

# Townsville Port Expansion Project

Initial Advice Statement

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## Initial Advice Statement

Prepared for

Port of Townsville Limited

Prepared by

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## Table of Contents

Abbreviations	i
Executive Summary	i
1.0 Introduction	1
1.1 Project Background	1
1.2 Purpose of the Initial Advice Statement	1
1.3 Scope of this Document	1
1.4 Project Location	2
1.5 The Proponent	2
2.0 The Need for the Project	5
2.1 Overview	5
2.2 Economic Importance and Project Justification	6
2.2.1 Port of Townsville is essential for regional growth	6
2.2.2 The PEP is essential for the Port to support and service the growth of the region	6
2.3 'Do Nothing' Option	6
3.0 Project Description	8
3.1 Project Infrastructure Outline	8
3.2 Vessel Fleet	8
3.3 Base Case for the EIS	10
3.4 Preliminary Engineering and Environment Study	10
3.5 Project Infrastructure Details	12
3.6 Ongoing Port Operation	15
3.7 Project Cost	16
3.8 Project Timing	16
3.9 Employment Opportunities	18
4.0 Legislation, Approvals and Other Requirements	19
4.1 Overview	19
4.2 Commonwealth Legislation	19
4.2.1 Environment Protection and Biodiversity Conservation Act 1999	19
4.2.2 Environmental Protection (Sea Dumping) Act 1981	20
4.2.3 Great Barrier Reef Marine Park Act 1975	20
4.3 State Legislation	20
4.3.1 State Development and Public Works Organisation Act 1971	20
4.3.2 Aboriginal Cultural Heritage Act 2003	21
4.3.3 Coastal Protection and Management Act 1995	21
4.3.4 Environmental Protection Act 1994	22
4.3.5 Fisheries Act 1994	22
4.3.6 Sustainable Planning Act 2009	22
4.3.7 Land Act 1994	23
4.3.8 Nature Conservation Act 1992	23
4.3.9 Queensland Heritage Act 1992	23
4.3.10 Transport Infrastructure Act 1994	23
4.4 Local Planning Scheme	24
4.5 Summary of Likely Approvals	24
5.0 Existing Environment and Potential Impacts	27
5.1 Introduction	27
5.2 Topography, Geology and Soils	27
5.3 Coastal Processes	28
5.4 Marine Water Quality	29
5.5 Terrestrial Ecology	30
5.6 Marine Ecology	31
5.7 Visual Amenity	35
5.8 Noise and Vibration	35
5.9 Air Quality	36
5.10 Cultural Heritage	37
5.11 Traffic and Transport	38

5.12	Trade and Economics	38
5.13	Social Impact and Consultation	39
5.14	Waste	40
5.15	Climate/Natural Disaster	41
5.16	Hazard and Risk	42
6.0	Matters of National Environmental Significance	43
6.1	Overview	43
6.2	World Heritage	43
6.3	National Heritage	44
6.4	Wetlands of International Importance (Ramsar wetlands)	44
6.5	Great Barrier Reef Marine Park	44
6.6	Listed Threatened and Migratory Species	44
7.0	Environmental Management Measures	47
7.1	Consideration of Environmental Values in the Preliminary Design	47
7.2	Environmental Management Plan	47
7.3	Environmental Offsets	48
8.0	Conclusion	49
9.0	References	50

## Abbreviations

The following abbreviations have been used in this document:

Abbreviation	Full Name
ACH Act	<i>Aboriginal Cultural Heritage Act 2003 (Qld)</i>
AHD	Australian Height Datum
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
CAMBA	China–Australia Migratory Birds Agreement
CBD	Central business district
CD	Chart Datum
CG	Coordinator-General
CHMP	Cultural heritage management plan
CPM Act	<i>Coastal Protection and Management Act 1995 (Qld)</i>
DEEDI	Queensland Department of Employment, Economic Development and Innovation
DERM	Queensland Department of Environment and Resource Management
DIP	Former Queensland Department of Infrastructure and Planning, now transferred to DEEDI
DTMR	Queensland Department of Transport and Main Roads
DPI&F	Former Queensland Department of Primary Industries and Fisheries
DMPA	Dredged material placement area
DEWHA	Former Australian Government, Department of the Environment, Water, Heritage and the Arts
EAC	Townsville Eastern Access Corridor
EIS	Environmental impact statement
EMP	Environmental management plan
EMS	Environmental management system
EPA	former Queensland Environmental Protection Agency
EP Act	<i>Environmental Protection Act 1994 (Qld)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
ERA	Environmentally Related Activity
Fisheries Act	<i>Fisheries Act 1994 (Qld)</i>
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRWHA	Great Barrier Reef World Heritage Area
HERBRECS	Queensland Herbarium vegetation site database
IAS	Initial Advice Statement
IDAS	Integrated Development Assessment System
IP Act	Former <i>Integrated Planning Act 1997 (Qld)</i>
JAMBA	Japan–Australia Migratory Birds Agreement
Land Act	<i>Land Act 1994 (Qld)</i>
LUP	Land Use Plan
Mtpa	Million tonnes per annum
MNES	Matters of National Environmental Significance (under the EPBC Act)
NC Act	<i>Nature Conservation Act 1992 (Qld)</i>
NRW	Former Queensland Department of Natural Resources and Water

Abbreviation	Full Name
QASSMAC	Queensland Acid Sulfate Soils Management Advisory Committee
PEES	Preliminary Engineering and Environment Study
PEP	Townsville Port Expansion Project
POTL	The Port of Townsville Limited
SDPWO Act	<i>State Development and Public Works Organisation Act 1971 (Qld)</i>
SEWPaC	Australian Government, Department of Sustainability, Environment, Water, Population and Communities
SP Act	<i>Sustainable Planning Act 2009 (Qld)</i>
TCC	Townsville City Council
The project	"Townsville Port Expansion Project" which involves expansion of the Port of Townsville
The proponent	The Port of Townsville Limited (POTL)
TI Act	<i>Transport Infrastructure Act 1994</i>
TOR	Terms of Reference
USL	Unallocated State Land

## Executive Summary

Port of Townsville Limited (POTL) proposes an expansion of the Port of Townsville to accommodate forecast growth in trade at the port and to address current capacity constraints. The proposed Port Expansion Project (PEP) will allow POTL to satisfy its functions as a Port Authority under the *Transport Infrastructure Act 1994*.

The key components of the PEP include the following:

- harbour dredging and channel deepening;
- land reclamation, predominantly through the placement of dredging material;
- installation of new breakwater and revetment structures;
- installation of new wharf structures and development of new internal bunds to facilitate effective land reclamation;
- installation of new navigational aids;
- upgrades to road and rail infrastructure as well as construction of new road and rail infrastructure; and
- installation of new services infrastructure.

The significance of the Port of Townsville to the local, regional and State economy and its future growth is recognised in various planning instruments. A major strategic objective of the *Northern Economic Triangle Infrastructure Plan 2007-2012* is to facilitate the adoption and progressive implementation of the *Port of Townsville Master Plan* that includes the seaward expansion of the port.

The purpose of this Initial Advice Statement (IAS) is to provide information to the Coordinator-General (CG) for consideration in seeking significant project declaration for the PEP under the provisions of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) for which an Environmental Impact Statement (EIS) will be prepared.

POTL will also seek approval under the EPBC Act for the proposed development relative to the following matters of National Environmental Significance (MNES) that may be potentially impacted by the project:

- sections 12 and 15A (World Heritage Properties [1]);
- section 15B and 15C (National Heritage place [1]);
- sections 16 and 17B (Ramsar wetlands of international importance [1]);
- sections 18 and 18A (Listed threatened species [19] and communities [0]);
- sections 20 and 20A (Listed migratory species [55]); and
- sections 24B and 24C (Great Barrier Reef Marine Park).

Approval pursuant to sections 24B and 24C (Great Barrier Reef Marine Park) applies only to the proposed deepening of the Sea Channel where it lies within the boundaries of the Great Barrier Reef Marine Park.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) recognises that environmental assessment under the Queensland SDPWO Act may be used for the purposes of the environmental assessment under the EPBC Act in accordance with the Bilateral Agreement between the Commonwealth and Queensland Governments. If such designation is granted, this will allow the Commonwealth Minister to rely on specified environmental impact assessment processes of the State of Queensland in assessing actions under the EPBC Act.

It is anticipated that the capital cost of the PEP will be approximately \$1.3 billion (at 2009). Of this, approximately \$660 million will be required for the first stage.

An assessment of the existing environment and an assessment of potential impacts will be undertaken as part of the EIS process. It is expected that the potential impacts resulting from the PEP on the natural, social and built environment can be avoided or minimised through appropriate mitigation measures; however, where this cannot be achieved, consideration will be given to appropriate offsets in accordance with relevant Government policies.

Consultation with relevant regulatory agencies and other stakeholders including the local community will be implemented to identify the broad issues of concern and to inform the EIS process. A Draft Terms of Reference (TOR) for the EIS will be prepared and advertised for public comment. Comments will be incorporated into the Final TOR setting out the scope of the EIS.

## 1.0 Introduction

### 1.1 Project Background

The Port of Townsville is a multi-purpose port that handles predominantly bulk and general cargo through nine operational berths. The port serves a geographically large hinterland region, and the significant mining and mineral processing industries within the region have shaped the development of the port and underpin its significance.

The port plays an important role in the economy in a local, regional and State context and this is recognised under the *Northern Economic Triangle Infrastructure Plan 2007-2012* and the *Townsville Economic Gateway Strategy (2006)*. Strong imperatives for future development and efficient operation of the Port of Townsville are promoted through these documents. It is in response to these strategic documents, current trade forecasts, and current land use pressures that POTL proposes the Townsville Port Expansion Project (PEP).

The current annual trade through the port amounts to approximately 10 million tonnes. Current trade forecasts predict a fourfold increase in this trade tonnage throughput by 2040. This increase is expected to result from increases in existing trades (particularly those linked with the mining and industrial sectors) and new bulk trades.

In response, POTL proposes an expansion of the port to address current capacity constraints and accommodate forecast growth in trade at the port over a planning horizon to 2040. A number of additional berths will be required to accommodate this forecast trade increase through the construction of a new harbour basin. Deepening and other minor modifications to the approach channels (the Platypus and Sea Channels) will also be required to overcome constraints imposed on vessel size by the present channel geometry and allow for increased shipping movements.

### 1.2 Purpose of the Initial Advice Statement

This Initial Advice Statement (IAS) has been prepared on behalf of POTL. This document describes the PEP and identifies the environmental and social issues associated with the proposed project.

The information presented in this IAS seeks to address the requirements of s.27(a) of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and is intended to assist the Coordinator-General (CG) in making a determination regarding the declaration of the Project.

The IAS also will allow key stakeholders to determine the nature and level of interest in the project and accordingly:

- facilitate the preparation of Terms of Reference (TOR) for an Environmental Impact Statement (EIS) for the project; and
- identify relevant statutory approvals that may be required for the proposal to proceed under State legislation and approval under the Commonwealth, *Environment Protection and Biodiversity Conservation Act 1999*.

### 1.3 Scope of this Document

This document:

- describes the proposal and proposed infrastructure, and the justification for the project;
- describes the project site;
- identifies the key statutory approvals that may be required for the project to proceed;
- provides a preliminary overview of the physical, ecological and socio-economic environment associated with the proposal;
- discusses the environmental values that may be affected by the project; and
- identifies the potential impacts of the project that will require further consideration in the EIS including possible measures to mitigate adverse effects.

## 1.4 Project Location

The Port of Townsville is located on Cleveland Bay, approximately 3km east of the city centre of Townsville in Queensland (refer to Figure 1.1).

The port is situated within the Great Barrier Reef World Heritage Area. The majority of the port infrastructure is positioned in an excised portion of the Great Barrier Reef Marine Park, with the exception of approximately 300m of the Sea Channel (east of Magnetic Island). This is shown on Figure 1.2.

The PEP proposes to extend the existing port area northwards on the seaward side within the excised area, and proposes to deepen the channel, which would result in some lengthening of the current Sea Channel into the Great Barrier Reef Marine Park.

## 1.5 The Proponent

The proponent for the PEP is Port of Townsville Limited. As Proponent, POTL is responsible for gaining all relevant approvals necessary to facilitate the development of the Project.

POTL is a government-owned corporation under the *Government Owned Corporations Act 1993* and is declared as a Port Authority under the *Transport Infrastructure Act 1994* (TI Act). Under the TI Act, POTL is responsible for establishing, managing and operating effective and efficient port facilities in the Port of Townsville and the Port of Lucinda.

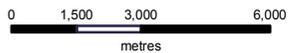
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**LEGEND**

- Project Study Area
- Existing Port Land
- Port Limits
- Offshore Spoil Ground

**TOWNSVILLE PORT EXPANSION  
PROJECT  
Locality Plan**

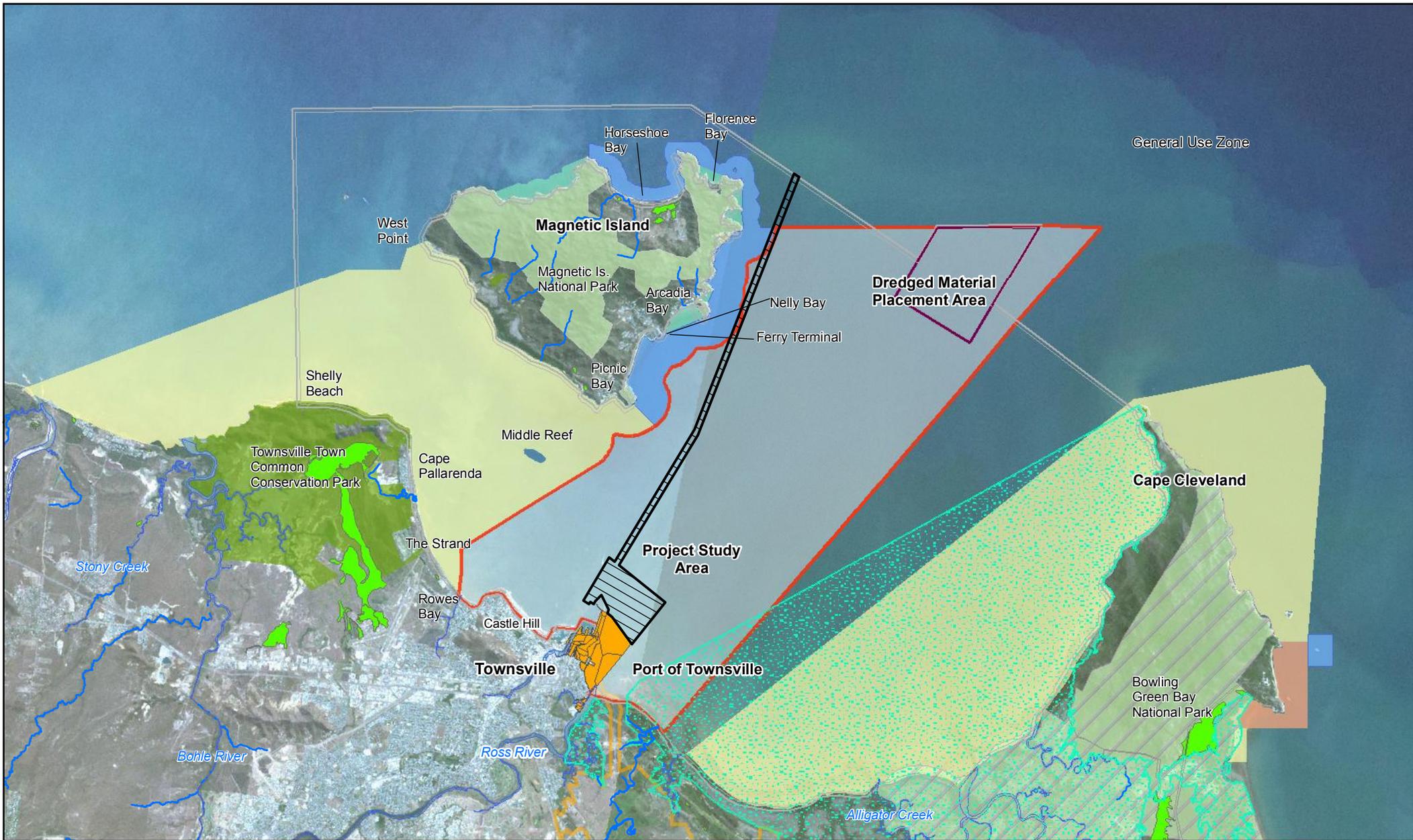
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VERSION 3

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**Figure**

**1.1**

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**LEGEND**

- Project Study Area
- Existing Port Land
- Middle Reef
- National Park
- Conservation Park
- Port Limits
- Townsville State Development Area
- Area excised from Greater Barrier Reef Marine Park (GBRMP)
- Offshore Spoil Ground
- RAMSAR Area
- Wetlands Protection Areas
- Fish Habitat Areas

**GBRMP Zoning**

- Habitat Protection Zone
- Conservation Park Zone
- Scientific Research Zone
- Marine National Park Zone

Note: Other waters not indicated are zoned General Use

**TOWNSVILLE PORT EXPANSION PROJECT**  
**Environmental Protection Areas**

PROJECT ID	60161996
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LAST MODIFIED	28/01/11 KL
VERSION	3

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**Figure**  
**1.2**

## 2.0 The Need for the Project

### 2.1 Overview

The Port of Townsville is one of Queensland's most strategic assets and plays a significant role in the local, regional and State economy. The port is well located to support the regional minerals and agricultural industries and as a regional trade hub for north Queensland. The significance of the port is recognised in the *Northern Economic Triangle Infrastructure Plan 2007-2012* (Queensland Department of Infrastructure, 2007). A major strategic objective of the plan is to ensure the future development and efficient operation of the port as a key contributory factor for the continued economic development of the region, to be achieved through the adoption and progressive implementation of the Port of Townsville Master Plan.

Such an approach is also consistent with the Federal Government's, *National Ports Strategy* (Infrastructure Australia, 2010). The aim of the National Ports Strategy is to improve the efficiency of port related freight movements and drive the development of efficient, sustainable ports and related freight logistics to balance the needs of a growing Australian community and economy with the quality of life aspirations of the Australian people. The strategy recognises that port operators and freight distributors need certainty and predictability for commercial decision making, and require long term visible plans on which to base commercial decisions. It recommends that future infrastructure requirements should be identified from an analysis of a combination of forecast demand and expected levels of productivity.

POTL's current trade forecast indicates growth from approximately 10Mtpa (2009/10) to approximately 20Mtpa by 2019/20 and 43Mtpa by 2040. This forecast includes significant growth in existing trades and the advent of new trades through the Port, especially dry bulk trades for the minerals industry, and is a major driver for the expansion of port facilities.

Current trade tonnage is dominated by nickel ore imports (36%), oil imports (10%) mineral concentrate exports (14%), sugar exports (12%) and fertilizer exports (8%).

Of the 10Mtpa of growth predicted between 2009/10 and 2019/20, 34% is expected to come from new magnetite exports, 22% from additional nickel ore imports, 12% from fertilizer exports and 12% from mineral concentrate exports.

The *Port of Townsville Master Plan* (Maunsell AECOM, 2007) examined the berth requirements to accommodate the increased trade forecast over a 25 year planning horizon, and examined a number of scenarios for the future development of the port to meet the forecast increase in berth capacity required, either through expansion of the existing port facility, or through the establishment of a new greenfield facility at Cape Cleveland. The Master Plan study concluded that the new berths should be provided through a staged program of redevelopment and rationalisation of operations at the existing site, with general cargo berths retained in the existing harbour, and a new harbour created by expanding the port seaward of the existing breakwater to provide new capacity for bulk trades. This recommendation was adopted by POTL and incorporated into the *Port of Townsville Land Use Plan 2010*.

The proposed PEP will allow POTL to:

- satisfy its responsibility under the TI Act, including establishment, management and effective and efficient operation of port facilities;
- respond to forecast trade growth and provide essential trade pathways for current and future trades in accordance with the *National Ports Strategy*;
- provide competitive market conditions for import and export of bulk materials and general cargo through the Port of Townsville;
- establish and maintain strong links between the local, regional, State and global economies;
- accommodate future trends in global shipping practices; and
- facilitate rationalisation and expansion of the port.

## 2.2 Economic Importance and Project Justification

### 2.2.1 Port of Townsville is essential for regional growth

The Port of Townsville has been integral to the development of the economy of Townsville and the north Queensland region since its construction in 1874. The port is Queensland's third largest multi-commodity port, handling 13% of the total international trade emanating from Queensland seaports. It provides north Queensland with a gateway for commerce and trade and it services the north-east and north-west minerals provinces of the state, handling 73% of all metals traded through Queensland ports in the 2009/10 financial year,

The Townsville State Development Area, located to the south east of the port (see Figure 1.2), was declared in 2003 to assist the Townsville region achieve its potential as a major base metals processing centre. Its proximity to the port and the minerals rich north-west makes it the most strategically positioned industrial land in north Queensland. New opportunities for minerals processing and transport and distribution services connecting northern Australia to the Asia Pacific region are expected to attract new industries and ensure continued economic growth and employment for the Townsville region and Queensland.

The importance of the Port of Townsville for the economy in a local, regional and State context is also recognised under the *Northern Economic Triangle Infrastructure Plan 2007-2012* and the *Townsville Economic Gateway Strategy* (2006). These documents emphasise the importance of future development and efficient operation of the port by adoption and progressive implementation of the Port of Townsville Master Plan.

The Master Plan incorporates the Townsville City-Port Strategic Plan, which seeks to protect the integrity of the port and provide for an effective and sustainable interface between Townsville's port area and the adjacent city area.

### 2.2.2 The PEP is essential for the Port to support and service the growth of the region

The Port of Townsville handles a diverse mix of high-value bulk trades, and during the 2009/2010 financial year, over 10Mt of cargo was handled through the port, with a total value of just under \$10 billion. The port handles approximately 4-5% of the total cargo tonnage handled through Queensland ports, which equates to approximately 14% of the total export value. As noted above, trade through the port is expected to increase to over 40Mt by 2040.

The Port of Townsville Master Plan identified the need to expand the port to satisfy forecast trade over a 25 year planning horizon, based on assessment of demand and capacity requirements. It recommended that the expansion take the form of a new outer harbour, to provide additional berths and cargo storage space for bulk products, an efficient rail loop connection to the Townsville Eastern Access Corridor (EAC), and provide an overall rationalisation of port activities.

The port expansion is a major strategic objective of the *Northern Economic Triangle Infrastructure Plan 2007-2012* and will be an important asset for the sustained economic growth of Townsville and the north Queensland region.

The port expansion is likely to have beneficial impacts on the local, regional and State economy by increasing the efficiency and capacity of the port.

## 2.3 'Do Nothing' Option

The Port of Townsville has reached capacity within its existing footprint. Works are currently underway to upgrade existing berths and improve the efficiency of the existing port layout, but this will not provide sufficient berth space and cargo handling facilities to meet the expected demand over the next 30 years and beyond.

If POTL does not proceed with the development of the PEP, there will not be sufficient capacity within existing port infrastructure to accommodate the forecast trade. Opportunities for future economic growth will be constrained, limiting the Port of Townsville's role in the local, regional and State economy. It will mean that the increased trade will need to be handled at another port, which could have a significant adverse economic impact for the development of regional trade, and may affect the viability of future minerals projects.

Some potential minerals projects currently being planned are likely to be dependent on adequate port capacity. The key projects that underpin forecast growth are an expansion of Yabulu (nickel ore imports), and Ernest Henry, Yabulu and Mount Moss (magnetite exports). Other projects that also contribute significantly to forecast growth are Legend International Paradise (fertiliser exports, and sulphur and ammonia imports) and Ivanhoe Merlin (copper exports). There are also several other smaller copper export projects.

If these projects are unable to secure sufficient port capacity at an economic distance from the mine, they may be delayed, relocated to other regions, or other ore bodies in other locations around the world may be developed instead.

Due to the long lead times involved in developing port infrastructure, and the long life of the infrastructure once developed, it is essential to plan for additional port capacity well in advance to ensure it can be delivered in a timely manner.

The economic assessment to be prepared for the EIS will explore the “do nothing” case and alternate development options in more detail.

## 3.0 Project Description

### 3.1 Project Infrastructure Outline

The proposed project development is shown on Figure 3.1 and involves

- the construction of a new deep water outer harbour formed by the construction of a new breakwater approximately 1km seaward of the existing northern breakwater, and deepening of the harbour area;
- potentially constructing a new western breakwater to protect the outer harbour, depending on the results of further hydrodynamic modelling to be undertaken as part of the EIS;
- the construction of up to six additional vessel berths in the new harbour (Berth 14 through Berth 19);
- the deepening of the existing approach channels (the Sea and Platypus Channels);
- widening of the approach channel near the outer harbour entrance;
- the creation of approximately 100ha of reclaimed land backing the new berths to provide for bulk cargo storage and a rail loop, all formed from material reclaimed from the harbour deepening. This will include internal bunds to facilitate effective land reclamation;
- placement of unsuitable and excess dredged material at sea in the approved dredge material placement area in Cleveland Bay;
- installation of new navigational aids;
- construction of new road and rail infrastructure within the project footprint and connection to the EAC currently under construction; and
- installation of new services infrastructure.

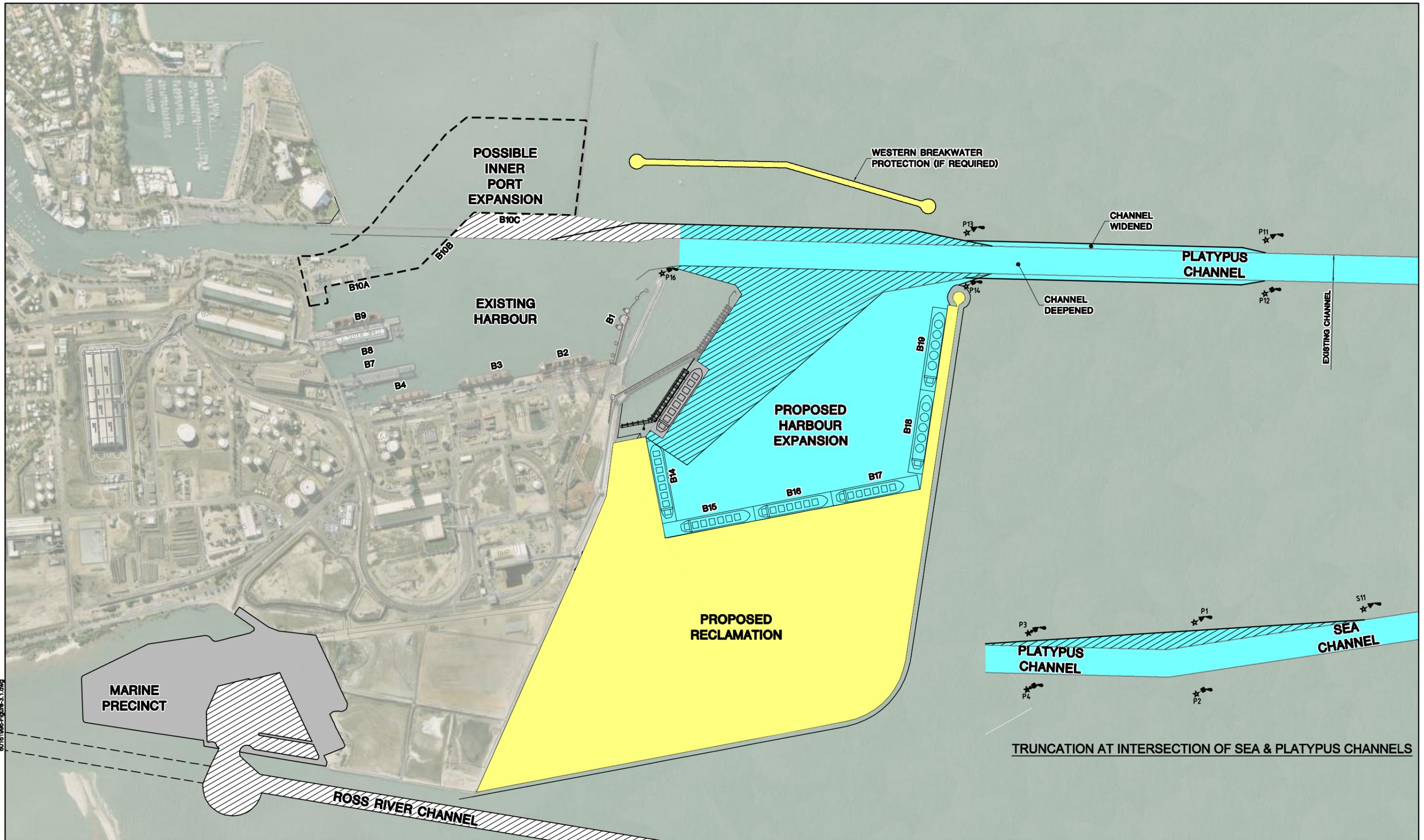
Note that the project is for the complete marine and land platform infrastructure, but does not include above ground development which will be the subject of appropriate development applications by the operators at the time of each development. Whilst the protective breakwater defining the entire footprint for the new harbour will be built at the beginning of the project to provide the appropriate protection for the progressive development of new berths, the berths and reclamation areas behind the breakwater will be developed in a staged manner in response to demand from increase in throughput or the advent of new trades. This expansion may be developed on a sequential berth-by-berth basis or in stages involving the development of multiple berths.

### 3.2 Vessel Fleet

The key element governing the layout and design of the expanded port infrastructure is the size of the largest ships likely to use the port both on a regular basis and on an exceptional basis. The economic ship size used is in turn dependent on the volumes of cargo to be shipped (and other factors such as the size of the receival port). The aim of the port layout and design is then to provide adequately sized the port infrastructure to support the economic ship size.

Based on the assessment of forecast trade and consignment size, it is anticipated that the number of cargo ships that call at the Port of Townsville will increase from 730 vessels per annum in 2009/10 up to approximately 1,200 vessels per annum toward the end of the planning horizon for the proposed expansion. It is anticipated that vessel operations will continue to occur on a 24 hour, 7 day per week basis.

From the trade forecast it is anticipated that dry bulk and bulk liquid trades will make up the majority of the projected cargo throughput increase in the port. The cargoes proposed to be handled through the port expansion include trades from known new minerals projects in the region currently under development or about to get underway, the growth of existing trades, and the advent of new trades.



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28 Mar 11 - 15:28



**LEGEND**

- |  |  |
|--|--|
|  Port Expansion Project Works     |  Other Port Development Project<br>(Separate To The Port Expansion Project) |
|  Port Expansion Project Deepening |  Other Port Dredging<br>(Separate To The Port Expansion Project)            |

**TOWNSVILLE PORT EXPANSION PROJECT**  
Port Expansion Project Layout

PROJECT ID 60161996  
 CREATED BY AM  
 LAST MODIFIED 03/03/11 LD  
 VERSION: CAD 2010

FIGURE  
**3.1**

An analysis of the trade forecast shows that most trades proposed to be handled through the port expansion are high value/ low to moderate volume mineral concentrates which are produced and shipped in quantities and parcel sizes appropriately suited to Handymax (around 50,000 DWT) and possibly Panamax shipping (70,000 to 85,000 DWT). However, the predicted cargo volume is dominated by magnetite, which is forecast to peak at an annual throughput of some 11.5Mtpa under the high growth scenario, and which will be approximately 50% of the total trade through the port. Panamax ships (maximum width 32.2m to pass through the Panama Canal) are the most economic ship size for this volume of trade, and as there is no economic driver for larger ships in the foreseeable future, it is proposed that the PEP be designed to accommodate the regular operation of these ships. This means that the existing channel needs only to be deepened, with no economic driver to widen until a particular trade (unknown at present) is proposed which has a strong economic argument to use wider ships.

### 3.3 Base Case for the EIS

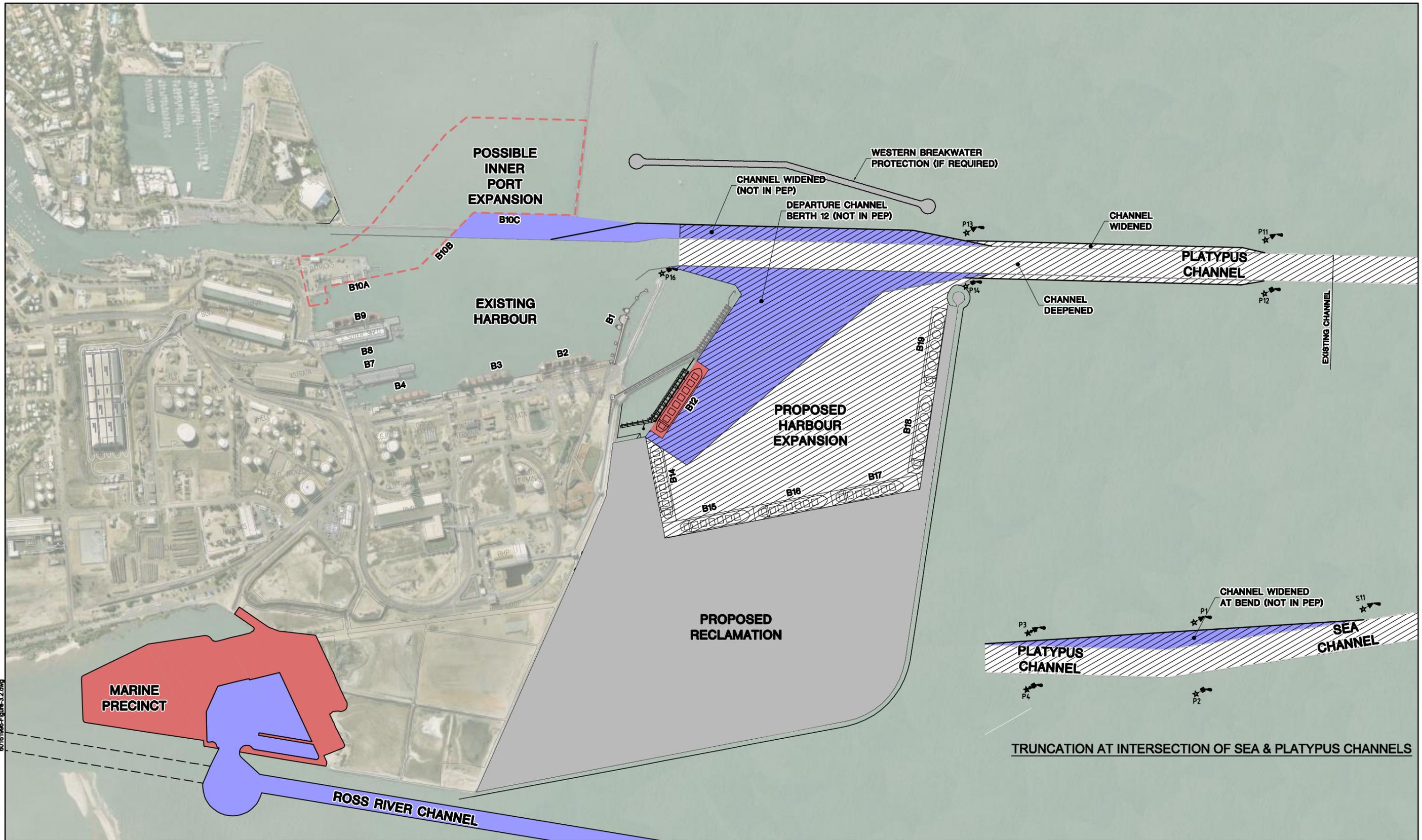
A number of other developments are planned or underway in the Port of Townsville in addition to the PEP. These are shown on Figure 3.2. The relationship of these projects to the base case for the PEP EIS is proposed as follows.

- The Townsville Marine Precinct Stage 1, a small boats facility on the Eastern Reclamation area, is currently under construction and will be completed prior to the PEP commencing. As such, the Townsville Marine Precinct will form part of the base case for the PEP EIS.
- POTL is proposing the construction of Berth 12, a new bulk handling berth outside the existing harbour adjacent to Berth 11. This project is not being assessed as part of the PEP but will be considered as being constructed and completed prior to the PEP commencing and will form part of the base case.
- POTL is proposing minor channel improvement works to increase the bend radius at the junction of the Sea and Platypus channels and minor channel widening between beacons P14 and P16. These channel works are not being assessed as part of the PEP but will be considered as being completed for the purpose of the base case.
- Various berth modifications and rationalisation inside the existing inner harbour, either underway or proposed by POTL such as the reconstruction of Berths 4, 8 and 10a, are not being assessed as part of the PEP but will be considered as being completed for the purpose of the base case.
- The proposed reconstruction of Berths 10 b and c and the diversion of Ross Creek is currently at an early planning stage and approval has not been sought for this work. If approved, this work may be underway during the construction of the PEP, but will be assessed and completed as separate projects and will not be considered as part of the base case.

### 3.4 Preliminary Engineering and Environment Study

Following selection of the preferred development scenario from those put forward in the Master Plan, POTL commissioned a Preliminary Engineering and Environment Study (PEES) (AECOM, 2009) to provide a sound understanding of the technical aspects, the potential environmental impacts that may need to be addressed, the capital expenditure likely to be incurred, and a staged development program to take the project forward. Collectively, these studies provided a framework for detailed engineering and environmental investigations to be undertaken during subsequent stages of the PEP.

Fundamental to the PEES was the integration of engineering and environmental studies, so that the EIS could be based on a proven, feasible development plan, and in turn the development plan tailored to minimise environmental impact. The engineering studies undertaken as part of the PEES aimed to determine the proposed layout of the harbour and channel development using a robust approach that could build upon the broad assessments presented in the Master Plan. These studies enabled a sound description of the project to be prepared. The environmental studies undertaken as part of the PEES aimed to inform the preliminary engineering aspects of the project and provide an understanding of the potential impacts for key environmental concerns to be addressed in the EIS.



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**AECOM**

**LEGEND**

- Port Expansion Project Works
- Other Port Development Project (Separate To The Port Expansion Project)
- Port Expansion Project Deepening
- Other Port Dredging (Separate To The Port Expansion Project)



**TOWNSVILLE PORT EXPANSION PROJECTS**  
Other Port Development Projects

PROJECT ID: 60161996  
 CREATED BY: AM  
 LAST MODIFIED: 03/03/11 LD  
 VERSION: CAD 2010

FIGURE  
**3.2**

## 3.5 Project Infrastructure Details

A description of each of the components of the PEP outlined in Section 3.1 is provided in the following.

### 3.5.1 Harbour and Channel Development

The PEP includes the dredging of a new harbour basin, seaward of the existing eastern breakwater, deepening of the Platypus and Sea channels, and widening of the existing channel at the entrance to the new harbour.

The area of the proposed new harbour basin is currently at a level of approximately 4m (below Chart Datum), and will need to be deepened to accommodate large Panamax sized vessels, as will the Platypus and Sea Channels to improve accessibility for these vessels.

The development of the harbour basin and channel will involve dredging works that are proposed to be undertaken in two stages for two vessel design drafts (nominally 13.0m and 14.6m) to reflect the ramp up of trade tonnages and the subsequent need to accommodating deeper draft vessels. The planned channel and outer harbour basin design depths for the PEP have been based on accessibility criteria for the design vessels as follows:

- Accessibility criterion for Stage 1 design depth – a minimum 3 hour sailing window is available for a Panamax vessel with a draft of 13.0m on 95% of high tides. (At this depth a 14.0m draft Panamax vessel would be able to sail on 22% of high tides.)
- Accessibility criterion for Stage 2 design depth – a minimum 3 hour sailing window available for a Panamax vessel with a draft of 14.6m on 50% of high tides. (At this depth a 14.0m draft Panamax vessel would be able to sail on 90% of high tides.)

The harbour basin will be protected from waves and currents by a breakwater on the north-east side. The EIS will also assess the impact of a breakwater on the western side of the outer harbour (although the need for this will be assessed as part of a further detailed wave study). The basin will be sized to accommodate six berths (Berth 14 through Berth 19) in addition to the existing offshore Berth 11 as well as the proposed Berth 12, which is expected to be developed prior to the port expansion and is not part of this EIS.

Unsuitable material (soft and compressible surface material) dredged from the proposed harbour and under the reclamation areas is proposed to be placed in the POTL's existing offshore dredged material placement area (DMPA), which is located east of Magnetic Island. A mechanical dredge (backhoe or grab type) is likely to be used for dredging this material and it is estimated that 1.5Mm<sup>3</sup> will be dredged.

Material dredged during development of the proposed outer harbour basin that is suitable for reclamation will be beneficially reused as reclamation fill for the port expansion. It is likely that a cutter-suction dredge will be used for the majority of dredging of the proposed harbour basin and reused as reclamation fill. The cutter suction dredge is considered the most effective and economical method of placing material in reclamation at this location. It is estimated that up to approximately 5Mm<sup>3</sup> of material will be dredged and placed in reclamation. (Further description of the proposed land reclamation is provided in Section 3.5.2 below.)

Dredged material from the channel deepening will be placed in POTL's existing DMPA using a medium-sized trailer-suction hopper dredge, which is considered the most suitable type of dredge to operate over the long distances involved. It is estimated that up to approximately 3.5Mm<sup>3</sup> of material will be dredged from the channel deepening and placed in the offshore DMPA. The EIS will investigate and report on the capacity of the existing DMPA to accept this volume of material both in the context of the proposed PEP as well as cumulatively for other projects and existing port maintenance dredging activities.

Table 1 summarises the volumes to be dredged and where this material is to be placed.

Table 1 Dredging and Reclamation Estimated Quantities for the PEP

Activity	To Reclamation (Mm <sup>3</sup> )	To DMPA (Mm <sup>3</sup> )	Total (Mm <sup>3</sup> )
Harbour basin dredging			
soft sediments	-	1.5	1.5
firm material	5.0		5.0
<b>Subtotal</b>	<b>5.0</b>	<b>1.5</b>	<b>6.5</b>
Channel deepening	-	3.5	3.5
<b>Total Dredging</b>	<b>5.0</b>	<b>5.0</b>	<b>10.0</b>
Imported rock for bunds, breakwaters and revetments	2.2	-	2.2
Imported capping layer	0.7		0.7
<b>Total</b>	<b>7.9</b>	<b>5.0</b>	<b>12.9</b>

### 3.5.2 Land Reclamation

The project involves significant reclamation to provide land-based operational areas adjacent to the new berths. The extent of reclamation is to provide sufficient area for ship loading and unloading, cargo handling, temporary cargo storage, integration with land-based transport, a rail loading/unloading loop for dry bulk materials, terminal support facilities, and liquid bulk storage.

The extent of the reclamation will consider the practical engineering, environmental, social and economic constraints and opportunities associated with dredging and the beneficial reuse of material from the proposed harbour basin development.

Although the land area required for the port expansion will be reclaimed using dredged material from the outer harbour basin, selected fill material will also be required from land sources to build bund structures to retain the dredged fill. Internal bunds will be constructed to contain the reclaimed fill and provide settlement areas for reclamation tailwater. The proposed location of the internal bunds will be determined by the areas required to provide suitable land-based operational areas behind Berths 14 through 17, to provide a suitable foundation for heavily loaded areas (such as road and rail infrastructure) and to provide sufficient capacity and flexibility for treatment of reclamation tailwater during the harbour dredging and reclamation activities. In any given stage of the development, it is proposed that future reclamation cells will be developed in advance of the cell being reclaimed to provide sufficient capacity for settlement of tailwater.

In addition to the reclamation fill material sourced from dredging works, good quality fill material will be required for construction of capping and pavement layers on the surface of the reclamation. It is proposed that this material will be imported from land-based sources. It is estimated that approximately 0.7Mm<sup>3</sup> of imported fill material will be required.

The reclamation area necessarily includes an additional volume for settlement of tailwater during reclamation (tailwater pond). The sizing of the reclamation area also provides for contingent tailwater settlement, dredged material bulking and increased tolerances during dredging.

### 3.5.3 Breakwater and Revetment Structures

The proposed breakwater structure will be constructed north of Berth 18 and Berth 19 to protect the harbour basin from extreme waves approaching from the east and north-east sector and to provide suitable calmness within the proposed harbour.

It is anticipated that the construction of the north-east and western breakwaters will consist of a traditional rock core, with either rock or precast concrete armour. The north-east breakwater structure will be constructed in the first stage of the PEP.

Revetments will be constructed to protect the northern and eastern extent of the reclamation area from waves approaching from the east and north-east sector. The revetments will be constructed in stages as the reclamation is developed and will be constructed to a similar profile as proposed for the breakwaters. It is anticipated that the breakwater and revetment structures will be progressively developed out from existing land areas within the Port of Townsville. Construction materials will be sourced from quarries off-site and transported to the site via road and rail, primarily via the new EAC (Port Access Road).

The approximate volume of rock to be imported for bunds, breakwaters and revetments is 2.2Mm<sup>3</sup> as shown in Table 1.

#### **3.5.4 Wharf Structures**

It is expected that the wharf structures developed as part of the PEP will consist of an open pile structure with a suspended concrete deck in front of and over a revetment protected by rock armour.

It is anticipated that the revetment component of the wharf structures will be developed during the initial stage of the PEP serving as a bund structure. The suspended deck and pile structure will most likely be developed in a staged manner as additional wharves are required to support increase in trade.

Construction materials will be sourced off-site and transported to the site via road and rail.

#### **3.5.5 Navigational Aids**

The PEP will require a number of existing navigational aids to be relocated and new navigational aids erected.

It is anticipated that changes to the existing navigational aids would include the following:

- installation of new beacons to delineate the increased length of Sea Channel (associated with the proposed channel deepening) which may include new beacons along the section of channel in the Great Barrier Reef Marine Park;
- relocation of existing aids to navigation in the outer harbour (for Berth 11 and Berth 12) and new aids to navigation associated with each development stage of the port expansion; and
- demarcation of the existing eastern breakwater, the proposed north-eastern breakwater and (if required) the proposed western breakwater.

It is anticipated that temporary navigational aids will also be installed during construction of the proposed harbour basin.

#### **3.5.6 Land Transport Infrastructure**

The port expansion involves construction of road and rail infrastructure within the port boundary to provide for integration of land-based transport with cargo throughput at the port.

The EAC will provide the primary rail access to the port expansion and road access from the south. Boundary Road will continue to provide the primary road access to the port expansion from the north.

A network of access roads is proposed within the reclamation area. The access road network will be predominantly constructed on internal bunds to support vehicle loading.

Rail infrastructure proposed as part of the port expansion includes a balloon loop and loading / unloading facilities located within the reclamation area. The rail loop will be constructed on internal bunds within the reclamation area to provide a suitable foundation for heavy loading. The location of the balloon loop will be determined following consideration of the connection to the EAC and specific operational requirements including acceptable longitudinal grades and the clear track length and straight track length either side of loading/unloading facilities. Necessarily, construction of the rail infrastructure may involve works outside of the port expansion, but within the Port of Townsville, to provide connection to the EAC.

The construction of rail loops and loading / unloading facilities will be staged in response to increased cargo throughput over the planning horizon of the expansion. It is anticipated that a three track loop would provide sufficient capacity for the forecast trade, however there is provision for the construction of additional rail infrastructure to accommodate increased trade.

The EAC road and rail access to the PEP site outside the port boundary is subject to a separate approvals process managed by the Department of Transport and Main Roads and will not form part of this EIS.

### 3.5.7 Services Infrastructure

The PEP will involve construction of infrastructure and services to support port operations, comprising:

- port administration and operations facilities;
- fire fighting, water and wastewater services;
- electrical and telecommunications services;
- port security;
- area lighting; and
- stormwater drainage infrastructure.

New port operations buildings will be constructed within the port expansion. It is expected that these facilities will include administration facilities for POTL and individual port users. A harbour control tower may also be constructed.

Water supply and wastewater reticulation systems will be constructed. Current planning for the development at the Port of Townsville includes provision of trunk water and wastewater infrastructure along the eastern perimeter of the existing developed area of the port. The trunk water main will connect to the existing Townsville City Council (TCC) water main located alongside Benwell Road. Wastewater from the port expansion will be discharged to the existing TCC wastewater network and will be treated at the existing Cleveland Bay Wastewater Purification Plant.

There is a substantial demand for electrical power to support the cargo handling and berth operations of the PEP. It is anticipated that construction of a new zone substation within the port expansion will be required. The existing Townsville Port substation may also require upgrading during the planning horizon of the port expansion to provide for growth in power demand over that period. A distribution network will be constructed within the port expansion for supply to individual port operations.

Trunk stormwater drainage infrastructure will be constructed as part of the port expansion to establish primary points of discharge to the marine environment. It is proposed that the stormwater drainage network would discharge predominantly to the harbour basin with appropriate environmental controls.

## 3.6 Ongoing Port Operation

The port expansion will involve changes to the current operation and maintenance activities of the Port of Townsville. The following sections provide a description of the major operational and maintenance activities associated with the PEP.

### Shipping Operations and Cargo Handling

The PEP will enable an increase in the number of ships calling at the Port of Townsville and increased cargo handling productivity. It is estimated that up to 1,200 cargo ships per annum will call at the port toward the end of the planning horizon for the current expansion, compared with 730 calls in 2009/10.

It is anticipated that the development of the port expansion and the potential relocation of existing bulk operations will consolidate dry bulk and bulk liquid operations within the port expansion. The expansion will provide improved productivity for bulk materials handling and will substantially increase the efficiency and thus the total throughput capacity at the port. It is anticipated that this concentration of bulk cargo within the port expansion will result in general cargo and containers being handling in the existing harbour area of Berth 2 through Berth 10.

The Port of Townsville will continue to operate on a 24 hour per day, 7 days per week basis.

### Land Transport Operations

The PEP will involve an increase in land transport operations. As discussed in Section 3.5.6, the proposed EAC will provide the primary rail access to the port expansion and the primary road access from the south. Boundary Street will continue to provide the primary road access to the port expansion from the north.

Increased cargo throughput at the Port of Townsville over the forecast time horizon will involve a proportional increase in road and rail transport operations. However, the trade forecast shows that most (around 90%) of the trade handled in the port expansion will be dry bulk cargo which will be transported by rail, and that very little cargo handled through the port expansion will be transported by road. Nevertheless, a traffic impact assessment will be undertaken as part of the EIS.

### **Maintenance Dredging**

If the PEP is approved and constructed, the ongoing program of maintenance dredging currently undertaken at the Port of Townsville will be extended to include maintenance of the new outer harbour basin and channel development proposed as part of the PEP. Amendments to POTL's licence and management plans will be required to reflect these changes, separate and subsequent to the EIS for the PEP.

## **3.7 Project Cost**

The capital cost of the project will be determined during subsequent stages of the project but preliminary estimates have put the expected capital cost for the complete expansion in the range of approximately \$1.3 billion (at 2009). Of this, approximately \$660 million will be required for the first stage (as described below).

## **3.8 Project Timing**

The port expansion works will be undertaken according to the need for port facilities which will be driven primarily by the demand for infrastructure works to accommodate the growth in existing and/or new trades. Development decisions will be made when favourable business cases can be demonstrated and subject to the availability of capital funding.

The staging of the works for marine infrastructure, reclamation and channel development will be determined by a number of factors, in particular those identified below.

- The development of the perimeter breakwater.
- The development of marine infrastructure in the new harbour, which may be undertaken on a berth-by-berth basis or groupings of two or more berths at a time.
- The development of the reclamation area, which will be undertaken to meet the requirements for:
  - land areas for cargo storage and transfer (allowing sufficient time for settlement and consolidation of material);
  - rail loop and road access development;
  - bunded area requirements for the placement of dredged material from the new harbour basin works;
  - bunded area requirements for settlement ponds to manage the turbidity of supernatant water released from reclamation operations by dredging; and
  - development of facilities and services needed to support port operations.
- The development of the channel, which will be undertaken in one or two stages to meet shipping requirements. The driving parameters will be the draft of the prevailing vessel fleet and the level of service for the vessels in terms of access criteria and the level of tide assisted transits required.

The indicative timing of the main components of the PEP development is outlined in Sections 3.8.1 to 3.8.3. These are based on the long term trade forecast for the port as at December 2010. The sequence and timing will be regularly reviewed and adjusted to reflect the actual demand for cargo handling capacity and shipping requirements.

### **3.8.1 Stage 1 (Years 2014/15 and 2015/16)**

Stage 1 development of the PEP is planned for construction during years 2014/15 and 2015/16 involving:

- Bunded outer harbour reclamation area (entire outer harbour reclamation footprint) with revetment and breakwater protection.
- Development of new Berths 14 and 15.

- Dredging works as follows:
  - Dredging of soft marine sediments within the footprints of the reclamation area, bund and breakwater structures, Berths 14 and 15 manoeuvring basin and widening of Platypus Channel (between beacons P11/P13 and P12/P14) with relocation of dredged material to the existing offshore DMPA.
  - Dredging of Berths 14 and 15 manoeuvring basin and widening of Platypus Channel (between beacons P11/P13 and P12/P14) with placement of dredged material in bunded areas as reclamation fill.
  - Stage 1 deepening of the Sea and Platypus Channels and widening of Platypus Channel (between beacons P11/P13 and P12/P14) with relocation of dredged material to the existing offshore DMPA.
- Development of rail loop and wagon unloading/loading infrastructure.
- Landside infrastructure for cargo storage and transfer.
- Road and other infrastructure to support port operations.

### **3.8.2 Stage 2 (Years 2018 and 2019)**

Stage 2 development of the PEP is planned for construction during years 2018 and 2019 involving:

- Development of new Berth 16.
- Dredging works as follows:
  - Dredging of soft marine sediments within the footprint of Berth 16 manoeuvring basin with relocation of dredged material to the existing offshore DMPA.
  - Dredging of Berth 16 manoeuvring basin with placement in bunded areas as reclamation fill.
- Development of additional rail and wagon unloading/loading infrastructure.
- Landside infrastructure for cargo storage and transfer.
- Road and other infrastructure to support port operations.

### **3.8.3 Stages 3, 4 and 5**

Development of stages 3, 4 and 5 of the PEP is planned for construction during years 2026, 2030 and 2035 involving:

- Sequential development of new Berths 17, 18 and 19.
- Dredging works for berths as follows:
  - Dredging of soft marine sediments within the footprint of new manoeuvring basin areas with relocation of dredged material to the existing offshore DMPA.
  - Dredging of the remaining manoeuvring basin area with placement in bunded areas as reclamation fill.
  - Stage 2 deepening of the Sea and Platypus channels with relocation of dredged material to the existing offshore DMPA.
- Development of additional rail and wagon unloading/loading infrastructure.
- Landside infrastructure for cargo storage and transfer.
- Road and other infrastructure to support port operations.

Legislative approvals and other statutory requirements are discussed in the next section of the IAS, noting that POTL will be seeking to ensure the currency period of relevant approvals required for the project allows for the intended staging of the project as outlined above.

### 3.9 Employment Opportunities

The PEP is proposed to be developed in a staged manner with the majority of construction expected to occur during Stage 1, the details of which are included in Section 3.8.1.

It is expected that at the peak of construction, which will occur in Stage 1, the project would demand approximately 40 to 50 people working directly on site related activities. It is most likely that this would be undertaken by contractors. In addition to the onsite work, further employment would be generated offsite from the project relating to materials supply and construction support including transport operators, quarry workers, precast concrete factory workers, steel fabricators and the like.

The subsequent dredging, capping and ground treatment of the reclamation would be undertaken progressively to meet demand for land required for future development purposes. Similarly, the development of other berths would also be undertaken progressively and the timing for the subsequent development for Stages 2 to 5, as detailed in Sections 3.8.2 and 3.8.3, would be linked to the need for additional port capacity (that is, an increase in trade). Construction employment would follow suit.

The flow on construction employment opportunities arising from this project will include:

- construction of the above wharf and above ground development by lessees, including shiploaders and unloaders, cargo storage sheds, administration facilities, conveyors, material receipt facilities, pipelines and tank farms, which could peak at 50 to 100 workers;
- operation of the above ground facilities, from the ship's side to the port precinct gate (management and administration, equipment operators, maintenance and general labour) could number approximately 30 workers per facility; and
- marine operations in the new harbour (pilots, linesmen, tug crews, security staff) and harbour facilities maintenance (routine infrastructure maintenance, repairs to damaged infrastructure) which would involve a small workforce.

The greatest employment opportunities expected from the project are those generated from the creation of industrial developments remote to the port, such as new or expanded mines, new or expanded refineries, and increase in product movement and transport. These developments rely on ready access to port infrastructure for import and export of product, and without port expansion these developments would not have access to the required infrastructure to be viable in this region. As such the PEP offers benefits to the local, State and National economies and thereby to increased employment opportunities.

Further consideration of potential workforce numbers associated with the PEP will be addressed in the EIS.

## 4.0 Legislation, Approvals and Other Requirements

### 4.1 Overview

This section describes the project approval framework for the PEP and relevant legislation to be addressed by POTL as proponent for the project. Due to the location, scale and nature of the PEP, there is a need for various approvals from Commonwealth, State and Local Governments. The following section provides a summary of the key likely approvals required for the PEP. This is also presented in tabular form in Table 3, which presents details about the respective legislation and administering authority for each of the likely works.

### 4.2 Commonwealth Legislation

#### 4.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies to those actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES).

The EPBC Act recognises and protects eight MNES:

- World Heritage properties;
- National heritage places;
- wetlands of international importance (listed under the Ramsar Convention);
- threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- Great Barrier Reef Marine Park; and
- nuclear actions.

POTL will refer the PEP to the Australian Government, Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) for determination as to whether it constitutes a 'controlled action' under the EPBC Act. A 'controlled action' requires formal assessment and approval by the Commonwealth Environment Minister.

POTL will seek approval for the development relative to the MNES that may be impacted by the project, which are deemed to include:

- sections 12 and 15A (World Heritage Properties [1]);
- section 15B and 15C (National Heritage place [1]);
- sections 16 and 17B (Ramsar wetlands of international importance [1]);
- sections 18 and 18A (Listed threatened species [19] and communities [0]);
- sections 20 and 20A (Listed migratory species [55]); and
- sections 24B and 24C (Great Barrier Reef Marine Park).

Further information about each of the MNES listed above is included in Section 6.0 of this IAS.

The EPBC Act recognises that environmental assessment under the Queensland SDPWO Act may be used for the purposes of the environmental assessment under the EPBC Act in accordance with the Bilateral Agreement between the Commonwealth and Queensland Governments.

POTL is seeking significant project declaration under the SDPWO Act for which an EIS will be required to be prepared. If such declaration is granted, this will allow the Commonwealth Environment Minister to rely on specified environmental impact assessment processes of the State of Queensland in assessing actions under the EPBC Act.

#### 4.2.2 Environmental Protection (Sea Dumping) Act 1981

The *Environmental Protection (Sea Dumping) Act 1981* (Sea Dumping Act) regulates the dumping and incineration of materials at sea and the loading of materials for the purposes of dumping and incineration, in accordance with international obligations under the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter 1972 (London Convention)*. The Act applies in respect of all Australian waters and in respect of all Australian vessels and aircraft anywhere at sea. The Act is administered by SEWPaC.

A permit is required under the Act for dumping of dredged material at sea (issued by the Commonwealth Environment Minister). The *National Assessment Guidelines for Dredging (2009)* provides a national framework to assess the environmental impacts from the disposal at sea of dredged material.

A permit under the Sea Dumping Act will be required to place dredged material associated with the PEP in the approved offshore dredge material placement area in Cleveland Bay. This permit will be sought following the completion of the EIA process but prior to the works being carried out, noting that only material that is deemed to be clean under the *National Assessment Guidelines for Dredging* is permitted to be disposed at sea.

#### 4.2.3 Great Barrier Reef Marine Park Act 1975

The *Great Barrier Reef Marine Park Act 1975* (GBRMP Act) establishes the Great Barrier Reef Marine Park Authority (GBRMPA) and its functions. The primary functions of the GBRMPA include:

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

For the PEP, approval pursuant to the Act will apply only to the proposed deepening of the existing Sea Channel and associated navigation beacons where these are within the boundaries of the Great Barrier Reef Marine Park. A permit to dredge in these specific areas will be sought (refer to Table 3).

### 4.3 State Legislation

#### 4.3.1 State Development and Public Works Organisation Act 1971

If the project is declared to be a 'significant project' an Environmental Impact Statement (EIS) is likely to be required under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Part 4 of the Act sets out the requirements for the environmental assessment and public review of an EIS associated with a significant project.

In considering whether the project should be declared a significant project, the Coordinator General (CG) must have regard to the matters set out in s.27. The following table presents the sections of this IAS that address each of the requirements under the Act which are to be considered.

**Table 2** Items to be Considered for Projects Declared a Significant Project

SWPWO Act Section	Criteria	Where the criteria are addressed in the IAS
Section 27(a)	Detailed information about the project given by the proponent in an initial advice statement	Chapter 3.0
Section 27(b)	Relevant planning schemes or policy frameworks, including those of a relevant local government or of the State or the Commonwealth	Chapter 4.0
Section 27(c)	The project's potential effect on relevant infrastructure	Chapter 5.0
Section 27(d)	The employment opportunities that will be provided by the project	Chapter 3.9
Section 27(e)	The potential environmental effects of the project	Chapter 5.0

SWPWO Act Section	Criteria	Where the criteria are addressed in the IAS
Section 27(f)	The complexity of local, State and Commonwealth requirements for the project	Chapter 4.0
Section 27(g)	The level of investment necessary for the proponent to carry out the project	Chapter 3.0
Section 27(h)	The strategic significance of the project to the locality, region or the State	Chapter 2.0

As outlined in Table 2, POTL considers that the project may be declared a significant project by the CG, on the basis of the complexity of local, State and Commonwealth approvals, the strategic significance of the project, its potential environmental effects, and the level of investment necessary for the proponent to carry out the project.

Accordingly, TOR will be drafted and finalised for the preparation of the EIS and the project will be evaluated by the CG.

The CG is responsible for administering the EIS process including an evaluation of the EIS and the preparation of a report. The CG is empowered to make recommendations, as well as prescribe conditions of approval that must be imposed under statutory approval processes as part of this report. For the PEP, it is expected that these conditions would relate to:

- Certain development approvals required under the *Sustainable Planning Act 2009*; and/or
- The granting of, or conditions to be imposed on, any other approvals under other State Acts that require preparation of an EIS, or similar statement to address environmental effects.

Once the CG has completed the EIA process under the SDPWO Act, project approvals will be sought under other relevant State Government legislation, as summarised below.

#### 4.3.2 Aboriginal Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* (ACH Act), administered by the Department of Environment and Resource Management (DERM), establishes a duty of care that requires a person who carries out an activity to take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage.

POTL has prepared and registered a Cultural Heritage Management Plan (CHMP) for the PEP, in accordance with the requirements of the ACH Act.

#### 4.3.3 Coastal Protection and Management Act 1995

The *Coastal Protection and Management Act 1995* (CPM Act), administered by DERM, provides the framework for integrated management of the coastal zone. Under the provisions of the Coastal Act, coastal management plans must be prepared to identify how the coastal zone within the State and coastal regions will be managed.

The *State Coastal Management Plan (2001)* identifies the expansion of the Port of Townsville as a key coastal management issue within the dry tropical coast region. A *Regional Coastal Management Plan for the Dry Tropical Coast* region, within which the PEP is located, is under development by DERM. The *State Coastal Management Plan (2001)* is currently under review, noting that the proposed State Planning Policy for Coastal Management will also apply to the proposal.

Approvals pursuant to the CPM Act (granted by the Queensland Minister for Environment and Resource Management) will be triggered for the PEP under the *Sustainable Planning Act 2009*. DERM will be a referral agency for tidal works and other assessable works within the coastal management district and will assess the coastal impacts and stipulate relevant approval conditions.

Under Chapter 2, Part 5 of the CPM Act an allocation of quarry material, or a dredge management plan, will also be required for the removal of dredged material from State land under tidal water and subsequent placement of that material in the reclamation.

#### 4.3.4 Environmental Protection Act 1994

The object of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment while allowing development that is consistent with the principles of ecological sustainability. The Act acknowledges a general environmental duty of care and does not permit activities that may cause environmental harm unless all reasonable and practical measures have been employed to prevent or minimise such harm.

The following regulations and policies exist under the EP Act and are relevant to the proposed PEP:

- *Environmental Protection Regulation 2008*;
- *Environmental Protection (Air) Policy 2008*;
- *Environmental Protection (Noise) Policy 2008*;
- *Environmental Protection (Water) Policy 2009*;
- *Environmental Protection (Waste Management) Policy 2000*; and
- *Environmental Protection (Waste Management) Regulation 2000*.

In particular, the EP Act provides for regulation and approval of prescribed Environmentally Relevant Activities (ERAs) that have the potential to cause environmental harm. A development approval for ERA 16 Extractive and Screening Activities (Dredging) will be required for the capital dredging and placement activities associated with the PEP, with DERM as the relevant referral agency.

#### 4.3.5 Fisheries Act 1994

The *Fisheries Act 1994* (Fisheries Act) protects commercial and recreational fisheries resources and their habitats through sustainable use and conservation. The nearest declared fish habitat protection area is "Cleveland Bay" which is located eastwards of the proposed development area near Ross River, extending to the tip of Cape Cleveland.

Approval under the provisions of the Fisheries Act may be triggered under the *Sustainable Planning Act 2009* (SP Act) for aspects of the PEP that involve:

- Disturbance of protected marine plants; and
- Constructing temporary or permanent waterway barriers.

The Department of Employment, Economic Development and Innovation (DEEDI) will be a referral agency for the statutory matters listed above as well as maintaining a general interest in the protection of fish habitats through the stipulation of relevant approval conditions for mitigation and/or offsets for disturbance of tidal lands or waters.

#### 4.3.6 Sustainable Planning Act 2009

The SP Act is Queensland's principal planning legislation. It provides a framework for integrated and coordinated assessment of new development through the Integrated Development Assessment System.

The PEP is not an assessable development under the TCC Planning Scheme on the basis that the proposed works are wholly outside the local government area (for example, in tidal waters) or otherwise on strategic port land which is not subject to local government planning scheme controls pursuant to the TI Act.

Notwithstanding exemption from the TCC Planning Scheme, the PEP will require approval under the SP Act for all relevant assessable development listed under *Sustainable Planning Regulation 2009*. As previously discussed, these will include primarily:

- a) Works in tidal areas and in coastal management districts;
- b) Environmentally Relevant Activities; and
- c) Disturbance of marine plants.

The *Port of Townsville Land Use Plan (LUP) (2010)* specifies the strategic port land as well as the current and planned future uses of strategic land. The plan designates the area of Unallocated State Land required for the PEP area as "Future Strategic Port Land" (refer to Figure 2 of the LUP (2010)). Applications for tenure will be submitted to DERM as required, and following the issue of tenure, it is proposed that the land/s will be designated as Strategic Port Land.

The assessment manager for future SP Act applications associated with the project will either be POTL (in the case of works on or adjoining Strategic Port Land) or a relevant State agency (such as DERM) depending on the sequence of applications lodged following the EIS process. Resource entitlement for these applications will be determined following discussions with DERM in the context of the most appropriate tenure prior to designation as Strategic Port Land.

#### **4.3.7 Land Act 1994**

The *Land Act 1994* (Land Act) provides for the allocation of tenure over State land. The land below the high water mark, where dredging is to occur and the PEP is to be constructed, is currently Unallocated State Land (USL).

As discussed above, an application for tenure under the Act in relation to USL will be made to DERM as an outcome of the EIS process.

#### **4.3.8 Nature Conservation Act 1992**

The *Nature Conservation Act 1992* (NC Act) declares and manages protected areas and provides for the protection of certain flora and fauna regardless of their location within Queensland.

Threatened species under the NC Act and regulations are listed as endangered, vulnerable or near threatened. Under the NC Act, each category of threatened species has proposed management intent (s.14, s.19 and s.24 of the *Nature Conservation (Wildlife) Regulation 2006*).

The potential impact of the PEP on any species found within the study area that are listed in the NC Act is discussed in Sections 5.5 (Terrestrial Ecology) and 5.6 (Aquatic Ecology).

#### **4.3.9 Queensland Heritage Act 1992**

The *Queensland Heritage Act 1992* protects non-indigenous cultural heritage by listing heritage places on the Queensland Heritage Register and requiring separate approvals for development on places listed on the Queensland Heritage Register. DERM will act as the referral agency in relation to information about the Queensland Heritage Register and any associated approvals.

The potential impact of the PEP on non-indigenous cultural heritage is discussed in Section 5.10.

#### **4.3.10 Transport Infrastructure Act 1994**

The TI Act provides a framework for integrated planning and management of an efficient system of transport infrastructure.

POTL is a "port authority" under the provisions of the TI Act. Under the Act, the functions of POTL include the following:

- a) Establishment, management, and operation of effective and efficient port facilities and services in its port.
- b) Making land available for (i) the establishment, management and operation of effective and efficient port facilities and services in its port by other persons; or (ii) other purposes consistent with the operation of its port.
- c) Provision or arrangement for the provision of ancillary services or works necessary or convenient for the effective and efficient operation of its port.
- d) Maintenance of appropriate levels of safety and security in the provision and operation of the facilities and services.
- e) Provision of other services incidental to the performance of its other functions or likely to enhance the usage of the port.
- f) Performance of any other functions conferred on it under the TI Act or under the regulations or another Act.

POTL has prepared a LUP pursuant to s.286 of the Act. The LUP specifies strategic port land as well as the current and planned future uses of strategic port land. The TI Act stipulates that strategic port land is not subject to a planning scheme.

While the proposed PEP is consistent with its responsibilities under the TI Act, and in particular, the requirement for provision of effective and efficient port facilities and safe operations within the port, POTL anticipates that revision of the current LUP will need to be undertaken to accommodate the proposed PEP following the issue of tenure. This is likely to occur in parallel with the EIA process.

In addition to its LUP, POTL also has an Environmental Management System (EMS) that is certified as compliant with the international standard AS/NZS ISO 14001:2004. Activities associated with the construction and operation of the PEP will be required to comply with the requirements of this EMS.

#### 4.4 Local Planning Scheme

As outlined above, the PEP will not require assessment against the Townsville City Council Planning Scheme on the basis that the proposed works are either wholly outside the local government area (for example, in tidal waters) or on strategic port land which is not subject to planning scheme controls under the TI Act.

#### 4.5 Summary of Likely Approvals

A summary of the likely project approvals to be required for the development of the PEP under Commonwealth, State and local legislation is presented in Table 3.

**Table 3** Summary of likely approvals to be sought by POTL as part of PEP

Works or activity	Legislation	Administering Authority
Commonwealth <sup>1</sup>		
Referral for consideration of matters of national environmental significance	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	SEWPaC (Commonwealth Environment Minister)
Dredging of the existing Sea Channel where it falls within the boundary of the Great Barrier Reef Marine Park	<i>Great Barrier Reef Marine Park Act 1974 and Regulations</i>	Great Barrier Reef Marine Park Authority (GBRMPA)
State <sup>2 3</sup>		
Coordinator-General's Report, with conditions	<i>State Development and Public Works Organisation Act 1971</i>	Minister and, subject to the Minister, by the Coordinator-General
Material change of use of a premises for an environmentally relevant activity - ERA 16 – Extractive and screening activities (dredging)  Registration Certificate for the ERA 16 will also need to be obtained by the contractor appointed to undertake the dredging works.	<i>Sustainable Planning Act 2009 / Coastal Protection and Management Act 1995</i>	Department of Environment and Resource Management <sup>4</sup> (DERM)
Operational work involving reclamation that is carried out completely or partly within a coastal management district	<i>Sustainable Planning Act 2009 / Coastal Protection and Management Act 1995</i>	DERM  POTL (as the relevant Port Authority)  Queensland Transport (Maritime Safety Queensland)

Works or activity	Legislation	Administering Authority
Operational work that is tidal work (for breakwaters, capital dredging and other maritime infrastructure)	<i>Sustainable Planning Act 2009 / Coastal Protection and Management Act 1995</i>	DERM  POTL (as the relevant Port Authority)  Queensland Transport (Maritime Safety Queensland)
Operational work involving disposing of dredged material or other solid waste material in tidal water	<i>Sustainable Planning Act 2009 / Coastal Protection and Management Act 1995</i>	DERM  POTL (as the relevant Port Authority)  Queensland Transport (Maritime Safety Queensland)
Dredging of the existing Sea Channel where it falls within the boundary of the State Marine Park	<i>Marine Parks Act 2004</i>	DERM  (note that this permit will be issued with the GBRMPA permit outlined above)
Allocation to remove quarry material from State Coastal Land <sup>5</sup>	<i>Coastal Protection and Management Act 1995</i>	DERM
Evidence of resource entitlement for reclamation and tidal works <sup>6</sup>	<i>Land Act 1994</i>	DERM
Local		
No development and/or works associated with the PEP will require approval under the Townsville City Council Planning Scheme	<i>Sustainable Planning Act 2009</i>	n/a

## Notes:

1. A permit (and associated sediment quality sampling requirements) under the *Environment Protection (Sea Dumping) Act 1981*(Cth) to dispose of dredged material at sea will not be sought as part of the EIS but will need to be applied for following a decision on the EIS and controlled actions.
2. The PEP is consistent with the approved land use plan for the Port of Townsville. As such referral of the application for a material change of use of premises to the Minister for Transport and Main Roads is not required.
3. Operational works involving the disturbance of marine plants (pursuant to the *Fisheries Act 1994*) may also apply to the extent that the works associated with the PEP involve disturbance/removal of seagrass. To date, marine ecology surveys and investigations have indicated that no seagrass communities are present within the footprint of the reclamation or in the areas of proposed capital dredging. POTL holds an existing development permit to place dredged material in the approved offshore spoil ground.
4. The Department of Environment and Resource Management or Port of Townsville Limited will be the likely assessment manager for the Integrated Development Assessment System (IDAS) applications. Which entity is the assessment manager will depend on how individual IDAS applications are phased and lodged by the proponent and the tenure of the land to which the applications' relate at the time of lodgement (for instance if the applications are on or adjoin strategic port land).
5. Proposed amendments to the *Coastal Protection and Management Act 1995* introduced into the Parliament in late 2010 provide that the allocation of quarry material application can be lodged/dealt with at the same time as the IDAS application for tidal works and does not require separate resource entitlement. The allocation will apply to the removal of dredged material that is subsequently placed above high water mark (for example in the reclamation). This requirement can also be met by preparation and approval of a 'dredge management plan' under the *Coastal Protection and Management Act 1995*.

6. Evidence of resource entitlement will be required by DERM prior to the lodgement of IDAS applications under the *Sustainable Planning Act 2009*.

## 5.0 Existing Environment and Potential Impacts

### 5.1 Introduction

This section provides an overview of the nature and extent of the potential environmental and socio-economic impacts that may be associated with the construction and operation of the PEP. The information is based on previous studies undertaken within and surrounding the project area as referenced. A detailed assessment will be undertaken as part of the EIS process and findings presented in the EIS documentation.

### 5.2 Topography, Geology and Soils

#### 5.2.1 Existing Environment

The port is constructed predominantly on reclaimed land and it is proposed that the new port land for expansion operations will be similarly constructed, using dredged material from the proposed new harbour basin and fill from the mainland.

Published geological data indicates that the footprint site of the PEP is underlain by Quaternary-age alluvium and colluvium sediments of late Palaeozoic-age granite.

Previous characterisation of marine sediments (Golder Associates, 2008) within the proposed new harbour and reclamation areas and within Platypus and Sea Channels identified the following broad material types:

- a) A surface layer of recent seabed sediments consisting of a mixture of very soft to soft silty clay to clayey silt with very loose and loose sand to silty sand to clayey sand. Shell fragments and organic materials commonly occur within this layer. The seabed sediments are easily identified by their dark hue and very soft and very loose nature. Preliminary investigations indicate that the surface materials are potential acid sulphate soils and, due to their soft and compressible nature, are unsuitable for use as reclamation fill or as the foundation material for marine structures.
- b) A subsurface layer of older stiff to hard clays and sandy clays and medium dense to very dense clayey sands and sands. These materials are much lighter in colour than the seabed sediments. The subsurface material was not identified as potential acid sulphate soil and is considered suitable, although not ideal, as reclamation fill.

The surface layer has a thickness of approximately 1 to 1.5m in the proposed new harbour and reclamation areas. A lesser thickness of the surface layer, typically in the order of 0.5 to 1m (prior to Cyclone Yasi) occurs in the Platypus and Sea Channels. This lesser thickness within the access channel is likely to be the result of regular maintenance dredging undertaken at the Port of Townsville.

#### 5.2.2 Potential Impacts

The characteristics of marine sediments will be important in relation to a number of aspects of the PEP, including:

- The methods of dredging and reclamation;
- The allowances for bulking of material to be placed to reclamation;
- The management of tailwater from reclamation;
- The suitability and potential impacts of offshore disposal;
- The ground improvement measures required to achieve competent ground conditions within the reclamation; and
- The management of acid sulphate soils and other potential contamination.

Groundwater conditions at the Port of Townsville are dominated by tidal effects, and are unlikely to be influenced by the PEP.

Further investigation of geological conditions, including consideration of marine sediments will be undertaken as part of the EIS. Section 5.4.2 also discusses further potential impacts associated with marine sediments from the PEP.

## 5.3 Coastal Processes

### 5.3.1 Existing Environment

The Port of Townsville is located along the south western boundary of Cleveland Bay, a U-shaped north facing embayment, 25km wide and 15km north to south, bounded to the east by Cape Cleveland and to the west by Cape Pallarenda. Magnetic Island is a dominant feature lying offshore partially within the northwest part of the bay.

Cleveland Bay is well sheltered from the predominant southeast waves by Cape Cleveland and is characterised by a relative low-energy wave environment. The bay has accumulated sediments to become relatively shallow, deepening to only 10 to 11m (below Chart Datum) along its northern entrance. The coastline continues to be shaped by the prevailing waves at a slow rate, determined by the generally low energy waves, punctuated by occasional higher energy cyclone wave occurrences that are able to penetrate across the bay to the shoreline.

The Strand Beach is a significant coastal feature located immediately west of the Port of Townsville. The beach was redeveloped in 1998 to provide four beach units separated by artificial rocky headlands, which control the longshore movement of sand.

The port and surrounding area has been extensively modified and has been artificially created by previous port reclamation. Further reclamation has been recently undertaken as part of the Townsville Marine Precinct Project.

### 5.3.2 Potential Impacts

Preliminary assessment of coastal processes was undertaken as part of the PEES to determine the potential changes in current fields within Cleveland Bay which could result from the PEP reclamation and associated dredging works. This study included hydrodynamic modelling and the assessment indicated that:

- there may be a slight increase in currents across the channel near the entrance of the proposed new harbour;
- there may be a general reduction in currents seaward of the proposed western breakwater and revetment structures on the northern side of the port expansion area; and
- there may be a localised increase in currents around the north eastern corner of the proposed expansion area.

These patterns were reasonably consistent during spring tides under varying wind conditions, since the tidal influence dominates. During neap tides, tidal currents are relatively low and the influence of wind-driven currents is more dominant. However, the absolute magnitude of currents is low.

The preliminary assessment of coastal processes also addressed potential changes to the longshore sand transport along The Strand beach. It indicated that local wind-driven waves may result in predominantly southward transport of sand at the southern parts of The Strand beach and predominantly northward transport at the northern parts of the beach. Sea waves that originate from outside of Cleveland Bay have little effect on the sand transport at the southern parts of The Strand beach, but result in predominant northward sand transport at the northern parts of the beach. The overall effect of incident waves is a relatively minor southward transport at the southern parts of the beach and a more pronounced northward transport at the mid and northern parts of the beach.

An assessment of the stability of The Strand beach in terms of longshore sand transport was completed and it identified the following potential changes to the existing sand transport processes which may affect the beach:

- The existing small southward net sand transport at the southern part of the Strand may be increased slightly. It is anticipated that this would result in some minor realignment compared with the present situation.
- The existing northward transport along the central part of the beach may be reversed, changing from a net northward movement to a net southward movement. It is anticipated that this change would be associated with a reduction in both local wind-wave and incident sea wave transport towards the north.
- A minor reduction in the net northward movement of sand may occur in the northern part of the beach. It is anticipated that the reduction would be predominantly associated with the effects on the local wind-waves.

It is anticipated that these minor changes could result in a different but stable beach alignment within each of the controlling artificial headlands than is currently progressing under the existing coastal processes. The stable shape is likely to be characterised by more prominent accretion within the southern parts of the beach and reduced accretion and loss through the northern parts of the beach.

Detailed hydrodynamic modelling and sediment transport assessments will be undertaken for the EIS to further determine the potential impacts on nearshore coastal processes based on local conditions. This will include further wave and current monitoring and hydrodynamic modelling to confirm the results of the above preliminary assessment.

## **5.4 Marine Water Quality**

### **5.4.1 Existing Environment**

The Port of Townsville is located between the mouths of Ross River and Ross Creek on the south western boundary of Cleveland Bay. The Ross Creek estuary has been extensively modified as a result of historical development within the river basin, particularly in the lower estuarine areas due to development of the Port of Townsville. Although extensively modified from its natural state, the Ross River estuary provides a contiguous habitat area, particularly along its eastern bank, which retains high conservation value.

Previous studies commissioned by POTL indicate that ambient water quality within the bay is strongly influenced by coastal processes. The fine terrigenous sediments that are characteristic of the seabed within the bay are readily suspended by wind-driven waves and currents within the shallow bay environment, resulting in high ambient turbidity. Flood and stormwater flows are also known to contribute sediment and contaminant load to Cleveland Bay.

Water quality monitoring data presented in the Townsville Marine Precinct Project EIS indicates that the area encompassing the port and the adjoining waters of Cleveland Bay, frequently experiences highly turbid conditions. In addition, elevated levels (compared to the relevant guidelines) of nutrients and other contaminants were observed in the vicinity of the Ross River estuary. Coastal sediments also exhibit some low level contamination (below published limits) in a few locations and, more generally, potential for acid generation.

In terms of water clarity, water quality in the outer bay in the vicinity of the existing offshore disposal ground and further offshore, is comparatively better than the nearshore, although as coastal processes are still active, ambient levels of turbidity and suspended solids increase during large wind and wave events.

### **5.4.2 Potential Impacts**

Potential water quality impacts may result from the following:

- capital and maintenance dredging;
- offshore disposal of dredged material;
- reclamation activities for the future land-based operational areas including tailwater release;
- stormwater runoff;
- discharge of ship ballast; and
- accidental spills within the port.

Construction works will involve the capital dredging of some 10Mm<sup>3</sup> of seabed material and the placement of the dredged material and armour rock into the marine waters. These activities have the potential to disturb seabed sediments, generating turbid plumes and mobilising sediment contaminants into the water column. The effects of elevated suspended sediment concentrations may cause decreased light availability and increased sediment deposition on seagrass beds and reef communities.

The PEES undertook a preliminary modelling assessment of the potential changes to ambient water quality from dredging activities associated with the proposed PEP. This assessment indicated that turbid plumes generated during dredging, reclamation tailwater release and offshore disposal activities, are likely to result in short-term changes to water quality within Cleveland Bay. While plumes (particularly those associated with the deepening of the entrance channel by a large trailer suction hopper dredge) may spread across areas known to support coral reef and sea grass habitat, changes to ambient turbidity were expected to remain within the range of background variability and no long term impacts were predicted.

Further investigation of potential water quality impacts from the PEP will be undertaken through more detailed hydrodynamic and water quality modelling as part of the EIS. Additional model calibration data has been collected through the installation of wave and current profilers. Dredge plume measurement and monitoring has also been undertaken during the 2010/11 maintenance dredging campaign. This additional data will be used to validate the modelling used the EIS.

Sediment quality in areas to be dredged as part of the PEP will be analysed prior to any dredging and appropriate disposal locations will be identified based on the level of contamination that may be present in the material to be dredged. Impact mitigation measures and monitoring programs to minimise impacts on the receiving environment, in particular water quality, will be implemented in accordance with permit conditions. In this context, disposal of any dredged material generated from the PEP to the offshore spoil ground disposal site would be subject to the requirements of the permits issued by the Australian Government in accordance with the Sea Dumping Act (see Section 4.0 of this IAS).

In terms of operational water quality management, POTL already monitors ambient water quality and this program will be reviewed to incorporate the area associated with the PEP. The EIS will recommend site specific measures to manage potential construction water quality impacts and at the completion of construction, all operational aspects of the project's EMP will be included and maintained as part of the port's EMS. The individual businesses within the new port land will also be required to operate in accordance with a development approval for each ERA that applies. Maintenance dredging of the PEP is likely to be managed as part of the ongoing maintenance program in the port and would be required to operate in accordance with the necessary ERA licence.

## 5.5 Terrestrial Ecology

### 5.5.1 Existing Environment

The PEP is located within a sub-tidal area and accordingly, it is not anticipated that direct impacts to terrestrial ecology would result from the project. Notwithstanding, there may be potential indirect effects to particular aspects of terrestrial ecology as outlined below.

The primary consideration from a terrestrial ecology perspective is avifauna (i.e. birds) that may visit the project area or utilise nearby shore habitats. Marine birds (e.g. gulls, terns) would frequently occur within the project area, at either the dredge footprint or offshore DMPA, whilst feeding, resting or overflying from one area to another.

Nearby intertidal shores (e.g. near the Ross River mouth) represent a significant habitat for shorebirds (roosting and feeding sites), many of which are protected as threatened or migratory species. These sites are located south-eastwards of the Townsville Marine Precinct area, which is currently under construction, and are located more than 1km from the PEP. The land-side port area adjoining the PEP does not support significant terrestrial flora and fauna.

The Townsville region supports a number of wetland areas which include lacustrine (lake), palustrine (marsh), and riverine wetland types as well as estuarine and marine types (see also Section 5.6 Marine Ecology of this IAS).

Bowling Green Bay is listed under the Ramsar Convention and protected under the EPBC Act as a MNES. This Ramsar site is largely situated to the east of Cape Cleveland, but also extends along the southeast coastline of Cleveland Bay. The site has outstanding values with respect to provision of habitat to migratory and resident waterbirds, marine megafauna (turtles, dugong) and a range of other natural resource values. The Ramsar site boundary (as shown in Figure 1.2) is approximately 9km from the port.

There are also three wetlands of national importance (listed under the ANCA Directory of Important Wetlands) located within the Townsville region, including the Burdekin-Townsville coastal aggregation which is a man-made inland coastal wetland, the Ross River Reservoir (also man-made) and the inland Serpentine Lagoon.

'Wetland protection areas' pursuant to the draft *State Planning Policy for Protecting Wetlands of High Ecological Significance in Great Barrier Reef Catchments* (2010) are also shown on Figure 1.2. The nearest site is located more than 6km west of the port.

### Threatened Species

A number of threatened or migratory terrestrial species under the EPBC Act and relevant State legislation may occur within the direct footprint of the PEP. Section 6.0 and Appendix A provide a summary of threatened species and migratory species identified using the EPBC protected matters search tool and Queensland DERM Wildlife On-Line search tool.

## Avian Fauna

The Cleveland Bay area provides habitat for large populations of migratory shore birds, which are protected under the EPBC Act as MNES.

Previous studies have recorded 44 species of birds (GHD, 2009) in nearby areas, with the greatest abundance occurring at the mouth of the Ross River. Fieldwork at the mouth of the Ross River was undertaken by GHD in September 2008 as part of the Townsville Marine Precinct Project. The majority of species observed during the surveys are listed as least concern wildlife under the NC Act.

### 5.5.2 Potential Impacts

Due to their considerable distance away from the project site, it is considered unlikely that the port expansion will have any effect on the value or condition of the listed Ramsar wetland, nationally important wetlands in the region or wetland protection areas pursuant to the draft SPP; however investigation will be undertaken as part of the EIS to confirm this.

Although the PEP is unlikely to directly influence intertidal shorebird feeding grounds, construction and operation activities may result in disturbance of nearby feeding or roosting habitat. It is also well known that shorebirds will use dredge spoil sites and expansive areas in the process of being reclaimed, as roosting habitat (Driscoll 1998). Further consideration of the potential impacts on migratory birds will be undertaken as part of the EIS as well as any potential impacts to listed threatened species under Commonwealth and State legislation.

## 5.6 Marine Ecology

### 5.6.1 Existing Environment

Cleveland Bay provides a range of marine habitat types including seagrass, coral reefs, soft bottom benthic communities, rockwall habitats and mangroves. These areas are recognised as providing critical habitat for a number of threatened species and are declared in statutory conservation areas both within Cleveland Bay or adjacent to it. Some of the key conservation areas include:

- The Great Barrier Reef Marine Park;
- The Great Barrier Reef World Heritage Area;
- Dugong Protected Areas;
- Fish Habitat Areas;
- Bowling Green Bay Ramsar site; and
- Magnetic Island National Park.

There has been substantial previous study of marine ecology within Cleveland Bay and the surrounding Great Barrier Reef Marine Park. The following sections provide a brief description of major aspects of the marine ecosystem of Cleveland Bay.

### Megafauna

The Cleveland Bay region is recognised as a key foraging area for the flatback turtle and a key feeding and nesting area for the green turtle (DEWHA, 2008). However, the port and proposed PEP area is not a transit route or area of high utilisation for megafauna.

The following species listed as threatened under the Queensland *Nature Conservation (Wildlife) Regulation 2006*, pursuant to the NC Act were observed within 2km of the port:

- Endangered
  - Loggerhead turtle (*Caretta caretta*); and
  - Leatherback turtle (*Dermodochelys coriacea*).
- Vulnerable
  - Dugong (*Dugong dugon*);
  - Green turtle (*Chelonia mydas*);

- Hawksbill turtle (*Eretmochelys imbricate*); and
  - Flatback turtle (*Natator depressus*).
- Near Threatened
- Australian snubfin dolphin (*Orcaella heinsohni*); and
  - Indo-Pacific humpback dolphin (*Sousa chinensis*).

Conservation plans, in accordance with the NC Act, are in place as follows:

- *Nature Conservation (Whales and Dolphins) Conservation Plan 1997*;
- *Nature Conservation (Dugong) Conservation Plan 1999*; and
- *Recovery Plan for Marine Turtles in Australia 2003* (National/State).

Cleveland Bay is a Dugong Protection Area and dugongs are relatively abundant, although they are not known to frequent areas close to the Port of Townsville due to the lack of suitable food sources. The Townsville Marine Precinct Project EIS (GHD, 2009a) documented that dugongs were found most often in areas with greater concentration of seagrass in Cleveland Bay.

Boat-based and aerial marine megafauna surveys were conducted for the Townsville Marine Precinct Project EIS over a seven month period from September 2008 to May 2009 (EIS Appendix U) and included three days of aerial surveys (two surveys per day, high and low tide) and seven monthly boat-based surveys (not including February and April 2009). Turtles, dugongs, rays, sea snakes and dolphins were observed as part of these surveys.

Both the Australian snubfin dolphin and the Indo-Pacific humpback dolphin were also observed as part of these surveys and are reported in the Townsville Marine Precinct Project EIS to be highly mobile and move in and out of Cleveland Bay. Two snubfin dolphins were observed during the seven month field surveys for the EIS. Based on previous studies snubfin dolphins have been observed to concentrate their activity around two areas, north-west of Cape Pallarenda, and south around the port and Ross River mouth.

Indo-Pacific humpback dolphins show a similar distribution, concentrating their activities mainly around the dredged channels and breakwaters close to the port, without a clear seasonal pattern.

POTL has committed to a number of additional monitoring studies to address impacts to marine habitats and megafauna as part of its EMP for the Townsville Marine Precinct Project. These include:

- monitoring the health of adjacent seagrass communities as indicators of water quality impacts and to act as an indicator for potential impacts to marine megafauna;
- monitoring of temporal and spatial persistence of meadows compared to existing baseline data; and
- ongoing marine megafauna monitoring to assess any influence on habitat utilisation of threatened and listed species.

The results of these monitoring studies will be compiled and relevant information presented in the EIS for the PEP.

The megafauna assessment for the EIS will build upon existing information as well as the findings of surveys currently being undertaken by POTL as part of its monitoring commitment for the Townsville Marine Precinct Project.

### **Seagrass**

Seagrass meadows near Townsville and Magnetic Island provide important habitat for a range of species of fisheries significance, and provision of food resources for threatened species such as dugong and green turtle.

Baseline surveys of seagrass within Cleveland Bay were commissioned by POTL and undertaken by the Queensland Department of Primary Industries and Fisheries (now DEEDI) during 2007, 2008, 2009 and 2010 (refer to Taylor and Rasheed, 2010). The baseline surveys identified large and continuous seagrass meadows within Cleveland Bay, most commonly in intertidal and shallow sub-tidal areas.

Shallow seagrass meadows occur along Cape Cleveland, The Strand, Cape Pallarenda and around Magnetic Island. The dominant species in the shallow waters include *Halophila ovalis*, *Halodule uninervis*, *Zostera capricorni*, and *Cymodocea serrulata*. The reef flats surrounding Magnetic Island support areas of *Thalassia hemprichii*.

The distribution, extent and density of seagrass assemblages within these nearshore areas can show great variation over a range of temporal scales (particularly seasonally and inter-annually) in response to variations in a range of environmental factors. In particular, changes in the availability of light that result from wave driven bed sediment remobilisation and turbidity associated with river flooding are key drivers of change in seagrass meadows (Taylor and Rahseed, 2010).

Cleveland Bay also contains deepwater seagrass beds. These deepwater meadows are typically patchy (non-contiguous, fragmented beds) with a sparse cover and low species richness. The deepwater meadows also show seasonal and inter-annual variability, with the surveys from 2007 to 2009 showing a decline in biomass of these communities that has been attributed to seasonal flooding (Taylor and Rasheed, 2010).

Based on the surveys undertaken to date, no seagrass is known to occur in the inner or outer harbour areas of the Port, although shallow water and intertidal seagrass beds can occur nearby (e.g. near the Ross River mouth and Townsville waterfront).

### **Reef Communities**

Reef communities exist around Magnetic Island and at Middle Reef and Virago Shoal (located between Magnetic Island and Cape Pallarenda). A large number of hard corals have been recorded within these communities, including extensive areas of *Montipora digitata*.

The distribution and abundance of coral species varies within the fringing reefs and is related to the physical characteristics of the reef environments. The Cockle Bay reefs, located on the south-western side of Magnetic Island, are characterised by species that are better adapted to high siltation and low turbidity, but there is general trend toward decreasing coral density in comparison to reef habitat within Geoffrey Bay, located on the south-eastern side of the island (Bell and Kettle, 1989).

Previous study of the fringing reefs on the south-eastern side of Magnetic Island between Florence Bay (north) and Geoffrey Bay (south) indicates that these areas are qualitatively similar (Mapstone et al 1989).

Coral cover, species diversity and aesthetic quality is generally considered higher within the fringing reefs of Horseshoe Bay, on the northern side of Magnetic Island, than within other fringing reef areas.

### **Soft Bottom Benthic Communities**

Soft sediment communities dominate the seabed of Cleveland Bay (Kettle et al 2001). The most common groups of benthic infauna present in the area include polychaetes, amphipods, sipunculids, bryozoans, tanaids and amphipods (Cruz-Motta & Collins 2004). Benthic communities provide a significant food source for many species of fish including higher order consumers such as flathead, whiting and flounder.

To support the PEP project, POTL has committed to undertaking a number of baseline studies to characterise the benthic environments in and around the proposed outer harbour, within the entrance channels, at the offshore dredge material placement area and at various control sites around Cleveland Bay. These studies will characterise sediment type as well as epifauna and infauna communities in these areas including the presence of any associated reef or seagrass communities not previously mapped.

### **Rockwalls**

The rockwalls in the port support a range of algal and sponge dominated communities as well as hard corals in more quiescent areas. Video survey of rockwall habitats around the current port reclamation area have been commissioned in order to assess the condition and health of these systems and provide an indication of the future environment that would be created as a result of the PEP reclamation works.

### **Mangroves**

Mangrove communities are most extensive in the southern portion of Cleveland Bay between Sandfly and Cocoa Creeks and in the Ross River. Smaller communities occur in Rowes Bay and at Three Mile Creek. Mangrove communities in these areas are ecologically important as they provide habitat for a range of fauna including crabs, prawns, fish and birds. The predominant threats to mangrove ecosystems arise from land use conflicts and impacts on water quality.

Mangrove communities are not known to inhabit the land area adjoining the proposed harbour and reclamation and, based on the findings of previous studies commissioned by POTL, it is considered unlikely that mangrove habitats within Cleveland Bay would be influenced by elevated turbidity and suspended sediment loads that may result from capital and maintenance dredging and offshore disposal activities.

## Fish

The mangroves, seagrass, reef and soft bottom benthic communities present in the waters adjacent to the Port of Townsville provide habitat for a variety of fish species. Fishing is a common practice in this area, undertaken by traditional owners and commercial and recreational fishers.

Fish habitat areas have been established in Cleveland Bay and in the nearby Bohle River and Bowling Green Bay (refer to Figure 1.2). These areas provide protection and are breeding grounds for barramundi, grunter, mud crabs and prawns. While these species are mobile, the loss of important habitat or feeding or breeding, such as seagrass, reef and benthic habitats may affect long time abundance.

## Marine Pest Management

Ships can introduce marine pests into Australian waters through the release of ballast water that may contain eggs or larvae, or through fouling organisms that attach to the hulls and other external surfaces of ships. Marine pests in Australia include the black-striped mussel, Asian mussel, New Zealand green-lipped mussel and European Shore crab.

The introduction of marine pests is governed by a suite of conventions, regulations, and policies. These arrangements are currently being implemented through the Intergovernmental Agreement on a National System for the Prevention and Management of Marine Pest Incursions.

Previous studies of marine pests commissioned by POTL did not identify the presence of known invasive species. In particular, no marine pests of concern for the Townsville region were detected in any of the samples collected during the benthic marine ecology field survey undertaken as part of the Townsville Marine Precinct Project (GHD 2009).

### 5.6.2 Potential Impacts

The PEP has the potential to cause direct and indirect adverse effects on both marine fauna and marine habitats during the construction and operational phases. These may include:

- the permanent loss of benthic habitats from the removal of benthic seabed as a result of the reclamation works (creation of approximately 100ha if reclaimed land);
- changes to ecological communities as a result of deepening from capital dredging;
- disturbance within and adjacent to the development from dredging of navigational channels and construction of breakwaters resulting in turbidity, sedimentation and mobilisation of contaminants from sediments;
- temporary smothering and/or elevated turbidity and sedimentation effects on sensitive habitats associated with dredging and material placement activities;
- contamination of marine waters from sediment disturbance, spills of fuel or other chemicals and stormwater runoff;
- trapping of marine fauna by the proposed reclamation works;
- injury/mortality to individual animals from direct contact related to vessel operations during construction and operational activities or boat strike;
- noise and vibration impacts to marine fauna from in-water construction or ongoing operational activities;
- lighting impacts to nesting turtles and hatchlings in the broader area (November to April);
- impact on commercial and recreational fishing; and
- Increased risk of marine pest incursions.

Hydrodynamic and advection-dispersion water quality modelling will be used to simulate and predict potential impacts from turbidity and sediment deposition on critical habitats, including seagrass meadows and coral reefs in Cleveland Bay.

The EIS will further investigate such potential construction and operational impacts on marine ecology and consider recommendations to mitigate these potential impacts as part of the EMP.

## **5.7 Visual Amenity**

### **5.7.1 Existing Environment**

The Townsville area is characterised by a low-lying coastal landform bounded by Cleveland Bay and the Paluma and Hervey mountain ranges (Queensland Government, 2007). Castle Hill and Mt Stuart are key landform elements within the wider landscape rising above the urban areas of the city of Townsville.

Magnetic Island is located approximately 8km off the coast of Townsville and has a steep landform with numerous bays and inlets, providing a visual backdrop to the east of the city.

Mt Stuart, located on the south-west edge of Townsville, is another dominant landscape feature and provides a visual backdrop to the city.

The Port of Townsville is a visually dominant feature of near-field and distant viewpoints, including open space and recreation areas of significance to the community, such as The Strand and Castle Hill.

A baseline lighting survey was commissioned by POTL to assess the suitability of current luminance levels within the port land and surrounding area. The study indicated that the ambient luminance at locations adjacent to and outside of the port boundary is compliant with guideline values and acceptable for the current adjoining land uses (Max Winders & Associates 2007). Notwithstanding, it is noted in these studies that there is potential for conflict in the event of land use changes in areas surrounding the port.

### **5.7.2 Potential Impacts**

The port expansion area, like the existing port, will be visually dominant and intensify the port presence in this location. There are few opportunities to screen views to the port from the waters near the port, the seafront (eg. The Strand) and other significant locations (eg. Castle Hill). Some structural components of the PEP, such as ship loaders and cranes, will be elevated and illuminated during night operations. Due to the 24 hour operation of the port, it is expected that lighting will also be a key influence on the visual amenity of the PEP. Visual amenity also includes discolouration of the seawater caused by the dredging and reclamation process. Such potential impacts are associated with construction activities and will therefore be temporary in nature.

An assessment of the potential visual amenity impacts from the PEP, including potential lighting impacts on terrestrial and marine fauna, will be undertaken as part of the EIS and recommendations provided.

## **5.8 Noise and Vibration**

### **5.8.1 Existing Environment**

The areas surrounding the existing port are heavily developed urban areas.

The port area is in close proximity to the South Townsville residential community and the existing port operations are separated by physical barriers including, but not limited to, open space (Port Environmental Park), transport corridors (roads) and benign development (such as warehousing).

The areas to the south-west of the project area (not within the port land) include the commercial and industry centre of Townsville, whilst land south-eastwards across the Ross River includes an environmental reserve.

The majority of the port land is used for industrial-based operations and the areas immediately adjoining the wharf are used as short-term lay-down areas for the loading and unloading of ships. The PEP proposes to extend port operations seawards, which is to the north of the existing port infrastructure and away from existing surrounding land uses.

Noise is also generated by land transport to and from the port. Current road access to the port is principally via Boundary and Benwell Roads and rail enters and exits the port on the rail line adjacent to Perkins Street in South Townsville. The EAC (currently under construction) will divert heavy vehicles from the suburbs. This development will also provide an alternative rail corridor to the port. Further details regarding traffic and other transportation is provided in Section 5.11.

## 5.8.2 Potential Impacts

Construction activities will result in a temporary increase in noise levels within the immediate vicinity of the port and access roads. The potential construction noise and vibration sources include:

- wharf construction, including piling;
- general construction noise, such as mechanical plant, material unloading and placement;
- dredging and reclamation activities; and
- geotechnical ground treatments associated with construction of the reclamation.

Noise management during construction will comply with the *Guide to Noise Control on Construction, Maintenance and Demolition Sites (AS 2436:1981)*.

Potential operational noise and vibration impacts are likely to be associated with the incremental increase in trade through the port and will therefore be primarily associated with the loading and unloading of vessels at the new wharves (located further away from sensitive receivers) and movement of road and rail traffic in and out of the port. This is most significant along Boundary Street and adjacent to the rail corridor.

Baseline noise monitoring was undertaken as part of the Townsville Marine Precinct Project EIS (December 2008) and this data will be supplemented with additional monitoring at key sensitive receptor locations. The potential noise impacts on these sensitive receptors, including the suburbs adjacent to the development will be assessed for both construction and operational phases of the PEP under the EIS. Noise and vibration impacts on terrestrial and marine fauna will also be addressed as part of the EIS. Mitigation measures will be considered as appropriate and these will be incorporated into the EMP.

## 5.9 Air Quality

### 5.9.1 Existing Environment

As highlighted in Section 5.8, the Port of Townsville is located in close proximity to a number of sensitive receptors, including residential and recreational areas and the Townsville CBD.

Air quality in the port area and adjacent locations is influenced by traffic, commercial and industrial emissions. Atmospheric dust comprising fine dust particles which can be carried substantial distances, is the main component of emissions together with minor quantities of nitrogen and carbon oxides and residual hydrocarbons.

Site-specific ambient air quality data, including PM<sub>10</sub>, are recorded at the port and operation of the POTL monitoring station at Berth 10 is supported by DERM to Australian Standards for air quality monitoring. Dust deposition gauges are also located throughout the port.

Previous studies of air emissions, specifically particulate emissions, have been undertaken by POTL to support the environmental management of the Port of Townsville. The studies indicate that particulate (PM<sub>10</sub>) concentrations at off-port locations are compliant with guideline values and sources of elevated particulate emissions during operation of the port were not identified.

### 5.9.2 Potential Impacts

The primary impact to local air quality is likely to be associated with dust generated during the construction phase. Dust may be generated by mechanical disturbance (dust emissions generated by construction and maintenance vehicles and equipment) and wind erosion (dust emissions generated by disturbed and exposed soil surfaces). The exposed surfaces of the PEP will be built over once construction is complete.

The potential impacts on air quality from the PEP will be assessed for both construction and operational phases during the EIS process. Measures will be implemented to minimise nuisance experienced by local residents and the workforce and these will be incorporated into the EMP. The port expansion area will be considered within the port's operational air quality monitoring program following the construction phase.

## 5.10 Cultural Heritage

### 5.10.1 Existing Environment

#### Historic Cultural Heritage

The Port of Townsville has played a significant role in the historical development of Townsville City and more broadly in the development of northern Queensland. The historic cultural heritage studies commissioned by POTL as part of the PEES and Townsville Marine Precinct Project EIS indicated that there were no listed places of historic heritage significance within the Port of Townsville (AECOM, 2009). This study considered both the Townsville Marine Precinct Project and adjoining areas.

A search of the National Heritage List, the Commonwealth Heritage List, the Register of the National Estate, and the Queensland Heritage Register (QHR) identified 55 places within approximately 3km from Berth 11 (westward of the PEP boundary). The Great Barrier Reef is the only place listed on the National Register and is protected under the EPBC Act as a MNES (refer to Section 6.3).

A search of the Townsville City Council's Local Heritage Database (TCCHR) identified 143 properties of local significance in the adjoining suburbs of Townsville and South Townsville.

#### Aboriginal Cultural Heritage

An Aboriginal Cultural Heritage Study was commissioned by POTL as part of the PEES and Townsville Marine Precinct Project EIS. The *Indigenous Cultural Heritage Report, Townsville Marine Precinct & Port Expansion Projects* by Northern Archaeology Consultancies Pty Ltd & Segue Pty Limited (2009) indicated that the project area is located within a broad cultural landscape that retains significant values. This survey and report was completed in consultation with and endorsed by Aboriginal parties.

### 5.10.2 Potential Impacts

#### Historic Cultural Heritage

The proposed PEP primarily involves reclamation of seabed where there are no identified places or items of European cultural heritage and as such it is highly unlikely that any places with potential heritage significance within the port will be directly affected.

Heritage places located adjacent to the port may potentially be indirectly impacted. Such potential impacts may be associated with increased traffic or alterations to visual amenity of the environment associated with the construction and operation of the PEP.

Further consideration of the potential historic heritage values will be undertaken as part of the EIS to determine the potential direct and indirect impact on significant places within and adjacent to the port.

#### Aboriginal Cultural Heritage

The potential impacts on the Aboriginal cultural heritage are likely to be minimal and it is unlikely that the PEP would diminish the cultural significance of Cleveland Bay and its waterways due to the extent of previous modification of the natural landscape in the port and project area.

A Cultural Heritage Management Plan has been agreed between POTL and the Aboriginal Party for the project area and has been approved by DERM's Cultural Heritage Unit. The plan sets out POTL's responsibilities for management of Aboriginal cultural heritage as part of future development at the port. POTL will adhere to the requirements of the CHMP for the PEP and consultation will be undertaken with the respective signatories should there be any need to alter the registered boundary of the CHMP. This ensures compliance with the Queensland, ACH Act.

## 5.11 Traffic and Transport

### 5.11.1 Existing Environment

The current road access to the port is primarily via Boundary Street and Benwell Road. Boundary Street is bounded by a mix of residential and non-residential uses, including industrial, commercial and shop-type uses. Both Boundary Street and Benwell Road form part of the 'Principal Road Freight Network' as defined in *Townsville City Plan 2005*. A connection to the Port also exists via McIlwraith Street and Perkins Street to Ross Street which forms part of the 'Secondary Road Freight Network' and further on to Lennon Drive which is part of the 'Principal Road Freight Network' as defined in *Townsville City Plan 2005*.

Rail access is provided via the rail corridor located along Perkins Street in South Townsville. The track then continues to the South Yard and enters the port alongside Jetty Road in South Townsville. The *Townsville City Plan 2005* identifies that this transport route is part of the Rail Freight Network and is designated as 'Other Freight' on Map 3.3(b).

Construction of the Stuart Bypass and Port Access Road, known as the EAC commenced in August 2008. It is envisaged that the current rail route will continue as a rail transport corridor to and from the port, however, development of the EAC corridor is expected to eventually provide an alternative rail transport corridor to and from the port. The new road/rail link over the mouth of the Ross River will improve port accessibility between the port and the State Development Area at Stuart.

The development is being completed in three stages. The opening of the first stage is to correspond with the completion of the EAC road and is scheduled for late 2011. The EAC will also include provisions for a future rail corridor for movement of rail freight primarily from the south and west of Townsville and the potential for product services of a conveyor or pipelines.

### 5.11.2 Potential Impacts

Boundary Street will continue to provide road access to the PEP from the north. However, it is anticipated that the EAC road component will be operational prior to the construction of the PEP. Assessment for the EAC has been undertaken under a separate approval process and does not form part of the PEP.

Any predicted increase in both construction and operational traffic volumes and impact of heavy vehicle access will be determined during the EIS process. An assessment of the potential traffic and transport impact will be completed. Consultation with stakeholders such as TCC, DTMR and QR National will also be undertaken as part of the EIS process.

A Road and Traffic Management Plan may be required to be developed in collaboration with stakeholders and this will be implemented prior to the commencement of construction.

## 5.12 Trade and Economics

The Port of Townsville has been integral to the development of the economy of Townsville and the north Queensland region. The port provides north Queensland with a gateway for commerce and trade and it services the north-east and north-west minerals provinces of north Queensland.

The Townsville State Development Area was declared in 2003 to assist the Townsville region achieve its potential as a major base metals processing centre. Its proximity to the port and the minerals rich north-west makes it the most strategically positioned industrial land in north Queensland. New opportunities for minerals processing and transport and distribution services connecting northern Australia to the Asia Pacific region are expected to attract new industries and ensure continued economic growth and employment for the Townsville region and Queensland.

The importance of the Port of Townsville for the economy in a local, regional and State context is also recognised under the *Northern Economic Triangle Infrastructure Plan 2007-2012* and the *Townsville Economic Gateway Strategy* (2006). These documents emphasise the importance of future development and efficient operation of the port.

The Port of Townsville handles a diverse mix of high-value bulk trades, and during the 2009/2010 financial year, over 10Mt of cargo was handled through the port, with a total value of approximately \$10 billion. The port handles approximately 4-5% of the total cargo tonnage handled through Queensland ports, which equates to approximately 14% of the total export value. As noted above, trade through the port is expected to increase to over 40Mt by 2040.

The *Port of Townsville Master Plan* identified the need to expand the port to satisfy forecast trade over a 25 year planning horizon, based on assessment of demand and capacity requirements. It recommended that the expansion take the form of a new outer harbour, to provide additional berths and cargo storage space for bulk products, an efficient rail loop connection to the EAC, and provide an overall rationalisation of port activities.

The port expansion is a major strategic objective of the *Northern Economic Triangle Infrastructure Plan 2007-2012* and will be an important asset for the sustained economic growth of Townsville and the north Queensland region.

The port expansion is likely to have beneficial impacts on the local, regional and State economy by increasing the efficiency and capacity of the port.

A detailed assessment of the economic case for the PEP will be prepared as part of the EIS, containing:

- a detailed trade forecast;
- a description of the existing economic environment, a review of relevant economic factors (macro and micro factors) and the global economic outlook;
- a review of the trade forecast, based on the review of macro-economic factors and global economic outlook;
- confirmation of the economic drivers for the project in terms of timing and staging of development;
- a cost-benefit analysis to evaluate the economic impact of the PEP;
- the application of Regional General Equilibrium Modelling to identify indirect economic effects such as employment and income effects, increased spending effects and others; and
- a qualitative economic evaluation of the 'do-nothing' case.

## **5.13 Social Impact and Consultation**

### **5.13.1 Existing Environment**

Townsville is the major administration centre for north Queensland. The Townsville region has a population of approximately 150,000 people and has shown a sustained population growth rate of approximately 1.5 to 2.0% per annum over the last 10 years (ABS, 2006). The region supports a diverse economy. Major occupations within the region are in the fields of public administration and safety, retail trade, health care and social assistance, construction, education and training, manufacturing and accommodation and food service (ABS, 2006).

Lavarack Barracks, a major Defence facility, is also located in Townsville. Defence operations associated with this facility, which also include Navy visits, have a significant influence on existing social aspects within the region.

POTL employs the following communication mechanisms:

- holds a quarterly Community Partnerships Forum (open to the public);
- maintains an informative website, which includes a website based feedback form;
- has a Complaints Handling Policy published on its website;
- all media releases are posted on their website.

### **5.13.2 Potential Impacts**

A major social outcome of the port expansion is the sustained employment opportunities that are likely to result from stable economic growth within the region. The PEP may also influence the social environment and values in a local context as a result of its construction and operation. It is anticipated that the predominant influences on social values would be the result of impacts on the existing natural and built environments, including:

- noise and light emission;
- dust emission and air quality;
- visual amenity
- rail and road transport
- recreational activities such as boating, sailing and skiing in Cleveland Bay.

To a large extent these impacts will involve the continuation with possible intensification of the current impacts as operations continue into the future. Each of the above will be assessed in the EIS under its respective section whilst the social impact section will consider the collective implications to the local and broader community.

The PEP proposes to extend the port land seawards and it is recognised that interfaces with local community are changing in a planned and consistent manner in accordance with the approved Port of Townsville Land Use Plan 2010. Other projects such as the EAC will assist in improving issues such as road and rail access to the port.

Further assessment of the potential social impacts of the PEP will be undertaken as part of the EIS. The assessment of other projects within the port is being undertaken through separate approvals; however, the PEP will consider the cumulative implications on the local community.

### **Consultation**

A program of consultation for the PEP will also be used to support the social impact assessment and EIS.

POTL proposes that a proactive engagement approach to involve local, state and federal government agencies and authorities with an interest in the project either as a result of their statutory approval responsibilities or related impact and interest perspective will be implemented.

The public consultation process will identify the broad issues of concern to the local and regional community and interest groups, and will address issues from project planning through commissioning and project operations. A stakeholder engagement plan has been prepared for the PEP and will be implemented and reported on in the EIS.

The stakeholder engagement program will provide opportunities for community involvement and education. It is proposed to continue the Port's Community Partnerships Forum and further include discussions with individuals, public communication activities, interest group meetings, production of regular summary information and updates, and other consultation mechanisms to encourage and facilitate active public consultation for the EIS.

A list of the stakeholders consulted during the stakeholder engagement program will be provided in the EIS documentation as well as details of key meetings held, presentations made and any other consultation undertaken during the EIS process.

Regular whole of government briefings will be scheduled at key project milestones and commenced early in the project program. The purpose of the meetings will be to provide project briefings and approval and permit discussions and undertake effective issues management. The intent will be to facilitate an effective and efficient permitting and approvals process and to establish and/or strengthen relationships with these critical stakeholders, Informing and involving them early in the project and at key milestones which will establish and build on existing relationships with POTL.

## **5.14 Waste**

### **5.14.1 Existing Environment**

Wastes generated by port activities in Queensland are governed by a suite of conventions, legislation, regulations, and policies.

Pollution of the marine environment by ships is controlled by the *International Convention for the Prevention of Pollution Ships 1973 (Amended 1978)* and also known as MARPOL 73/78. Australia is a signatory country to this convention that deals with all forms of waste disposal from ships with the exception of disposal of land generated wastes (eg. dredge spoil by dumping). The Australian Maritime Safety Authority (AMSA) applies the convention in Australian waters and its regulations are implemented through Commonwealth and State legislation. The State legislation is administered in coastal waters up to three nautical miles offshore, whilst the Commonwealth legislation continues from the three nautical miles offshore to the exclusive economic zone at 200 nautical miles offshore.

Wastes generated by current port operations at common user facilities are managed through POTL's EMS that ensures compliance with all applicable relevant legislation, codes of practice and standards.

The majority of solid inert waste at the port is disposed to landfill at the TCC's municipal facility, whilst some solid inert wastes such as scrap metal are recycled. Waste oil and batteries are also recycled and other regulated wastes are disposed of at licensed facilities.

The present disposal arrangements for dredged spoil material from maintenance dredging operations at the port includes disposal to the designated offshore spoil ground site (SD2007/0602) located approximately 5km east of existing harbour. This activity is pursuant to development approval for ERA 16 – Dredging under the *Sustainable Planning Act 2009* and Sea Dumping Act.

#### 5.14.2 Potential Impacts

Construction and operation of the PEP will result in the generation of a range of waste products including solid inert, liquid and regulated wastes. The most significant wastes generated during the construction phase of the PEP are likely to be excess spoil from dredging works, excess concrete and building material waste. It is expected that only minor quantities of hazardous wastes such as paints and oils will be generated and these can be readily managed through authorised waste contractors.

The management of dredged spoil is particularly relevant to the project as it is proposed to dredge approximately 10Mm<sup>3</sup> of spoil material. It is estimated that approximately 5Mm<sup>3</sup> of dredged material will be beneficially re-used as reclamation fill for the expansion of port land. This is considered the maximum quantity of material that may be retained within a reasonable reclamation footprint. It is proposed that the remaining material, approximately 5Mm<sup>3</sup>, will be disposed offshore, subject to its suitability (see Section 5.4).

In addition to dredged spoil generated during construction of the PEP, current maintenance dredging practices will need to be extended to the proposed new harbour and channel areas that form a part of the PEP. It is likely that this material will also be disposed offshore.

Other potential wastes generated during the construction and operational phases of the PEP, both from land-based activities and from vessels associated with the port operations, will be further investigated as part of the EIS process.

Waste management will be based on the hierarchy set out in the *Environmental Protection (Waste Management) Policy 2000* (Qld) that begins with waste avoidance, re-use and recycling before disposal. Regulated waste will be disposed of at licensed facilities, or treated in-situ on site and waste management strategies will be developed as part of the EMP.

The EIS will outline recommendations regarding the appropriate disposal and control measures implemented for the management of all wastes associated with the PEP.

### 5.15 Climate/Natural Disaster

Townsville is located within a dry tropical region and is characterised by a tropical wet and dry climate. High humidity and frequent storms with occasional cyclones typically occur during the wet season (November to April). The dry season produces mild and moderate temperatures. The temperature ranges from a mean maximum of 31.5°C in December to a mean minimum of 13.6 °C in July. Wind speed is highest in the afternoon and the monthly wind speed averages vary between 18.1 km/h in June and 23.6km/h in September. The winter months are dominated by south east trade winds, whilst the summer months bring winds typically from the northeast.

Tropical cyclones can occur in Townsville leading to major flooding and beach erosion. Storm surges often occur during the passing of a tropical cyclone causing flooding to low-lying coastal areas and the potential for severe wave action acting on coastal structures.

Extreme events have the potential to impact on coastal structures and cause damage to property and potential risk to human lives. All developments in cyclone prone areas, including the PEP, must comply with minimum engineering design and construction standards to withstand such forces.

A risk assessment will be used to define the appropriate design criteria. This will be based on the design life and consequence of exceedance guidelines in Australian Standard, *AS4997-2005 Guidelines for the design of maritime structures*, and also taking into account historical cyclone events in Townsville (for example, cyclone Yasi).

POTL has developed and implemented as part of port operations, numerous site-specific emergency response plans, including a natural hazard emergency response plan. These plans will be revised to incorporate the PEP.

Further studies to assess the potential impacts of extreme events on the PEP will be undertaken as part of the EIS process and appropriate recommendations regarding management measures will be presented in the EMP.

## 5.16 Hazard and Risk

POTL has developed and implemented a number of management measures to minimise potential hazards and risks to the receiving marine environment as part of its operations. These existing controls include, but are not limited to, waste management plans, hazardous material handling procedures, emergency response plans including access to appropriate emergency response kits, and environmental monitoring programs.

POTL also operates a Safety Management Plan for its port operations. This Safety Management Plan deals with the various aspects of hazardous materials handling and access to personnel on site.

These controls mitigate the safety, asset damage and environmental risks from hazards associated with current port activities. Similar port operations are proposed for the PEP and therefore the proposed development is not likely to significantly impact on the amenity of sensitive receptors.

The EIS will identify and assess the key potential hazards and risks for the construction, operational and decommissioning phases of the PEP. These will include, but not be limited to, items such as dredging impacts, strain on existing infrastructure, increased traffic, increased risk of vessel collision, inappropriate disposal of wastes, acid sulphate soil, vandalism, natural hazards for example, cyclones. Specific measures will be addressed under each of the respective assessments.

## 6.0 Matters of National Environmental Significance

### 6.1 Overview

As discussed in Section 4.2.1 of this IAS, POTL will refer the PEP to SEWPaC for determination as to whether the project constitutes a 'controlled action' under the EPBC Act. A number of MNES has been highlighted for consideration (refer to Section 4.2.1). POTL will seek approval for the development relative to these MNES.

SEWPaC's Environmental Reporting Tool was used to identify MNES protected under the EPBC Act. A summary of the results are provided in Table 4 and a copy of the output presented in Appendix A.

**Table 4 Summary of Results from the EPBC Act Protected Matters Report**

Item	Number
World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Significance (Ramsar Wetlands):	1
Great Barrier Reef Marine Park:	Relevant
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	19
Migratory Species:	55
Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	103
Whales and other cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves:	None

The above MNES are briefly discussed in the following section and the potential impacts on each of the relevant matters will be assessed as part of the EIS process.

### 6.2 World Heritage

The entire project area is located within the boundaries of the Great Barrier Reef World Heritage Area (GBRWHA). The World Heritage Values of the Great Barrier Reef are extensive as is the size of the area listed. The World Heritage property extends over 2,000km and covers approximately 348,000km<sup>2</sup> of which the Cleveland Bay forms a part of. The specific criteria for which the GBRWHA was listed and those that are inclusive of elements found throughout the broader Cleveland Bay area involve:

- coral reefs;
- inter-reefal and lagoonal benthos;
- coastal/continental islands (Magnetic Island) of exceptional natural beauty;
- many species of coral, macroalgae crustaceans, polychaetes, molluscs, phytoplankton, fish, seabirds, mammals and reptiles;
- seagrass meadows and mangrove ecosystems; and
- habitats for species of conservation significance.

Further details about the marine environment specific to the PEP area are discussed in Section 5.6.

### 6.3 National Heritage

The Great Barrier Reef is the only National Heritage place potentially affected by the PEP development. The natural and cultural heritage values associated with the world heritage criteria listed above, also apply to the Great Barrier Reef as a National Heritage place.

### 6.4 Wetlands of International Importance (Ramsar wetlands)

The nearest wetland of international importance (listed under the Ramsar Convention) is the Bowling Green Bay Ramsar site. This Ramsar site is largely situated to the east of Cape Cleveland, but also extends along the southeast coastline of Cleveland Bay. The site has outstanding values with respect to provision of habitat to migratory and resident waterbirds, marine megafauna (turtles, dugong) and a range of other natural resource values. The western boundary of the Ramsar site is located about 9km southeast of the Port of Townsville.

Previous studies of hydrodynamic processes in Cleveland Bay have shown that prevailing winds and associated waves and currents present at the mouth of the Ross River in the vicinity of the port will generally move suspended sediments in a north westerly direction, away from the Ramsar site at Bowling Green Bay.

This combined with the 9km distance to the Ramsar wetland is such that indirect impacts from activities such as dredging and material placement are very unlikely to have any adverse effect on the ecological character of the Ramsar site. However, the potential effects will be assessed as part of the EIS.

### 6.5 Great Barrier Reef Marine Park

A small area (approximately 300m) of the current Sea Channel is located within the boundaries of the Great Barrier Reef Marine Park (GBRMP) (refer to Figure 1.2). This area includes both Habitat Protection Zone (HP-19-5161) and General Zone (GU-16-6004) designations. Deepening of the channel as part of the PEP and the associated navigation beacons, to the extent that the works are within the boundaries of the marine park, will require a permit under the GBRMP Act and is therefore relevant to sections 24B and 24C of the EPBC Act.

### 6.6 Listed Threatened and Migratory Species

A total of 19 threatened species have been identified by the EPBC Protected Matters Search Tool as potentially occurring or having suitable habitat within the project area. These species are listed in Table 5 below. The presence or absences of these species and potential effects of the project will be investigated during the EIS process.

No threatened ecological communities were identified from database searches and previous studies in the area as potentially occurring within the waters of the PEP area.

**Table 5 Threatened Species Potentially Occurring Within or Adjacent to Proposed Project Site**

Threatened Species		Common Name	Status	Comment
Birds				
1	<i>Erythrotriorchis radiatus</i>	Red Goshawk	Vulnerable	Terrestrial species – Open sclerophyll forests and woodlands near freshwater; wetlands; fringes of rainforest. No suitable habitat at the subject site. Possible transient in nearby land and structures. Unlikely to occur in the subject area.
2	<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern)	Vulnerable	Terrestrial species – Open woodlands with sandy shallow soils with short grasses for ease of movement and close to water. No suitable habitat at subject site. Highly unlikely to occur at the subject site.
3	<i>Neochmia ruficauda ruficauda</i>	Star Finch (eastern), Star Finch (southern)	Endangered	Terrestrial species – Moist grasslands including grasses and woodlands associated with a permanent water source or areas frequently inundated. No suitable habitat at subject site or immediate surrounds. Highly unlikely to occur in the subject area.

Threatened Species		Common Name	Status	Comment
4	<i>Poephila cincta cincta</i>	Black-throated Finch (southern)	Endangered	Terrestrial species – Woodlands, scrublands, dune woodlands, with native grasses and close to freshwater. No suitable habitat at subject site or immediate surrounds. Highly unlikely to occur in the subject area.
5	<i>Rostratula australis</i>	Australian Painted Snipe	Vulnerable	Terrestrial species – Well-vegetated shallows and verges of wetlands on sub-coastal plains. No suitable habitat in subject site but possible transient in wider Cleveland Bay. Unlikely to occur in the subject area.
<b>Mammals</b>				
6	<i>Balaenoptera musculus</i>	Blue Whale	Endangered /Migratory	Species not common in Cleveland Bay but may be a transient visitor.
7	<i>Dasyurus hallucatus</i>	Northern Quoll	Endangered	Terrestrial species – open eucalypt forest and rocky country within 150km of the coast. No suitable habitat at the subject site or immediate surrounds. Highly unlikely to occur in the subject area.
8	<i>Megaptera novaeangliae</i>	Humpback Whale	Vulnerable /Migratory	Cleveland Bay exists within the humpback whale's migration route and sightings of this whale have been observed in the waters of Cleveland Bay between October and January ( <a href="http://www.environment.gov.au">www.environment.gov.au</a> ). Likely to be a transient visitor to the subject site.
9	<i>Pteropus conspicillatus</i>	Spectacled Flying-fox	Vulnerable	Terrestrial species found near shallow water bodies, mangroves and saltmarshes in coastal areas. No suitable habitat at subject site or in close proximity to known movement corridors or critical habitats for this species. Highly unlikely to occur at the subject site.
<b>Reptiles</b>				
10	<i>Caretta caretta</i>	Loggerhead Turtle	Endangered /Migratory	Occurs in pelagic areas and near the seabed. Cleveland Bay is not known to represent a nesting site. Forages on gelatinous marine invertebrates (Wilson and Swan, 2004). Suitable habitat located at nearby reef and seagrass areas of Cleveland Bay. Likely to be a transient visitor to the subject site.
11	<i>Chelonia mydas</i>	Green Turtle	Vulnerable /Migratory	Marine waters and near the seabed. Cleveland Bay is recognised as an important foraging area, where it feeds mainly on seagrass and benthic invertebrates (Wilson and Swan, 2004). Low density nesting arches in Cleveland Bay. Suitable habitat located at nearby reef and seagrass areas of Cleveland Bay. Likely to be a transient visitor to the subject site.
12	<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle, Luth	Endangered /Migratory	Oceanic species, feeds on nekton. Rarely sighted in Cleveland Bay and then only in deep waters. Rarely nests on the Australian coastline (mostly Territory and Cape York Peninsula). Possible transient visitor.
13	<i>Egernia rugosa</i>	Yakka Skink	Vulnerable	Terrestrial species – Found in dense cover, hollow logs and beneath ricks in dry open sclerophyll forest. Highly unlikely to occur as no suitable habitat at the subject area or immediate

Threatened Species	Common Name	Status	Comment	
			surrounds.	
14	<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Vulnerable /Migratory	No critical nesting areas known in Cleveland Bay. Not thought to be common in Cleveland Bay but may be a transient visitor.
15	<i>Lepidochelys olivacea</i>	Olive Ridley Turtle, Pacific Ridley Turtle	Endangered /Migratory	Deep waters around Magnetic Island. May be a transient visitor to Cleveland Bay, but not common.
16	<i>Natator depressus</i>	Flatback Turtle	Vulnerable /Migratory	Marine species found around reef areas. Low density nesting known to occur in Cleveland Bay but is not known to be abundant. Possible transient visitor.
<b>Sharks</b>				
17	<i>Pristis zijsron</i>	Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable	Thought to occur north of Cairns in estuaries and river mouths, embankments and beaches. Benthic feeder, found in depths from 1 to 70m (TSSC, 2008). Species or species habitat may occur within the subject site, however the project area appears to be outside known geographic range.
18	<i>Rhincodon typus</i>	Whale Shark	Vulnerable /Migratory	Whale sharks are filter feeders and generally prefer clearer, offshore waters. Wide ranging tropical species. Critical habitat in Australia includes Ningaloo Reef in WA, the Coral Sea and Christmas Island. Cleveland Bay not known to represent an important habitat for this species. Low abundance regionally but may be a transient visitor.
<b>Flora</b>				
19	<i>Hydrocharis dubia</i>	Frogbit	Vulnerable	This aquatic plant is found in freshwater lagoons and it is therefore highly unlikely to occur as no suitable habitat in the subject area.

Migratory species and 'Listed' marine species under the EPBC Act potentially occurring within or adjacent to the subject area are listed in Appendix A. As discussed in Section 5.6 of the IAS, the key Migratory and Listed marine species that will be investigated as part of the EIS include:

- marine turtles;
- dugong;
- dolphins and other cetaceans;
- migratory waterbirds including those listed under the JAMBA, CAMBA, ROKAMBA and Bonn Convention; and
- estuarine crocodiles.

## 7.0 Environmental Management Measures

### 7.1 Consideration of Environmental Values in the Preliminary Design

Planning for the PEP has been guided by the principle of delivering necessary infrastructure while balancing protection of the environment. Based on current and previous investigations, the ecological and other environmental values of Cleveland Bay have been thoroughly considered in the context of both the dredge strategy and the preliminary design and layout of the reclamation. This includes the consideration of various development options and scenarios to ensure potential impacts can be accurately predicted and where possible, modifications to the design to avoid or minimise impacts.

From a long term planning perspective, the expansion of the port and associated maritime works such as the offshore breakwaters will provide additional protection to existing berths and infrastructure while also increasing the flexibility of the port in terms of developing the optimal layout of new or existing infrastructure. Recent events have shown that some areas of the existing port are vulnerable to physical damage and can become an environmental hazard in extreme weather events. The layout of the PEP will be designed to give further protection to existing assets and to better protect new assets from the effects of such events.

Some of the specific measures that have been considered and incorporated into the design and construction methodology to protect ecological and other environmental values include the following:

- maintaining the main channel at its existing width in the absence of any strong economic case to widen in the foreseeable future;
- re-use of all dredged material from the proposed outer harbour basin within the bunded reclamation area with the exception of soft, compressible surface sediments which are of poor engineering quality (noting that these sediments will be placed at the existing offshore disposal site following appropriate sediment quality testing in accordance with the *National Assessment Guidelines for Dredging* (2009));
- design of a treatment-train approach within the proposed reclamation cells in order to maximise settlement of fine sediments in dredge tailwater prior to discharge of those waters back into the marine environment;
- consideration of options and selection of a tailwater discharge site from the reclamation that minimises cumulative turbidity impacts of dredging and tailwater release on nearby sensitive environments to the west of the port such as seagrass along the Strand and Middle Reef;
- selection of dredge plant and development of a tailwater strategy that will ensure flow rates can be effectively managed within the reclamation footprint and ensure that tailwater treatment processes are efficient and effective;
- design of a stormwater drainage system to discharge into the harbour area as a measure to reduce the dispersion of contaminants from accidental spills, etc into the broader embayment and allow for implementation of contingency measures such as floating booms for containment;
- inclusion of treatment measures to manage stormwater quality of runoff from port assets (major access roads, etc);
- ensuring the design finished surface level of the reclamation and infrastructure layout takes into account the projected effects of climate change (in line with findings of the climate change study). In accordance with the principles of adaptive management, these design measures will be further investigated and refined as part of the EIS process.

### 7.2 Environmental Management Plan

The Townsville PEP will require a site-specific Construction EMP that will aim to provide:

- commitments to practical and achievable strategies and design standards (performance specifications) for the management of the project to ensure that environmental requirements are specified and complied with an integrated plan for comprehensive monitoring and control of impacts;

- local, state and federal government authorities, stakeholders and the proponent with a common focus for approvals conditions and compliance with policies and conditions; and
- the community with evidence that the environmental management of the project is acceptable.

Management of operational impacts associated with the PEP that are the responsibility of the port will be integrated into the existing POTL Operational EMS.

Future tenants of port land will be required to develop individual construction and operational EMPs for development sites/berths that are created as part of the PEP.

### **7.3 Environmental Offsets**

As outlined above, for impact issues that cannot be 'designed out', best practice mitigation methodologies will be applied to further minimise environmental impacts.

Following consideration and development of best practice environmental management measures, if there are residual environmental impact issues identified in the EIS (for example, impacts that are a necessary and unavoidable impact of the construction or operation of the future infrastructure), consideration will be given to appropriate offsets in accordance with the Queensland Government's, *Environmental Offsets Policy* (Queensland Government, 2008) and/or in the case of MNES the Australian Government's *Draft Policy on the use of environmental offsets under the EPBC Act* ([www.env.gov.au](http://www.env.gov.au)).

## 8.0 Conclusion

POTL proposes expansion of the Port of Townsville to accommodate forecast growth in trade at the port and to address current capacity constraints. The proposed expansion will allow POTL to satisfy its functions as a Port Authority under the TI Act.

The purpose of this IAS is to provide information to the CG for consideration in seeking a significant project declaration for the PEP under the provisions of the SDPWO Act for which an EIS will be prepared.

POTL will also seek approval under the EPBC Act for the proposed development relative to the following MNES that may be potentially impacted by the project:

- sections 12 and 15A (World Heritage Properties [1]);
- section 15B and 15C (National Heritage place [1]);
- sections 16 and 17B (Ramsar wetlands of international importance [1]);
- sections 18 and 18A (Listed threatened species [19] and communities [0]);
- sections 20 and 20A (Listed migratory species [55]); and
- sections 24B and 24C (Great Barrier Reef Marine Park).

Approval pursuant to sections 24B and 24C (Great Barrier Reef Marine Park) applies only to the proposed dredging of the Sea Channel where it lies within the boundaries of the Great Barrier Marine Park.

The EPBC Act recognises that environmental assessment under the Queensland SDPWO Act may be used for the purposes of the environmental assessment under the EPBC Act in accordance with the Bilateral Agreement between the Commonwealth and Queensland Governments. If such declaration is granted, this will allow the Commonwealth Minister to rely on specified environmental impact assessment processes of the State of Queensland in assessing actions under the EPBC Act.

Further details on the existing environment and assessment of potential impacts will be undertaken as part of the EIS process. Subject to further investigations (both desktop and site surveys), it is expected that the potential impacts resulting from the PEP on the natural, social or built environment can be avoided or minimised through appropriate mitigation measures. Where this cannot be achieved, consideration will be given to appropriate offsets in accordance with relevant Government policies.

Consultation with relevant regulatory agencies and other stakeholders including the local community will be implemented to identify the broad issues of concern and to inform the EIS process. A Draft TOR for the EIS will be prepared and advertised for public comment. Comments will be incorporated into the Final TOR setting out the scope of the EIS.

## 9.0 References

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Cruz-Motta, J.J. and Collins, J. (2004) Impacts of dredged material disposal on a tropical soft-bottom benthic assemblage. *Marine Pollution Bulletin* 48 pp. 270-280.

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Taylor, H and Rasheed M. (2010) Port of Townsville Long Term Seagrass Monitoring, October 2009. DEEDI Publication, Fisheries Queensland, Cairns, 32pp.

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Wilson, S. and Swan, G. (2004) A Complete Guide to Reptiles of Australia, New Holland Publishers, Sydney.

## Appendix A EPBC Protected Matter Report and DERM Wildlife Online Searches



# EPBC Act Protected Matters Report: Coordinates

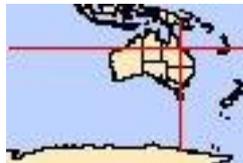
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

**Report created: 24/01/11 13:17:21**



## [Summary](#)

## [Details](#)

[Matters of NES](#)

[Other matters protected by the EPBC Act](#)

[Extra Information](#)

## [Caveat](#)

## [Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 1Km

# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

<a href="#">World Heritage Properties:</a>	1
<a href="#">National Heritage Places:</a>	1
<a href="#">Wetlands of International Significance (Ramsar Wetlands):</a>	1
<a href="#">Great Barrier Reef Marine Park:</a>	Relevant
<a href="#">Commonwealth Marine Areas:</a>	None
<a href="#">Threatened Ecological Communities:</a>	None
<a href="#">Threatened Species:</a>	19
<a href="#">Migratory Species:</a>	55

## Other Matters Protected by the EPBC Act

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

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

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

<a href="#">Commonwealth Lands:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	103

<a href="#">Whales and Other Cetaceans:</a>	12
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves:</a>	None

## Report Summary for Extra Information

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

<a href="#">Place on the RNE:</a>	2
<a href="#">State and Territory Reserves:</a>	2
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	10
<a href="#">Nationally Important Wetlands:</a>	1

## Details

### Matters of National Environmental Significance

#### World Heritage Properties [\[ Resource Information \]](#)

Name	Status
<a href="#">Great Barrier Reef QLD</a>	Declared property

#### National Heritage Places [\[ Resource Information \]](#)

Name	Status
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#### Natural

<a href="#">Great Barrier Reef QLD</a>	Listed place
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#### Wetlands of International Significance (RAMSAR Sites) [\[ Resource Information \]](#)

Name	Proximity
<a href="#">Bowling green bay</a>	Within 10km of Ramsar site

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

Zone Type	Zone Name	IUCN
Habitat Protection	HP-19-5161	VI
General Use	GU-16-6004	VI

#### Threatened Species [\[ Resource Information \]](#)

Name	Status	Type of Presence
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#### BIRDS

##### [Erythrotriorchis radiatus](#)

Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
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##### [Geophaps scripta scripta](#)

Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area
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##### [Neochmia ruficauda ruficauda](#)

Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
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##### [Poephila cincta cincta](#)

Black-throated Finch (southern)	Endangered	Species or species habitat likely to occur within area
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[64447]

[Rostratula australis](#)

Australian Painted Snipe [77037]      Vulnerable      Species or species habitat may occur within area

**MAMMALS**

[Balaenoptera musculus](#)

Blue Whale [36]      Endangered      Species or species habitat may occur within area

[Dasyurus hallucatus](#)

Northern Quoll [331]      Endangered      Species or species habitat likely to occur within area

[Megaptera novaeangliae](#)

Humpback Whale [38]      Vulnerable      Breeding known to occur within area

[Pteropus conspicillatus](#)

Spectacled Flying-fox [185]      Vulnerable      Species or species habitat may occur within area

**PLANTS**

[Hydrocharis dubia](#)

Frogbit [3650]      Vulnerable      Species or species habitat likely to occur within area

**REPTILES**

[Caretta caretta](#)

Loggerhead Turtle [1763]      Endangered      Species or species habitat likely to occur within area

[Chelonia mydas](#)

Green Turtle [1765]      Vulnerable      Foraging, feeding or related behaviour known to occur within area

[Dermochelys coriacea](#)

Leatherback Turtle, Leathery Turtle, Luth [1768]      Endangered      Species or species habitat likely to occur within area

[Egernia rugosa](#)

Yakka Skink [1420]      Vulnerable      Species or species habitat likely to occur within area

[Eretmochelys imbricata](#)

Hawksbill Turtle [1766]      Vulnerable      Species or species habitat likely to occur within area

[Lepidochelys olivacea](#)

Olive Ridley Turtle, Pacific Ridley Turtle [1767]      Endangered      Species or species habitat likely to occur within area

[Natator depressus](#)

Flatback Turtle [59257]      Vulnerable      Breeding known to occur within area

**SHARKS**

[Pristis zijsron](#)

Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]      Vulnerable      Species or species habitat may occur within area

[Rhincodon typus](#)

Whale Shark [66680]      Vulnerable      Species or species habitat may occur within area

**Migratory Species**

**[ Resource Information ]**

Name      Status      Type of Presence

**Migratory Marine Birds**

[Apus pacificus](#)

Fork-tailed Swift [678]      Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret [59541] <a href="#">Ardea ibis</a>		Species or species habitat may occur within area
Cattle Egret [59542] <a href="#">Sterna albifrons</a>		Species or species habitat may occur within area
Little Tern [813]		Species or species habitat may occur within area
<b>Migratory Marine Species</b>		
<a href="#">Balaenoptera edeni</a>		Species or species habitat may occur within area
Bryde's Whale [35] <a href="#">Balaenoptera musculus</a>		Species or species habitat may occur within area
Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Caretta caretta</a>		Species or species habitat likely to occur within area
Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
<a href="#">Chelonia mydas</a>		Foraging, feeding or related behaviour known to occur within area
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Crocodylus porosus</a>		Species or species habitat likely to occur within area
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
<a href="#">Dermochelys coriacea</a>		Species or species habitat likely to occur within area
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
<a href="#">Dugong dugon</a>		Species or species habitat likely to occur within area
Dugong [28]		Species or species habitat likely to occur within area
<a href="#">Eretmochelys imbricata</a>		Species or species habitat likely to occur within area
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lepidochelys olivacea</a>		Species or species habitat likely to occur within area
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat likely to occur within area
<a href="#">Megaptera novaeangliae</a>		Breeding known to occur within area
Humpback Whale [38]	Vulnerable	Breeding known to occur within area
<a href="#">Natator depressus</a>		Breeding known to occur within area
Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
<a href="#">Orcaella brevirostris</a>		Species or species habitat may occur within area
Irrawaddy Dolphin [45]		Species or species habitat may occur within area
<a href="#">Orcinus orca</a>		Species or species habitat may occur within area
Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Rhincodon typus</a>		Species or species habitat may occur within area
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
<a href="#">Sousa chinensis</a>		Species or species habitat may occur within area
Indo-Pacific Humpback Dolphin [50]		Species or species habitat may occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Haliaeetus leucogaster</a>		Species or species habitat likely to occur within area
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a>		Species or species habitat may occur within area
White-throated Needletail [682]		Species or species habitat may occur within area
<a href="#">Hirundo rustica</a>		Species or species habitat may occur within area
Barn Swallow [662]		Species or species habitat may occur within area

<a href="#">Merops ornatus</a>	Species or species habitat may occur within area
Rainbow Bee-eater [670]	
<a href="#">Monarcha melanopsis</a>	Breeding may occur within area
Black-faced Monarch [609]	
<a href="#">Monarcha trivirgatus</a>	Breeding likely to occur within area
Spectacled Monarch [610]	
<a href="#">Myiagra cyanoleuca</a>	Species or species habitat likely to occur within area
Satin Flycatcher [612]	
<a href="#">Rhipidura rufifrons</a>	
Rufous Fantail [592]	Breeding may occur within area
<b>Migratory Wetlands Species</b>	
<a href="#">Actitis hypoleucos</a>	
Common Sandpiper [59309]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Ardea alba</a>	
Great Egret, White Egret [59541]	Species or species habitat may occur within area
<a href="#">Ardea ibis</a>	
Cattle Egret [59542]	Species or species habitat may occur within area
<a href="#">Arenaria interpres</a>	
Ruddy Turnstone [872]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris acuminata</a>	
Sharp-tailed Sandpiper [874]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris alba</a>	
Sanderling [875]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris canutus</a>	
Red Knot, Knot [855]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris ferruginea</a>	
Curlew Sandpiper [856]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris ruficollis</a>	
Red-necked Stint [860]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Calidris tenuirostris</a>	
Great Knot [862]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius leschenaultii</a>	
Greater Sand Plover, Large Sand Plover [877]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius mongolus</a>	
Lesser Sand Plover, Mongolian Plover [879]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Charadrius veredus</a>	
Oriental Plover, Oriental Dotterel [882]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Gallinago hardwickii</a>	



[Anseranas semipalmata](#)

Magpie Goose [978]

Species or species habitat may occur within area

[Apus pacificus](#)

Fork-tailed Swift [678]

Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret  
[59541]

Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542]

Species or species habitat may occur within area

[Arenaria interpres](#)

Ruddy Turnstone [872]

Foraging, feeding or related behaviour known to occur within area

[Calidris acuminata](#)

Sharp-tailed Sandpiper [874]

Foraging, feeding or related behaviour known to occur within area

[Calidris alba](#)

Sanderling [875]

Foraging, feeding or related behaviour known to occur within area

[Calidris canutus](#)

Red Knot, Knot [855]

Foraging, feeding or related behaviour known to occur within area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Foraging, feeding or related behaviour known to occur within area

[Calidris ruficollis](#)

Red-necked Stint [860]

Foraging, feeding or related behaviour known to occur within area

[Calidris tenuirostris](#)

Great Knot [862]

Foraging, feeding or related behaviour known to occur within area

[Charadrius leschenaultii](#)

Greater Sand Plover, Large Sand Plover [877]

Foraging, feeding or related behaviour known to occur within area

[Charadrius mongolus](#)

Lesser Sand Plover, Mongolian Plover [879]

Foraging, feeding or related behaviour known to occur within area

[Charadrius ruficapillus](#)

Red-capped Plover [881]

Foraging, feeding or related behaviour known to occur within area

[Charadrius veredus](#)

Oriental Plover, Oriental Dotterel [882]

Foraging, feeding or related behaviour known to occur within area

[Gallinago hardwickii](#)

Latham's Snipe, Japanese Snipe [863]

Species or species habitat may occur within area

[Gallinago megala](#)

Swinhoe's Snipe [864]

Foraging, feeding or related behaviour likely to occur within area

[Gallinago stenura](#)

Pin-tailed Snipe [841]

Foraging, feeding or related behaviour likely to occur within area

<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]	Species or species habitat likely to occur within area
<a href="#">Heteroscelus brevipes</a> Grey-tailed Tattler [59311]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Heteroscelus incanus</a> Wandering Tattler [59547]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Himantopus himantopus</a> Black-winged Stilt [870]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Species or species habitat may occur within area
<a href="#">Hirundo rustica</a> Barn Swallow [662]	Species or species habitat may occur within area
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]	Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]	Breeding may occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]	Breeding likely to occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]	Species or species habitat likely to occur within area
<a href="#">Nettapus coromandelianus albipennis</a> Australian Cotton Pygmy-goose [25979]	Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew [847]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Numenius phaeopus</a> Whimbrel [849]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Philomachus pugnax</a> Ruff (Reeve) [850]	Foraging, feeding or related behaviour known to occur within area
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]	Foraging, feeding or related behaviour known to occur within area

[Pluvialis squatarola](#)

Grey Plover [865]

Foraging, feeding or related behaviour known to occur within area

[Recurvirostra novaehollandiae](#)

Red-necked Avocet [871]

Foraging, feeding or related behaviour known to occur within area

[Rhipidura rufifrons](#)

Rufous Fantail [592]

Breeding may occur within area

[Rostratula benghalensis s. lat.](#)

Painted Snipe [889]

Species or species habitat may occur within area

[Sterna albifrons](#)

Little Tern [813]

Species or species habitat may occur within area

[Tringa glareola](#)

Wood Sandpiper [829]

Foraging, feeding or related behaviour known to occur within area

[Tringa stagnatilis](#)

Marsh Sandpiper, Little Greenshank [833]

Foraging, feeding or related behaviour known to occur within area

[Xenus cinereus](#)

Terek Sandpiper [59300]

Foraging, feeding or related behaviour known to occur within area

**Fish**

[Acentronura tentaculata](#)

Shortpouch Pygmy Pipehorse [66187]

Species or species habitat may occur within area

[Campichthys tryoni](#)

Tryon's Pipefish [66193]

Species or species habitat may occur within area

[Choeroichthys brachysoma](#)

Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]

Species or species habitat may occur within area

[Choeroichthys suillus](#)

Pig-snouted Pipefish [66198]

Species or species habitat may occur within area

[Corythoichthys amplexus](#)

Fijian Banded Pipefish, Brown-banded Pipefish [66199]

Species or species habitat may occur within area

[Corythoichthys flavofasciatus](#)

Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]

Species or species habitat may occur within area

[Corythoichthys intestinalis](#)

Australian Messmate Pipefish, Banded Pipefish [66202]

Species or species habitat may occur within area

[Corythoichthys ocellatus](#)

Orange-spotted Pipefish, Ocellated Pipefish [66203]

Species or species habitat may occur within area

[Corythoichthys paxtoni](#)

Paxton's Pipefish [66204]

Species or species habitat may occur within area

[Corythoichthys schultzi](#)

Schultz's Pipefish [66205]

Species or species habitat may occur within area

[Cosmocampus darrosanus](#)

D'Arros Pipefish [66207]

Species or species habitat may occur within area

[Doryrhamphus excisus](#)

Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211] <a href="#">Festucalex cinctus</a>	Species or species habitat may occur within area
Girdled Pipefish [66214] <a href="#">Halicampus dunckeri</a>	Species or species habitat may occur within area
Red-hair Pipefish, Duncker's Pipefish [66220] <a href="#">Halicampus grayi</a>	Species or species habitat may occur within area
Mud Pipefish, Gray's Pipefish [66221] <a href="#">Halicampus nitidus</a>	Species or species habitat may occur within area
Glittering Pipefish [66224] <a href="#">Halicampus spinirostris</a>	Species or species habitat may occur within area
Spiny-snout Pipefish [66225] <a href="#">Hippichthys cyanospilos</a>	Species or species habitat may occur within area
Blue-speckled Pipefish, Blue-spotted Pipefish [66228] <a href="#">Hippichthys heptagonus</a>	Species or species habitat may occur within area
Madura Pipefish, Reticulated Freshwater Pipefish [66229] <a href="#">Hippichthys penicillus</a>	Species or species habitat may occur within area
Beady Pipefish, Steep-nosed Pipefish [66231] <a href="#">Hippocampus bargibanti</a>	Species or species habitat may occur within area
Pygmy Seahorse [66721] <a href="#">Hippocampus kuda</a>	Species or species habitat may occur within area
Spotted Seahorse, Yellow Seahorse [66237] <a href="#">Hippocampus planifrons</a>	Species or species habitat may occur within area
Flat-face Seahorse [66238] <a href="#">Hippocampus zebra</a>	Species or species habitat may occur within area
Zebra Seahorse [66241] <a href="#">Micrognathus andersonii</a>	Species or species habitat may occur within area
Anderson's Pipefish, Shortnose Pipefish [66253] <a href="#">Micrognathus brevirostris</a>	Species or species habitat may occur within area
thorntail Pipefish, Thorn-tailed Pipefish [66254] <a href="#">Nannocampus pictus</a>	Species or species habitat may occur within area
Painted Pipefish, Reef Pipefish [66263] <a href="#">Solegnathus hardwickii</a>	Species or species habitat may occur within area
Pallid Pipehorse, Hardwick's Pipehorse [66272] <a href="#">Solenostomus cyanopterus</a>	Species or species habitat may occur within area
Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183] <a href="#">Solenostomus paegnius</a>	Species or species habitat may occur within area
Rough-snout Ghost Pipefish [68425] <a href="#">Solenostomus paradoxus</a>	Species or species habitat may occur within area
Ornate Ghostpipefish, Harlequin	Species or species habitat may occur within area

Ghost Pipefish, Ornate Ghost Pipefish [66184]

[Syngnathoides biaculeatus](#)

Double-end Pipehorse,  
Double-ended Pipehorse,  
Alligator Pipefish [66279]

Species or species habitat may occur within area

[Trachyrhamphus bicoarctatus](#)

Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]

Species or species habitat may occur within area

[Trachyrhamphus longirostris](#)

Straightstick Pipefish,  
Long-nosed Pipefish, Straight Stick Pipefish [66281]

Species or species habitat may occur within area

## Mammals

[Dugong dugon](#)

Dugong [28]

Species or species habitat likely to occur within area

## Reptiles

[Acalyptophis peronii](#)

Horned Seasnake [1114]

Species or species habitat may occur within area

[Aipysurus duboisii](#)

Dubois' Seasnake [1116]

Species or species habitat may occur within area

[Aipysurus eydouxi](#)

Spine-tailed Seasnake [1117]

Species or species habitat may occur within area

[Aipysurus laevis](#)

Olive Seasnake [1120]

Species or species habitat may occur within area

[Astrotia stokesii](#)

Stokes' Seasnake [1122]

Species or species habitat may occur within area

[Caretta caretta](#)

Loggerhead Turtle [1763]

Endangered

Species or species habitat likely to occur within area

[Chelonia mydas](#)

Green Turtle [1765]

Vulnerable

Foraging, feeding or related behaviour known to occur within area

[Crocodylus porosus](#)

Salt-water Crocodile, Estuarine Crocodile [1774]

Species or species habitat likely to occur within area

[Dermochelys coriacea](#)

Leatherback Turtle, Leathery Turtle, Luth [1768]

Endangered

Species or species habitat likely to occur within area

[Disteira kingii](#)

Spectacled Seasnake [1123]

Species or species habitat may occur within area

[Disteira major](#)

Olive-headed Seasnake [1124]

Species or species habitat may occur within area

[Enhydrina schistosa](#)

Beaked Seasnake [1126]

Species or species habitat may occur within area

[Eretmochelys imbricata](#)

Hawksbill Turtle [1766]

Vulnerable

Species or species habitat likely to occur within area

[Hydrophis elegans](#)

Elegant Seasnake [1104]

Species or species habitat may occur within area

[Hydrophis mcdowelli](#)

<a href="#">null</a> [25926]		Species or species habitat may occur within area
<a href="#">Hydrophis ornatus</a>		
a seasnake [1111]		Species or species habitat may occur within area
<a href="#">Lapemis hardwickii</a>		
Spine-bellied Seasnake [1113]		Species or species habitat may occur within area
<a href="#">Laticauda colubrina</a>		
a sea krait [1092]		Species or species habitat may occur within area
<a href="#">Laticauda laticaudata</a>		
a sea krait [1093]		Species or species habitat may occur within area
<a href="#">Lepidochelys olivacea</a>		
Olive Ridley Turtle, Pacific	Endangered	Species or species habitat likely to occur within area
Ridley Turtle [1767]		
<a href="#">Natator depressus</a>		
Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
<a href="#">Pelamis platurus</a>		
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

## Whales and Other Cetaceans [ [Resource Information](#) ]

Name	Status	Type of Presence
<b>Mammals</b>		
<a href="#">Balaenoptera acutorostrata</a>		
Minke Whale [33]		Species or species habitat may occur within area
<a href="#">Balaenoptera edeni</a>		
Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a>		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Delphinus delphis</a>		
Common Dophin, Short-beaked		Species or species habitat may occur within area
Common Dolphin [60]		
<a href="#">Grampus griseus</a>		
Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a>		
Humpback Whale [38]	Vulnerable	Breeding known to occur within area
<a href="#">Orcaella brevirostris</a>		
Irrawaddy Dolphin [45]		Species or species habitat may occur within area
<a href="#">Orcinus orca</a>		
Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Sousa chinensis</a>		
Indo-Pacific Humpback Dolphin		Species or species habitat may occur within area
[50]		
<a href="#">Stenella attenuata</a>		
Spotted Dolphin, Pantropical		Species or species habitat may occur within area
Spotted Dolphin [51]		
<a href="#">Tursiops aduncus</a>		
Indian Ocean Bottlenose		Species or species habitat likely to occur within area
Dolphin, Spotted Bottlenose		
Dolphin [68418]		
<a href="#">Tursiops truncatus s. str.</a>		
Bottlenose Dolphin [68417]		Species or species habitat may occur within area

## Extra Information

## Places on the RNE [ [Resource Information](#) ]

Note that not all Indigenous sites may be listed.

Name	Status
<b>Natural</b>	
<a href="#">Great Barrier Reef Region QLD</a>	Registered
<a href="#">Magnetic Island (in part) QLD</a>	Registered

### **State and Territory Reserves** **[ [Resource Information](#) ]**

Great Barrier Reef Coast, QLD  
Cleveland Bay - Magnetic Island, QLD

### **Invasive Species** **[ [Resource Information](#) ]**

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Mammals</b>		

#### [Felis catus](#)

Cat, House Cat, Domestic Cat  
[19] Species or species habitat likely to occur within area

#### [Oryctolagus cuniculus](#)

Rabbit, European Rabbit [128] Species or species habitat may occur within area

#### [Vulpes vulpes](#)

Red Fox, Fox [18] Species or species habitat may occur within area

### **Plants**

#### [Acacia nilotica subsp. indica](#)

Prickly Acacia [6196] Species or species habitat may occur within area

#### [Cryptostegia grandiflora](#)

Rubber Vine, Rubbervine, India Species or species habitat may occur within area

Rubber Vine, India Rubbervine,  
Palay Rubbervine, Purple  
Allamanda [18913]

#### [Hymenachne amplexicaulis](#)

Hymenachne, Olive Species or species habitat likely to occur within area

Hymenachne, Water Stargrass,  
West Indian Grass, West Indian  
Marsh Grass [31754]

#### [Lantana camara](#)

Lantana, Common Lantana, Species or species habitat may occur within area

Kamara Lantana, Large-leaf  
Lantana, Pink Flowered  
Lantana, Red Flowered Lantana,  
Red-Flowered Sage, White  
Sage, Wild Sage [10892]

#### [Parkinsonia aculeata](#)

Parkinsonia, Jerusalem Thorn, Species or species habitat may occur within area

Jelly Bean Tree, Horse Bean  
[12301]

#### [Parthenium hysterophorus](#)

Parthenium Weed, Bitter Weed, Species or species habitat likely to occur within area

Carrot Grass, False Ragweed  
[19566]

#### [Salvinia molesta](#)

Salvinia, Giant Salvinia,  
Aquarium Watermoss, Kariba  
Weed [13665]

Species or species habitat may occur within area

**Nationally Important Wetlands**

**[ Resource Information ]**

[Great Barrier Reef Marine Park, QLD](#)

## Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

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

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

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

## Coordinates

146.9008  
-19.11419,146.8689  
-19.19116,146.8429

-19.23145,146.8581  
-19.24295,146.847  
-19.2559,146.8311  
-19.24234,146.8397  
-19.22901,146.8414  
-19.23031,146.8678  
-19.18947,146.8993  
-19.1133,146.9008 -19.11419

## Acknowledgements

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

- [-Department of Environment, Climate Change and Water, New South Wales](#)
- [-Department of Sustainability and Environment, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment and Natural Resources, South Australia](#)
- [-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [-Environmental and Resource Management, Queensland](#)
- [-Department of Environment and Conservation, Western Australia](#)
- [-Department of the Environment, Climate Change, Energy and Water](#)
- [-Birds Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-SA Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- Other groups and individuals

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

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

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Last updated: Thursday, 16-Sep-2010 09:13:25 EST

[Department of Sustainability, Environment, Water, Population and Communities](#)

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## Wildlife Online Extract

Search Criteria: Species List for a Defined Area  
Species: All  
Type: All  
Status: All  
Records: All  
Date: All  
Latitude: 19.2264 to 19.2578  
Longitude: 146.8289 to 146.8625  
Email: vlatka.varagic@aecom.com  
Date submitted: Tuesday 01 Mar 2011 09:52:26  
Date extracted: Tuesday 01 Mar 2011 10:01:33

The number of records retrieved = 93

### **Disclaimer**

As the DERM is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Feedback about Wildlife Online should be emailed to [Wildlife.Online@derm.qld.gov.au](mailto:Wildlife.Online@derm.qld.gov.au)

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Acanthizidae	<i>Gerygone levigaster</i>	mangrove gerygone		C		2
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		2
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmyny kite		C		3
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		1
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		2
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		2
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		2
animals	birds	Ardeidae	<i>Ardea modesta</i>	eastern great egret		C		2
animals	birds	Ardeidae	<i>Egretta sacra</i>	eastern reef egret		C		2
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		2
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		1
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		2
animals	birds	Ardeidae	<i>Butorides striata</i>	striated heron		C		1
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		3/1
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		1
animals	birds	Burhinidae	<i>Esacus magnirostris</i>	beach stone-curlew		V		1
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		1
animals	birds	Charadriidae	<i>Euseyornis melanops</i>	black-fronted dotterel		C		1
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		3
animals	birds	Charadriidae	<i>Charadrius leschenaultii</i>	greater sand plover		C		1
animals	birds	Charadriidae	<i>Pluvialis squatarola</i>	grey plover		C		2
animals	birds	Charadriidae	<i>Charadrius mongolus</i>	lesser sand plover		C		3
animals	birds	Charadriidae	<i>Pluvialis fulva</i>	Pacific golden plover		C		3
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			2
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		2
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			1
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		2
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		1
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		1
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		1
animals	birds	Haematopodidae	<i>Haematopus fuliginosus</i>	sooty oystercatcher		NT		1
animals	birds	Haematopodidae	<i>Haematopus longirostris</i>	Australian pied oystercatcher		C		2
animals	birds	Halcyonidae	<i>Todiramphus chloris</i>	collared kingfisher		C		1
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		2
animals	birds	Laridae	<i>Sterna hirundo</i>	common tern		C		1
animals	birds	Laridae	<i>Sternula albifrons</i>	little tern		E		2
animals	birds	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull		C		5
animals	birds	Laridae	<i>Thalasseus bengalensis</i>	lesser crested tern		C		4
animals	birds	Laridae	<i>Chlidonias leucopterus</i>	white-winged black tern		C		1
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		C		3
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		C		2
animals	birds	Laridae	<i>Thalasseus bergii</i>	crested tern		C		6
animals	birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush-turkey		C		1
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		2
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		2
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		1
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		1
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	piebald cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		1
animals	birds	Procellariidae	<i>Ardenna tenuirostris</i>	short-tailed shearwater		C		1
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		1
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		1
animals	birds	Rallidae	<i>Porphyrio porphyrio</i>	purple swamphen		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		1
animals	birds	Scolopacidae	<i>Limosa limosa</i>	black-tailed godwit		C		1
animals	birds	Scolopacidae	<i>Tringa glareola</i>	wood sandpiper		C		1
animals	birds	Scolopacidae	<i>Calidris canutus</i>	red knot		C		1
animals	birds	Scolopacidae	<i>Tringa brevipes</i>	grey-tailed tattler		C		3
animals	birds	Scolopacidae	<i>Xenus cinereus</i>	terek sandpiper		C		1
animals	birds	Scolopacidae	<i>Limosa lapponica</i>	bar-tailed godwit		C		3
animals	birds	Scolopacidae	<i>Tringa nebularia</i>	common greenshank		C		3
animals	birds	Scolopacidae	<i>Numenius madagascariensis</i>	eastern curlew		NT		4
animals	birds	Scolopacidae	<i>Calidris tenuirostris</i>	great knot		C		2
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		C		2
animals	birds	Scolopacidae	<i>Calidris ruficollis</i>	red-necked stint		C		2
animals	birds	Scolopacidae	<i>Calidris ferruginea</i>	curlew sandpiper		C		2
animals	birds	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper		C		1
animals	birds	Scolopacidae	<i>Calidris acuminata</i>	sharp-tailed sandpiper		C		2
animals	birds	Scolopacidae	<i>Actitis hypoleucos</i>	common sandpiper		C		1
animals	birds	Scolopacidae	<i>Numenius phaeopus</i>	whimbrel		C		4
animals	birds	Scolopacidae	<i>Numenius minutus</i>	little curlew		C		1
animals	birds	Sturnidae	<i>Sturnus tristis</i>	common myna	Y			1
animals	birds	Sulidae	<i>Sula leucogaster</i>	brown booby		C		4
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		C		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		1
animals	birds	Threskiornithidae	<i>Threskiornis spicicollis</i>	straw-necked ibis		C		1
animals	mammals	Balaenopteridae	<i>Megaptera novaeangliae</i>	humpback whale		V	V	1
animals	mammals	Delphinidae	<i>Orcaella heinsohni</i>	Australian snubfin dolphin		NT		3
fungi	sac fungi	Ramalinaceae	<i>Ramalina confirmata</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Thymophylla tenuiloba</i>		Y			1/1
plants	higher dicots	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		1/1
plants	higher dicots	Cleomaceae	<i>Cleome gynandra</i>		Y			1/1
plants	higher dicots	Fabaceae	<i>Indigofera tinctoria</i>		Y			1/1
plants	higher dicots	Sparrmanniaceae	<i>Corchorus olitorius</i>	jute		C		1/1
plants	monocots	Poaceae	<i>Eragrostis curvula</i>		Y			1/1
plants	monocots	Poaceae	<i>Leptochloa fusca subsp. uninervia</i>		Y			1/1
plants	uncertain	Indet.	Indet.			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
protists	red algae	Rhodophyceae	<i>Acanthophora spicifera</i>			C		1/1

#### CODES

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

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.



## Wildlife Online Extract

Search Criteria: Species List for a Defined Area  
Species: All  
Type: All  
Status: All  
Records: All  
Date: All  
Latitude: 19.1944 to 19.2258  
Longitude: 146.8386 to 146.8722  
Email: vlatka.varagic@aecom.com  
Date submitted: Thursday 03 Mar 2011 10:58:08  
Date extracted: Thursday 03 Mar 2011 11:01:28

The number of records retrieved = 1

### **Disclaimer**

As the DERM is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Delphinidae	<i>Orcaella heinsohni</i>	Australian snubfin dolphin		NT		1

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This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.



## Wildlife Online Extract

Search Criteria: Species List for a Defined Area  
Species: All  
Type: All  
Status: All  
Records: All  
Date: All  
Latitude: 19.1056 to 19.1622  
Longitude: 146.8775 to 146.9092  
Email: vlatka.varagic@aecom.com  
Date submitted: Thursday 03 Mar 2011 10:59:19  
Date extracted: Thursday 03 Mar 2011 11:01:31

The number of records retrieved = 36

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		C		5
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		1
animals	birds	Ardeidae	<i>Egretta sacra</i>	eastern reef egret		C		1
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		1
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		1
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		1
animals	birds	Fregatidae	<i>Fregata ariel</i>	lesser frigatebird		C		1
animals	birds	Haematopodidae	<i>Haematopus fuliginosus</i>	sooty oystercatcher		NT		8
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		1
animals	birds	Megapodiidae	<i>Megapodius reinwardt</i>	orange-footed scrubfowl		C		1
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		1
animals	birds	Procellariidae	<i>Macronectes giganteus</i>	southern giant-petrel		E	E	1
animals	birds	Sulidae	<i>Morus serrator</i>	Australasian gannet		C		1
animals	mammals	Balaenopteridae	<i>Megaptera novaeangliae</i>	humpback whale		V	V	4
animals	mammals	Delphinidae	<i>Sousa chinensis</i>	Indo-Pacific humpback dolphin		NT		1/1
animals	mammals	Dugongidae	<i>Dugong dugon</i>	dugong		V		1
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		C		2
animals	reptiles	Crocodylidae	<i>Crocodylus porosus</i>	estuarine crocodile		V		1
animals	reptiles	Scincidae	<i>Bellatorias frerei</i>	major skink		C		1
plants	higher dicots	Acanthaceae	<i>Hypoestes</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Tephrosia macrostachya</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Cajanus reticulatus</i> var. <i>reticulatus</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Tephrosia brachyodon</i> var. <i>brachyodon</i>			C		1/1
plants	higher dicots	Malvaceae	<i>Thespesia populnea</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia aulacocarpa</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		1/1
plants	higher dicots	Myrtaceae	<i>Gossia bidwillii</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Aidia racemosa</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Ixora timorensis</i>			C		1/1
plants	higher dicots	Sapindaceae	<i>Cupaniopsis anacardioides</i>	tuckeroo		C		1/1
plants	higher dicots	Sapotaceae	<i>Planchonella pohlmaniana</i>			C		1/1
plants	higher dicots	Sparrmanniaceae	<i>Grewia graniticola</i>			NT		1/1
plants	higher dicots	Vitaceae	<i>Cissus oblonga</i>			C		1/1
plants	higher dicots	Vitaceae	<i>Clematicissus opaca</i>			C		1/1
plants	lower dicots	Menispermaceae	<i>Pachygone ovata</i>			C		1/1
plants	lower dicots	Menispermaceae	<i>Pleogyne australis</i>	wiry grape		C		1/1

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This number is output as 999 if it equals or exceeds this value.



## Wildlife Online Extract

Search Criteria: Species List for a Defined Area  
Species: All  
Type: All  
Status: All  
Records: All  
Date: All  
Latitude: 19.1633 to 19.1944  
Longitude: 146.8586 to 146.5522  
Email: vlatka.varagic@aecom.com  
Date submitted: Thursday 03 Mar 2011 11:00:55  
Date extracted: Thursday 03 Mar 2011 11:01:34

The number of records retrieved = 474

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	Y			33
animals	amphibians	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog		C		3
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		1
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		9
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		13
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		15
animals	birds	Acanthizidae	<i>Gerygone levigaster</i>	mangrove gerygone		C		17
animals	birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone		C		5
animals	birds	Acanthizidae	<i>Gerygone magnirostris</i>	large-billed gerygone		C		3
animals	birds	Acanthizidae	<i>Gerygone albugularis</i>	white-throated gerygone		C		3
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		17
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		84
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		1
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		NT		5
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		11
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		44
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		NT		2
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		2
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		77
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		7
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		C		40
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmyn kite		C		56
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		1
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		1
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		4
animals	birds	Alcedinidae	<i>Ceyx pusilla</i>	little kingfisher		C		1
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		2
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		10
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		1
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		NT		1
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		28
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		2
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		30
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		9
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		27
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		C		3
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		C		4
animals	birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet		NT		11
animals	birds	Ardeidae	<i>Ardea ibis</i>	cattle egret		C		8
animals	birds	Ardeidae	<i>Ardea modesta</i>	eastern great egret		C		38
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		12
animals	birds	Ardeidae	<i>Egretta sacra</i>	eastern reef egret		C		22
animals	birds	Ardeidae	<i>Ardea sumatrana</i>	great-billed heron		C		1
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		33
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	Nankeen night-heron		C		3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	<i>Butorides striata</i>	striated heron		C		16
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		47
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		30
animals	birds	Artamidae	<i>Cracticus quoyi</i>	black butcherbird		C		4
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		2
animals	birds	Artamidae	<i>Cracticus tibicen</i>	Australian magpie		C		38
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		30
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		44
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		1
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		13
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		2
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		45
animals	birds	Burhinidae	<i>Esacus magnirostris</i>	beach stone-curlew		V		5
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		38
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		43
animals	birds	Cacatuidae	<i>Eolophus roseicapillus</i>	galah		C		8
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		3
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		2
animals	birds	Campephagidae	<i>Lalage sueurii</i>	white-winged triller		C		1
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		44
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		37
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		33
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		12
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		21
animals	birds	Charadriidae	<i>Vanellus miles miles</i>	masked lapwing (northern subspecies)		C		23
animals	birds	Charadriidae	<i>Charadrius leschenaultii</i>	greater sand plover		C		18
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		39
animals	birds	Charadriidae	<i>Pluvialis squatarola</i>	grey plover		C		2
animals	birds	Charadriidae	<i>Pluvialis fulva</i>	Pacific golden plover		C		1
animals	birds	Charadriidae	<i>Charadrius mongolus</i>	lesser sand plover		C		12
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		5
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		NT		17
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		4
animals	birds	Columbidae	<i>Ptilinopus magnificus</i>	wompoo fruit-dove		C		2
animals	birds	Columbidae	<i>Streptopelia chinensis</i>	spotted dove	Y			1
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		1
animals	birds	Columbidae	<i>Ptilinopus superbis</i>	superb fruit-dove		C		2
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		43
animals	birds	Columbidae	<i>Chalcophaps indica</i>	emerald dove		C		3
animals	birds	Columbidae	<i>Ptilinopus regina</i>	rose-crowned fruit-dove		C		1
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		31
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		81
animals	birds	Columbidae	<i>Ducula bicolor</i>	piebald imperial-pigeon		C		19
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			2
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		1
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		26

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		47
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		7
animals	birds	Cuculidae	<i>Cuculus optatus</i>	oriental cuckoo		C		1
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		26
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		43
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		24
animals	birds	Cuculidae	<i>Chalcites minutillus minutillus</i>	little bronze-cuckoo		C		3
animals	birds	Cuculidae	<i>Chalcites minutillus russatus</i>	Gould's bronze-cuckoo		C		1
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		2
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		16
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		16
animals	birds	Cuculidae	<i>Chalcites basalus</i>	Horsfield's bronze-cuckoo		C		4
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		1
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		59
animals	birds	Dicruridae	<i>Dicrurus bracteatus bracteatus</i>	spangled drongo (eastern Australia)		C		2
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		3
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		32
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		1
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		5
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			7
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		3
animals	birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar		C		1
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		1
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		3
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		2
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		6
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		11
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		2
animals	birds	Gruidae	<i>Grus rubicunda</i>	broilga		C		23
animals	birds	Haematopodidae	<i>Haematopus fuliginosus</i>	sooty oystercatcher		NT		3
animals	birds	Haematopodidae	<i>Haematopus longirostris</i>	Australian pied oystercatcher		C		40
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		46
animals	birds	Halcyonidae	<i>Tanysiptera sylvia</i>	buff-breasted paradise-kingfisher		C		1
animals	birds	Halcyonidae	<i>Todiramphus chloris</i>	collared kingfisher		C		3
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		19
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		42
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		30
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		30
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		22
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		4
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		4
animals	birds	Laridae	<i>Thalasseus bergii</i>	crested tern		C		22
animals	birds	Laridae	<i>Sterna sumatrana</i>	black-naped tern		C		1
animals	birds	Laridae	<i>Sterna hirundo</i>	common tern		C		4
animals	birds	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull		C		62
animals	birds	Laridae	<i>Thalasseus bengalensis</i>	lesser crested tern		C		11

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Laridae	<i>Onychoprion anaethetus</i>	bridled tern		C		1
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		C		36
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		1
animals	birds	Laridae	<i>Sternula albifrons</i>	little tern		E		12
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		C		42
animals	birds	Maluridae	<i>Malurus amabilis</i>	lovely fairy-wren		C		1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		41
animals	birds	Megaluridae	<i>Megalurus gramineus</i>	little grassbird		C		1
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		27
animals	birds	Megapodiidae	<i>Megapodius reinwardt</i>	orange-footed scrubfowl		C		6
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		1
animals	birds	Meliphagidae	<i>Ramsayornis modestus</i>	brown-backed honeyeater		C		41
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		1
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		37
animals	birds	Meliphagidae	<i>Lichenostomus versicolor</i>	varied honeyeater		C		1
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		1
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		38
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		1
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		1
animals	birds	Meliphagidae	<i>Lichenostomus unicolor</i>	white-gaped honeyeater		C		3
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		21
animals	birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater		C		36
animals	birds	Meliphagidae	<i>Meliphaga notata</i>	yellow-spotted honeyeater		C		10
animals	birds	Meliphagidae	<i>Lichenostomus fasciocularis</i>	mangrove honeyeater		C		3
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		52
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		38
animals	birds	Meliphagidae	<i>Meliphaga gracilis</i>	graceful honeyeater		C		1
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		49
animals	birds	Meliphagidae	<i>Lichenostomus flavus</i>	yellow honeyeater		C		43
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		66
animals	birds	Monarchidae	<i>Myiagra alecto</i>	shining flycatcher		C		3
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		1
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		51
animals	birds	Monarchidae	<i>Carterornis leucotis</i>	white-eared monarch		C		4
animals	birds	Monarchidae	<i>Symposiarchus trivirgatus</i>	spectacled monarch		C		2
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		41
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		15
animals	birds	Motacillidae	<i>Motacilla flava sensu lato</i>	yellow wagtail		C		1
animals	birds	Nectariniidae	<i>Nectarinia jugularis</i>	olive-backed sunbird		C		65
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		34
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		1
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		29
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		51
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		1
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		10
animals	birds	Pachycephalidae	<i>Colluricincla megarrhyncha</i>	little shrike-thrush		C		11

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		4
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		18
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			7
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		39
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		1
animals	birds	Petroicidae	<i>Peneonanthe pulverulenta</i>	mangrove robin		C		5
animals	birds	Petroicidae	<i>Microeca flavigaster</i>	lemon-bellied flycatcher		C		10
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		8
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		10
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		10
animals	birds	Phasianidae	<i>Pavo cristatus</i>	Indian peafowl	Y			2
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		7
animals	birds	Pittidae	<i>Pitta versicolor</i>	noisy pitta		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		22
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		3
animals	birds	Psittacidae	<i>Platycercus elegans</i>	crimson rosella		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		30
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		32
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		69
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		30
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	great bowerbird		C		38
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		1
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		2
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		26
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		C		6
animals	birds	Rhipiduridae	<i>Rhipidura rufiventris</i>	northern fantail		C		5
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		17
animals	birds	Scolopacidae	<i>Calidris alba</i>	sanderling		C		3
animals	birds	Scolopacidae	<i>Limosa lapponica</i>	bar-tailed godwit		C		45
animals	birds	Scolopacidae	<i>Tringa nebularia</i>	common greenshank		C		20
animals	birds	Scolopacidae	<i>Numenius madagascariensis</i>	eastern curlew		NT		63
animals	birds	Scolopacidae	<i>Calidris tenuirostris</i>	great knot		C		23
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		C		2
animals	birds	Scolopacidae	<i>Calidris ruficollis</i>	red-necked stint		C		15
animals	birds	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper		C		5
animals	birds	Scolopacidae	<i>Calidris acuminata</i>	sharp-tailed sandpiper		C		5
animals	birds	Scolopacidae	<i>Actitis hypoleucos</i>	common sandpiper		C		8
animals	birds	Scolopacidae	<i>Numenius phaeopus</i>	whimbrel		C		51
animals	birds	Scolopacidae	<i>Numenius minutus</i>	little curlew		C		5
animals	birds	Scolopacidae	<i>Calidris canutus</i>	red knot		C		1
animals	birds	Scolopacidae	<i>Limosa limosa</i>	black-tailed godwit		C		2
animals	birds	Scolopacidae	<i>Xenus cinereus</i>	terek sandpiper		C		6
animals	birds	Scolopacidae	<i>Tringa brevipes</i>	grey-tailed tattler		C		20
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		3
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		V		4
animals	birds	Sturnidae	<i>Sturnus tristis</i>	common myna	Y			4
animals	birds	Sturnidae	<i>Apornis metallica</i>	metallic starling		C		1
animals	birds	Sulidae	<i>Sula leucogaster</i>	brown booby		C		3
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		10
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		30
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		5
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		C		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		48
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		1
animals	birds	Tytonidae	<i>Tyto javanica</i>	eastern barn owl		C		1
animals	bony fish	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				1/1
animals	cartilaginous fishes	Myliobatidae	<i>Aetobatus narinari</i>	whitespotted eagle ray				1
animals	insects	Nymphalidae	<i>Hypolimnas alimena lamina</i>	blue-banded eggfly				1
animals	mammals	Balaenopteridae	<i>Megaptera novaeangliae</i>	humpback whale		V	V	1
animals	mammals	Canidae	<i>Canis lupus dingo</i>	dingo				1
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		4
animals	mammals	Delphinidae	<i>Sousa chinensis</i>	Indo-Pacific humpback dolphin		NT		1/1
animals	mammals	Delphinidae	<i>Orcaella heinsohni</i>	Australian snubfin dolphin		NT		8/4
animals	mammals	Dugongidae	<i>Dugong dugon</i>	dugong		V		5
animals	mammals	Hipposideridae	<i>Hipposideros ater aruensis</i>	eastern dusky leaf-nosed bat		C		1
animals	mammals	Macropodidae	<i>Thylogale sp.</i>					1
animals	mammals	Macropodidae	<i>Macropus agilis</i>	agile wallaby		C		5
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		1
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		1
animals	mammals	Macropodidae	<i>Petrogale assimilis</i>	allied rock-wallaby		C		4
animals	mammals	Macropodidae	<i>Macropus robustus</i>	common wallaroo		C		1
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			6
animals	mammals	Muridae	<i>Pseudomys gracilicaudatus</i>	eastern chestnut mouse		C		1
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		1
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		1
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		2
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		2
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		C		2
animals	mammals	Physeteridae	<i>Physeter macrocephalus</i>	sperm whale		C		1/1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			1
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		C		7
animals	mammals	Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>			C		2
animals	reptiles	Boidae	<i>Morelia kinghorni</i>	amethystine python (Australian form)		C		1
animals	reptiles	Cheloniidae	<i>Chelonia mydas</i>	green turtle		V	V	1
animals	reptiles	Cheloniidae	<i>Eretmochelys imbricata</i>	hawksbill turtle		V	V	2
animals	reptiles	Cheloniidae	<i>Natator depressus</i>	flatback turtle		V	V	1
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		4
animals	reptiles	Colubridae	<i>Dendrelaphis punctulata</i>	common tree snake		C		2
animals	reptiles	Crocodylidae	<i>Crocodylus porosus</i>	estuarine crocodile		V		1
animals	reptiles	Elapidae	<i>Demansia torquata</i>	collared whip snake		C		2
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		1
animals	reptiles	Elapidae	<i>Rhinoplocephalus nigrostriatus</i>	black-striped snake		C		1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>			C		3/1
animals	reptiles	Pygopodidae	<i>Delma tincta</i>			C		1
animals	reptiles	Pygopodidae	<i>Delma labialis</i>	striped-tailed delma		V	V	2
animals	reptiles	Scincidae	<i>Carlia vivax</i>			C		3
animals	reptiles	Scincidae	<i>Carlia pectoralis</i>			C		4
animals	reptiles	Scincidae	<i>Ctenotus robustus</i>			C		4
animals	reptiles	Scincidae	<i>Tiliqua scincoides</i>	eastern blue-tongued lizard		C		2
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>			C		1
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		1
animals	reptiles	Varanidae	<i>Varanus gouldii</i>	sand monitor		C		1
plants	ferns	Davalliaceae	<i>Davallia denticulata var. denticulata</i>			C		1/1
plants	ferns	Marsileaceae	<i>Marsilea crenata</i>			C		1/1
plants	ferns	Thelypteridaceae	<i>Cyclosorus interruptus</i>			C		1/1
plants	higher dicots	Acanthaceae	<i>Asystasia gangetica subsp. gangetica</i>		Y			1/1
plants	higher dicots	Aizoaceae	<i>Trianthema triquetra</i>	red spinach		C		1/1
plants	higher dicots	Amaranthaceae	<i>Alternanthera ficoidea</i>		Y			3/3
plants	higher dicots	Amaranthaceae	<i>Alternanthera denticulata</i>	lesser joyweed		C		1/1
plants	higher dicots	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		1/1
plants	higher dicots	Apocynaceae	<i>Calotropis gigantea</i>		Y			1/1
plants	higher dicots	Apocynaceae	<i>Catharanthus roseus</i>	pink periwinkle	Y			1/1
plants	higher dicots	Apocynaceae	<i>Marsdenia microlepis</i>			C		1/1
plants	higher dicots	Apocynaceae	<i>Parsonsia plaesiophylla</i>			C		1/1
plants	higher dicots	Apocynaceae	<i>Rauvolfia tetraphylla</i>		Y			2/2
plants	higher dicots	Asteraceae	<i>Calyptocarpus vialis</i>	creeping cinderella weed	Y			1/1
plants	higher dicots	Asteraceae	<i>Gnaphalium polycaulon</i>		Y			1/1
plants	higher dicots	Asteraceae	<i>Pluchea rubelliflora</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Cyanthillium cinereum</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Praxelis clematidea</i>		Y			1/1
plants	higher dicots	Asteraceae	<i>Bidens bipinnata</i>	bipinnate beggar's ticks	Y			1/1
plants	higher dicots	Asteraceae	<i>Wedelia spilanthis</i>			C		1/1
plants	higher dicots	Boraginaceae	<i>Heliotropium indicum</i>		Y			1/1
plants	higher dicots	Boraginaceae	<i>Heliotropium pauciflorum</i>			C		1/1
plants	higher dicots	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		1/1
plants	higher dicots	Burseraceae	<i>Garuga floribunda var. floribunda</i>			C		1/1
plants	higher dicots	Burseraceae	<i>Canarium australicum var. australicum</i>			C		1/1
plants	higher dicots	Byttneriaceae	<i>Waltheria indica</i>			C		1/1
plants	higher dicots	Byttneriaceae	<i>Melochia corchorifolia</i>			C		1/1
plants	higher dicots	Caesalpiniaceae	<i>Senna occidentalis</i>	coffee senna	Y			1/1
plants	higher dicots	Capparaceae	<i>Capparis lucida</i>			C		2/2
plants	higher dicots	Capparaceae	<i>Capparis sepiaria</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Celastraceae	<i>Maytenus disperma</i>	orange boxwood		C		2/2
plants	higher dicots	Chenopodiaceae	<i>Salsola kali</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Dysphania glomulifera</i> subsp. <i>glomulifera</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Tecticornia pergranulata</i> subsp. <i>queenslandica</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Tecticornia indica</i> subsp. <i>leiostachya</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Tecticornia indica</i> subsp. <i>indica</i>			C		1/1
plants	higher dicots	Cleomaceae	<i>Cleome tetrandra</i> var. <i>tetrandra</i>			C		1/1
plants	higher dicots	Cochlospermaceae	<i>Cochlospermum gillivraei</i>			C		1
plants	higher dicots	Convolvulaceae	<i>Cuscuta australis</i>	Australian dodder		C		1/1
plants	higher dicots	Convolvulaceae	<i>Ipomoea mauritiana</i>			C		1/1
plants	higher dicots	Convolvulaceae	<i>Ipomoea polymorpha</i>			C		4/4
plants	higher dicots	Convolvulaceae	<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>	goatsfoot		C		1/1
plants	higher dicots	Convolvulaceae	<i>Jacquemontia paniculata</i>			C		1/1
plants	higher dicots	Cucurbitaceae	<i>Cucumis maderaspatanus</i>			C		2/2
plants	higher dicots	Cucurbitaceae	<i>Citrullus lanatus</i> var. <i>lanatus</i>		Y			1/1
plants	higher dicots	Euphorbiaceae	<i>Chamaesyce bifida</i>			C		2/2
plants	higher dicots	Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>tannensis</i>			C		1/1
plants	higher dicots	Euphorbiaceae	<i>Claoxylon tenerifolium</i> subsp. <i>tenerifolium</i>			C		1/1
plants	higher dicots	Euphorbiaceae	<i>Microstachys chamaelea</i>			C		2/2
plants	higher dicots	Euphorbiaceae	<i>Croton arnhemicus</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Canavalia rosea</i>	coastal jack bean		C		2/2
plants	higher dicots	Fabaceae	<i>Desmodium trichostachyum</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Indigofera pratensis</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Glycine tomentella</i>	woolly glycine		C		1/1
plants	higher dicots	Fabaceae	<i>Desmodium filiforme</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Indigofera linifolia</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Tephrosia barbatala</i>			C		2/2
plants	higher dicots	Lamiaceae	<i>Hyptis capitata</i>		Y			1/1
plants	higher dicots	Lamiaceae	<i>Vitex rotundifolia</i>			C		1/1
plants	higher dicots	Lamiaceae	<i>Clerodendrum floribundum</i>			C		1
plants	higher dicots	Loranthaceae	<i>Amyema bifurcata</i>			C		1/1
plants	higher dicots	Loranthaceae	<i>Amyema mackayensis</i>			C		1/1
plants	higher dicots	Malvaceae	<i>Sida rhombifolia</i>		Y			1/1
plants	higher dicots	Malvaceae	<i>Abutilon guineense</i>			C		1/1
plants	higher dicots	Malvaceae	<i>Abutilon albescens</i>			C		1/1
plants	higher dicots	Meliaceae	<i>Turraea pubescens</i>	native honeysuckle		C		1/1
plants	higher dicots	Meliaceae	<i>Xylocarpus moluccensis</i>			C		1/1
plants	higher dicots	Menyanthaceae	<i>Nymphoides exiliflora</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia polystachya</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia nesophila</i> x <i>Acacia polystachya</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia spirorbis</i> subsp. <i>solandri</i>			C		1/1
plants	higher dicots	Molluginaceae	<i>Glinus oppositifolius</i>			C		3/3
plants	higher dicots	Moraceae	<i>Ficus opposita</i>			C		1/1
plants	higher dicots	Moraceae	<i>Ficus rubiginosa</i> forma <i>rubiginosa</i>			C		1/1
plants	higher dicots	Myoporaceae	<i>Myoporum montanum</i>	boobialla		C		1/1

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plants	higher dicots	Myrtaceae	<i>Gossia bidwillii</i>			C		1/1
plants	higher dicots	Myrtaceae	<i>Melaleuca viridiflora</i>			C		1
plants	higher dicots	Myrtaceae	<i>Lophostemon suaveolens</i>	swamp box		C		1/1
plants	higher dicots	Myrtaceae	<i>Osbornia octodonta</i>	myrtle mangrove		C		1/1
plants	higher dicots	Nyctaginaceae	<i>Boerhavia</i>			C		1/1
plants	higher dicots	Nyctaginaceae	<i>Boerhavia mutabilis</i>			C		1/1
plants	higher dicots	Nyctaginaceae	<i>Boerhavia pubescens</i>			C		4/4
plants	higher dicots	Oleaceae	<i>Chionanthus ramiflorus</i>	northern olive		C		2/1
plants	higher dicots	Passifloraceae	<i>Passiflora aurantia</i>			C		1
plants	higher dicots	Passifloraceae	<i>Passiflora aurantia var. aurantia</i>			C		1/1
plants	higher dicots	Phyllanthaceae	<i>Antidesma ghaesembilla</i>			C		1/1
plants	higher dicots	Phyllanthaceae	<i>Flueggea virosa subsp. melanthesoides</i>			C		2/2
plants	higher dicots	Phyllanthaceae	<i>Cleistanthus dallachyanus</i>			C		1/1
plants	higher dicots	Portulacaceae	<i>Portulaca pilosa subsp. pilosa</i>		Y			1/1
plants	higher dicots	Proteaceae	<i>Grevillea pteridifolia</i>	golden parrot tree		C		1/1
plants	higher dicots	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		3/2
plants	higher dicots	Rhamnaceae	<i>Colubrina asiatica</i>			C		1/1
plants	higher dicots	Rhizophoraceae	<i>Rhizophora stylosa</i>	spotted mangrove		C		1/1
plants	higher dicots	Rubiaceae	<i>Aidia racemosa</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Larsenaikia ochreata</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Morinda citrifolia</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Dentella repens</i>	dentella		C		1/1
plants	higher dicots	Rubiaceae	<i>Pavetta australiensis</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Psychotria fitzalanii</i>			C		1/1
plants	higher dicots	Rutaceae	<i>Micromelum minutum</i>	clusterberry		C		1/1
plants	higher dicots	Rutaceae	<i>Murraya ovatifoliolata</i>			C		1/1
plants	higher dicots	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		1/1
plants	higher dicots	Sapindaceae	<i>Dodonaea polyandra</i>			C		1/1
plants	higher dicots	Scrophulariaceae	<i>Limnophila brownii</i>			C		1/1
plants	higher dicots	Scrophulariaceae	<i>Limnophila fragrans</i>			C		1/1
plants	higher dicots	Solanaceae	<i>Physalis angulata</i>		Y			1/1
plants	higher dicots	Sparrmanniaceae	<i>Grewia asiatica</i>		Y			1/1
plants	higher dicots	Sparrmanniaceae	<i>Grewia retusifolia</i>			C		1/1
plants	higher dicots	Sterculiaceae	<i>Sterculia quadrifida</i>	peanut tree		C		1
plants	higher dicots	Tamaricaceae	<i>Tamarix aphylla</i>	athel tree	Y			1/1
plants	higher dicots	Ulmaceae	<i>Celtis paniculata</i>	native celtis		C		1/1
plants	higher dicots	Verbenaceae	<i>Lantana camara</i>		Y			1/1
plants	higher dicots	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			1/1
plants	higher dicots	Violaceae	<i>Hybanthus enneaspermus</i>			C		1/1
plants	higher dicots	Vitaceae	<i>Clematicissus opaca</i>			C		1/1
plants	higher dicots	Zygophyllaceae	<i>Tribulus cistoides</i>	bulls head vine		C		1/1
plants	lower dicots	Annonaceae	<i>Fitzalania heteropetala</i>			C		1/1
plants	lower dicots	Lauraceae	<i>Cassytha filiformis</i>	dodder laurel		C		1/1
plants	lower dicots	Menispermaceae	<i>Pachygone ovata</i>			C		1/1
plants	lower dicots	Nymphaeaceae	<i>Nymphaea gigantea</i>			C		1/1
plants	lower dicots	Nymphaeaceae	<i>Nymphaea nouchali</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Arecaceae	<i>Livistona decora</i>			C		3/2
plants	monocots	Commelinaceae	<i>Cyanotis axillaris</i>			C		1/1
plants	monocots	Commelinaceae	<i>Commelina lanceolata</i>			C		1/1
plants	monocots	Cymodoceaceae	<i>Halodule uninervis</i>			C		2/2
plants	monocots	Cymodoceaceae	<i>Cymodocea serrulata</i>			C		1/1
plants	monocots	Cyperaceae	<i>Fuirena ciliaris</i>			C		1/1
plants	monocots	Cyperaceae	<i>Cyperus alopecuroides</i>			C		1/1
plants	monocots	Cyperaceae	<i>Cyperus polystachyos</i> var. <i>polystachyos</i>			C		1/1
plants	monocots	Cyperaceae	<i>Fimbristylis tristachya</i>			C		1/1
plants	monocots	Cyperaceae	<i>Cyperus pedunculatus</i>			C		2/2
plants	monocots	Cyperaceae	<i>Fimbristylis dolera</i>			C		1/1
plants	monocots	Cyperaceae	<i>Cyperus decompositus</i>			C		1/1
plants	monocots	Hydrocharitaceae	<i>Blyxa aubertii</i>			C		1/1
plants	monocots	Hydrocharitaceae	<i>Enhalus acoroides</i>			C		1/1
plants	monocots	Hydrocharitaceae	<i>Halophila decipiens</i>			C		3/3
plants	monocots	Hydrocharitaceae	<i>Halophila tricostata</i>			C		3/3
plants	monocots	Hydrocharitaceae	<i>Halophila ovalis</i> subsp. <i>ovalis</i>			C		5/5
plants	monocots	Hydrocharitaceae	<i>Thalassia hemprichii</i>			C		1/1
plants	monocots	Hydrocharitaceae	<i>Halophila spinulosa</i>			C		4/4
plants	monocots	Hydrocharitaceae	<i>Ottelia ovalifolia</i>	swamp lily		C		1/1
plants	monocots	Hydrocharitaceae	<i>Halophila minor</i>			C		5/5
plants	monocots	Orchidaceae	<i>Dendrobium canaliculatum</i>			C		1/1
plants	monocots	Poaceae	<i>Sarga plumosum</i>			C		1/1
plants	monocots	Poaceae	<i>Mnesithea formosa</i>			C		1/1
plants	monocots	Poaceae	<i>Paspalidium rarum</i>			C		1/1
plants	monocots	Poaceae	<i>Oryza meridionalis</i>			C		1/1
plants	monocots	Poaceae	<i>Panicum seminudum</i> var. <i>cairnsianum</i>			C		1/1
plants	monocots	Poaceae	<i>Megathyrsus maximus</i> var. <i>coloratus</i>		Y			1/1
plants	monocots	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>			C		1/1
plants	monocots	Poaceae	<i>Pennisetum pennisetiforme</i>		Y			1/1
plants	monocots	Poaceae	<i>Enneapogon robustissimus</i>			C		1/1
plants	monocots	Poaceae	<i>Sporobolus jacquemontii</i>		Y			1/1
plants	monocots	Poaceae	<i>Urochloa subquadripara</i>		Y			1/1
plants	monocots	Poaceae	<i>Enneapogon lindleyanus</i>			C		1/1
plants	monocots	Poaceae	<i>Digitaria leucostachya</i>			C		1/1
plants	monocots	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>			C		1/1
plants	monocots	Poaceae	<i>Setaria oplismenoides</i>			C		1/1
plants	monocots	Poaceae	<i>Eragrostis interrupta</i>			C		1/1
plants	monocots	Poaceae	<i>Cymbopogon bombycinus</i>	silky oilgrass		C		1/1
plants	monocots	Poaceae	<i>Pennisetum setigerum</i>		Y			1/1
plants	monocots	Poaceae	<i>Eriachne triodioides</i>			C		1/1
plants	monocots	Poaceae	<i>Ectrosia lasioclada</i>			C		1/1
plants	monocots	Poaceae	<i>Cymbopogon obtectus</i>			C		1/1
plants	monocots	Poaceae	<i>Urochloa distachya</i>		Y			1/1
plants	monocots	Poaceae	<i>Digitaria bicornis</i>			C		1/1
protists	blue-green algae	Cyanophyceae	<i>Cyanophyceae</i>			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
protists	brown algae	Phaeophyceae	<i>Padina australis</i>			C		1/1
protists	brown algae	Phaeophyceae	<i>Padina tetrastromatica</i>			C		1/1
protists	green algae	Chlorophyceae	<i>Rhizoclonium tortuosum</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Catenella nipae</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Gelidium crinale</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Laurencia obtusa</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Ceramium cimbricum</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Chondria rainfordi</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Laurencia papillosa</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Polysiphonia fragilis</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Acanthophora muscoides</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Acanthophora spicifera</i>			C		1/1
protists	red algae	Rhodophyceae	<i>Antrocentrum nigrescens</i>			C		1/1
protists	yellow-green algae	Xanthophyceae	<i>Vaucheria</i>			C		1/1

#### CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

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

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.