevant only to GBR Coast Marine Park (State Marine -Park) – see MSES below

GBRMPA issued a Marine Park Permit in 2010 to Ports North which is valid for the period 17 June 2010 to 1 June 2020. The permit allows for the placement of up to a maximum of 6.6 (wet load) million cubic metres (m³) of dredge material associated with maintenance dredging at the Port of Cairns within the approved Dredge Material Placement Area (DMPA) (located within a circular area of one nautical mile diameter centred on Latitude -16.70, Longitude 145.8133) within the GBRMP (see **Figure B2.3.2.2b**).

A new or amended marine parks permit under the GBRMP Act will be required for the placement of dredging material within the GBRMP as an outcome of this project.

Figure B2.3.2.2b Great Barrier Reef Marine Park – Zoning Map



B2.3.2.3 Commonwealth Marine Area

Commonwealth Marine Areas (CMAs) are a MNES protected under the EPBC Act. CMAs include 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.

It should be noted that the proposed DMPA is the only part of the project located within the CMA (see **Figure B2.3.2.2b**). The assessment for the GBRMP and GBRWHA above applies to this area and covers the relevant criteria for this jurisdictional MNES under the EPBC Act. For this reason, the CMA within the study area is not further mentioned in the chapter.

B2.3.2.4 Great Barrier Reef National Heritage Place

See **Section B2.3.2.2**.

B2.3.2.5 Wetlands of National Importance

On a national scale, the Commonwealth has developed a Directory of Important Wetlands in Australia (DIWA). A wetland may be considered 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.

Wetlands of National Importance are not specifically protected under legislation; however, they do give indication of an area's environmental value and are often considered during development assessment.

Two DIWA occur within or adjacent to the study area at a local scale; these being Port of Cairns and Trinity Inlet (PCTI) Wetland (QLD157) and GBRMP (QLD100). The location of these wetlands are shown in **Figure B2.3.3.4b**.

PCTI Wetland is a coastal wetland aggregation that covers an area of 6410 ha. The PCTI Wetland are predominately 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).

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

B2.3.3 State of Queensland

B2.3.3.1 Matters of State Environmental Significance Areas

Matters of State Environmental Significance (MSES) are established in the *Environmental Offsets Act 2014*; and in the context of the single State Planning Policy, under the *Sustainable Planning Act 2009*. The MSES include:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* (See **Section B2.3.3.3**)
- 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* (see **Section B2.3.3.5**)
- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animal under the *Nature Conservation (Wildlife) Regulation 2006* (See **Chapter B7, Marine Ecology** and **Chapter B8, Terrestrial Ecology**)
- Regulated vegetation under the *Vegetation Management Act 1999* (see **Section B2.3.3.6**) 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 *Nature Conservation Act 1992*
 - 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* (See **Section B2.3.3.4**)
- Wetlands and watercourses in high ecological value waters as defined in the *Environmental Protection (Water) Policy 2009*, schedule 2
- Legally secured offset areas.

The key MSES areas in the study area include:

- The State marine park (Great Barrier Reef Coast Marine Park) (see **Section B2.3.3.2**)
- Protected estate including coastal national parks and other declared areas under the *Nature Conservation Act 1992* (see **Section B2.3.3.3**)
- 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 B2.3.3.4**)
- FHAs declared under the *Fisheries Act 1994* (see **Section B2.3.3.5**)
- Regional Ecosystems and Essential Habitat (see **Section B2.3.3.6** and **Section B2.3.3.7**).

These areas are discussed in the following sections.

The terrestrial project footprint intersects an area mapped as MSES, which is labelled as a ‘Vegetation Management Wetland’ as per the Queensland MSES GIS information Version 4. However, the same area is not considered a Vegetation Management Wetland as per the Queensland Vegetation Management Wetland Map data, Version 2.9 (see **Figure B2.3.3.4b**). Further, no regional ecosystems exist in the project area. For this reason, it is considered that no MSES areas overlay the terrestrial extent of the project footprint.

B2.3.3.2 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. 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.

Parts of the proposed channel expansion are located within the Estuarine Conservation and General Use zones of the Great Barrier Reef Coast Marine Park.

The Great Barrier Reef Coast Marine Park adopts similar zoning and management objectives to the GBRMP, although some Queensland-specific provisions apply.

B2.3.3.3 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 under the *Forestry Act 1959* (Qld) and the *Nature Conservation Act 1992* (Qld).

There are numerous protected estates in the study area at a local and regional scale (see **Figure B2.3.3.4a**). The closest protected estates to the Port of Cairns are:

- Greys Peak National Park, approximately 3.5km east of the Port of Cairns. A portion of this park is within the study area
- Trinity Forest Reserve, approximately 4.5km to the east of the Port of Cairns
- Malbon Thompson Conservation Park, approximately 7km to the east of the Port of Cairns
- Malbon Thompson Forest Reserve, approximately 6km to the south-east of the Port of Cairns
- Anderson Street Conservation Park, approximately 4km to the west of the Port of Cairns
- Dinden National Park, approximately 6.5km to the south-east of the Port of Cairns
- Mount Whitfield Conservation Park is also situated approximately 5km to the north-west of the Port of Cairns.

It is highly unlikely that these areas will be impacted directly or indirectly by the project due its primarily maritime impacts, and therefore they are not considered further within this assessment.

There are also no declared areas of major interest or critical habitats (i.e. Dugong Protection Areas) declared under the *Nature Conservation Act 1992* (Qld) within the study area at a local scale.

B2.3.3.4 Wetland Protection Areas and High Ecological Value Wetlands – Trinity Inlet

There are several Wetland Protection Areas (WPA) and the associated 100m trigger area buffers within the study area at a local scale, with the nearest being approximately 2.6 km east at East Trinity. These are shown in **Figure B2.3.3.4b**.

Statutory regulation of WPA wetlands has been established to maintain ecological processes of wetlands and reduce threats (see **Chapter A1, Project Introduction**). As WPAs will not be directly or indirectly impacted by the project due to its primarily maritime impacts, these are not considered further in this assessment.

Trinity Inlet is mapped as a High Ecological Value (HEV) wetland on the basis of its declaration as a wetland of national importance (see **Section B2.3.2.5** and **Figure B2.3.3.4b**). 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 B2.3.3.4a DIWA and Protected Estate

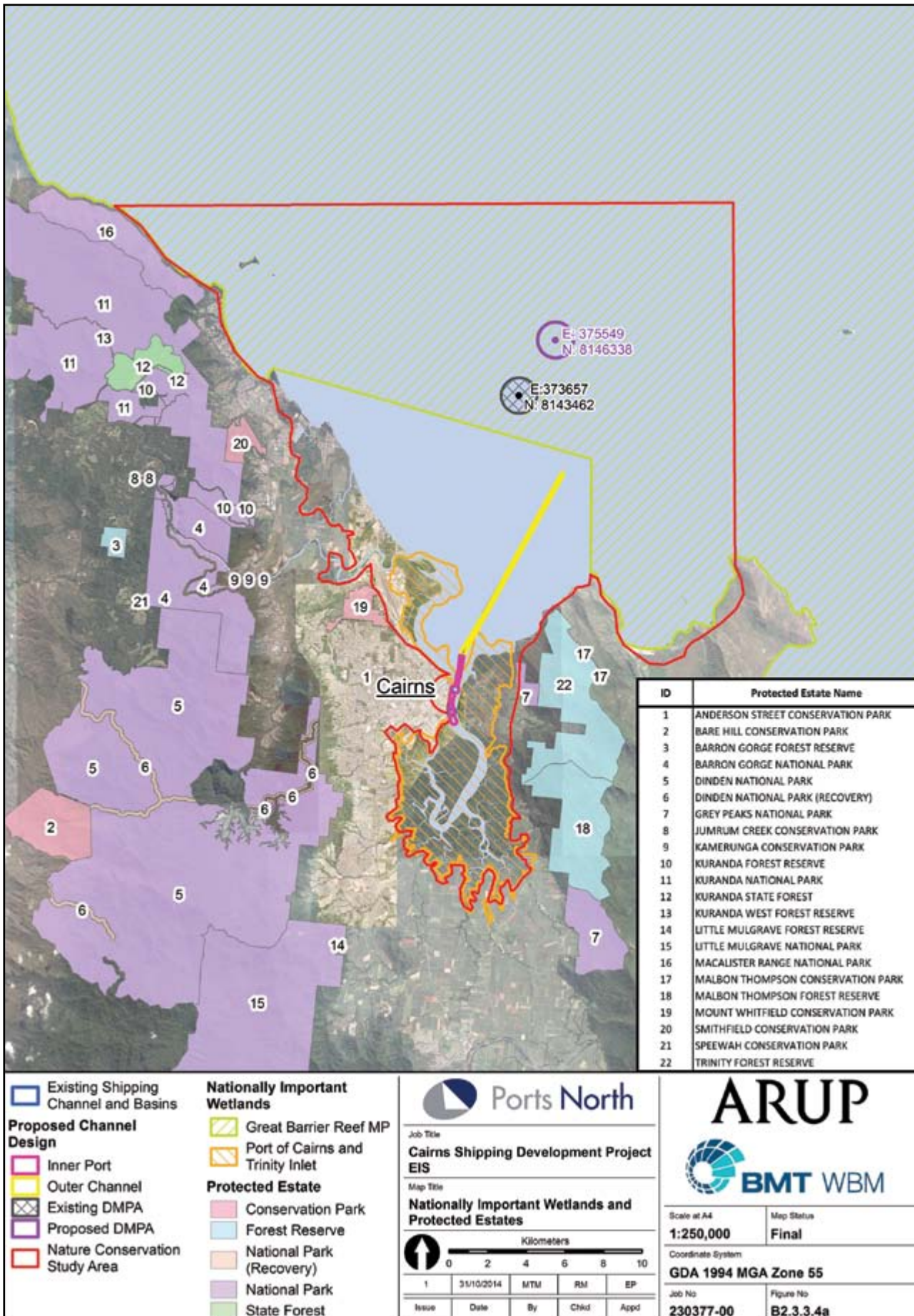
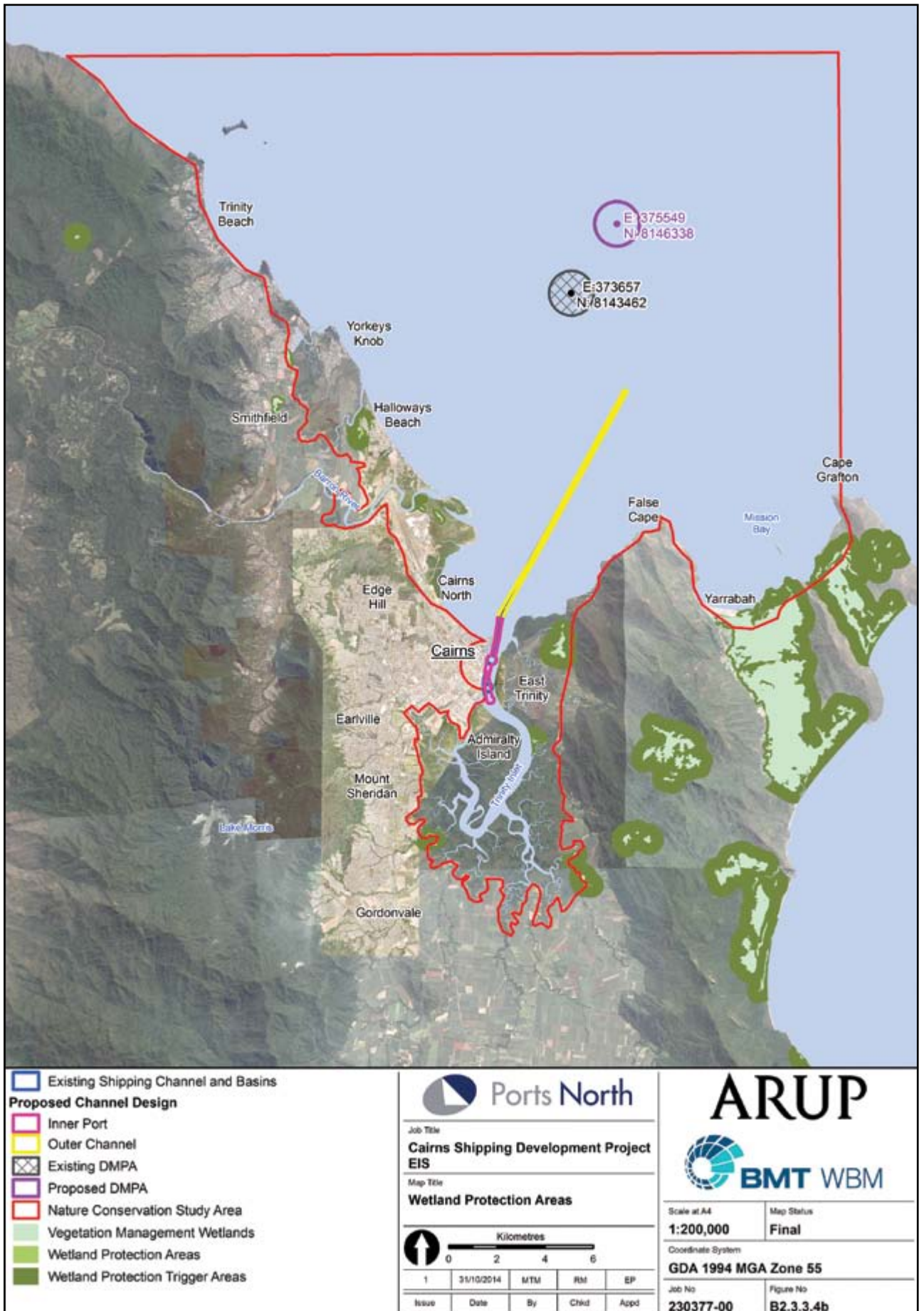


Figure B2.3.3.4b Wetland Protection Areas and Vegetation Management Wetlands



B2.3.3.5 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 Trinity Inlet FHA (see **Figure B2.3.3.5a**) lies within the study area. It contains the largest FHA in the Cairns region, covering 7,212ha (DNPRSR 2012). It also contains both 'Management Area A' (6,042 ha) and 'Management Area B' (1,170ha) areas (*Trinity Inlet Fish Habitat Area Plan*, DPI, 2003 - see **Figure B2.3.3.5a**). 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 this project have been informed by this constraint and the channel design adjusted to avoid and minimise 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.

Other nearby FHAs located in proximity to the study area at a local scale include Barr Creek, Half Moon Creek, and Yorkeys Creek FHAs. All these FHAs are located with estuarine creeks that support well developed mangrove forests and saltmarsh/saltpan areas.

No Dugong Protection Areas (DPAs) occur within 50 km of the study area at a local scale, with the nearest being approximately 150km south at Hinchinbrook. Dugong Protection Areas are protected through provisions in the *Fisheries Act 1994* and *Nature Conservation Act 1992*.

Figure B2.3.3.5a Fish Habitat Areas

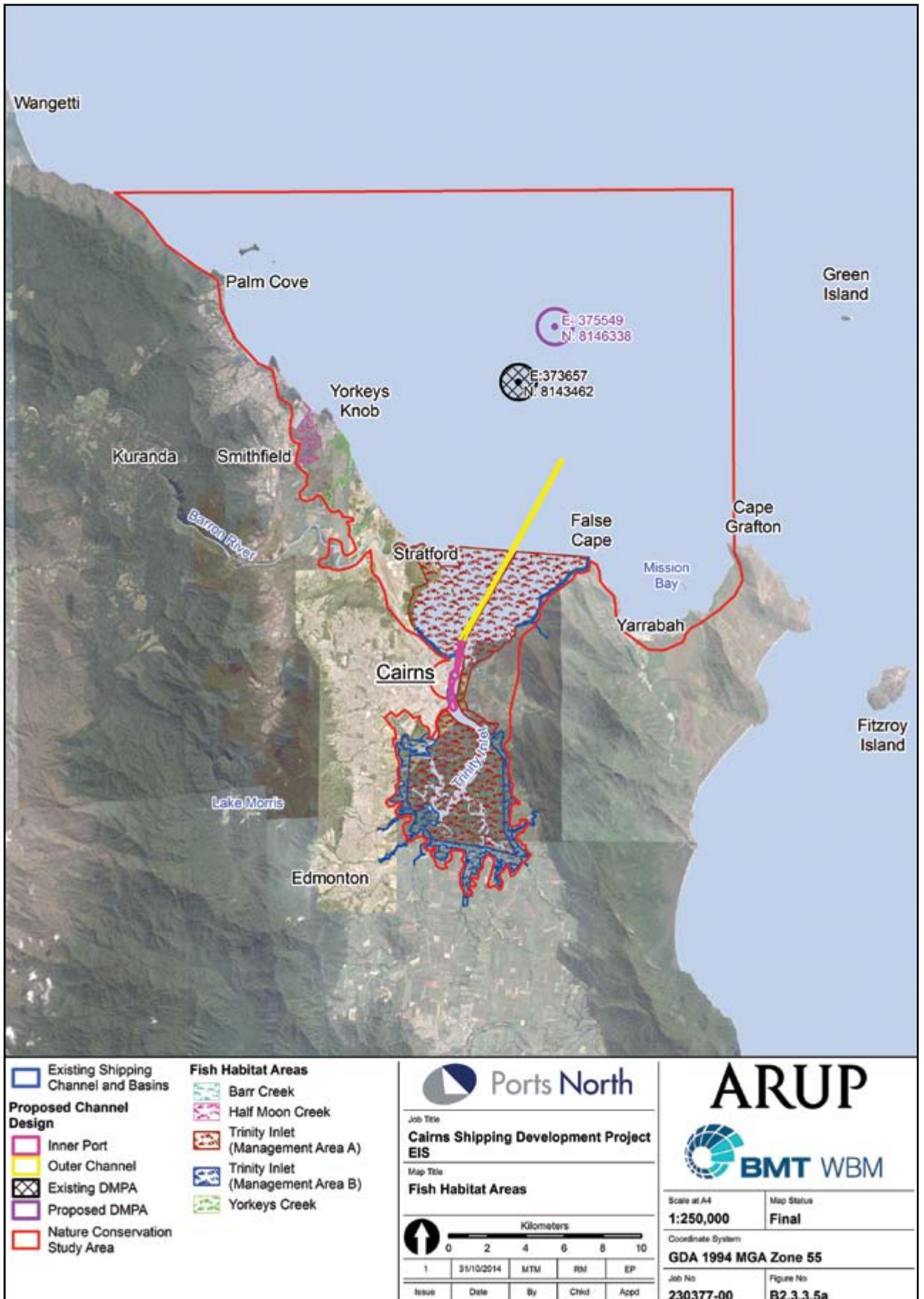
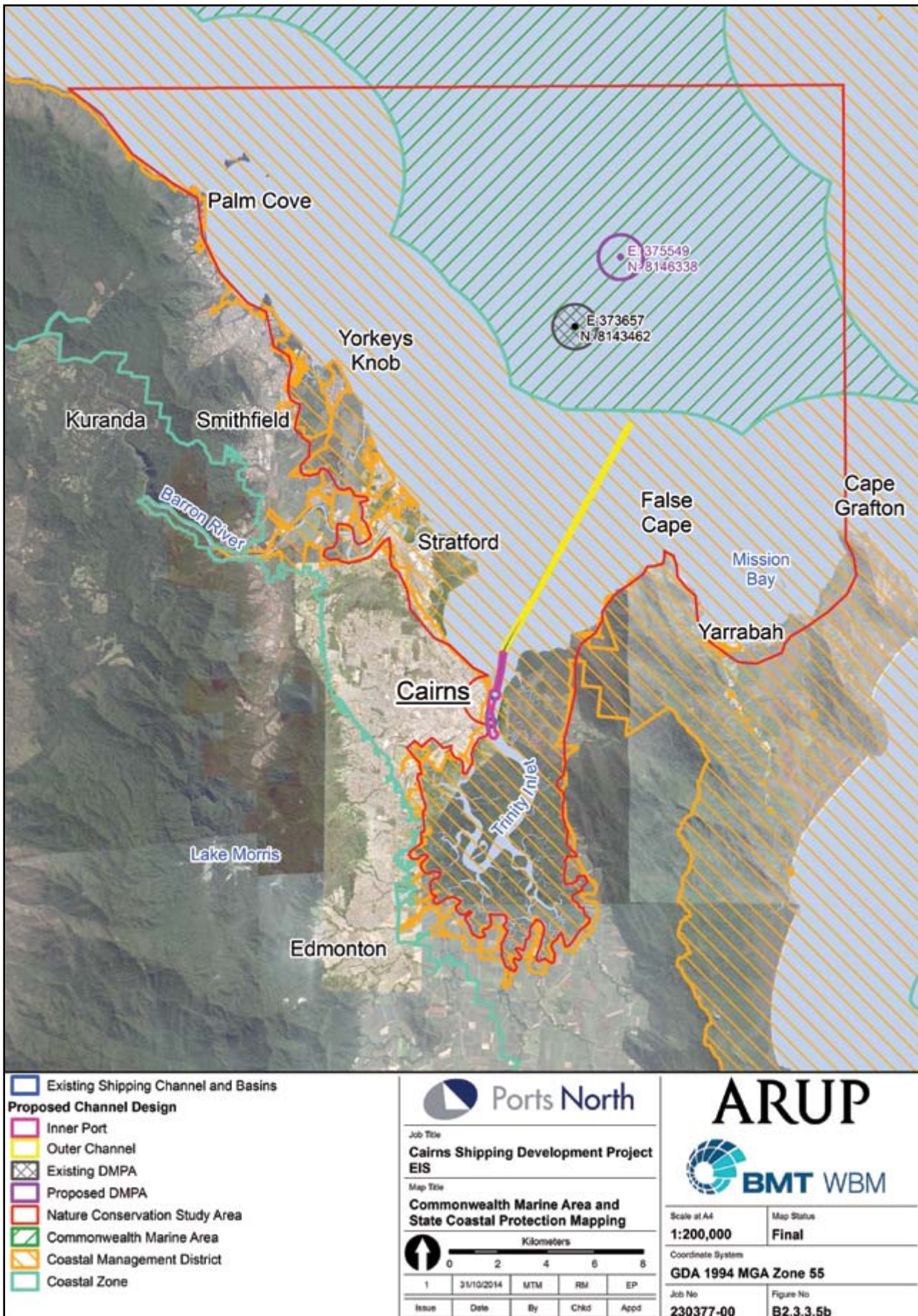


Figure B2.3.3.5b Commonwealth Marine Area and State Coastal Management Areas



B2.3.3.6 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 RE in the study area.

B2.3.3.7 Essential Habitat

Essential habitat is relevant to the terrestrial project area only. As no essential habitat will be impacted by the project, this assessment does not consider it further.

B2.3.4 Local

At a local government level, the *Cairns Plan 2009* includes Planning Area and Overlay Codes that directly relate to the conservation of environmental values. The application of the Cairns Plan 2009 is discussed in **Chapter A1, Project Introduction** and **Chapter B1, Land**.

B2.4 Impact Assessment

B2.4.1 Commonwealth Government

B2.4.1.1 Impacts to the Great Barrier Reef World Heritage Area

As outlined in the baseline section, the OUVs of the GBRWHA recognise the ecological, cultural heritage and visual amenity values of the area. The key impacting processes from the project that have the greatest potential to impact the GBRWHA's 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 DMPA
- The creation of turbid plumes during dredging and dredge material placement, which can increase both turbidity within the water column and sediment deposition on the seabed.

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 B8, Terrestrial Ecology** respectively.

In this context, the findings of several chapters of the EIS (**Chapter B3, Coastal Processes**, **Chapter B5, Marine Water Quality** and **Chapter B7, Marine Ecology** amongst others) have been considered in preparing **Table B2.4.4.1a** which summarises the assessment of potential impacts to 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 (as defined in **Section B2.2.1, Study Area**). (2014).

Based on the outcomes and findings outlined in **Table B2.4.1.1a**, for the local and regional scale, at the whole of site scale, the project is not expected to cause an impact on OUV of the GBRWHA on the basis that the project:

- Does not cause one or more of the 'Attributes' of the WHA to be lost
- Does not cause one or more of the 'Attributes' of the WHA to be degraded or damaged
- Does not cause one or more of the 'Attributes' of the WHA to be notably altered, modified, obscured or diminished
- Does not cause impact on the 'Integrity' of the property.

Table B2.4.4.1a Attributes supported by the Study Area that contribute to the OUV of the GBRWHA and other nature conservation areas and how the project could affect them

Relevant World Heritage Criteria	Attribute	Examples of this Attribute in the Local or Regional Study Area	Predicted residual risks of impact from these impacting processes (summarised from other EIS chapters)
vii, viii, ix	Islands	Green Island, Fitzroy Island, Double Island	Low – 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 and sedimentation rates 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 – water quality modelling predicts that coral communities are in the zone of influence of dredging and placement turbidity plumes but are not expected to be adversely impacted.
vii	Soft coral communities	Offshore soft coral communities (isolated and sparse)	Low – these communities are generally situated outside of direct impact zones (dredging footprint and placement area) and water quality impacts are not expected to cause adverse impacts.
x	Seagrass meadows	Trinity Bay seagrass Trinity Inlet seagrass Seagrass at Double Island	Low to Medium – water quality modelling predicts that existing seagrass meadows are in the zone of influence of dredging turbidity plumes but are not expected to be adversely impacted. There is uncertainty regarding tolerance levels for recovering seagrass areas; these areas to be further assessed and monitored at the time of dredging.
ix	Diversity of benthic invertebrates (soft bottom benthos)	Soft bottom benthic environments within Trinity Bay	Medium – soft bottom benthic habitats will recover following disturbance by dredging (widening and deepening) and placement of the capital dredge material. Recovery will occur progressively but full recovery is not expected for periods of months (e.g 6 – 24 months).

Relevant World Heritage Criteria	Attribute	Examples of this Attribute in the Local or Regional Study Area	Predicted residual risks of impact from these impacting processes (summarised from other EIS chapters)
x	Cetaceans (dolphins)	Inshore dolphins (Indo Pacific and Snubfin dolphins)	Low – impacts on soft bottom benthic habitat as per 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 and proposed DMPA 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	Low – impacts on seagrass habitat as per above; mitigation and monitoring proposed to reduce impacts from dredging (turtle exclusion devices, etc.)
X	Dugongs	Dugongs	Low – impacts on seagrass habitat as per 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	Migratory waterbirds	Wading birds Sea birds	Low – impacts on soft bottom and mangrove habitat as per 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. The new DMPA is located in an area currently used by commercial trawlers and will be subject to further discussion between Ports North and the commercial fishing industry.
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.

B2.4.1.2 Impacts to the Great Barrier Reef National Heritage Place

The assessment above for the GBRWHA is consistent with any potential impacts on the Great Barrier Reef National Heritage Place noting the similar listing criteria and requirements.

B2.4.1.3 Impacts to the GBRMP

Similar to **Section B2.4.1.1** (Impacts to the GBRWHA), this section is concentrated on impacts to the GBRMP at a regional and local scale only, as defined in **Section B2.2**.

The impacting processes from the project that are relevant to the GBRMP include:

- The direct and indirect impacts on the GBRMP from marine placement (noting the new DMPA is situated in the boundaries of the GBRMP)
- Indirect impacts on water quality from dredging (noting that all dredging associated with the project is located within the port limits which are outside the GBRMP).

The identification and designation of a new DMPA in the GBRMP is not anticipated to be a significant impact on the basis of the following:

- The GBRMPA has previously approved the existing DMPA in the GBRMP which is used for placement of maintenance dredge material. Ports North has an approval to use the area for this purpose for a period of 10 years
- The new DMPA will be used for both capital and future maintenance dredging. The existing DMPA has similar sediment and biological characteristics to surrounding areas of seabed. Assessment of the existing DMPA as part of the current study as well as studies undertaken of DMPA conditions in other ports of the GBRWHA have shown that these sites will recolonise following capital dredge placement as well as annual disturbance as a result of maintenance dredging (refer to **Chapter B7, Marine Ecology** for further information)
- The new DMPA is proposed to be the same size as the existing DMPA (a one nautical mile circle) and has similar sediment characteristics to the material being placed there from capital dredging. The area has been surveyed and does not contain seagrass, coral communities or other hard substrate that could contribute to fish aggregation (refer to **Chapter B7, Marine Ecology** for further information)
- The new DMPA is in deep water (18 – 22m), and whilst in the GBRMP, provides further improvement in terms of retentiveness over the existing DMPA given the seasonal variability of water quality due to the suspension of natural sediment movement. The existing DMPA has a retention capacity of approximately 95 percent of the material placed there annually, while the new DMPA has been assessed as being able to retain 99.7 percent of the material placed there over an annual 12 month period in normal conditions. The proposed DMPA is predicted to be able to retain approximately 98.9 percent placed material under extreme weather events (cyclonic conditions). It should be noted that while these predictions are based on the calibrated numerical modelling assessment undertaken as part of the current EIS study, the long-term retentiveness of marine placement sites in Cairns is well understood and demonstrated when reviewing long-term bathymetric studies of Trinity Bay and the continuing presence of well-defined elevated sediment mounds from historical dredge placement including at the existing DMPA
- Recolonisation of the new DMPA following capital placement will take longer (12 – 24 months) than maintenance dredging placement activities due to the volume of material. (Refer to **Chapter B7, Marine Ecology** for further information). The proposed duration of disturbance (with dredging and placement to occur over a minimum 23 weeks consecutively) and the resultant fill platform of approximately 1m which will deter burrowing organisms in the short term. However, full recovery of this area is expected over the medium term
- The location of the new DMPA generally avoids other uses and users of the GBRMP including shipping activities. It is, however, in an area of seabed that is opportunistically used by the local prawn trawl fishery. As a result, Ports North is engaging with the commercial fishing groups as part of the consultation on the EIS to determine the extent of any impact and possible mitigation that can be explored to reduce impacts during dredging and post placement. The existing DMPA would be available for trawling with transfer of operations to the new DMPA, noting measures to improve its fish-ability to a range of fishing groups (recreational, commercial netting, trawling) will be explored as part of future mitigation.

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 B2.4.1.3a below.

Table B2.4.1.3a Assessment of Impacts to GBR Marine Park

Significance Criterion	Assessment
<p>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</p>	<p><u>Direct Impact from Placement</u></p> <p>Refer Chapter B7, Marine Ecology. Placement of dredged material at the DMPA will result in direct alterations to soft sediment habitat and biota (invertebrates and occasional sparse epibiota) throughout the 269 ha area of the DMPA. Biota recolonisation and habitat recovery following disturbance will occur almost immediately with the area progressively recolonising over a period of months to years (generally full recovery will be between six months and two years depending on the conditions, depth of fill and a range of other factors).</p> <p><u>Increased Suspended Sediment Concentrations and Turbidity</u></p> <p>Refer Chapter B5, Marine Water Quality. Predicted impact zones (high and moderate/low impacts) are outside the boundaries of the GBRMP except for highly localised impacts around the DMPA (during placement).</p> <p>Key sensitive receptors that are vulnerable to increased turbidity are seagrasses and corals; however, significant seagrass or coral communities are not known to occur with the turbidity or sediment deposition impact zones (i.e. zones of moderate or high impact) for either the base case or worst-case dredging scenarios.</p>
<p>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</p>	<p>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.</p>
<p>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</p>	<p>Refer Chapter B5, Marine Water Quality and Chapter B11, Air Quality.</p> <p>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.</p>
<p>Result in a known or potential pest species being introduced or becoming established in the GBRMP</p>	<p>Refer Chapter B7, Marine Ecology and Chapter C2, Dredge Management Plan.</p> <p>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, Department of Agriculture and other requirements as outlined in the Dredge Management Plan.</p> <p>The vast majority of material to be placed at the DMPA at sea will be fine sediment that will not facilitate marine pest or other exotic organism habitat opportunities.</p>

Significance Criterion	Assessment
<p>Result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity or social amenity or human health may be adversely affected</p>	<p>Refer Chapter B4, Marine Sediment Quality. The capital dredge material has been thoroughly analysed in accordance with a Sediment Analysis Plan (SAP) approved by the GBRMPA. Laboratory analysis of the sampling indicates that the capital dredge material is uncontaminated and suitable for at sea placement. Any impact on marine water quality from contaminated sediments is therefore predicted to be negligible.</p> <p>Under Chapter C1, Environmental Management Plan (Construction and Operation), C2, Dredge Management Plan and Chapter B15, Waste Management, hazardous materials, chemicals and substances associated with construction and operation will be managed in accordance with best practice.</p> <p>The EIS includes stochastic modelling of potential oil spills in Trinity Bay and Inlet (refer Chapter B5, Marine Water Quality) and existing fuel management procedures at the port will be updated to accommodate the additional provision of bunker fuel (Intermediate Fuel Oil) contemplated by the project. These are outlined in Chapter C1, Environmental Management Plan (Construction and Operation).</p>
<p>Have a substantial adverse impact on heritage values of the GBRMP, including damage or destruction of an historic shipwreck.</p>	<p>Refer Chapter B13, Cultural Heritage. There are no known historic shipwrecks that are likely to be harmed or otherwise adversely affected by the project.</p>

B2.4.1.3 Impacts to Wetlands of National Importance

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 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 (approximately 400,000m³)
- The dredge material in these areas generally consist of firmer clays that will likely be dredged by a mechanical (backhoe) dredge which produces less suspension of sediment or turbidity generation
- Some areas in the inner port may be able to be dredged by a trailing suction hopper dredger (TSHD). Any dredging by a TSHD will be done under constrained overflow conditions (as outlined in **Chapter A4, Project Description**), so as to further minimise fine sediment generation during operations
- 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.

B2.4.2 State Government

B2.4.2.1 Impacts to Matters of State Environmental Significance (MSES) Areas

The project is not predicted to result in impacts to any MSES areas that exist on land above HAT. Any predicted impacts on marine and estuarine (intertidal) MSES areas, are described below.

B2.4.2.2 Trinity Inlet Fish Habitat Area

The current shipping channel in Cairns is within a 200m 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
- 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.

As outlined in **Part A** of the EIS, ship simulation undertaken during 2013 and 2014 has allowed refinement of the design channel width from 140m to 130m which is advantageous for reducing the impact on the FHA through the reduction of the dredging footprint. However, the proposed 130m widened channel for the project will still extend outside of the 100m exclusion area (from the channel centre line) along the western portion over an area of approximately 2.25ha.

To overcome 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.

The proposed FHA boundary amendment is shown in **Figure 2.4.2.2a**. 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.

B2.4.2.3 Great Barrier Reef Coast State Marine Park

Dredging will encroach on the General Use Zone of the GBR Coast State 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 of the GBR Coast State Marine Park along the shipping channel contain a similar buffer to that of the FHA 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.

The additional 'impact' to the GBR Coast State Marine Park will be the encroachment of the roughly 1km extension of the existing channel covering an area of 13ha in the GBR Coast State Marine Park, as well as a widening of the existing channel from the FHA boundary.

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.

An Estuary Conservation Zone of the GBR Coast State Marine Park is located adjacent to the eastern side of the navigation channel. However, as the majority of widening will be occurring on the western side of the channel, this zone is not expected to be directly affected.

The inner harbour and existing shipping channel are located within the designated port limits and are not within the GBR Coast State Marine Park. Likewise, the existing and proposed DMPAs are located outside of Queensland waters in the GBRMP.

B2.5 Mitigation and Residual Impacts

B2.5.1 Management measures and mitigations

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 follows:

Table 2.5.1a Documents describing project management measures and mitigation

Relevant Document in Part C of the EIS	Applicable Nature Conservation Areas
Chapter C1, Environmental Management Plan (Construction and Operation)	Great Barrier Reef World Heritage Area Fish Habitat Area – Trinity Inlet Wetland of National Importance – Trinity Inlet
Chapter C2, Dredge Management Plan	Great Barrier Reef World Heritage Area Great Barrier Reef Marine Park Fish Habitat Area – Trinity Inlet Wetland of National Importance – Trinity Inlet
Chapter C3, Vessel Traffic Management Plan	Great Barrier Reef World Heritage Area Great Barrier Reef Marine Park Fish Habitat Area – Trinity Inlet Wetland of National Importance – Trinity Inlet
Chapter C4, Maritime Operations Management Plan	Great Barrier Reef World Heritage Area Great Barrier Reef Marine Park Fish Habitat Area – Trinity Inlet Wetland of National Importance – Trinity Inlet

B2.5.2 Residual Impacts and Offsets

Environmental offsets for a 'Coordinated Project' such as the CSD project are governed by the following documents:

- EPBC Act Environmental Offsets Policy (October 2012)
- Queensland Environmental Offsets Policy - Version 1.0 (1 July 2014).

Environmental offsets become applicable when the impacts from a development or action cannot be fully avoided and/or minimised and where all other Government standards are met. Specifically, offsets are required under the offset policies listed above where a 'significant' residual impact is predicted or likely based on a determination of significance for both MNES areas and MSES areas.

A summary of the residual impacts for the project and the requirements for offsets are discussed in **Chapter B18, Cumulative Impacts Assessment** which includes further reference and discussion about the applicability of predicted impacts to Nature Conservation Areas identified in this chapter.

B2.6 Summary

A summary of the outcomes of the risk-based assessment for activities that have the potential to impact on the various Nature Conservation Area values of the study area at a regional or local scale, during either the construction and/or operational phases of the project are summarised in **Table B2.6a**.

Table B2.6a Assessment Summary Table – Nature Conservation Areas

Nature Conservation Area	Summary of Impact	Mitigation Measures	Residual Risk Rating with mitigation measures in place
GBRWHA and Great Barrier Reef Marine Park – Whole of Property Scale	<p>Consideration of impacts from the project on Key Attributes as listed in Table B2.4.1.3a</p> <p>No significant impacts are predicted at the Whole of Property Scale</p>	<p>Dredge Management Plan and other plans outlined in Part C</p>	Negligible
GBRWHA and Great Barrier Reef Marine Park – Regional Scale	<p>Consideration of impacts from the project on Key Attributes as listed in Table B2.4.1.3a</p> <p>No significant impacts are predicted at the Regional Scale</p>	<p>Dredge Management Plan and other plans outlined in Part C</p>	Low
GBRWHA and Great Barrier Reef Marine Park – Local Scale	<p>Consideration of impacts from the project on Key Attributes as listed in Table B2.4.1.3a</p> <p>No significant impacts are predicted at the Local Scale</p> <p>Medium residual risks are predicted with respect to soft bottom benthic habitat in the dredge footprint and in the proposed DMIPA (with full recovery in six-24 months)</p> <p>Low to medium residual risks are predicted with respect to temporary water quality impacts to recovering seagrass areas in Trinity Bay</p>	<p>Dredge Management Plan and other plans outlined in Part C</p>	Medium
Commonwealth Marine Area	<p>No significant impacts are predicted in the Commonwealth Marine Area</p>	<p>Dredge Management Plan and other plans outlined in Part C</p>	Low

Nature Conservation Area	Summary of Impact	Mitigation Measures	Residual Risk Rating with mitigation measures in place
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
Fish Habitat Area (FHA)	No significant impact to the Fish Habitat Area are predicted. Temporary impacts will occur to benthic habitats associated with channel widening and deepening Boundaries of the FHA will require minor amendment to accommodate the extension of the channel	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
Great Barrier Reef Coast Marine Park	No significant impact to the State Marine Park are predicted. Temporary impacts will occur to benthic habitats associated with channel widening and deepening Boundaries of the State marine park will require minor amendment to accommodate the extension of the channel	Dredge Management Plan and other plans outlined in Part C	Medium
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

B2.7 References

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DSDIP 2012, *Great Barrier Reef Ports Strategy 2012-2022* – For public consultation - October 2012, Queensland Government, Brisbane.

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DEHP 2011, *Queensland Biodiversity and Vegetation Offsets Special Features*, GIS Data, Queensland Government, Brisbane

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DSEWPAC/GBRMMPA (2013) Guidelines for an Environmental Impact statement for the Cairns Shipping Development (Trinity Inlet) Project, in Port of Cairns and Great Barrier Reef Marine Park, Queensland – March 2013. Jointly prepared by the Australian Government Department of Sustainability, Environment, Water, Population and Communities and the Great Barrier Reef Park Marine Authority.

DNPRSR (2012) Declared Fish Habitat Area Summary – Trinity Inlet. Online fact sheet available through the Queensland Government Department of National Parks, Recreation, Sport and Racing.

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GBRMMPA 1994, *Keeping it Great – The Great Barrier Reef: A 25 Year Strategic Plan for the Great Barrier Reef World Heritage Area*, Published by the Great Barrier Reef Marine Park Authority, Queensland.

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UNESCO 2012, *Mission Report: Reactive Monitoring Mission to the Great Barrier Reef (Australia) 6th to 14th March 2012*, UNESCO World Heritage Centre – IUCN, Paris.

UNESCO 2013, The World Heritage List: Great Barrier Reef, viewed online on the 28 of September 2013, available at <http://whc.unesco.org/en/list/154>

