RTA Weipa Pty Ltd

South of Embley Project – Operations Marine and Shipping Management Plan

April 2021

Chith Export Facility – First vessel departure

Document Control

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Drafts of this plan were titled Operational Marine and Shipping Management Plan. This plan was renamed Operations Marine and Shipping Management Plan to better align with terminology of the EPBC Act Approval EPBC 2010/5642.

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Acronyms

Term	Definition
AFS	International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001
AHS	Australian Hydrographic Service
AIS	Automatic Identification System
AMSA	Australian Maritime Safety Authority
AQIS	Australian Quarantine Inspection Service
BMP	Biosecurity Management Plan
CCIMPE	National Consultative Committee on Introduced Marine Pest Emergencies
CLC	International Convention on Civil Liability for Oil Pollution Damage 1992
COLREG	International Convention for Preventing Collisions at Sea 1972
DAF	Department of Agriculture and Fisheries (Queensland)
DAFF	Department of Agriculture, Fisheries and Forestry (Commonwealth)
DAWE	Department of Agriculture, water and the Environment
DES	Department of Environment and Science
DoE	Commonwealth Department of the Environment
DoEE	Commonwealth Department of the Environment and Energy
DoA	Department of Agriculture
DTMR	Department of Transport and Main Roads
dwt	Dead weight tonnage
EA	Environmental Authority
ECDIS	Electronic Chart Display Information System
EEZ	Economic Exclusion Zone
EHP	Queensland Department of Environment and Heritage Protection
EIS	Environmental Impact Statement
EPBC	Environmental Protection and Biodiversity Conservation Act
EPCM	Engineering, Procurement and Construction Management
FAMP	Foreshore Access Management Plan
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRNHP	Great Barrier Reef National Heritage Place
GBRWHA	Great Barrier Reef World Heritage Area
GBRWHP	Great Barrier Reef World Heritage Property
IMO	International Maritime Organization
MARPOL	International Convention for the Prevention of Pollution from Ships 73/78
Mdptpa	million dry product tonnes per annum
MEPC	Marine Environment Protection Committee
ML	Mining Lease
MSQ	Maritime Safety Queensland
MNES	Matters of National Environmental Significance
NESMG	North-East Shipping Management Group

Term	Definition
NIMPIS	National Introduced Marine Pest Information System
NSPIMP	National System for the Prevention and Incursion of Marine Pests
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation 1990
POLREP	MSQ Marine Pollution Report form
PSSA	Particularly Sensitive Sea Area
QA/QC	Quality Assurance / Quality Control
QCCAP	Queensland Coastal Contingency Action Plan
RHM	Regional Harbour Master
RORO	Roll on/Roll off
RSPCA	Royal Society for Protection of Cruelty to Animals
RTA	RTA Weipa Pty Ltd
RTBS	Rio Tinto Business Solution
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SoE	South of Embley
SOLAS	International Convention for the Safety of Life at Sea 1974
SOPEP	Shipboard Oil Pollution Emergency Plan
TBT	tri-butyl tin
TMR	Department of Transport and Main Roads
UNCLOS	United Nations Convention on the Law of the Sea 1982

Glossary

Commencement of the action - any works that are required to be undertaken for construction (except exploration, site investigation and **preliminary works**).

Construction – any works that are required to be undertaken for the project including the beneficiation plant (including tailings storage facility); Boyd Port facility, and Hey and Embley River facilitates; dam construction; clearing of vegetation; and infrastructure facilities (including power station, roads, and fuels storage). Excludes **preliminary works**.

Department – the Australian Government department administering the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

Impacts/impacted – as defined in section 527E of the EPBC Act.

Incidental observation - sightings recorded during field survey (not specifically targeting marine fauna) and described in relation to local geographic features.

Listed dolphin species – listed migratory species under the EPBC Act, specifically Australian Snubfin Dolphin (*Orcaella heinsohni)*; and Australian Humpback Dolphin (*Sousa sahulensis*) – previously the Indo-Pacific Humpback Dolphin (*Sousa chinensis).*

Listed turtle species – listed threatened species and/or Listed migratory species under the EPBC Act, specifically Green Turtle (*Chelonia mydas),* Hawksbill Turtle (*Eretmochelys imbricate);* Flatback Turtle *(Natator depressus);* Loggerhead Turtle *(Caretta caretta);* Olive Ridley Turtle *(Lepidochelys olivacea);* and Leatherback Turtle (*Dermochelys coriacea)*.

Matter of national environmental significance (MNES) – those matters protected under the EPBC Act: World Heritage properties, National Heritage places, wetlands of international importance (Ramsar wetlands), listed threatened species and communities, listed migratory species, Commonwealth marine areas, Great Barrier Reef Marine Park, the environment where nuclear actions are involved (including uranium mines).

Minister – the **Minister** administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the **Minister**.

Operation/s - commencement of activities associated with bauxite mining and production, including shipping activities from the Boyd Port and facilitates in the Hey and Embley Rivers. This does not include activities associated with construction or preliminary works.

1. Introduction

The Operations Marine and Shipping Management Plan (the Plan, OMSMP) documents the principles and practices under which RTA Weipa Pty Ltd (RTA) will undertake all marine-based activities, including shipping, associated with the operations phase of the South of Embley (SoE) Project (the Project).

The SoE Project extends RTA's current bauxite mining activities on part of RTA's existing lease to south of the Embley River, between Weipa and Aurukun. The Port of Amrun has been constructed for the loading of bauxite ore from the SoE Project. Bauxite is shipped to either Gladstone through the Great Barrier Reef or west of Papua New Guinea to international markets. Passenger ferries and barges will transport the workforce and materials between Weipa and Amrun via Humbug and the Hey River Terminals.

1.1 Purpose of this plan

The Plan has been prepared to satisfy Conditions 5 to 11 of the SoE Project approval (EPBC 2010/5642) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In accordance with Condition 8(ii), the Plan comprises the secondary operations shipping phase of the SoE Project[1]. In accordance with Condition 10 the previously approved operations plan (approved by Minister on 02 October 2018) has been reviewed and revised within two years of operations commencing.

The purpose of the Plan is to define, avoid, manage and mitigate potential negative impacts of all facets of marine operations and shipping on the following Matters of National Environmental Significance (MNES):

The outstanding universal value of the Great Barrier Reef World Heritage Property (GBRWHP)

- Great Barrier Reef National Heritage place (GBRNHP)
- Great Barrier Reef Marine Park (GBRMP)
- Listed turtle species:
    - Green Turtle (*Chelonia mydas*) – listed as vulnerable and migratory
    - Hawksbill Turtle (*Eretmochelys imbricata*) – listed as vulnerable and migratory
    - Flatback Turtle (*Natator depressus*) – listed as vulnerable and migratory
    - Loggerhead Turtle (*Caretta caretta*) – listed as endangered and migratory
    - Olive Ridley Turtle (*Lepidochelys olivacea*) - listed as endangered and migratory
    - Leatherback Turtle (*Dermochelys coriacea*) - listed as endangered and migratory
- Listed cetacean species:
    - Australian Snubfin Dolphin (*Orcaella heinsohni*) – listed as migratory
    - Australian Humpback Dolphin[2] (*Sousa sahulensis*) – listed as migratory

[1] A construction phase plan was developed and approved previously (on 19 November 2015), prior to the commencement of construction.

[2] Formerly known as the Indo-Pacific Humpback Dolphin (Sousa chinensis) the Australian humpback dolphin was described as a separate species in 2014.

- Bryde's Whale (*Balaenoptera edeni*) – listed as migratory

- Dugong (*Dugong dugon*) – listed as marine and migratory.
- Estuarine Crocodile (*Crocodylus porosus*) – listed as migratory

1.2 Related Management Plans

This Plan is part of an overall environmental management framework for the Project. It is one of a number of interrelated management plans and strategies that have been developed to avoid, manage and mitigate potential environmental impacts of the Amrun Project.

The following marine and shipping activities have previously been approved by the Department of Agriculture, water and the Environment (DAWE; previously the Department of Environment and Energy (DoEE) under separate management plans and conditions of the EPBC Act approval. These facets will continue to be managed in accordance with the management plans described below:

- Construction marine and shipping activities: approved in the Amrun Project Construction Marine and Shipping Management Plan July 2017 as required by the Project EPBC Act Approval Condition 8.i.
- Initial capital dredging for Port of Amrun and Hey River and Humbug Terminals was approved in 2015 in separate management plans as required by Project EPBC Act Approval Conditions 14 and 15 and has now been completed.
- Maintenance Dredging for 2018-2020 was approved at the Port of Amrun in the Maintenance Dredge Management Plan –Port in March 2018 as required by the Project EPBC Act Approval Conditions 16 and 17.
- The Amrun Port and River Facilities Long-term Maintenance Dredge Management Plan 2021 - 2031 (LMDMP) was approved by the Minister on 03 February 2021.

Other plans related to marine operations that will provide specific direction of the marine operations addressed by this plan include:

- Chith Export Facility Oil Spill Response Plan
- Amrun Port Security Plan
- Amrun Port Procedures and Information for Shipping
- Business Recovery and Resilience Plan
- Feral Pig Management Offset Strategy (EPBC Act Approval) and Marine Turtle Offset Plan (Environmental Authority)
- Inshore Dolphin Offset Strategy
- Foreshore Access Management Plan.

These plans have their own approval requirements and are developed with relevant regulatory agencies (e.g. the oil spill response plan was developed with Maritime Safety Queensland (MSQ)). Accordingly, summary of the principles and practices from these plans under which RTA will undertake marine operations including shipping is provided where relevant. Further information will be available on the Amrun website when publication is required.

2. Background

A detailed environmental impact assessment related to MNES under the EPBC Act, including community consultation is detailed in the South of Embley Project Environmental Impact Statement (RTA, 2013) referred to herein as the Commonwealth EIS.

2.1 Project Approval Conditions

The then Minister for Sustainability, Environment, Water, Population and Communities (the Minister) approved the SoE Project (EPBC 2010/5642) with conditions on 14 May 2013. The approval (varied on 3 June 2014) requires a Marine and Shipping Management Plan for the operations phase of the SoE Project to be prepared and submitted to the Minister for approval prior to operations. The Plan was approved by the minister on 18 September 2018 prior to operations commencing on 2 December 2018 and continues to be implemented. This plan addresses Condition 10 which required submission of a revised Operational Marine and Shipping Management Plan within 2 years of commencement of operations. The conditions relating to the Operations Marine and Shipping Management Plan, and where they are addressed in this document, are outlined in Table 1. Certain conditions, such as those related to piling, do not apply during the operations phase.

Table 1: Operations Marine and Shipping Management Plan EPBC Act Approval Conditions

Condition	**Where Addressed in this Plan**
Marine and Shipping Management Plan **5.** The person taking the action must submit a Marine and Shipping Management Plan, covering all facets of the **construction** and **operation** of all marine-related precincts for the South of Embley project including, but not limited to, the Boyd Port development, shipping activities, barge and ferry terminals, recreational use of beaches on Mining Lease (ML) 7024 by project workforce and the marine environment, anchoring, and underwater noise (excluding dredge management plans at condition 14 and condition 16) for the **Minister's** approval and must effectively define, avoid, manage and mitigate against **impacts** to the following **matters of national environmental significance:** **a.** the outstanding universal value of the Great Barrier Reef World Heritage Property; **b.** Great Barrier Reef National Heritage Place; **c.** Great Barrier Reef Marine Park; **d. Listed turtle species;** **e. Listed dolphin species;** and, **f.** Dugong (*Dugong dugon)* and Bryde's Whale (*Balaenoptera edeni).*	a. This plan
6. The Marine and Shipping Management Plan must incorporate avoidance and mitigation mechanisms for **impacts** to the outstanding universal value of the Great Barrier Reef World Heritage Property; Great Barrier Reef National Heritage Place: Great Barrier Reef Marine Park; **Listed turtle species; Listed dolphin species;** Dugong *(Dugong dugon)* and Bryde's whale *(Balaenoptera edeni)*, including but not limited to:	Section 6 describes potential impacts and Section 7 describes avoidance and mitigation measures as follows:

Condition		Where Addressed in this Plan
a.	**impacts** to the marine environment that supports the above listed species traversing, foraging and/or breeding habitat including, seagrass, reefs and corals, **listed turtle species** nesting and/or foraging habitat;	Section 7
b.	**impacts** from changes to coastal processes, including beach and/or shore erosion from the Boyd Port development, barge facilities and/or ferry facilities and ensure the action does not alter the beach gradients to such an extent that **listed turtle species** are prevented from and/or impeded in accessing the beach foreshore to nest or **listed turtle species** hatchlings are prevented and/or impeded from entering the marine environment;	Section 6.6
c.	artificial light-related **impacts** on **listed turtle species** (including hatchlings) nesting beaches and adjacent marine environment including, but not limited to, lighting from Boyd Port construction and operation, shipping, temporary passenger landing and barge facility between Pera Head and Boyd Bay, and anchored/moored vessels (but excludes operations within the Hey and Embley Rivers);	Section 7.4
d.	measures to ensure shipping activities are undertaken in accordance with the *Great Barrier Reef Marine Park Zoning Plan (2003)*, or its current version	Section 7.1.4
e.	mechanisms to implement best practice mitigation and management measures for ship loading and unloading, and all other aspects of shipping activities to minimise **impacts** on the marine environment (including bauxite and/or other contamination spills);	Section 7.3
f.	**impacts** from vessel strike to **listed turtle species, listed dolphin species** or Dugongs including, but not limited to, restricting vessel speed limits to 6 knots in water depths of 2.5 metres or less; and, implementation of a transit lane in the Hey River and Embley River that follows the greatest water depths;	Section 7.1.1
g.	**impacts** from underwater noise including, but not limited to, pile driving activities at Condition 12 and shipping;	Vessel noise Section 7.1.2 No piling activities will be conducted during operation
h.	measures that minimise the risk of introduced marine pest species over the life of the project, including ballast water management. The marine pest monitoring program must be consistent with the Department of Agriculture, Fisheries and Forestry's *Australian Marine Pest Monitoring Manual (version 2.0),* or its most current version;	Section 7.2
i.	**impacts** associated with recreational use by project employees of **listed turtle species** nesting habitat (including, but not	Section 7.5

Condition			Where Addressed in this Plan
		limited to, implementation of a permit access system for the employees);	
	j.	if agreed by the **department** in writing, requirements of condition 1 to condition 4 may be incorporated into the Marine and Shipping Management Plan;	Not required. A separate Temporary Barge Plan has been prepared.
	k.	**impacts** identified in the Environmental Management Plan Outlines at Appendix 7-E (Threatened estuarine and Marine species); Appendix 9-A (Non-avian Migratory Species); Appendix 11-A (Great Barrier Reef Marine Park, World Heritage Property and National Heritage Place); and, Appendix 10- A (Commonwealth Marine Area) in the **Final Environmental Impact Statement;** and,	Section 6
	l.	mechanisms to notify the **department** in writing within five (5) business days of any confirmed or suspected sighting/s and/or observation/s in the marine environment in and/or around the project area of the dwarf sawfish *(Pristis clavata*); green sawfish *(Pristis zijsron);* freshwater sawfish *(Pristis microdon);* or the speartooth shark *(Glyphis sp. A*).	Section 3.6 and Section 7.6
7.		The Marine and Shipping Management Plan must also include adaptive management strategies to benefit the outstanding universal value of the Great Barrier Reef World Heritage Property; Great Barrier Reef National Heritage Place; Great Barrier Reef Marine Park; listed turtle species, listed dolphin species, dugong and Bryde's whale. The Marine and Shipping Management Plan must include and address effective management strategies to mitigate each potential impact, desired outcomes, benchmarks, readily measurable performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and specify the persons/ roles with responsibility for implementing actions. The Marine and Shipping Management Plan must provide information detailing Traditional Owner opportunities for employment, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of this Plan (consistent with condition 42).	Section 7
8.		The Marine and Shipping Management Plan may be submitted to the Minister in the following stages, but the respective stages must not commence until the Minister has approved each respective version of the plan:	This plan is the secondary plan addressing the operational stage of the Amun Project. NB: a separate Temporary Barge Plan has been prepared in accordance with Conditions 1 to 4.
	ii.	a subsequent plan to also reflect impacts associated with operations on the outstanding universal value of the Great Barrier Reef World Heritage Property; Great Barrier Reef National Heritage Place and Great Barrier Reef Marine Park; and,	
	iii.	subsequent revisions in accordance with condition 10.	
9.		The subsequent Marine and Shipping Management Plan at condition 5 must be developed in consultation with relevant Commonwealth agencies, including the Australian Maritime Safety Authority and the	Section 10

Condition	Where Addressed in this Plan
Great Barrier Reef Marine Park Authority, and state agencies, including Maritime Safety Queensland.	
10. Within two (2) years of operations commencing, the Marine and Shipping Management Plan must be reviewed, revised and submitted to the Minister for approval. The Marine and Shipping Management Plan must be reviewed, revised and submitted to the Minister for approval every three (3) years for the next nine (9) years and, unless otherwise agreed by the Minister in writing every five (5) years thereafter for the life of the project.	Section 3.8
11. The approved Marine and Shipping Management Plan/s must be implemented.	The Management Plan will be implemented.

2.2 Project Description Summary

The Amrun Project involves the construction and operation of a bauxite mine and associated processing and port facilities for shipping of bauxite to either Gladstone or international markets. The Project involves a staged increase in production of up to 50 million dry product tonnes per annum (Mdptpa) of bauxite. The initial production capacity of the SoE Project is approximately 22.8 Mdptpa (nameplate production capacity), which has been constructed through the Amrun Project. Actual production rates and the timing and size of capacity expansions will depend on market conditions. The anticipated mine life is approximately 40 years (depending on production rates).

The Port of Amrun (previously Boyd Port) and mine operations are located near Boyd Point on the western side of Cape York Peninsula (Figure 1) and include a range of infrastructure to support mining including processing plant, dam, tailing storage. Ferry and barge terminals are located at the existing Port of Weipa and along the northern and southern side of the Hey River and will transport the workforce and materials for day to day operations.

The key marine components of Amrun Project associated with this Plan are illustrated in Figure 1 and Figure 2 and summarised in Section 2.2.1**.**

2.2.1 Project facilities

Project facilities which have been developed for the Amrun Project include:

- Weipa - Barge, ferry and tug river facilities – Permanent River Facilities have been constructed in the Embley and Hey Rivers (Figure 1), including:
    - A new roll on/roll off barge and ferry terminal (Humbug RORO barge and ferry terminal) adjacent the existing Port of Weipa Humbug Point Wharf.
    - A new combined roll on/roll off barge and ferry terminal (Hey River barge/ferry terminal) on the western bank of the Hey River.
- Port of Amrun and ship-loading facilities – A new Port of Amrun and associated ship loading facility (Chith Export Facility) and have been constructed between Boyd Point and Pera Head (Figure 1 and Figure 2). The Chith Export Facility includes a jetty, bulk carrier vessel wharf and berthing structures small vessel tie-up areas and bauxite ship-loader.

- Tug moorings are located at two moorings offshore at Boyd Bay.

Future maintenance dredging for the river and port facilities is addressed Amrun Port and River Facilities Long-term Maintenance Dredge Management Plan 2021 - 2031 (LMDMP) was approved by the Minister on 03 February 2021.

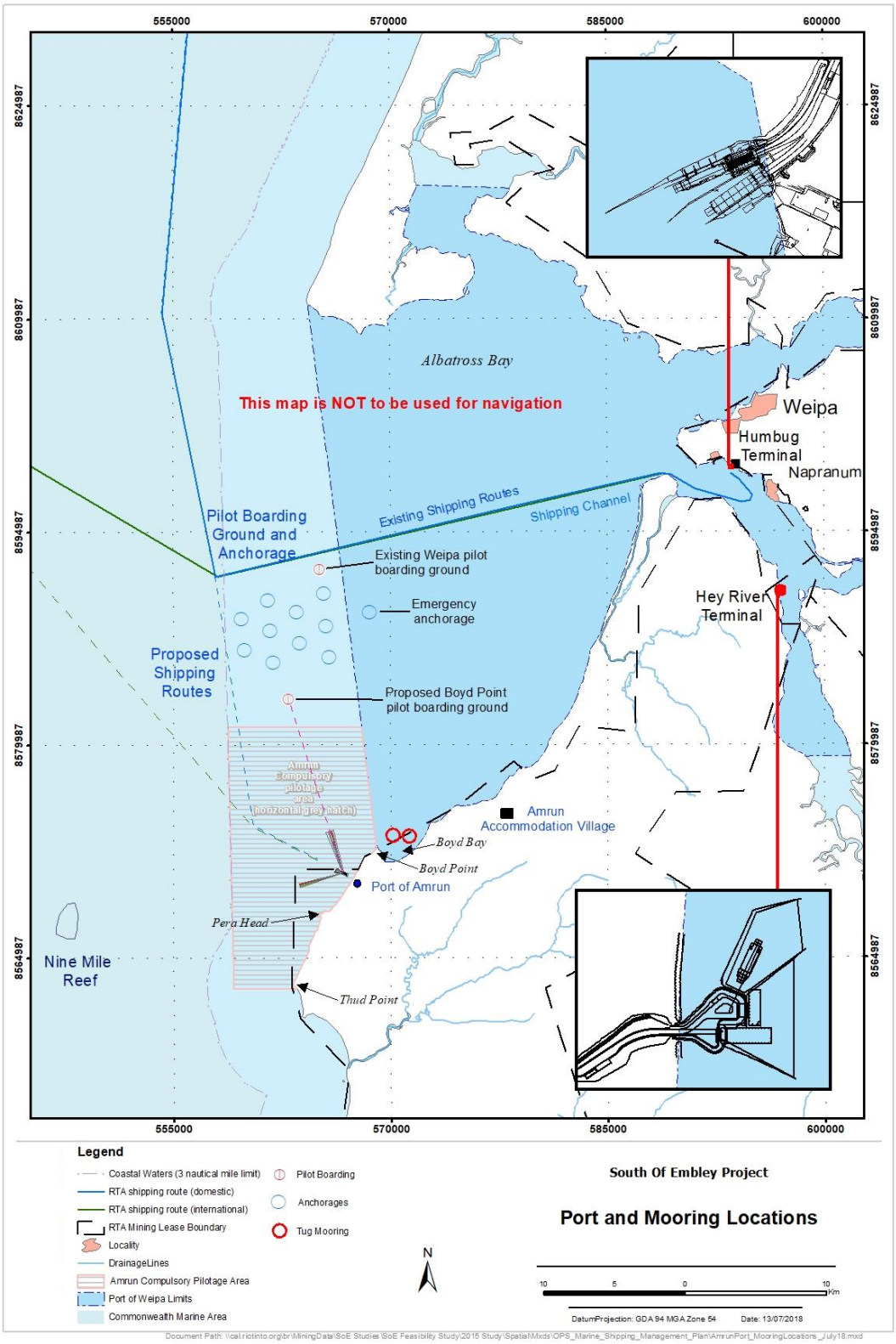


Figure 1 River Facilities, Port and Mooring Locations

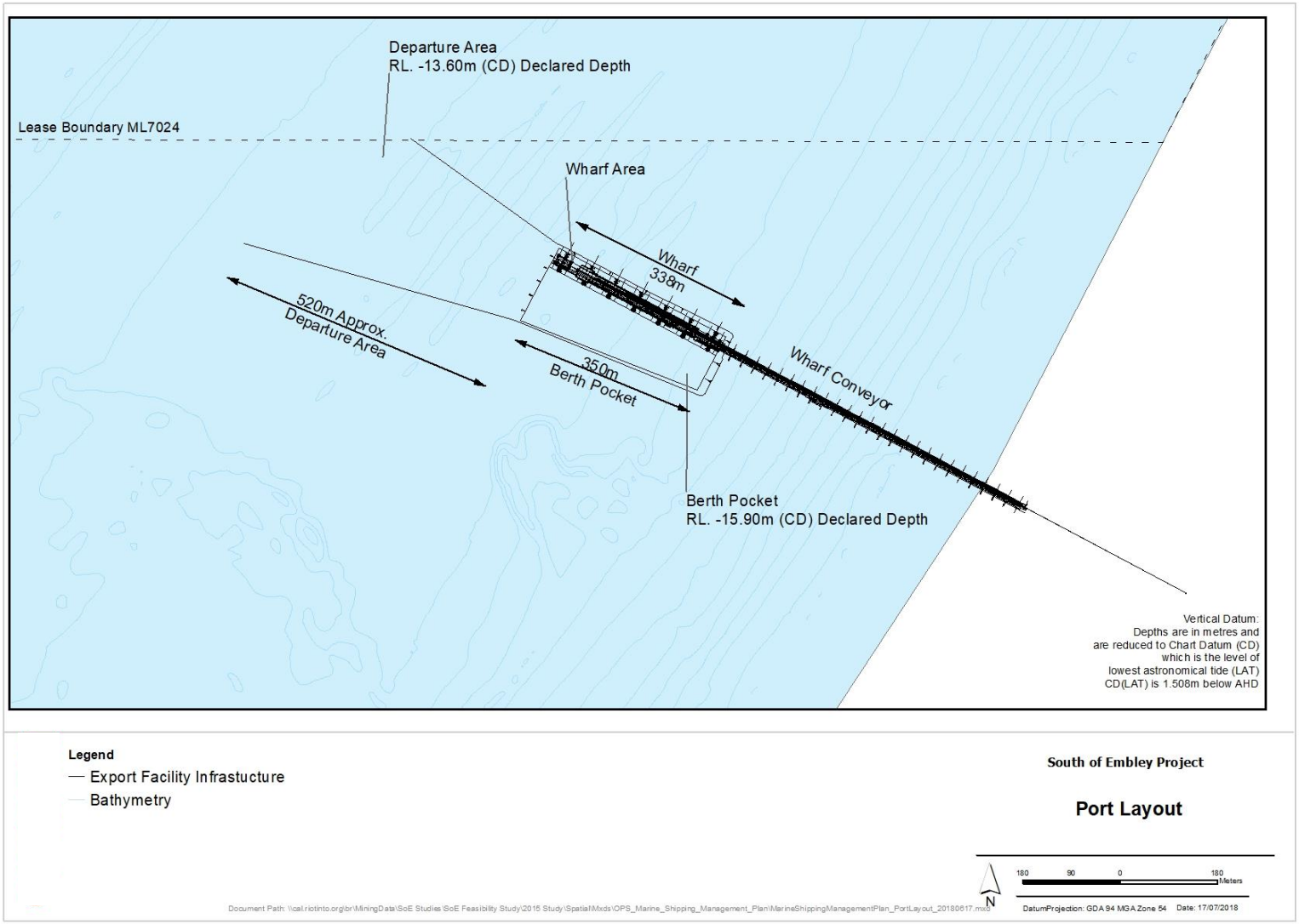


Figure 2 Chith Export Facility Layout

2.2.2 Shipping activities

There are a number of different components to shipping activities for the Project. The Port of Weipa movements involve cargo and fuel deliveries as well as transfers of cargo, fuel and the workforce within the Project area (**Section 2.2.3**). The Port of Amrun is exclusively used for bauxite shipping and is discussed in **Section 2.2.4.** The anticipated shipping and vessel movements during Project operations are summarised in Table 2 and further detail is provided in the following sections.

2.2.3 Weipa

Shipping activities in Weipa fall under the management of the Regional Harbour Master (RHM). Emergency management is managed by North Queensland Bulk Ports (NQBP) and MSQ.

2.2.3.1 Existing Operations

Existing shipping operations at Weipa and the Port of Weipa when not related specifically to the Project are outside the scope of the SoE EPBC Act Approval and this management plan and will continue to operate as normal. Existing operations include:

- Cairns-Weipa barge service caters for the cargo transport requirements of the existing Weipa community and mining operations and involves approximately 110 shipments per year from the Port of Cairns to the Port of Weipa via the inner GBR Designated Shipping Area and the Torres Strait.
- Green Coast Resources Hey Point Bauxite Project involves the operation of a small bauxite mine which will produce approximately 4 million tonnes of bauxite in 3 years (2019 expected end year). The export from the open cut mine transfers through a radial stacker onto barge moored in the Hey River which transfers to bulk vessel. This operation only occurs in the dry season.
- Urquhart Bauxite Project is proposed development which will export using Green Coast Resources equipment (stacker and barge). Approvals are still being completed for this works.
- Urquhart sand mining project
- Fuel supplies are currently transported by medium range fuel tankers, with 12 shipments a year servicing the existing community and Weipa operations. Fuel supplies currently travel to the Port of Weipa from the Port of Darwin.
- The Port area and the Hey and Embley Rivers are currently utilised by private recreational, charter fishing, and commercial fishing vessels.

Port of Weipa bauxite shipping is conducted at the Lorim Point Shiploaders on the bank of the Embley River, east of Humbug Point. There is a shiploader at the east and west wharf which loads 55kt to 80kt bauxite vessels. Of the 213 vessels loaded at the Port of Weipa in 2020 approximately 5% sailed to and returned from Port of Gladstone (6 shipments or 12 vessel movements). The remainder of the vessels departed Weipa for international destinations. The volume of bauxite shipping from the Port of Weipa will decrease over time as the reserves north of the Embley River are depleted and bauxite shipping from the Port of Amrun replaces some of this demand.

Table 2: Anticipated operations related shipping activities

	Route	Vessel type	Shipments / Vessel movements
Operations phase (22.8Mdptpa)			
Bauxite shipping			
SoE Project operations	Port of Amrun to Gladstone (via GBR)	Panamax/DPPV – Rio Tinto Shipping owned	130 shipments (260 movements) annually (average)
		Panamax/DPPV – contract charter	
		Mini Cape size – contract charter	
	Port of Amrun to international ports	Panamax/Post Panamax/Mini Cape – customer	130 shipments (260 movements) annually (average)
Cargo			
Cargo supplying Weipa and surrounding community, and SoE Project operations*	Cairns to Port of Weipa or direct to Hey River terminal (via GBR)	Barge	110 shipments (220 movements) annually
Fuel deliveries			
Fuel supplying Weipa and surrounding community, and SoE Project operations^	Darwin to Port of Weipa	Medium range fuel tanker (30,000dwt)	12 shipment (24 movements) annually
Other vessels			
Passenger vessel, Cargo and Diesel transfer (SoE Project Operations)	Humbug terminal to Hey River terminal	50m ROPAX Cargo/Passenger Barge 12m Passenger Ferry	8 ROPAX shipments (16 movements) daily plus additional ad-hoc movements of the fast ferry as required
Tugs and Line Boat (SoE Project Operations)	Lorim Point to Boyd Point and Lorim Point to anchorage/departure area	Weipa – 2 x Ramparts 3000 ASD Tugs 55T bollard pull, and 1 x Rampart 2800 ASD Tug 65 T bollard pull Amrun – 2 x Damen 3212 80T Bollard Pull	Linked to bauxite ship movements
Pilot vessel	Amrun Pilot vessel – Lorim Point to Amrun Weipa Pilot vessel at Evans Landing Wharf Existing Pilot Boarding Ground and Anchorage, and Pilot Disembarkation Area	2 x 12m Vessel	Linked to bauxite ship movements

	Route	Vessel type	Shipments / Vessel movements
Emergency vessel	Humbug terminal to Project area/Hey River Terminal	Weipa –12m Passenger Ferry	As required
Utility vessel	Humbug terminal to Project area/Hey River Terminal	Weipa –12m Passenger Ferry	As required
Monitoring / Research Vessels	Humbug or Evans Landing terminal to Project area.	Small vessels, as required	As required

umber of shipments includes shipments directly for the SoE operations (22.8Mdptpa) and indirectly for the Weipa community.

^ Fuel is currently sourced from Singapore Region and shipped to Northern Australian Ports (including Darwin, Gove and Weipa)

2.2.3.2 Amrun river operational movements

Vessels transiting the Hey and Embley Rivers between Humbug and Hey River Terminals are required to follow transit lanes designated by NQBP and the RHM.

The operational workforce would be housed in the existing Weipa community and for a portion of the workforce when on shift at the Amrun Accommodation Village. The workforce will commute across the Hey and Embley River between Humbug Terminal and Hey River Terminal on their scheduled roster Shipping operations involve a combined passenger and RORO barge/ferry to transport personnel between Humbug and Hey River terminals for their regular shift. The services will be conducted through regular scheduled services and ad-hoc movements as required.

Materials and equipment will be transported between Humbug Terminal and Hey River Terminal in addition to the personnel movements summarised above. Transport will include vehicles, wastes, foods, fuels and other necessary requirements for day to day operation of the mine.

Equipment and cargo required for Amrun operations will typically be brought from Cairns to Weipa using the existing barge transfer as has been completed for all existing Weipa operations. Cargo and equipment would typically be delivered to existing Port of Weipa facilities or direct to the SoE Project area through Hey River Terminal. The number of movements may increase or decrease on a daily basis as required to service the project needs.

2.2.4 Port of Amrun operations

Rio Tinto sets and maintains world-class standards in health, safety and environmental performance, and vessel assurance for freight transportation, and has an excellent record in managing its shipping operations internationally and through the GBR.

The Chith Export Facility has been constructed to load bauxite into Panamax (234m length), Post Panamax (229m length) and Mini Cape Vessels (260m length). Approximately 290 vessels are expected to be loaded annually with a loading time of approximately18 hours at an initial nameplate production capacity of 23.5 Mdptpa. Annual throughput of the Amrun shiploader was approximately 20Mdptpa. Actual number of vessels loaded would depend on the mixture of vessels loaded at the Port and market conditions. Of the 280 vessels loaded at the Port of Amrun approximately 50% are expected to sail to and return from the Port of Gladstone (approximately 154 shipments or 308 vessel movements) with the remainder of the vessels departing Amrun for international destinations. The first shipment loaded in December 2018.

In addition to bauxite ship movements the following vessels will operate at the Port of Amrun.

- Two supporting tugs (Damen 3212 80T Bollard Pull or similar) will be based at the Boyd Bay permanent moorings (Figure 1) and will be used to support port operations.
- A pilot vessel will be based in Weipa and utilised for transfer of Pilots.
- A small emergency vessel (12m utility) will launch from Weipa to Hey River Terminal or Amrun Port as required in the event of an emergency.

No bunkering, waste transfer or unloading of vessels will occur at Chith Export Facility.

An additional range of small ancillary vessels, including monitoring and research vessels will operate in and around the Port as required.

2.2.5 Shipping routes

Loading and departure for bauxite shipping would be conducted at the Chith Export Facility. When a ship arrives near the Facility and has to wait to berth, it would anchor at one of the four designated Amrun anchorages within the existing anchorage area for the Port of Weipa, or as directed by the RHM. The existing anchorage area is in Queensland coastal waters outside of the Port of Weipa limits.

The Chith Export Facility has been designed and constructed for continuous hours of operation. When the Port is ready to receive a ship, tug boats would assist to manoeuvre the ship to and from the berth. Pilots will board the incoming vessel at the anchorage and disembark from an outgoing vessel approximately one nautical mile from the end of the wharf facility.

Bulk carriers leaving the Chith Export Facility would then travel north past the existing Port of Weipa and through the Gulf of Carpentaria. Vessels travelling to international ports (e.g. China or Korea) would typically pass to the west of West Papua then east of the Philippines and would not travel through the GBR (**Figure 3**). Vessels supplying the domestic market would travel to the Port of Gladstone via the Torres Strait shipping route and the inner GBR Designated Shipping Area (**Figure 3**). In both cases, once vessels have passed the Port of Weipa they would travel via the same shipping routes that have been used by bauxite shipping from Weipa to Gladstone and international ports for over 40 years which are consistent with the GBR Zoning Plan 2003.

Upon arrival at the Port of Gladstone the vessels would operate in accordance with the Port of Gladstone procedures, including environmental management procedures, developed and implemented by the Gladstone Ports Corporation (GPC). Bauxite unloading operations at the Port of Gladstone would be managed by the GPC and are outside the scope of the Project EPBC Act approval. All shipping operations follow the legislative requirements for the area of operations. This includes but is not limited to:

A designated two-way route through Torres Strait and the entire length of the inside of the Great Barrier Reef (AMSA Marine Notice 11/2014)

Compulsory pilotage in certain areas (Torres Strait and GBR north of Cairns and some areas to the south), for all ships over 70 m in length and all loaded oil tankers, loaded chemical carriers and loaded liquefied gas carriers (irrespective of length; AMSA *Navigation Act 2012* and Marine Order 54)

Mandatory reporting for all ships with an overall length of 50 m or more and all tankers regardless of size, transiting the Great Barrier Reef and Torres Strait, through Reef VTS (Vessel Traffic Service; AMSA *Navigation Act 2012* and Marine Orders Part 56)

Figure 3 International and Domestic Shipping Routes (series)

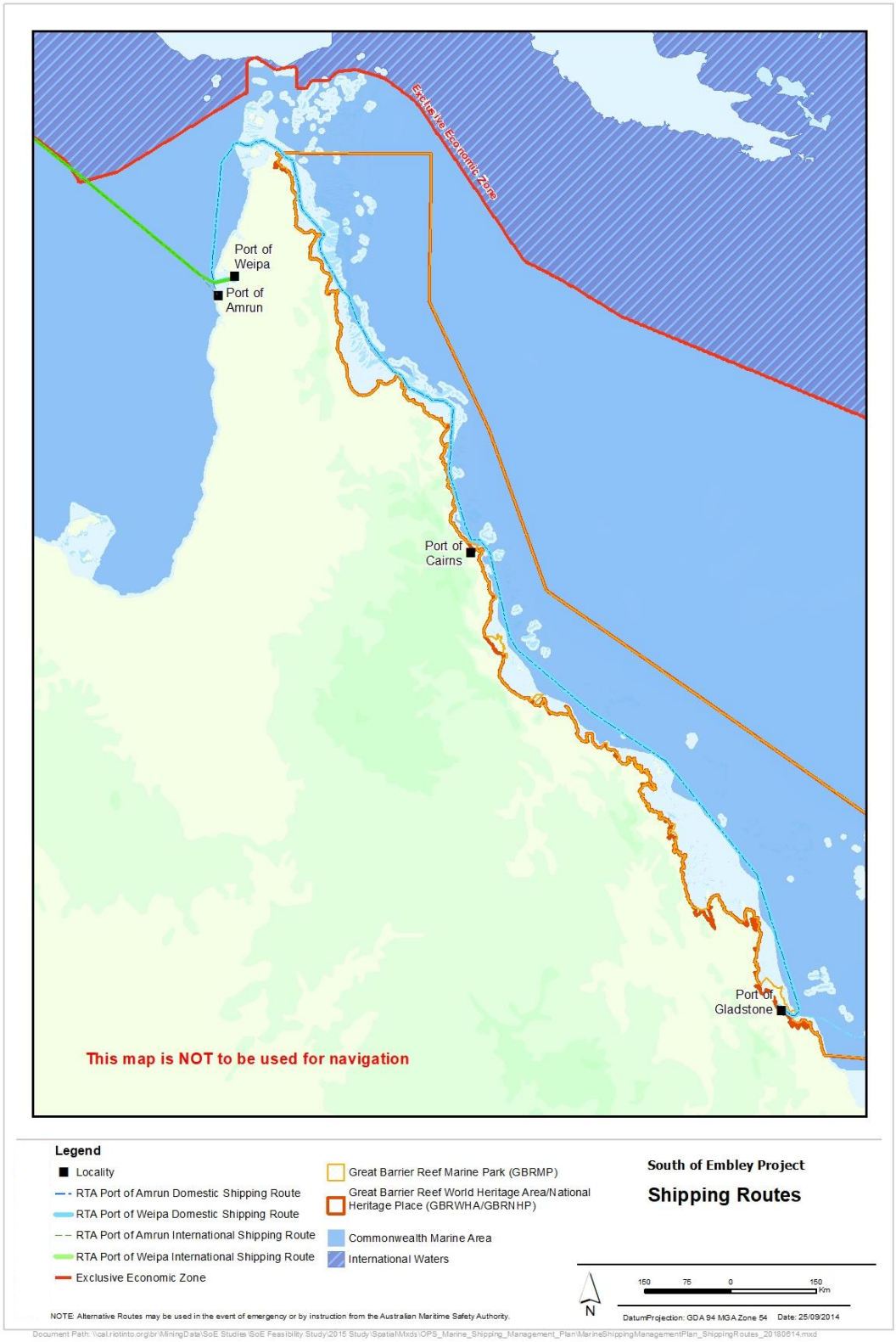


Figure 3a Shipping Route (Torres Strait)

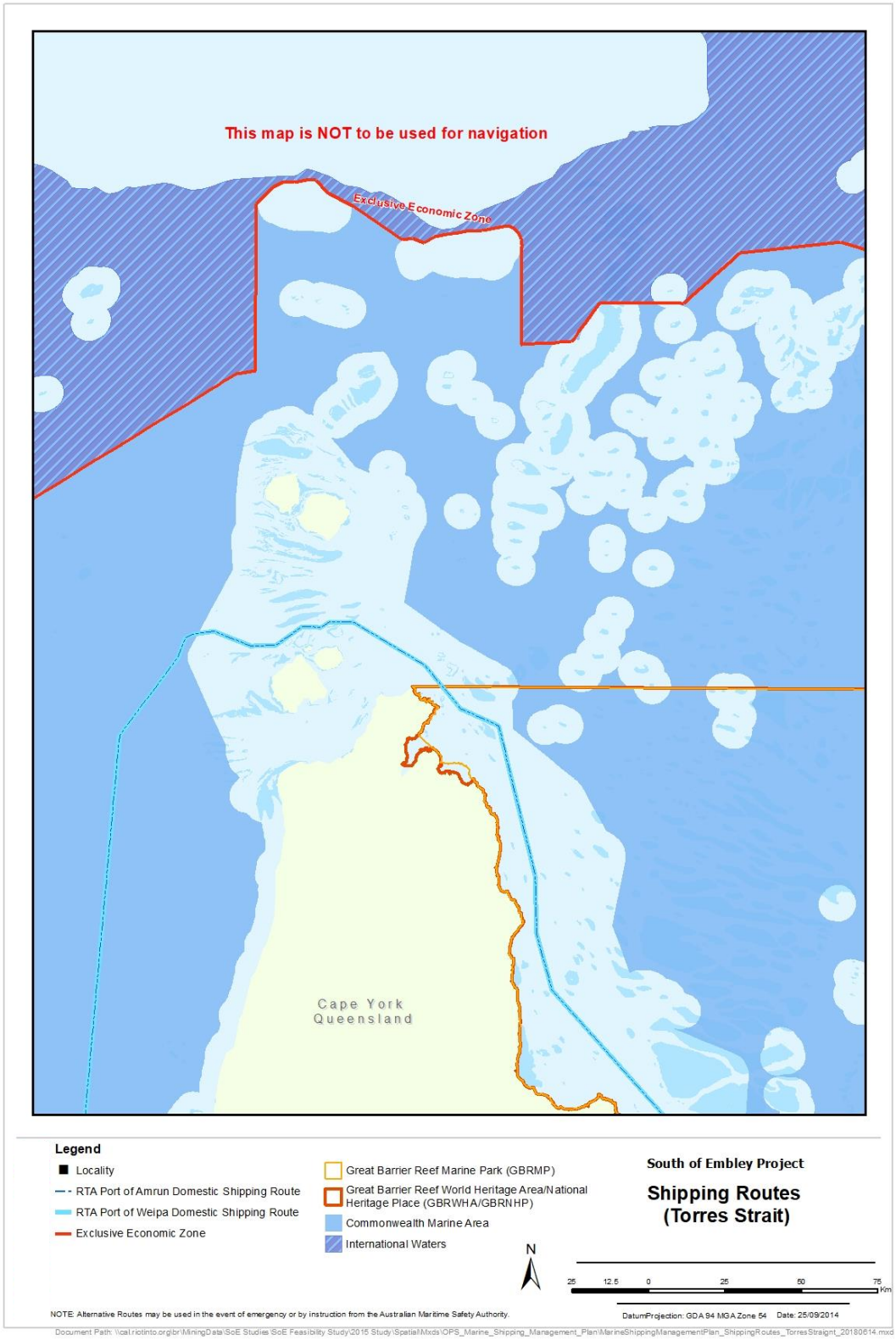


Figure 3b Shipping Route (Great Barrier Reef Marine Park)

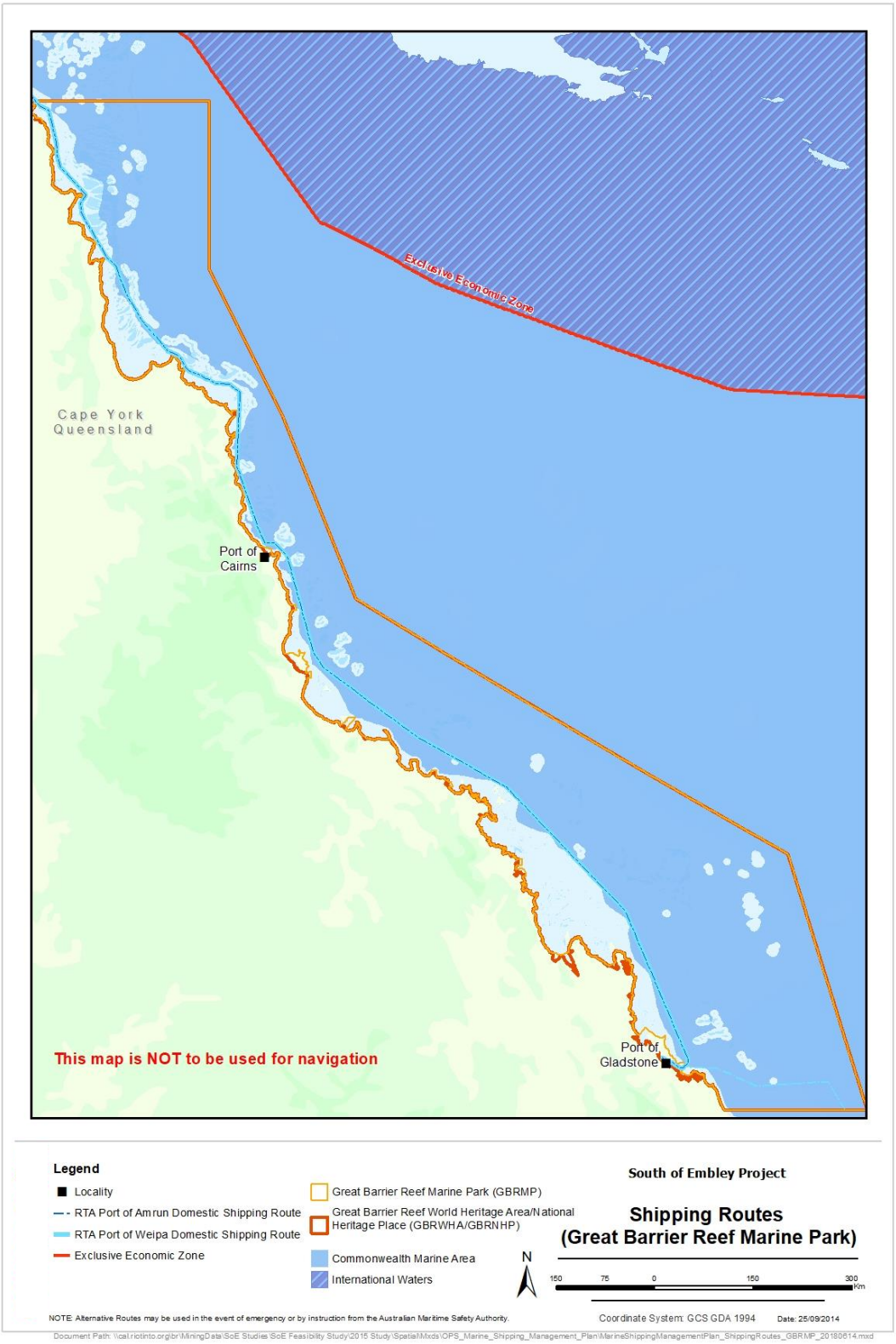
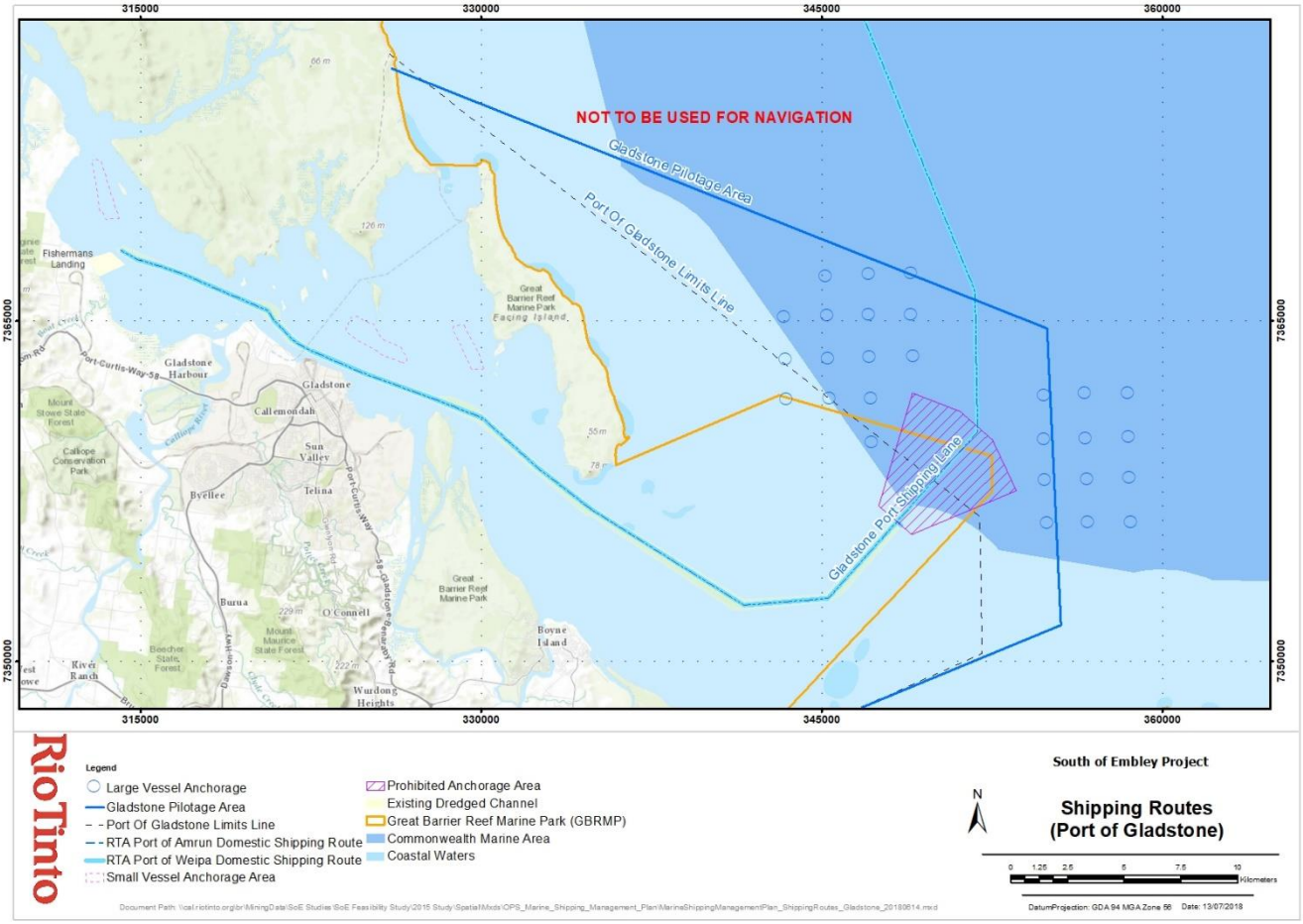


Figure 3c Shipping Route (Port of Gladstone)



2.3 Past and current marine activities

The Port of Weipa is an active Port which has been operational since 1960. Shipping and vessel movements in the area include, but are not limited to export of bauxite, import of fuel food and other supplies for Weipa and surrounding communities and recreational vessels (Weipa has one of the highest ownership of recreational vessels per Capita in QLD). The Port of Weipa and its approach channel were developed through capital dredging from 1961 through to 1975 (PCQ 1995). The most recent capital dredging program occurred in 2006 to lengthen the existing channel. Maintenance dredging occurs annually to provide safe passage of vessels throughout the area.

Port of Amrun is located in a remote and previously undeveloped area and as such there are few, if any, pre-existing potential contaminant sources either from shipping activity or land use. The Port construction commenced with the capital dredge program in March 2016, wharf and jetty construction of the Chith Export Facility commenced in May 2017. The first Maintenance dredging was completed in May 2018 in readiness for operations. Current vessels operating in the area consist of those related to Bauxite loading operations (Ore carriers, tugs and Pilot Launch) and recreational vessels (including yachts and fishing vessels).

3. Environmental Framework

3.1 Health, Safety and Environmental Management System

The Health, Safety and Environment Management System (HSE MS) is the system used at RTA to manage HSE requirements and drive continuous improvement. This includes HSE MS policies, procedures, documents and resources. The HSE MS provides a structured method to identify, assess and control significant HSE risks. Conformance with the HSE MS enables RTA to maintain the following certifications:

- ISO14001 Environment Management System, and
- OHSAS 18001 Occupational Health and Safety Management System.

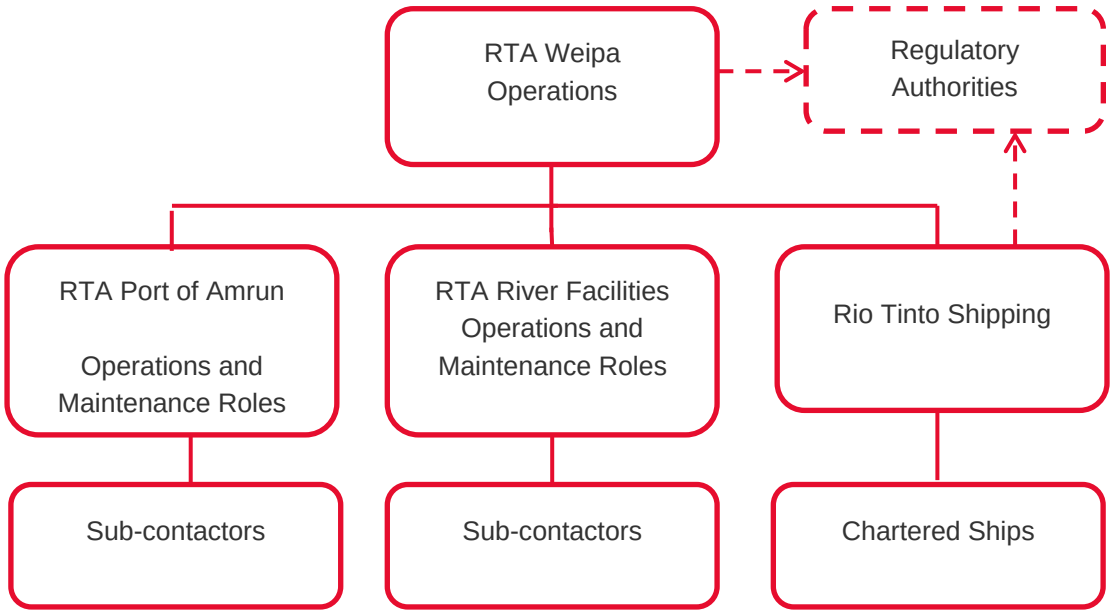
The HSE MS applies to all contracted and internal tasks conducted by or for RTA whether the works are within the bounds of the RTA mining lease or not. The environmental performance of the Port of Amrun, Humbug Terminal, Hey River Terminal and Amrun Project Shipping activities are managed in accordance with the HSE MS, this includes the procedures and policies that describe it. The following are relevant HSE MS documents that are applicable to the operation of the plant to ensure environmental compliance:

- RTA Risk register
- Legal and Other Obligations register
- Water Quality and Control Standard (CLASSIC-ENV-STD-562)
- Non-mineral Waste Management Standard (CLASSIC-ENV-STD-557)
- Measuring and Monitoring Standard (CLASSIC-SYS-STD-613))
- Training, Competency and Awareness Standard (CLASSIC-SYS-STD-662)
- Performance Assessment and Auditing Standard (CLASSIC-SYS-STD-803)

3.2 Management structure

The Port of Amrun and River Facilities for the Amrun Project will be managed by RTA with Contractors appointed from time to time for operational and maintenance activities. RTA will have operational responsibility for managing smaller sub-contractors, including vessel operators. Bauxite shipping activities would continue to be managed by Rio Tinto Shipping, under the management of RTA for the purposes of compliance with this OMSMP. Management for the Project is clearly defined, with identified lines of authority and reporting. The overall management structure is outlined in **Figure 4**.

Figure 4 Overall Management Structure for the South of Embley Project



A number of key management roles have been identified for the Operation, as summarised below. The role names are subject to change, but the basic structure will remain the same.

- RTA Weipa Operations, General Manager
  - Manages the Project Operations, including providing adequate resources for environmental management requirements
  - Liaises with Regulatory Authorities, in coordination with the HSE Manager.
- RTA Weipa Line Managers
  - Report to the Weipa Operations, General Manager.
  - Day-to-day management of the Project marine and shipping activities.
  - Monitor implementation of management plans including the OMSMP, refining procedures as necessary to ensure relevant management measures are implemented effectively and adaptive management/corrective action is taken in a timely manner.
  - Review and report on environmental incidents.

- Ensure all staff are trained in environmental awareness, site issues and the requirements of environmental management plans.
- Monitor environmental compliance and reports non-compliance to the HSE Manager.
- Assist in developing corrective actions for complaints, non-compliances and environmental incidents and ensures they are implemented.
- Facilitate regular environmental audits by the HSE Manager to monitor compliance.
- On-site monitoring as provided for in management plans and procedures.

- RTA Weipa Operations, HSE Manager
  - Reports to the Weipa Operations, General Manager.
  - Supports the Line Managers in day-to-day management of environmental performance.
  - Monitors environmental performance.
  - Reviews compliance with permits and management plans.
  - Monitors, investigates and reports on complaints, incidents of environmental non-compliance and environmental incidents.
  - Liaises with relevant regulatory authorities including providing monitoring results and reporting non-compliance and environmental incidents.
  - Ensures non-compliances and environmental incidents are followed up and corrective actions are implemented within reasonable timeframes
  - Ensures environmental monitoring is completed in accordance with approved management and monitoring plans.
  - Arranges regular environmental audits.
  - Reviews contractor environmental management plans.
  - Ensures all contractors are trained in environmental awareness, site issues and the requirements of environmental management plans.
  - Ensures environmental management plans and procedures are updated as necessary including annual review of the OMSMP.
  - Ensures that consultation with regulatory agencies is conducted in accordance with the EPBC Act Approval, and that all comments are appropriately considered.
  - Review the OMSMP in accordance with the EPBC Act review requirements.
- Rio Tinto Marine Superintendent
  - Responsible for day-to-day management of bauxite shipping activities in consultation with the RTA Weipa Shipping Manager and HSE Manager.
  - Ensure all shipping staff and contractors are trained in environmental awareness, site issues and the requirements of environmental management plans.
  - Monitor environmental compliance and reports non-compliance to the HSE Manager.
  - Assist in developing corrective actions for complaints, non-compliances and environmental incidents and ensures they are implemented.

- Facilitate regular environmental audits by the HSE Manager to monitor compliance.
- Monitoring as provided for in management plans and procedures.

- Employees, contractors and sub-contractors
  - Conduct all activities in accordance with the OMSMP, including water quality monitoring and marine mammal and marine turtle monitoring.
  - Regularly report on the relevant works to RTA.
  - Report any non-compliances to their line manager.

3.3 Non-compliances, inspections and audits

RTA will ensure compliance with the OMSMP and in turn the EPBC Act approval through reporting of non-compliance and routine inspection and auditing of mitigation and monitoring measures which include:

Audit and Inspections – Project worksite inspections and audits will be carried out on a routine basis during marine and shipping activities. These inspections and audits will be documented, and deficiencies recorded in a corrective action register, such as the Rio Tinto Business Solution (RTBS), with a copy of the documented checklist submitted to the HSE Manager Marine Superintendent. The audit findings will be acted on by the Marine Superintendent and implementation of corrective actions reported to HSE Manager. Relevant regulatory agencies and external stakeholders will be notified by the HSE Manager as required by the regulatory approvals.

Condition 69 of the EPBC Act approval requires that an independent audit of compliance with the conditions of approval, and by extension with this Plan, be conducted by an independent auditor approved by the Minister. Criteria for the audit must be approved by the Minister prior to the audit, and the audit report must address the criteria and be submitted to the Minister.

Incidents - Should any personnel become aware of an environmental issue associated with shipping or Port Operations that is causing, or may cause, environmental harm, the person must immediately advise their line manager, who will contact the HSE Manager. Incidents will be recorded internally through RTBS and will be investigated and impacts assessed. Corrective actions will be developed as required and recorded in a corrective action register (RTBS), with a copy of the documented checklist submitted to the HSE Manager and Marine Superintendent. Corrective actions will be acted on by the Marine Superintendent and implementation of corrective actions reported to HSE Manager. Relevant regulatory agencies and external stakeholders will be notified by the HSE Manager or Marine Superintendent as required by the Project approvals. If external notification is triggered, a report will be provided to the relevant parties and documented with the internal incident record.

Sources of potential environmental impact that might give rise to an environmental incident have been considered and assessed in Section 7.8, **Table 13**. Where objectives and goals are not met for each potential impact source, relevant management measures and corrective actions will be assessed for continued effectiveness and amended where necessary.

3.4 Emergency Response

The Business Recovery and Resilience Plan (BRRP) is the RTA integrated set of management response plans to control an incident, protect people and return business activities back to a normal state. It comprises of three interrelated plans:

- Business Resilience Management Plan;
- Emergency Response Plan; and
- Business continuity plan.

The BRRP covers certain events that may occur at RTA operations that would require immediate actions. For example, natural disasters, major fire / explosions on the Chith Export Facility, spill response or property damage.

Emergency response will be coordinated in conjunction with NQBP and MSQ at the Port of Weipa and MSQ at the Port of Amrun as required.

3.5 Document and Data control

Documents and records (electronic and hard copy) associated with this OMSMP will be stored safely in accordance with the HSE MS, and remain accessible to nominated personnel.

Standard Operating Procedures will be developed and implemented for monitoring methods, site maintenance, and data capture, analysis and interpretation, which include strict Quality Assurance and Quality Control (QA/QC) processes.

3.6 Reporting

This OMSMP will be published on the RTA website within one (1) month of approval in accordance with Condition 59 of the EPBC Act approval. The RTA website address is:
https://www.riotinto.com/search/documents#main-search_e=0&main-search_sxatags=weipa

In accordance with Condition 68 of the EPBC Act approval RTA will publish a report on this web site addressing compliance with the OMSMP over the previous 12 months annually in August. When published the annual report will be provided to DAWE along with reporting any non-compliance with any condition of the approval or management plan.

Additionally, if requested RTA will facilitate site access and assistance to DAWE to witness, inspect, examine or audit operations and provide appropriate documentation to support as requested.

In accordance with Condition 57 all survey data, methodologies and related analysis of data associated with the OMSMP shall be published annually in August.

If requested by the DoE, all survey data and information related to this Plan and MNES will be submitted within 30 business days of the request, or within a time frame agreed by the DoE in writing, in accordance with Condition 56 of the EPBC approval.

RTA will also provide the survey data and related information within 30 business days of a request to anyone who may request such information. Notification of the availability of this information and data will be provided on the RTA website.

A summary of reporting requirements associated with marine and shipping activities is presented in **Table 3**.

Table 3 Reporting Requirements

Incidents/Non-compliance	Potential Impact Sources	Timeframe	Reporting Requirement
Environmental Incidents (internal)	All potential impacts in Table 13	Immediately (or as soon as reasonably practical after becoming aware, and on the same shift)	Report to line manager Line manager to report to HSE Manager and HSE Manager to notify external Department if required in accordance with licences and legislation. Recorded as an internal incident in RTBS.
Marine Pollution Reporting (external incident reporting)	Marine Pollution - Vessels and waste Marine Pollution - Spills	Within 24 hours of becoming aware	HSE Manager to report to MSQ and Department of Environment and Science (DES) for spills from Chith Export Facility activities. Rio Tinto Shipping or shipping contractor to report to MSQ and AMSA Marine Pollution Report form (POLREP)
Non-compliance with EPBC Act Approval condition	If marine and shipping activities commence before approval of the MDMP Approved OMSMP is not implemented.	Annually, in August	HSE Manager to report to DAWE Record as an internal incident in RTBS
Marine Pest listed on the CCIMPE Trigger List identified from monitoring	Marine Pest – Establishment	As soon as practicable	HSE Manager to report to DAF Biosecurity Queensland Record as an internal incident in RTBS
Any stranding, injury or death of marine turtle, dugong, dolphin or whale	Megafauna – vessel strike and vessel avoidance Megafauna – entrainment Megafauna – pollution Megafauna – nesting and hatchling disorientation	As soon as practicable	HSE Manager to report in regard to Chith Export Facility activities. Rio Tinto Shipping or shipping contractor to report in regard to shipping activities. Reports are to be provided to: DES-designated marine stranding hotline on 1300 130 372 and Queensland Parks and Wildlife Service. Record as an internal incident in RTBS if cause is related to Project activities.

Incidents/Non-compliance	Potential Impact Sources	Timeframe	Reporting Requirement
Cetacean death or injury	Megafauna – vessel strike and vessel avoidance Megafauna – entrainment Megafauna – pollution Megafauna – nesting and hatchling disorientation	Within seven days of resulted activity	HSE Manager to report in regard to Chith Export Facility activities. Rio Tinto Shipping or shipping contractor to report in regard to shipping activities. Report to be provided to DAWW: 1800 803 732, or **protected.species@environment.gov.au** Record as an internal incident in RTBS if cause is related to Project activities.
Elasmobranch sighting	n/a	Within 5 business days of sighting	HSE Manager to Report to DAWE
Traditional Owner Employment Opportunities, and Number of local traditional owners employed in the implementation of the OMSMP.	n/a	Quarterly and Annually	RTA to report quarterly to Western Cape Communities Co-existence Agreement committees (WCCCA). HSE Manager to report annual to DAWE
Crocodiles of Concern / Problem crocodiles Crocodile relocation	n/a	If crocodile relocation required	HSE Manager to contact DES as soon as possible on 1300 130 372.

3.7 Independent Peer Review

Consistent with Condition 60 of the EPBC Act Approval an independent peer review of the OMSMP has been performed by an independent marine scientist with recognised expertise in marine and shipping management plans and an expert understanding of MNES in the marine environment. The review included the analysis and effectiveness of management measures and recommendations and advice of the peer reviewer and how these have been addressed and revised in the OMSMP has been provided to the Minister.

3.8 OMSMP Review

Consistent with Condition 10 of the EPBC Act Approval the OMSMP and the performances pertaining to it will be reviewed, revised and submitted to the Minister for approval within two (2) years of operations commencing, the subsequently every three (3) years for the next nine (9) years and, unless otherwise agreed by the Minister in writing every five (5) years thereafter for the life of the project.

The OMSMP must be reviewed based on data and analysis from monitoring programs, and if applicable any incidents and non-compliances, results of audits or reviews which identify improvements that should be incorporated. This review process will enable work methods to be updated when deemed to be ineffective and will also facilitate continuous improvement of environmental management. Consultation with relevant stakeholders will occur for any major changes to the plan if it may impact their respective areas of concern.

This update represents the first review from approval within two years of operations commencing. The proposed changes are all administrative in nature. Condition 60 requires each program/s, plans/s, or strategies specified in the conditions to be independently peer reviewed prior to submission to the minister for approval. The Operational Marine Shipping Management Plan (OMSMP) was independently peer reviewed by the approved reviewer Dr James Stoddart on 03 August 2018 using the approved peer review criteria approved by the Department of Environment and Energy on 03 April 2018. As the initial OMSMP was independently peer reviewed it is compliant with the requirements of Condition 60. As this review is administrative in nature it does not introduce any additional risk to Matters of National Environmental Significance (MNES) not already contemplated and independently peer reviewed.

Training

All employees involved in Port and shipping operations will be appropriated qualified and trained or under appropriate supervision. All employees related to marine and shipping operations will undergo environmental training and awareness through the induction program at a minimum this will include:

- Roles and responsibilities – General Environmental Duty, who to contact and when to contact them when an environmental issue is identified.
- General site requirements – EMS elements such as policy, objectives & targets, general aspects and "environmental awareness" in everyday duties, and particularly good housekeeping.
- Marine pollution prevention requirements.
- Spills prevention and response procedures and reporting.
- General emergency response, incident identification/classification and reporting/notifications.
- Marine fauna identification and reporting procedures.

- Easily identifiable marine pests and reporting procedures.

4. Environmental risk

Activities carried out for operational shipping and marine activities can pose considerable risk to MNES. This risk framework was developed specifically for the potential impacts to MNES from Project marine activities and shipping based on the management practices outlined in the Leading Practice sustainable development for the mining industry risk assessment and risk management handbook (LPSDP 2016). The risk assessment approach was based on the following:

- Identification of potential impacts
- Assessment of likelihood and consequence of the potential impacts
- Assignment of a risk rating (inherent risk)
- Consideration of mitigation measures
- Reassessment of the risk rating, by re-evaluating the consequence and likelihood criteria, given the influence of the mitigation measure (residual risk).

A summary of the criteria used to determine consequence and likelihood of each potential impact is described in **Table 4** and **Table 5** respectively. Consequence levels are assessed based on impacts to ecosystem function, communities or species based on the impact (e.g. reef is habitat communities, while impacts on megafauna are species). The risks were assessed as low, moderate, high and critical with the risk assessment matrix in **Table 6**. An initial risk assessment was completed based off already existing legislative controls (e.g. legislation) and is presented in Section 6.7**.** The assessment was then repeated, following consideration of all mitigation measures and safeguards (Section 7.7).

Table 4 Consequence descriptions

Consequence levels	Negligible	Minor	Moderate	Major	High
Ecosystem function	Alteration or disturbance within natural variability. Ecosystem interactions may have changed but it is unlikely that there would be any detectable change outside natural variation or occurrence	Measurable change to the ecosystem components without a major change in function (no loss of species or introduction of new species that affects function), Recovery in less than 1 year	Measurable changes to ecosystem components without major change in function (no loss of species or introduction of new species that affects function), Recovery in 1-2 years	Measurable changes to ecosystem components with a major change in function Recovery in 3-10 years	Long term and possible irreversible damage to one or more ecosystems functions. Recovery if at all is greater than 10 years
Habitat communities / assemblages	Alteration or disturbance within natural variability. Less than 1% area is affected or removed	1 – 5% of area affected in major way or removed. Re-establishment in a year	5-30% of area affected in major way or removed. Re-establishment 1-2 years	30-90% of area affected in major way or removed. Re-establishment 3-10 years	Greater than 90% of the area affected in a major way or removed. Reestablishment is at all is greater than 10 years.
Species	Population size or behaviour may change but unlikely to be any detectable change outside natural variation	Detectable change to population size and behaviour. No detectable impact on population breeding or dynamics and recover in less than a year	Detectable change to population size and behaviour. No detectable impact on population breeding or dynamics and recover in 1-2 years	Detectable change to population size and behaviour. No detectable impact on population breeding or dynamics and recover in 3-10 years	Local extinctions are imminent/immediate or population no longer viable. Recover if at all greater than 10 years.

Table 5 Likelihood Descriptions

Likelihood	Description
A – Almost certain	Recurring event during life of the project – occurs multiple times a years (more than twice)
B – Likely	May occur frequently during the project – 1 to 2 times per year
C – Possible	May occur during life of project – 1 -10 years
D – Unlikely	Event that is unlikely to occur in the life time of project – 10 -100 year event
E - Rare	Event that is very unlikely to occur during the life time of a project - 100 year event

Table 6 Risk Assessment Matrix

	Consequence				
Likelihood	**Negligible**	**Minor**	**Moderate**	**Major**	**High**
A – Almost certain	Moderate	High	Critical	Critical	Critical
B – Likely	Moderate	High	High	Critical	Critical
C – Possible	Low	Moderate	High	Critical	Critical
D – Unlikely	Low	Low	Moderate	High	Critical
E - Rare	Low	Low	Moderate	High	High

5. Matter of National Environmental Significance

5.1 Water quality

Water quality in Albatross Bay is in good condition with minimal local anthropogenic impacts due to the relatively undeveloped catchment. Physical and chemical properties have been monitored at both Weipa and Amrun areas with parameters including turbidity and photosynthetically active radiation (PAR).

Turbidity has been measured monthly from May 2012 to June 2015 at four sites in the Embley River (**Figure 5**), upstream, Hornibrook Point, west of Humbug Wharf and the mouth of the Embley River, with median turbidity of 13.8, 13.8, 12.9 and 13.1 NTU, respectively. Higher turbidity regimes are typical in estuarine systems with the effects of catchment runoff, shallow bathymetry and high current velocities mobilising fine sediments into the water column (RTA, 2011). **Table 7** shows the statistical summary of the turbidity at the four sites in the Embley River.

Table 7 Summary of Embley River Turbidity (May 2012 - June 2015)

Turbidity (NTU)	Hornibrook Point	West of Humbug Wharf	Upstream	Embley River Mouth
Max	42.6	22.6	50.5	37.7
Min	1.1	0.5	1.4	0.2
Median	13.8	12.9	13.8	13.1

Background water quality has been collated from numerous deployed logger investigations within the vicinity of the Port of Amrun since 2007 (**Figure 6**). Key monitored parameters have included turbidity (NTU) and PAR. Monitoring results from all investigations compare favourably with results showing turbidity and total suspended solids (TSS) concentrations are considerably higher in the wet season than the dry season. An exponential relationship was identified between turbidity and PAR for both the wet and dry season (2015 and 2016) with PAR reducing below detection limits in periods of high turbidity. A summary of the 2015 and 2016 turbidity results is summarised in **Table 8** below.

Increases in turbidity are largely weather driven with a strong temporal correlation is observed between elevations in turbidity and the increases in significant wave height (**Figure 7**). From this investigation, as significant wave height approaches 0.5m sediments begin to mobilise elevating ambient turbidity. Whilst the occurrence of such conditions are typically associated with the monsoon/wet season, these events can occur throughout the year.

Figure 5 Embley River Water Quality Monitoring Sites

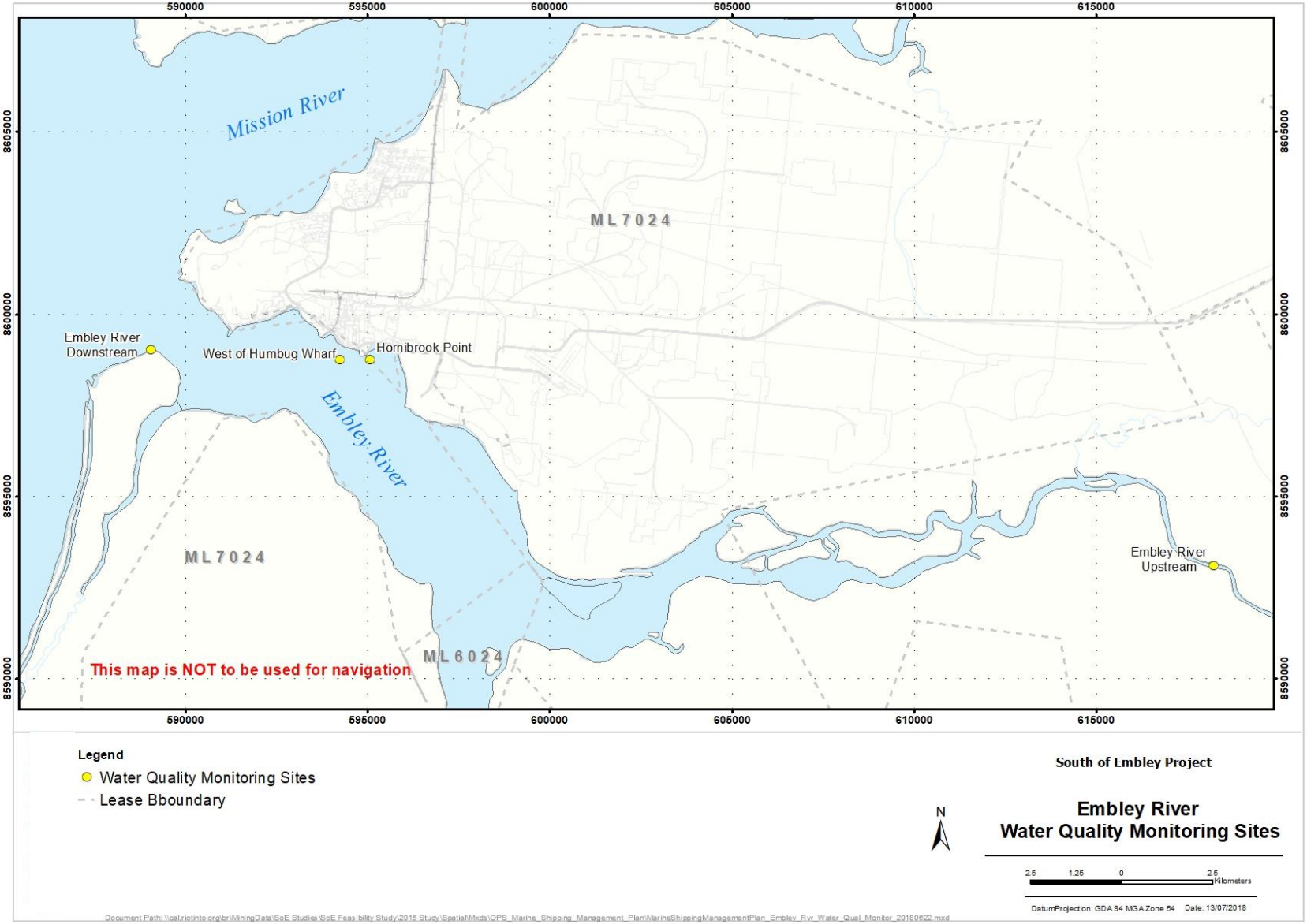


Figure 6 Port of Amrun Water Quality Monitoring Sites

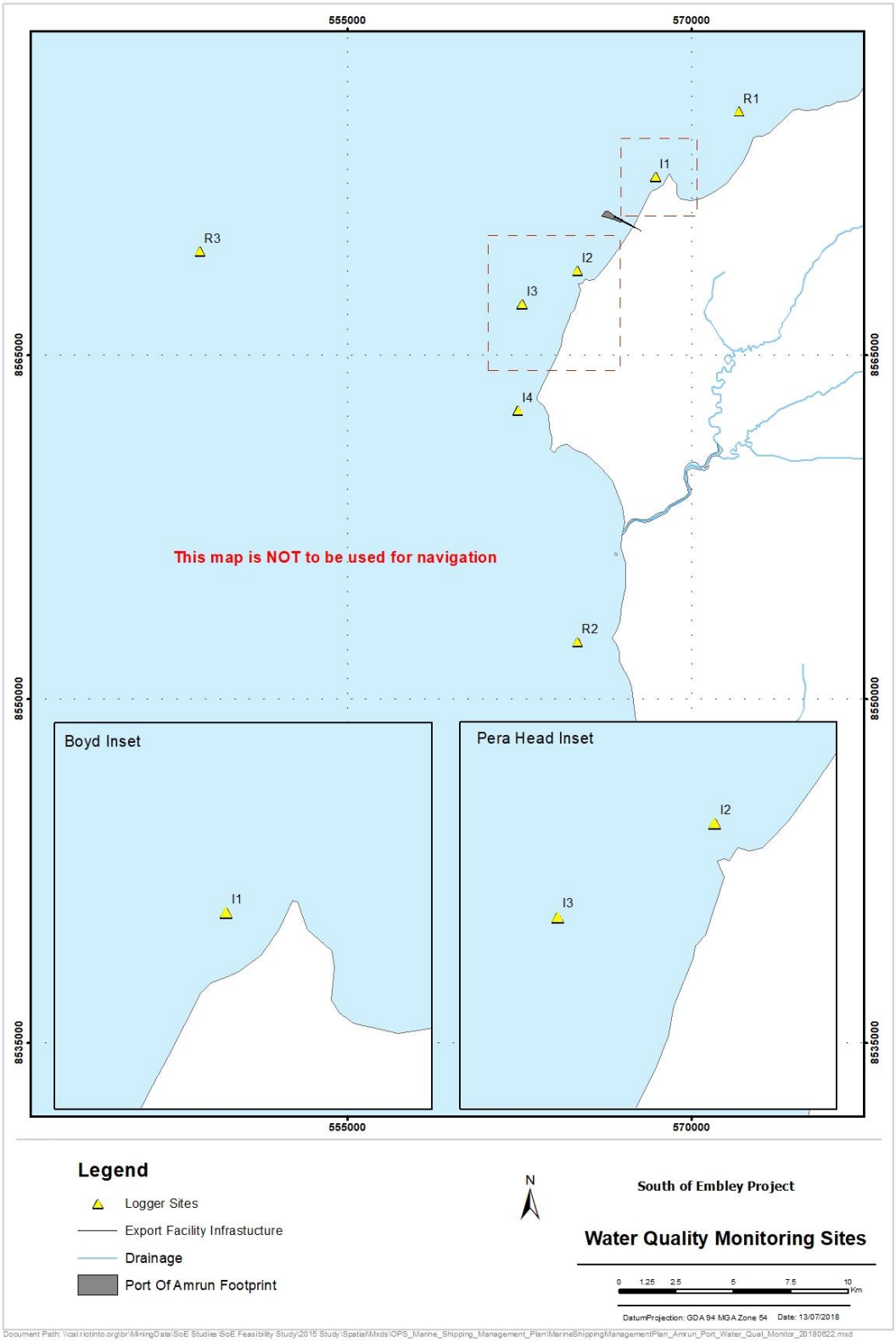
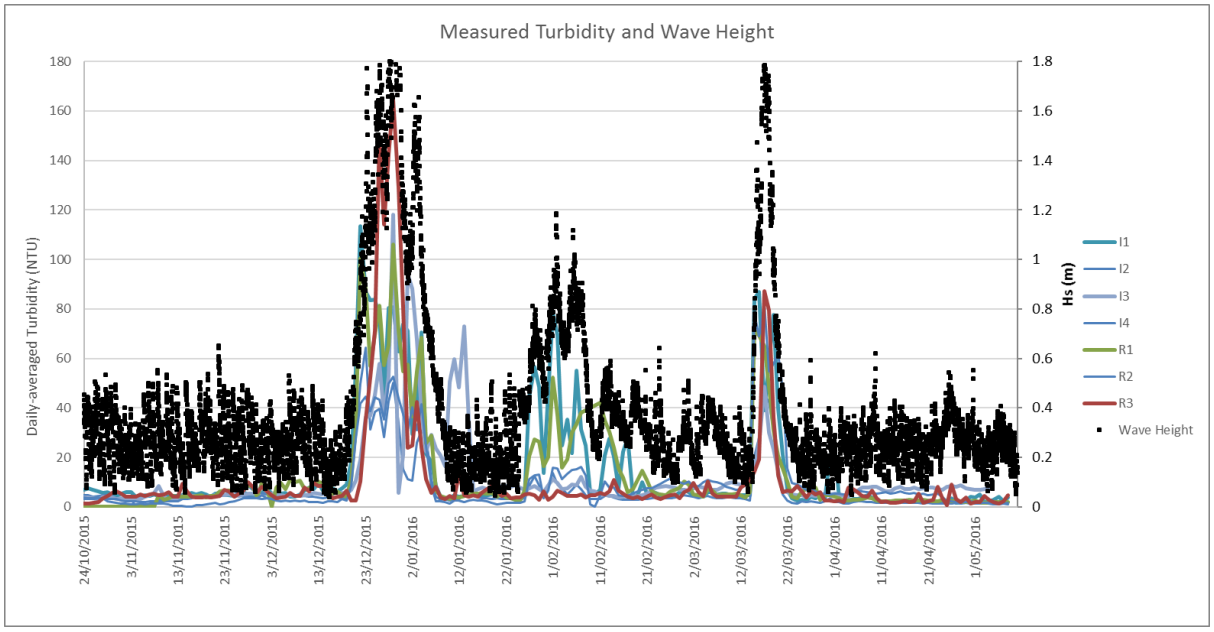


Table 8 Summary of Port of Amrun Turbidity (NTU) (2015 dry and 2016 wet season)

Site	Depth (m)	Dry Season			Wet Season		
		50th percentile	Internal Trigger Level (80th percentile)	External Trigger Levels (95th percentile)	50th percentile	Internal Trigger Level (80th percentile)	External Trigger Levels (95th percentile)
I1	8.7	4	5	9	6	32	90
I2	8.9	4	4	6	4	11	42
I3	9.4	4	5	6		20	72
I4	9.2	4	6	8		15	57
Reference							
R1	9.3	5	7	11		35	85
R2	10.4	1	3	5		16	46
R3	26.5	3	4	8		8	89

Figure 7 Mean daily turbidity and significant wave height (October 2015 to May 2016).



Note: Turbidity from impact and reference monitoring locations; significant wave height (Hs) recorded from Albatross Bay

5.2 Habitats

Shipping and marine operations occur in the Gulf of Carpentaria which has a number of near shore tropical environments including near shore fringing reef communities, seagrass and open sandy substrate and associated sparse macrobenthic communities.

Previous benthic surveys in the Weipa area have identified the following coastal habitats which may be used by MNES include mangrove assemblages, seagrass communities, open soft substrate and rocky reefs.

5.2.1 Seagrass

Seagrass beds are typically found in the more sheltered areas of Albatross Bay and the Hey and Embley Rivers. James Cook University Centre for Tropical Water and Aquatic Ecosystem Research (TropWATER; formerly DAF) have been completing ongoing monitoring and surveys in the area since 2000. While there is minor seasonal changes in the seagrass beds the meadows have consistently been found to be in good condition with six species recorded in the area. Seagrass meadows are dominated by *Enhalus accoroides* and largely restricted to shallow sand and mud banks at depths of less than 4m. Distribution of seagrass within the Port is shown in **Figure 8**.

A small area of seagrass has been recorded adjacent to the Boyd Bay beach (north of Boyd Point) consisting of *Halophila decipiens* and *Halophila uninervis* (McKenzie and Yoshida, 2009). A small area of *Halodule uninervis* was confirmed in 2017 when completing surveys for the Amrun moorings. No seagrass has been found within the Boyd Point to Pera Head area with physical conditions, sediment and prevailing bathymetry unlikely to support seagrass in the Amrun Port.

5.2.1.1 Mangrove

Mangrove communities are located within Port of Weipa and provide structurally complex habitat that can provide a nursery habitat, protection and food for a number of important commercial species. Patches of fringing mangrove (1-2 trees wide) occur at the foreshore location of the Hey River Terminal. Species include *Rhizophora stylosa* (red mangrove), *Bruguiera gymnorhiza* (large-fruited orange mangrove), *Avicennia marina* (grey mangrove) and *Aegiceras corniculatum* (river mangrove)

No mangrove communities occur adjacent to the Chith Export Facility.

5.2.2 Rocky reef and rocky foreshore

Rocky foreshores are present with the Weipa area. These rocky areas provided substrate for a variety of marine invertebrates. Rocky reefs are generally located in shallow areas near the mouth of the river (e.g. Duifken Point). The revetment walls installed for Humbug Terminal and Hey River Terminal provide structure similar to rocky foreshore resulting in the development of community similar to those found on other rocky outcrops. No natural reef areas have been recorded in the Hey and Embley Rivers.

Near shore fringing rocky reef communities in the vicinity of the Port of Amrun area occur at Boyd Point, Pera Head and between Pera Head and Thud Point (**Figure 8**).

Patchy reef supports hard coral communities while low profile reefs comprising of soft coral and sponge assemblages. Surveys for the area were completed during the baseline assessment for the EIS (2007 – 2008 and 2010) and impact monitoring (2016). All surveys recorded reefs in the area consisted of outcrops of hard coral primarily forming over ironstone formations.

All surveys identified that hard coral cover is of a depauperate and patchy nature. Reefs are dominated by small to medium sized colonies of corals of the families *Dendrophylliidae*, *Faviidae* and *Poritidae*. The genera and species in these three families are typical of hard corals

that grow in environments that that grow in environments that experience extremes in turbidity and sedimentation (K. Anthony, Pers Comm; Erftemeijer *et al.,* 2012).

These near shore reefs systems between Boyd Point and Thud Point may be considered of high importance in a regional context due to the resources they support that are of conservation, cultural, commercial and recreational importance (Baker and Sheppard, 2006).

There is a paucity of information on coral spawning in the Gulf of Carpentaria and timing for spawning events is unknown. The most probable spawning period for eastern Gulf of Carpentaria corals is October – November when water temperatures are rising (pers. Comms Prof. Andrew Baird, JCU 13 Nov 2017; Keith *et al.,* 2013).

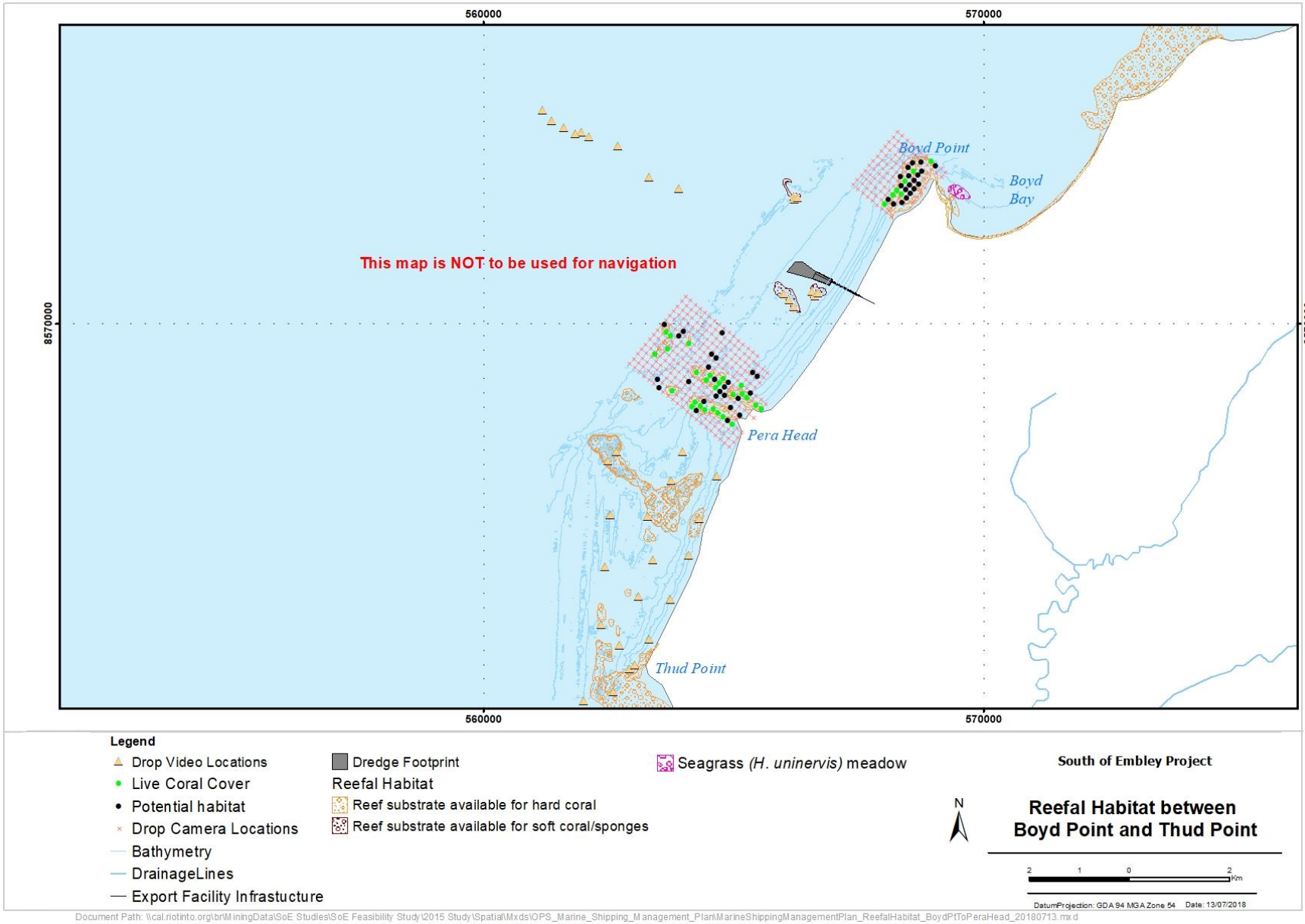


Figure 8 Reefal Habitat Between Boyd Point and Thud Point

5.2.3 Soft Sediment Habitat

Most of the coastline surrounding Port of Amrun, Port of Weipa and Albatross bay consists of open sandy and muddy substrates with occasional macroinvertebrates (RTA, 2011; RTA, 2012). The development footprints for the River Terminals, and Port of Amrun area have been confirmed through field inspections that consist primarily of soft open substrate that contain sparse epifaunal organisms such as sea pens and polychaetes which are common in the Gulf of Carpentaria (Post *et al.,* 2006).

5.3 Marine Megafauna (EPBC Listed species)

Several EPBC listed, threatened or migratory species have been recorded in Weipa and Amrun areas (**Table 9**).

Marine fauna offset programs have been developed to offset significant residual impacts identified in the Project EIS for Inshore Dolphins (Inshore Dolphin Offset Strategy (RTA, 2015)) and Marine Turtles (Feral Pig Management Offset Strategy (RTA, 2016a)) and Marine Turtle Offset Plan (RTA, 2016b) in accordance with the Projects Commonwealth and State Approvals. The offset programs include survey and monitoring for these species within the Project area and findings to date have been presented below and considered in development of management and monitoring requirements within Section 7 of this OMSMP.

Table 9 Port of Weipa and Port of Amrun Listed Threatened, Vulnerable or Migratory MNES Species

Species	EPBC status	Weipa	Port of Amrun
Dugong - *Dugon Dugong*	Migratory	Present - Dugong have been recorded in the Weipa area, with a large food source (seagrass) available in the area (GHD, 2015; BPM, 2017)	Present – Dugongs have been recorded transiting around the Chith Export Facility (GHD, 2015; BPM, 2017)
Australian snubfin - *Orcaella heinsohni*	Migratory	Likely – Animals are known to occur in the surrounding area but have not been recorded in the river (GHD, 2015; BPM, 2017)	Present – animals are known to occur in the area with behaviours including foraging (GHD, 2015; BPM, 2017)
Australian Humpback Dolphin - *Sousa sahulensis*	Migratory	Present – animals are known to occur in the area with behaviours including foraging (GHD, 2015; BPM, 2017)	Present – animals are known to occur in the area with behaviours including foraging (GHD, 2015; BPM, 2017)
Bryde's whale – *Balaenoptera edeni*	Migratory	Unlikely – no sightings have been recorded in the Port of Weipa and animals are unlikely to be present in the area	Present - – Sightings have been recorded offshore Port of Amrun past 9 mile reef area. While the proposed Port site does not contain preferred habitat, the recording of the species from tropical inshore waters suggests it is possible that the species may occur sporadically in the vicinity of the proposed Port footprint.
Green Turtles – *Chelonia mydas*	Vulnerable and Migratory	Present – Green Turtles are known to occur in the areas with preferred foraging habitats (seagrass beds) in the area (GHD, 2015; BPM, 2017)	Present - Green Turtles are known to occur in the area with nesting recently recorded (Guinea, 2014). Preferred foraging habitats include sea grass beds (nearest beds located at Boyd Bay) however they may also forage at reef habitats at Boyd Point, Pera Head and between Pera Head and Thud Point.
Hawksbill Turtles – *Eretmochelys imbricata*	Vulnerable and Migratory	Present - Hawksbill Turtles are known to occur in the area and may forage in the area (GHD, 2015; BPM, 2017)	Present - Hawksbill Turtles are known to occur in the area and may forage on reef areas at Boyd Point, Pera Head and between Pera Head and Thud Point. They are also known to nest on the beach in the vicinity of the Chith Export Facility site (Guinea, 2014, Pendoley Environmental, 2017; 2018).
Flatback Turtles – *Natator depressus*	Vulnerable and Migratory	Likely – Flatback Turtles are known to occur in the surrounding area and may forage or rest in the Hey and Embley River (GHD, 2015; BPM, 2017)	Present - Flatback Turtles are known to occur in the area and may forage in the shallow rocky reef areas and sedimentary habitats around the Chith Export Facility and are known to nest on the beach in the vicinity of the Chith Export Facility site (Guinea, 2014; Pendoley Environmental 2017; 2018).
Olive Ridley Turtles – *Lepidochelys olivacea*	Endangered and Migratory	Likely - Olive Ridley Turtles are known to occur in the area and may forage in the Hey and Embley Rivers (RTA, 2013)	Present - Olive Ridley Turtles are known to occur in the area and may forage in the shallow coastal unvegetated habitats around the Chith Export Facility area.

Species	EPBC status	Weipa	Port of Amrun
			Nesting has been recorded in the vicinity of the Chith Export Facility site (Guinea, 2014, Pendoley Environmental 2017).
Leatherback Turtles – *Dermochelys coriacea*	Endangered and Migratory	Unlikely - Leatherback Turtles may forage in the area but are principally oceanic (RTA, 2013)).	Likely - Leatherback Turtles may forage in the area but are principally oceanic (RTA, 2013)
Loggerhead Turtles – *Caretta caretta*	Endangered and Migratory	Likely - Loggerhead Turtles may be transient in the area and may forage in the Weipa reef areas (RTA, 2013)	Present - Loggerhead Turtles have been sighted in the area during the 2016 dolphin survey (BPM, 2017)
Estuarine Crocodile *Crocodylus porosus*	Migratory	Present - Recorded in estuarine environments within the Project area with individuals observed in close proximity to the proposed Hey Point and Humbug terminals.	Present - Recorded in marine environments within the Project area with individuals sighted along the beach between Pera Head and Boyd Bay.

5.3.1 Inshore dolphins

Limitations on information regarding the status of inshore dolphins along western Cape York led to the development of an offset program involving inshore dolphin monitoring over a period of thirteen years. The program aims to provide a better understanding of the distribution, habitat use and abundance of Australian snubfin (*Orcaella heinsohni)* and Australian humpback dolphins (*Sousa sahulensis)* within the vicinity of the Amrun project area. The research also contributes towards the 'co-ordinated research framework to assess the national conservation status of Australian snubfin dolphins (*Orcaella heinsohni*) and other tropical inshore dolphins' (the National Inshore Dolphin Strategy). The research based offset program is consistent with the Threat Abatement and Recovery actions as identified by both DES and DAWE.

Five surveys have been completed since 2014 this has included:

- One survey prior to the commencement of the action (2014 pre-construction survey; completed).
- Three annual surveys during the initial construction period (2016, 2017 and 2018 completed).
- One survey to be conducted within 12 months of bauxite shipping from Boyd Port becoming fully operational (2019, completed)

Inshore dolphin survey results have identified:

- Australian humpback dolphins and Indo-Pacific (inshore) Bottlenose Dolphins were recorded in within the vicinity of the Port on each survey.
- Australian snubfin dolphins were recorded for each survey, however in lower numbers.
- Australian humpback dolphins and inshore bottlenose dolphins were found over a range of depths from shore out to 25 metres (limit of survey) with an average depth of 9.1 m and 9.8 m respectively.
- Australian snubfin dolphins were sighted on considerably less occasions and were sighted in shallower waters ranging from 2.5 to 10.4m.

The inshore dolphin surveys have found that the Weipa and Boyd Bay sites should be considered regional hotspots for both Australian humpback and Indo-Pacific bottlenose dolphins. The Inshore Dolphin Offset Strategy will continue with one additional survey within 10 years of bauxite shipping from the Port.

Findings from the dolphin surveys completed during construction have not recorded area avoidance by any species around the Port of Amrun. Additionally, inshore dolphins are observed extensively around operational ports and accordingly no additional management measures are proposed at this stage. Further information will be obtained as the project continues and the management plan amended as necessary to prevent impacts to the local population.

5.3.2 Marine Turtles

Marine turtle nesting monitoring has been completed along the Amrun coastline since 2013 (Guinea 2014; Pendoley 2016; 2017; 2018; 2019). Four nesting turtle species have been identified to date including flatback (*Natator depressus)*, hawksbill (*Eretmochelys imbricate)*, olive ridley (*Lepidochelys olivacea*) and green (*Chelonia mydas*) turtles. Surveys to date have confirmed low density turtle nesting occurs on the beaches between Winda Winda Creek and Ina Creek (RTA, 2013, Guinea. 2014, Pendoley Environmental. 2017 and unpublished data). Peak turtle nesting occurs between August and September; but nesting has been recorded from March through to December.

Surveys have identified feral pigs as a key threatening process for the survival of turtles along the Amrun Project coastline. As part of the approval conditions to offset potential shipping activities a feral pig offset program was required. Since 2016 the feral animal control program has continued to improve with predation on actively controlled beaches restricted to below 10% for 2020 and 91 hatched nests recorded (unpublished data) up from one successful nest in 2016.

The *Recovery Plan for Marine Turtles in Australia 2017 – 2027* was released in July 2017 (Commonwealth of Australia 2017). The long-term recovery objective for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list. All six of Australia's threatened or endangered turtle species may occur near Chith Export Facility with the four confirmed nesting species identified above.

The recovery plan has identified nesting and interesting (up to 20km seaward of nesting habitat) habitat critical to the survival of marine turtles for each turtle species. The beaches adjacent to the Port are regarded as habitat critical to the survival of two turtle species, olive-ridley turtles (Western Cape York genetic stock) and flatback turtles (Arafura Sea genetic stock).

The Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017) has identified Olive Ridley Turtles as a priority for management action on the basis that they are in decline or likely to be in decline due to multiple, continuing threats occurring on a substantial scale. This species has only small nesting aggregations in Australia, which have been affected by up to 90 per cent nest predation at some beaches for multiple decades. In addition, they are likely to be heavily impacted by ghost nets in the Arafura-Timor Seas and the Gulf of Carpentaria. Other key threats to the Olive Ridley Turtles are identified as climate change and variability and domestic fisheries bycatch.

The flatback turtles nesting in the Project area are not identified in the recovery plan as a priority species for management action however the nesting beaches are identified as habitat critical to the survival of the genetic stock. Key threats to this species are identified as marine debris entanglement (ghost nets), climate change and variability, terrestrial predation and indigenous egg collection.

The recovery plan identified several other key threats which are relevant to marine and shipping operations including:

- Marine debris ingestion;
- Chemical and terrestrial discharge;
- Light pollution
- Habitat modification - infrastructure/coastal development
- Vessel disturbance
- Noise interference
- Recreational activities.

Overarching actions have been developed to address the key threats to turtle species, and those which are applicable during the marine and shipping operations are listed below.

- Reduce the impacts from marine debris;

- Minimise chemical and terrestrial discharge;
- Minimise light pollution; and
- Address the impacts of coastal development/infrastructure.

Potential impacts from the marine and shipping activities of the Project are further assessed, consistent with these overarching actions, in Section 6**.**

5.4 Elasmobranchs

Four species of threatened Elasmobranchs have the potential to occur in the rivers and offshore environment of the Amrun and Weipa waters. This includes the

- Largetooth sawfish (*Pristis pristis*) [previously known as the freshwater sawfish, *Pristis microdon*]
- Green sawfish (*Pristis zijsron*)
- Dwarf sawfish (*Pristis clavata*)
- Speartooth shark (*Glyphis glyphis*)

The animals are not commonly sighted and do not spend long periods of time at the surface. No species have been sighted on site.

The Australian National Recovery Plan for sawfish and river sharks (Commonwealth of Australia 2015) notes the major threats to the species are through fishing activity and habitat degradation.

5.5 Marine Pests

Marine pests are marine biota that are translocated into waters outside their natural geographic range and subsequently settle, survive and spread. Translocation and survival of these species in new areas can cause irreversible impacts to the local ecosystem by competing with and/or predating on native species, as well as introducing disease. The consequences include a combination of environmental, social and economic impacts.

Marine pests surveys and monitoring in the area have included:

- Port of Weipa in October 1999 by the CRC Reef Research Centre and James Cook University (Hoedt *et al.,* 2001). No marine pests were detected during this survey.
- Port of Weipa since 2000 settlement plate monitoring. The plates target black striped and Asian green mussels. No incursions of marine pests have been recorded at the Port of Weipa using settlement monitoring plates (NQBP, pers comms).
- Port of Weipa and Amrun 2015 marine pest baseline survey. No marine pests were observed.
- Port of Amrun since February 2016 settlement plate monitoring program. One individual Asian Green mussel was identified in May 2017 with no recurring records.
- Port of Weipa and Amrun 2019 marine pest post construction survey. One pest species *Didemnum perlicudum* was recorded at the Port of Amrun and is suspected to occur at the Port of Weipa. *Didemnum perlicudum* is not listed on either the APMPL or the QMPWL and is widespread throughout Australia

One individual specimen of an Asian green mussel *P. viridis* was found during the May 2017 Amrun Project settlement plate monitoring event at the Amrun Jetty No. 2. As per the *Biosecurity Act 2014*, Act RTA notified the Department of Agriculture Fisheries (DAF). The specimen was confirmed as Asian Green Mussel by the Curator of Molluscs at the Museum and Art Gallery of the Northern Territory. RTA have worked closely with DAF to assist with the investigation to potentially identify the causal vessel and with the investigation and surveillance to delimit the area of the incursion. Since identification of *P. Viridis,* surveillance methods including beach walks, remote operated vehicle, infrastructure inspections, vessel inspections, plankton tows, diver inspection of pylons and continuation of settlement plate monitoring have been implemented, with no additional marine pest specimens identified in the area (as of December 2020).

The 2019 post construction survey identified a species of white colonial ascidian in both the Port of Weipa and Port of Amrun. Scrapings at Amrun confirmed the specimen was *Didemnum perlicudum.* While suspected there is no confirmation of *Didemnum perlicudum* at Port of Weipa as the specimens were too deep on the structure to sample. *Didemnum perlicudum* is not listed on either the APMPL or the QMPWL. The information was provided to Biosecurity Queensland who confirmed the species had been identified at a number of Ports around Queensland and Australia.

The Amrun marine pest settlement plate monitoring program has been amended to utilise the settlement plate design program developed by Biosecurity Queensland as part of their Q-SEAS Program. This adaptive management measure has been discussed with Biosecurity Queensland. This approach in no way compromises the effectiveness of the marine pest surveillance program as the previous arrangement was established to service the construction phase prior to the establishment of the export facility. Now this superstructure is in place it provides an appropriate alternative and access to the area.

5.6 Shipping Routes

5.6.1 Torres Strait

The Torres Strait region covers an area of more than 35,000km^2, of which 2.6% is terrestrial land, 6.2% tidally inundated reef flats, and 91.2% open seas. The Torres Strait is a major shipping route for transit between the Indian and Pacific Oceans. The numerous reefs and shoals in Torres Strait limit safe navigation by large vessels with much of the navigable route through Torres Strait confined in both width and depth.

The Torres Strait contains a variety of biogeographical qualities ranging from mangrove islands of terrigenous origin in the north, sand cays in the central region, highly fertile volcanic islands in the east, and the granitic terrestrial islands in the west. The tidal influences of two ocean systems, the Indian and Pacific, as well as the input of freshwater and sediment from coastal rivers have a great effect on the area's biodiversity.

The Torres Strait provides important habitat for many vulnerable and endangered species, including marine turtles, and migratory species including Dugong.

In recognition of the environmental sensitivity of the area and the difficulties associated with safe navigation, the International Maritime Organization (IMO) has designated the Torres Strait as an extension of the GBR and classified it as a 'Particularly Sensitive Sea Area' (PSSA). This designation allows Australian regulators to apply additional protective measures such as a ship reporting system,

coastal vessel tracking services, compulsory pilotage, navigational aids, marine pollution response plans, and Designated Shipping Areas.

5.7 Great Barrier Reef

The Great Barrier Reef is heritage listed and one of the world's best known and complex ecosystems. It supports a wide range of commercial activities and is home to a number of EPBC Act Listed Species. Shipping operations for transport of bauxite to Gladstone will progress through the Great Barrier Reef World Heritage Property (GBRWHP), Great Barrier Reef Natural Heritage Place (GBRNHP) and Great Barrier Reef Marine Park (GBRMP). All operations within Weipa and Amrun areas lie outside these areas. The Criteria under which it is listed is summarised in **Table 10** below.

Table 10 Great Barrier Reef Heritage Listing Criteria

World Heritage Criteria[1]	**Corresponding National Heritage Criteria**
Criterion VIII – Outstanding Example of Earth's Evolutionary History • Forms the world's largest coral reef ecosystem, extending over 14 degrees of latitude. • Globally outstanding example of an ecosystem that has evolved over millennia. • Environmental history recorded in the reef structure. • Comprises about 3000 separate coral reefs, ranging from inshore fringing reefs to mid shelf reefs and shoals, exposed outer reefs and deep water reefs, including examples of all stages of reef development. • Deep water features of the adjoining continental shelf includes canyons, channels, plateaux and abyssal plains.	Criterion A – Process: Natural Phenomena, Formations, Features and Exceptional Beauty Criterion C – Research: Yield Information to Contribute to an Understanding of Australia's Natural or Cultural History Criterion D – Characteristics: Principal Characteristics of Natural or Cultural Places or Environments
Criterion IX – Example of Significant Ongoing Geological Processes, Biological Evolution and Man's Interaction with his Natural Environment • Globally significant diversity of reef and island morphologies reflecting on-going geomorphic, oceanographic and environmental processes. • Complex cross-shelf, longshore and vertical connectivity influenced by dynamic oceanic currents and ongoing ecological processes such as upwellings, larval dispersal and migration. • Over 900 islands and cays; around 600 are continental (high) islands, 300 are coral cays in various stages of geomorphic development, with the remaining islands comprising mangrove islands that provide important ecological services. • An ecosystem that has evolved over millennia with evidence of the evolution of hard corals and other fauna. • Globally significant marine faunal groups include over 4000 species of molluscs; over 1500 species of fish; plus a great diversity of sponges, anemones, marine worms, crustaceans, and many others. • Man's interaction with the natural environment illustrated by strong ongoing links between Aboriginal and Torres Strait Islanders and their sea country, including numerous shell deposits (middens) and fish traps, plus the application of story places and marine totems.	Criterion A – Process: Natural Phenomena, Formations, Features and Exceptional Beauty Criterion C – Research: Yield Information to Contribute to an Understanding of Australia's Natural or Cultural History Criterion D – Characteristics: Principal Characteristics of Natural or Cultural Places or Environments

World Heritage Criteria[1]	**Corresponding National Heritage Criteria**
Criterion VII – Rare Natural Phenomena Formations and Exceptional Natural Beauty • Vast mosaic patterns of reefs providing an unparalleled aerial panorama of seascapes and landscapes for example, Whitehaven Beach, Whitsunday islands, Hinchinbrook Island. • One of the few living structures visible from space. • Beneath the ocean surface, there is an abundance of shapes, sizes and colours, including spectacular coral assemblages (hard and soft corals) and >1500 species of fish. • Globally important breeding colonies of seabirds and marine turtles, including Raine Island, the world's largest green turtle breeding area • Superlative natural phenomena include the annual coral spawning, migrating whales, and significant spawning aggregations of many fish species.	Criterion A – Process: Natural Phenomena, Formations, Features and Exceptional Beauty Criterion E – Aesthetics: Exhibiting Particular Aesthetics Valued by Community or Cultural Group
Criterion X – Habitats where Populations of Rare or Endangered Species Survive • One of the richest and most complex natural ecosystems on earth, and one of the most significant for biodiversity conservation. • Amazing diversity supports tens of thousands of marine and terrestrial species, many of which are of global conservation significance. • Some 39 species of mangroves comprising 54 per cent of the world's mangrove diversity. • ~ 43,000km^2 of seagrass meadows in both shallow and deep water areas, including 23 per cent of known global species diversity. • Habitat for one of the world's most important dugong populations and six of the world's seven species of marine turtle. • A breeding area for humpback whales, with at least 30 other species of whales and dolphins also identified. • 70 bioregions (broad-scale habitats) identified comprising 30 reef bioregions and 40 non-reefal bioregions; including algal and sponge gardens, sandy and muddy bottom communities, continental slopes and deep ocean troughs. • The reef bioregions contain one third of the world's soft coral and sea pen species (80 species). • 2000 species of sponges equalling 30 per cent of Australia's diversity in sponges. • 630 species of echinoderms (for example sea stars) equalling 13 per cent of the known global diversity.	Criterion A – Process: Natural Phenomena, Formations, Features and Exceptional Beauty Criterion B – Rarity: Uncommon, Rare or Endangered Aspects of Australia's Natural or Cultural History Criterion C – Research: Yield Information to Contribute to an Understanding of Australia's Natural or Cultural History Criterion D – Characteristics: Principal Characteristics of Natural or Cultural Places or Environments

[1] – Information pertaining to the World Heritage Criteria Listing (values and attributes) extracted from GBRMPA (2018) Available at: **http://www.gbrmpa.gov.au/about-the-reef/heritage/great-barrier-reef-world-heritage-area/criteria-values-and-attributes**.

6. Potential impacts and risks

The following potential impacts of SoE Project marine and shipping activities on MNES will be risk assessed based on previous observations of the relevant marine operations and shipping of similar projects and appropriate literature.

6.1 Vessel traffic

The anticipated shipping and vessel movements during Project operations are summarised in **Section 6.1.4.** and further detail is provided in the following sections. As identified in Section 3.8 the OMSMP is to be reviewed within two years of operations commencing and the review will be based on actual bauxite shipments from the Port of Amrun during initial Port of Amrun operations. If the number of shipping and vessel movement's increase from those identified in the plan the potential risk from shipping activities would be reviewed and management measures updated if required.

6.1.1 Vessel Strike

The risk of vessel collision is a known threat for surface breathing marine fauna including listed marine species such as turtle, cetaceans and dugong. Impacts to animals can range from being fatal to non-fatal. Factors such as speed, depth, size of vessel and travel path are generally accepted to affect the risk of vessel strike (Groom *et al.,* 2004; Hazel *et al.,* 2007, Hazel, 2009, Todd *et al.,* 2015, Commonwealth of Australia, 2017).

Vessel speed is a critical factor as slower moving vessels provide greater time for detection and the animal has greater opportunity to avoid collision. Additionally the speed of the vessel will impact the force of strike and the severity of the injury. Smaller vessels are more manoeuvrable and have the chance of avoiding animals if sighted. Larger bauxite vessels are slower moving and provide the opportunity for animals to avoid collision.

Shallow waters surrounding Humbug Terminal and Hey River Terminal, which provide foraging resources (seagrass), are of higher risk than those deepwater around the Chith Export Facility and along shipping routes as there is limited clearance between the animal and vessel. Deeper waters provide clearance for the animal to dive to avoid collision.

Inshore dolphin and marine turtle species which frequent the Port area are highly mobile within deeper waters and would be able to temporarily move from the slow moving vessels to avoid collision. All vessels must comply with the relevant legislation and the additional management methods outlined in this Plan Section 7.1.1. It is considered unlikely that Project related shipping activities would result in a detectable change in the population of inshore dolphin species, marine turtles or dugong within the Project area or GBR and the unmitigated risk of potential impacts of underwater noise on listed marine species is considered low as identified in Section 6.8.

6.1.2 Underwater Noise

Underwater noise from vessel traffic movements has the potential to impact communications, alter behaviours and lead to avoidance of critical habitat of listed marine turtle species, inshore dolphin species, Bryde's Whale, dugong and Estuarine Crocodile.

The Port of Weipa is already industrialised however Project related shipping may increase shipping through additional cross river movements of cargo and personnel as well as operational shipping to and from the Port of Amrun. Extensive foraging habitats for marine turtle, inshore dolphins and

dugongs exist throughout the Hey and Embley Rivers away from any potential impacts from project activities in the Port of Weipa. Project activities are unlikely to result in potential impacts for listed species.

Noise associated with the Port of Amrun will be the main anthropogenic source in the area. Observations from the inshore dolphin surveys in 2016 and 2017 demonstrated that construction activities including vessel movements and piling did not result in a decrease in population. Ongoing surveys will provide further monitoring of the potential impacts. Inshore dolphin and marine turtle species which frequent the area have continued to use the Port area during the construction period and accordingly additional vessel movements in the area during operations are unlikely to result in potential impacts for listed species.

All listed species have been previously recorded in busy ports throughout Australian waters and recent dolphin surveys have not recorded a reduction in megafauna with the increased traffic associated with the Port development. Management measures associated with vessel noise are outlined in Section 7.1.3**.** The unmitigated risk of potential impacts of underwater noise on listed marine species is considered low as identified in Section 6.8.

6.1.3 Turbidity

Turbidity from vessel operations has the potential to impact water clarity as vessel propulsions systems may mobilise sediments. Fine sediments such as those found in the berth pockets may become suspended in the water column increasing turbidity, spreading contaminants, smothering benthic organisms and reducing light through the water column. It is unlikely turbidity plumes from shipping will impact the surrounding MNES habitats with elevated **turbidity** levels likely to be localised around the berth where open sandy substrates occur. Plumes are also likely to be of short duration and much less than those experienced naturally in the area. Management measures associated with vessel propulsion are outlined in Section 7.1.3**.** The unmitigated risk of potential impacts of elevated turbidity associated with shipping propulsion is considered to be low as identified in Section 6.8**.**

6.1.4 RTA Shipping within the GBR

It is expected that approximately 154 bauxite shipments would depart from Port of Amrun (actual shipping numbers may vary subject to market conditions), through the Great Barrier Reef, to the Port of Gladstone and then return each year (308 vessel movements). These shipments would largely be a replacement of part of the total bauxite shipments from Port of Weipa each year (2017: 228 shipments Port of Weipa to Port of Gladstone or 456 vessel movements). As such the bauxite shipping from the Port of Amrun is not expected to increase shipping through the Great Barrier Reef. If the number of bauxite shipments increase from those identified in the plan the potential risk from shipping activities would be reviewed and management measures updated if required. As identified in Section 3.8 the OMSMP is to be reviewed within two years of operations commencing and the review will be based on actual bauxite shipments from the Port of Amrun during initial Port of Amrun operations.

Environmental risks associated with shipping in the GBR include those associated with normal operations as assessed in Section 6.1.1 to Section 6.1.3 and Section 6.3. However, this area is of high economic and natural value (including the listed GBRWHA, GBRNHP, and GBRMP) and as such additional management measures are required by legislation to reduce the risk of accidents or incidents. While potential impacts associated with shipping to the GBR are unlikely the impacts may have a high unmitigated risk level due to the potential consequences if a large oil spill or vessel

grounding were to occur (refer to Section 6.8). Management measures implemented through extensive legislation as identified in Section 7.1.4.

6.2 Marine pests

The introduction of marine pests or translocation of marine pests may impact on listed marine species and/or habitats in the area Port of Weipa, Port of Amrun and GBR through competition and/or predation. Impacts to MNES may occur indirectly on turtles, dugong and dolphins. Invasive mussels previously recorded through ecosystem functions, potentially shifting the base of the food web (eg Great Lakes) reducing algae and small species such prawns which can be the pillar of food webs.

Vessels have the potential to translocate marine pest species into the Amrun or Weipa areas, or out of the Amrun and Weipa areas into the GBR through ballast water or vessel biofouling.

The marine pest risk associated with operations is primarily associated with the movement of new vessels into the area. Once the vessel is on site the risk is negated. Accordingly, all new vessels to site with the exception of bauxite vessels will be required to undergo a marine pest risk assessment prior to mobilisation to site. The risk assessment process is outlined in Section 7.2.

Bauxite vessels are required to comply with the Maritime arrivals systems (MARS). Ballast water and biofouling are or will be managed through this and is consistent with the national requirements and recommended by Biosecurity Queensland to be consistent with other Queensland Ports.

Early identification of a pest into an area is critical to increase likelihood of eradication and prevent movement to sensitive areas and other ports. Accordingly marine pest settlement plate monitoring will be conducted quarterly at the Port with settlement devices established on the export facility which is the greatest risk for pest establishment. RTA will work with Biosecurity Queensland to confirm management measures are consistent with other Queensland Ports and update management accordingly.

Although a marine pest incursion due to Project shipping activities would be unlikely the potential unmitigated risk of marine pest establishment within the Port of Weipa, Port of Amrun or GBR is considered to be a critical risk due to the potential consequences as identified in Section 6.8**.** Management and monitoring measures to reduce the likelihood of occurrence and reduce the risk associated with marine pest introduction from the Project marine and shipping activities are detailed in Section 7.2**.**

6.3 Marine Pollution

Marine operations including shipping have the potential to introduce marine pollution into the environment. Spills, discarded waste and contaminants such as bauxite, fuel, oil and waste water can pollute the GBR or MNES habitats including turtle nesting beaches or foraging habitats. Garbage may be ingested by marine mammals or result in their entanglement causing death. The volume and type of waste varies with each vessel. Discharges may also occur in the event of an emergency such as grounding or collision.

The beaches of the Project area are low nesting density and the potential unmitigated risk to marine turtles from discarded garbage or objects dropped or discarded from the Project marine facilities or shipping is considered low.

Bauxite generally consists of granular nodules ranging in size from 0.3 to 25.0 mm. Bauxite has negligible solubility in water and a specific gravity (individual particles) of 2.65.

All Project-related shipping would operate in strict accordance with international and domestic regulations relating to marine discharges. Bauxite ships carry only bauxite as cargo.

An assessment of potential for environmental harm from bauxite spillage within the marine environment was conducted within the Commonwealth EIS (RTA, 2013). Seawater elutriate tests were conducted and the elemental concentrations from the elutriate test, with due regard to initial dilution, were compared to the ANZECC/ARMCANZ (2000) marine water quality trigger values, where available, and to regional background concentrations. Marine water trigger values applied included the 95% protection level to assess potential impacts at Gladstone Harbour, and the 99% protection level to assess potential impacts at the Port of Amrun and along the shipping routes. The sea water elutriate analysis showed that bauxite is not hazardous within these marine environments. Based on these results bauxite is a benign material with negligible solubility that does not leach contaminants in seawater. Bauxite is not classified as a dangerous good or marine pollutant, and is a Class C substance under the International Maritime Solid Bulk Cargo code.

During shipping activities potential exists for grounding or collision of vessels with reefs however bauxite vessels are required to follow designated shipping routes which follow deeper water, be piloted by MSQ licensed pilots, and utilise mandatory reporting and tracking systems as identified in Sections 7.1.4 and Section 7.3.3**.** In over 40 years of bauxite shipping from Weipa to Gladstone, there has been no reported collision or grounding incidents that have resulted in environmental harm in the GBR. In the event of a shipping collision, the likelihood of bauxite spills smothering coral or seagrass communities is considered unlikely as these communities occur in shallow waters outside of deeper shipping channels. Physical recovery of any spilled material may be possible, where the recovery method would not increase impacts to marine habitats, to limit the potential of any long term and widespread impacts occurring. Bauxite, having negligible solubility in water and low toxicity, would not be anticipated to cause either acute or chronic toxic effects in marine biota. Unmitigated risk to MNES habitats from bauxite spillage during shipping operations would be considered moderate given the potential consequences of impacts within the GBR.

Hydrocarbon spills during shipping may occur due to collision with other vessels or external objects, structural hull damage, bunkering, unauthorised discharge and vessel grounding and potential result in smothering of MNES species or their habitats. As identified above bauxite vessels are required to follow designated shipping routes which follow deeper water and a range of other existing controls. Bunkering of Project vessels would be conducted at Port of Gladstone (bauxite vessels), or existing facilities at Port of Weipa or other managed ports. No bunkering would occur at Port of Amrun. Barges would be used to transfer fuel carried in road tankers from the Humbug Wharf to the Hey River barge/ferry Terminal. The highest risk of oil spill was identified to be during bunkering activities which would occur at the Port of Gladstone. The existing Australian Ports all have strict management procedures and controls in place for management and response to spills. An assessment of oil spill risk for Project related shipping activities, including modelling of potential oil spill scenarios, was presented within the Commonwealth EIS and concluded that there would be negligible risk of impact to MNES from Project related shipping or marine activities (RTA, 2013). The potential unmitigated (without existing controls at the existing Ports) risk of hydrocarbon spill from Project related shipping activities would be High. Management and response measures are outlined in Section 7.3**.**

Bauxite or slurry spillage from the Chith Export Facility onto the turtle nesting beaches and marine habitats may occur during ship loading activities and from cleaning and maintenance activities. Spillage risks increase during the wet season as the ship loader and product is exposed to rain and storm events. Bauxite would be loaded into bulk carriers with an approximate moisture content of 13% (on a wet weight basis) which would minimise potential for dust emissions during ship loading. Any water quality impacts from bauxite spilled during ship loading or unloading would be limited to sediment deposition. Due to its large particle size (gravel), its density and its lack of solubility, any bauxite spilled into the sea would be expected to settle to the sea floor within the immediate vicinity of the Port within a short period of time. Unmitigated risk to MNES habitats from bauxite spillage at the Port would be considered high due to the potential deposition of bauxite onto turtle nesting beaches underneath the jetty. It should be noted that bauxite naturally occurs in the sediment of the Amrun and Weipa Ports, having been derived from the adjacent cliff areas through natural erosion processes. These naturally deposited bauxite materials do not appear to have had any impact on the marine environment.

Hydraulic spills may occur from the operations of the Chith Export Facility. The maximum spill volume would be limited to 50 litres should the containment measures fail to capture any of the spill. Should a spill of this magnitude occur it has the potential to spread and deposit on the shoreline within the vicinity of the Port and smother adjacent reef habitats. Containment required and response measures are outlined in Section 7.3**.** The unmitigated risk of impacts to MNES from hydraulic spills at the Chith Export Facility would be considered high.

All vessels must comply with the relevant legislation and the additional management methods outlined in Section 7.1**.** Management measures associated with marine pollution are outlined in Section 7.3.

6.4 Lighting

Turtle nesting does not occur within the Hey and Embley Rivers and therefore artificial lighting at the Hey River Terminal and Humbug Terminal terminals would not impact marine turtles.

At Chith Export Facility artificial lighting has the potential to disorientate nesting females and turtles hatchlings. Lighting at the Chith Export Facility was designed and constructed to ensure safe operation during night time and low light levels to minimise the impact on nearby turtle nesting and hatchlings. Lighting fixtures incorporated shielding recessing, diffusers and “turtle friendly” lighting technologies (long wave lighting) to minimise light glare spill and environmental impact. Further detail around this management measure is provided in Section 7.4**.** The potential risk associated with impacts of turtle nesting from Chith Export Facility lighting if mitigations were not implemented would be considered High (refer to Section 6.8).

6.5 Recreational Activities

No recreational activities are scheduled to occur during the operations phase of the project. However if necessary recreational access will be managed on a restricted basis through a foreshore access permit system as completed through construction with support from Traditional Owners. Typical activities may include:

- Beach fishing
- Nature and culture walks
- BBQs
- Emu Parades to collect rubbish;

- General relaxation.

From time to time, additional recreational activities may be held in a foreshore location and will be conducted in accordance with the foreshore access permit system.

Recreational uses of the foreshore beaches have potential to impact on nesting turtle habitats and turtle nests. Additionally any lights from vehicles and torches of workers accessing the beach at night may potentially lead to marine turtles abandoning nesting attempts and returning to the water. The risk associated with impacts of turtle nesting from recreational activities if access controls were not implemented would be considered moderate (refer to Section 6.8).

6.6 Coastal Processes

The Chith Export Facility could potentially impact turtle nesting beaches through changes to shoreline sediment transport processes and hydrodynamics which may reduce availability of turtle nesting habitat including:

- Interruption of long-shore sediment transport by blocking or capturing sediment moving along the coast and altering shoreline profile.
- Larger storm waves reaching the shoreline through the deepened dredge area, increasing cross shore sediment movement and leading to beach and/or cliff erosion.

The Chith Export Facility is a piled jetty and wharf structure with only six piles placed on the beach / foreshore and a small dredged footprint located approximately 500m from the shoreline. Coastal processes and the hydrodynamics around the proposed Port development area were assessed via hydrodynamic modelling, and analysis of collected field data (RTA, 2013). Currents, water levels, wave heights, and plumes were predicted and compared against recorded data where practical. Results of modelling indicated that for even the largest of the modelled storms, along-shore sediment transport occurred within 350m of the shoreline and that negligible impact on coastal morphology is expected from the piled structure and dredge area, even in extreme weather events (eg cyclones). The unmitigated risk of altered coastal processes resulting from construction of the Chith Export Facility is considered low and no further management measures or monitoring are proposed (refer to Section 6.8).

6.7 Cumulative Impacts

Cumulative impacts from the shipping operation and other natural events or operations within the region could impact reef, seagrass and marine megafauna. Potential cumulative stressors and the likelihood of impact are summarised in the **Table 11** below.

Table 11 Cumulative Impacts

Stressor	Current known status in area	Potential to impact	Cumulative impact likely
Intense weather (eg cyclone)	Vessel movements will not occur during intense weather and therefore are unlikely to ground and cause impacts to these areas.	Reef Seagrass	No
Port operations - Weipa	Operational shipping movements in the Port of Weipa will be limited to movement of personnel and equipment. Megafauna species that occur in the area occur in more heavily trafficked environments (eg Gladstone)	Megafauna	No

Noise - Weipa	Shipping activities in the Port of Weipa will result in minor increase in noise in the Port. However movements will be less than those completed during the construction phase which did not negatively impact marine fauna with inshore dolphins and turtles sighted during construction works.	Megafauna	No
Shipping activities – Torres Strait, GBR and Gladstone	Production of bauxite from the Amrun Project will replace the production out of East Weipa.	Megafauna Water quality GBR	No

6.8 Risk Assessment of Potential Impacts

The potential impacts from SoE Project marine and shipping activities were risk assessed using the assessment process described in Section 4. Impacts have been assessed prior to consideration of any additional management measures as identified in Section 7 and the outcomes of the risk assessment are presented in **Table 12** below. A further assessment of residual risk following consideration of the management measures is provided in Section 7.7**.**

Table 12 Potential Impact Risk Assessment (Unmitigated)

Impact	Environmental Value	Consequence	Likelihood	Risk
Vessel strike	Marine Megafauna, GBR	Negligible	Unlikely	Low
Underwater noise	Marine Megafauna, GBR	Negligible	Rare	Low
Turbidity	Marine Megafauna, Marine habitats, GBR	Negligible	Rare	Low
Shipping activities	GBR	Moderate	Possible	High
Marine Pests	Marine ecosystems, GBR	High	Unlikely	Critical
Marine Pollution – Waste	Marine Megafauna, Marine habitats, GBR	Negligible	Possible	Low
Marine Pollution – Spill	Marine Megafauna, Marine habitats, GBR	Moderate	Possible	High
Marine Pollution – Chith Export Facility bauxite spill	Marine habitats	Minor	Likely	High
Marine Pollution – shipping bauxite spillage	Marine habitats, GBR	Minor	Possible	Moderate
Lighting	Marine turtles nesting and hatchling disorientation	Moderate	Possible	High

Recreational Activities	Marine turtles nesting	Minor	Possible	Moderate
Coastal Processes	Marine habitats	Negligible	Rare	Low

7. Management and monitoring

The following mitigation and monitoring measures will be implemented to minimise the impacts of the Project operational shipping and marine activities.

7.1 Vessel traffic

The following management measures will be implemented for general vessel management:

- All vessels being loaded at Chith Export Facility will be piloted by MSQ licensed pilots and tug masters for the safe berthing and slipping of all vessels.
- Vessels masters are required to comply with all relevant legislation and operate safely and use NQBP and RHM authorised shipping routes for all travel.
- All vessels will have adequate lighting for safe navigation.
- Vessels will comply with all requests from MSQ (or relevant statutory body) or the relevant harbour master unless it is unsafe to do so.
- In water depths less than 2.5 m, vessel speed will be restricted to a maximum of 6 knots.
- Vessel tracking systems, including automated identification systems (AIS) will used on all vessels.
- The majority supporting fleet (tugs and pilot) are new builds and will meet the minimum AMSA and MSQ requirements for operation. Any supporting vessels that may need to provide relief will also be managed and meet all required legislative requirements.
- To ensure the highest standards of performance in terms of operation, safety and environmental performance, all chartered vessels are subject to vetting inspection under the independent Rightship system and must be rated to a minimum of three stars. The Rightship Ship Vetting Information System involves an in-depth assessment of a ship's quality and suitability for a task. In addition to the direct inspection of the vessel, this system takes account of a wide range of risk factors relating to the vessel's age, flag, class, vessel incidents and casualties, port state control and inspection history all of which are reviewed frequently.

Routine inspections and monitoring of vessel operations would be conducted as specified within Section 7.8**.** All vessel incidents and non-conformances would be reported and investigated in accordance with the environmental management framework (Section 3.3). Adaptive management strategies for vessel impacts will include development of appropriate corrective actions to improve implementation of management controls for Project shipping activities.

7.1.1 Vessel Strike

The following measures will be implemented to reduce the risk of vessel strike of listed species:

- All local support vessel Masters and other relevant crew (e.g. relief vessel master) will receive inductions on listed turtle species, listed dolphin species, dugong and Bryde's Whale and the requirements listed below.

- Vessels will be required to maintain a lookout for marine fauna when underway, and when these species are sighted vessels must make alterations to avoid collision, this could include reducing the vessel's speed or making course corrections if safe to do so.
- In accordance with Condition 6f of the EPBC approval, vessel speed will be restricted to a maximum of 6 knots in water depths less than 2.5m. Vessel movements will be reviewed through vessel AIS with breaches investigated and appropriate corrective actions identified including potential disciplinary action.
- Vessels in the Hey and Embley Rivers are required to follow transit lanes designated by NQBP and the RHM which generally follow the greatest water depth. Vessel movements will be reviewed through vessel AIS with breaches investigated and appropriate corrective actions identified including potential disciplinary action.
- Any injury or death of marine turtle, dugong, dolphin or whale will be reported to the DES-designated marine stranding hotline through the RSPCA Queensland on 1300 ANIMAL as soon as practicable. A Queensland Parks and Wildlife Service officer will then be contacted to determine the relevant response. Any stranding or incident that may be attributable to Project activities will be investigated in cooperation with the relevant authorities to determine appropriate corrective action as part of adaptive management.
- Notification to DAWE for cetacean death or injury related to the project within seven days of the incident (1800 803 732 or protected.species@environment.gov.au).

7.1.2 Underwater Noise

Underwater noise from vessels has the potential to impact the behaviour of listed species. Measures that will be implemented to minimise underwater noise generated by vessels associated with marine works are consistent with IMO Guidelines for the reduction of underwater noise from ships (IMO 2014) which include:

- The majority supporting fleet (tugs and pilot) are new builds and will meet the minimum AMSA and MSQ requirements for operation. Any supporting vessels that may need to provide relief will also be managed and meet all required legislative requirements.
- To ensure the highest standards of performance in terms of operation, safety and environmental performance, all chartered vessels are subject to vetting inspection under the independent Rightship system and must be rated to a minimum of three stars. The Rightship Ship Vetting Information System involves an in-depth assessment of a ship's quality and suitability for a task. In addition to the direct inspection of the vessel, this system takes account of a wide range of risk factors relating to the vessel's age, flag, class, vessel incidents and casualties, port state control and inspection history all of which are reviewed frequently.
- All vessels, including on board machinery and equipment, would be maintained to a high standard through regular scheduled maintenance as specified in the vessels maintenance requirements. Maintenance would ensure that all vessels have clean propellers and that any source of excessive underwater noise would be investigated and remedied.
- Vessel engines, thrusters and auxiliary plant will not be left in stand-by or running mode unnecessarily.
- Vessels will transit via the approved regional harbour master designated transit lanes which follow the greatest water depths will be implemented in the Hey and Embley Rivers, avoiding shallow seagrass areas where Green Turtles or dugong are most likely to be found.

- Vessel speed restrictions in water depths less than 2.5 meters, with vessels restricted to a maximum of six knots (the IMO's guidelines state that reduced speed is often the most effective noise reduction measure for vessels).

7.1.3 Turbidity

The following management measures will be implemented to minimise turbidity plumes from operational vessels:

- Vessel engines, thrusters and auxiliary plant will not be left in stand-by or running mode unnecessarily.
- Once a vessel has berthed, vessels will minimise use of the vessel propulsion system to the extent practicable and safe, to reduce risk of disturbance to seabed during loading and unloading.
- When mooring in water depths less than 2.5 metres vessel secondary thruster systems would not be used in place of making the vessel fast.
- Vessels will transit via the approved NQBP and RHM designated transit lanes which generally follow the greatest water depths.
- Vessel speed restrictions in water depths less than 2.5 metres, with vessels restricted to a maximum of six knots.

7.1.4 RTA Shipping through the GBR

RTAs bauxite shipping to Gladstone through the GBR is delivered through contractual arrangement with Rio Tinto Shipping. The contractual arrangement would be extended to cover shipping from Port of Amrun. Accountabilities for RTA and Rio Tinto Shipping are established under the contract as listed below:

- RTA:
    - specifying bauxite shipping requirements to match production and bauxite sale tonnages;
    - specifying acceptable vessel types to be used for shipping from the Port of Amrun, and the requirements of this plan.
- Rio Tinto Shipping:
    - chartering vessels to meet RTAs requirements;
    - manage day-to-day shipping activities for Rio Tinto Shipping owned vessels to RTAs requirements and ensuring that contracted vessels are operated in accordance with RTAs requirements.

Bauxite shipping from Port of Amrun would largely be a replacement of existing shipping from the Port of Weipa and shipping would be managed to the same standard, including compliance with the high level of regulatory requirements for shipping through the GBR. RTA would manage the contractual arrangement with Rio Tinto Shipping in accordance with the Environmental Management Framework, including non-conformance management and audit as set out in Section 3.

In addition to AMSA, MSQ and international requirements (as identified in Section 7.1 and Section 7.3) when shipping through the GBRMP all vessels must comply with the GBRMP Act, administered by the Great Barrier Reef Marine Park Authority (GBRMPA) which also regulates certain aspects of shipping operations within the GBRMP, including prohibiting discharges of pollutants from ships (in addition to the MARPOL prohibitions).

Under MARPOL, the definition of ‘nearest land” for the Great Barrier Reef region is a defined line along the outer edge of the reef, from which all MARPOL discharge control distances are measures to seaward. This effectively makes the entire Great Barrier Reef a ZERO DISCHARGE area for all MARPOL regulated ship-sourced pollutants (oil, chemicals, harmful packaged substances, sewage and garbage)

The Great Barrier Reef Marine Park Zoning Plan (GBRMPA 2003) also defines Designated Shipping Areas (areas within the Marine Park to which shipping is confined). However, commercial shipping generally complies with the IMO and AMSA declared two way route which is more restrictive than the GBRMPA Designated Shipping Areas (**Figure 3**).

Additionally, IMO has declared the Great Barrier Reef, Torres Strait and the Coral Sea as PSSAs, which gives Australia an international mandate to implement more stringent shipping controls known as PSSA Associated Protective Measures (APMs). RTA will comply with the APMs for all shipping within the PSSA’s. These include:

- A designated two-way route through Torres Strait and the entire length of the inside of the Great Barrier Reef (AMSA Marine Notice 11/2014)
- Compulsory pilotage in certain areas (Torres Strait and GBR north of Cairns and some areas to the south), for all ships over 70 m in length and all loaded oil tankers, loaded chemical carriers and loaded liquefied gas carriers (irrespective of length; AMSA *Navigation Act 2012* and Marine Order 54).
- Mandatory reporting for all ships with an overall length of 50 m or more and all tankers regardless of size, transiting the Great Barrier Reef and Torres Strait, through Reef VTS (Vessel Traffic Service; AMSA *Navigation Act 2012* and Marine Orders Part 56).

The North-East Shipping Management Plan (North-East Shipping Management Group, 2014) was developed by AMSA with input from relevant stakeholder groups. The plan covers shipping activities in the Torres Strait, Coral Sea and the GBR and aims to:

- Describe existing measures currently in place to manage shipping and propose additional measures to minimise the environmental impacts in the short, medium and long terms.
- Inform the Great Barrier Reef Region Strategic Assessment and the Reef 2050 Great Barrier Reef Long-term Sustainability Plan of existing and proposed measures to mitigate shipping impacts on the Outstanding Universal Value and integrity of the Great Barrier Reef World Heritage Property and other MNES.

The plan includes a work program detailing commitments; new management measures; and measures to be kept under review. RTA will comply with all existing regulatory requirements identified within the plan. If and when North-East Shipping Management Plan activities result in new requirements for shipping management in north-east Australia, over and above the existing measures as described in Section 7, RTA will implement new relevant measures as part of adaptive management.

7.2 Marine Pests

Marine pests have the potential to be transported to site via biofouling or ballast water. To minimise the incursion, or translocation of marine pests all vessels, excluding carriers, are subject to the following management measures:

- Application, maintenance and certification of antifouling coatings on vessel wet surfaces (including in niche areas) excluding trailered vessels[3].
- Prior to mobilisation to site all vessels (excluding carriers) and submersible equipment (e.g. moorings, piping), excluding new submersible equipment, will have a marine pest risk assessment completed by a marine biologist who has experience is marine pests. The assessment will consider:
    - Vessel type
    - Cleaning and marine pest inspection history
    - The presence, age and suitability of antifouling coating
    - The type and treatment history of internal seawater systems
    - Previous areas of operation (including climatic region, and the presence of marine pests of concern) since the last documented cleaning and/or marine pest inspection, and the duration the vessel spent in those areas
    - Activities in areas with known records of marine pests
    - Residual sediment
    - The nature of previous vessel operations
    - Time to be spent on site
    - Any periods spent out of water immediately prior to mobilisation.
- All vessels rated above a low risk will be required to implement risk mitigation measures such as:
    - Hull and niche space cleaning
    - Internal seawater systems treatment
    - Physical marine pest inspection by personnel with qualifications and experience in marine pest management
    - Additional management methods must be detailed and the vessel must be cleared as free of biofouling or low risk prior to mobilisation to site.
- In-water cleaning of vessels will be in accordance with the Australian Anti-fouling and In-water Cleaning Guidelines (DAFF and DSEWPaC, 2013). This reduces the risk that marine pests will be physically released from the vessel into the environment in the event that the vessel does harbour undetected marine pests.
- If marine pests are recorded in an area the project will implement the management measures recommended by responding government departments (eg DAF) and Emergency Response Teams (e.g. investigation and eradication).

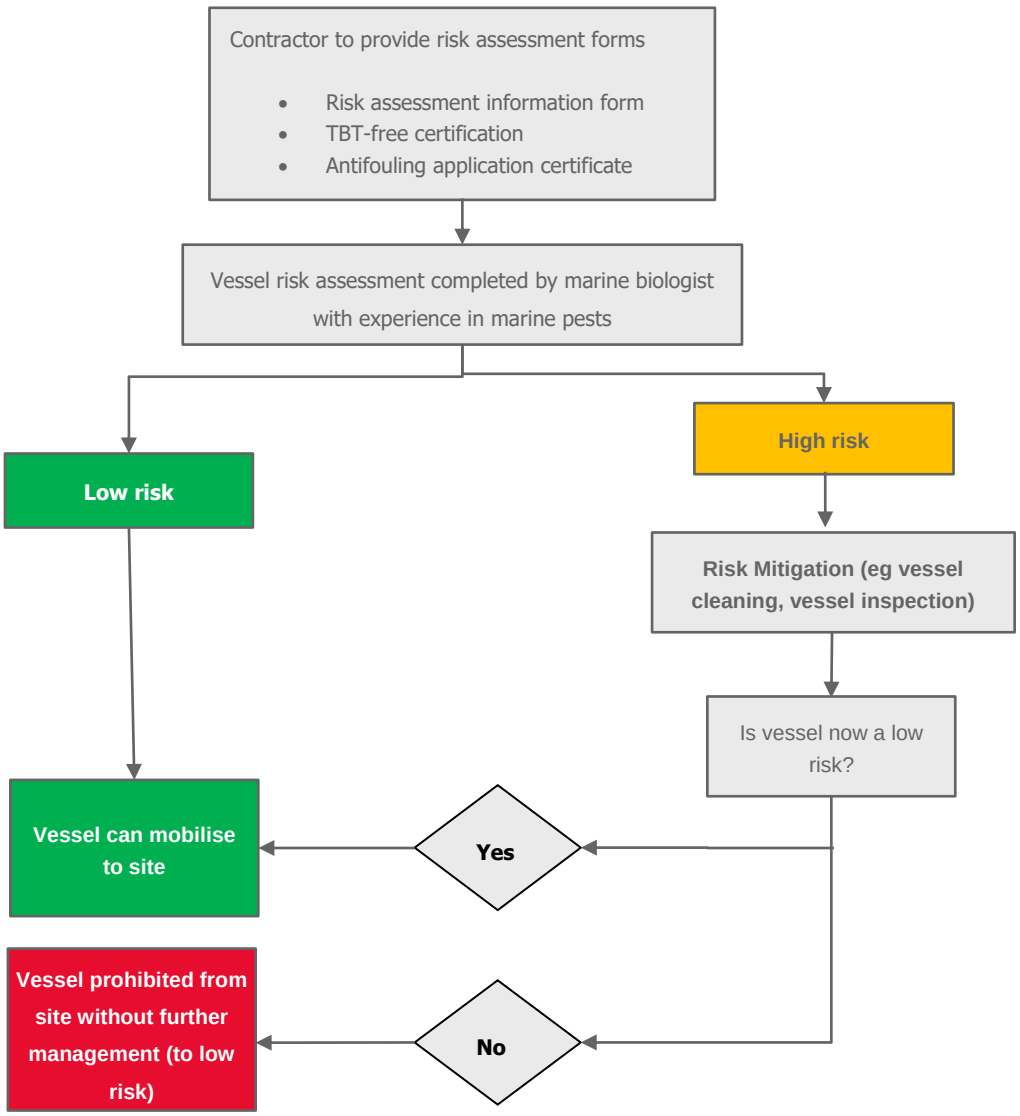
This method is consistent with previous assessment methods completed for Queensland projects (BMA, 2014) and WA Fisheries entry requirements (Vessel Check; DoF 2015; DoF 2014; DoF ND.) and was considered appropriate by QLD DAF to manage risk associated with marine pests (pers

[3] Trailered vessels are defined as those vessels which are removed from the water on a trailer regularly and therefore do not spend prolonged periods of time in the water. These vessels are low risk from a pest perspective as they spend extensive periods out of the water and are washed on a regular basis. This eliminates the chance of antifouling flaking and being released into the water

comms. A. Ramage). The vessel will be assessed prior to leaving site to confirm there is a low risk of translocating any marine pests.

The process for marine pest risk assessment is shown in **Figure 9**.

Figure 9 Marine Pest Risk Assessment Procedure



Ongoing marine pest settlement plate monitoring will continue for the life of the project:

- NQBP will continue the operations at the Port of Weipa
- The marine pest settlement plate program at Port of Amrun will be relocated to the wharf from using the same configuration as that identified by Biosecurity QLD in the Q-SEAS program.

Additionally Traditional Owner's employed through the Land and Sea Management Program are trained to look for Asian green mussels during other beach works and quarterly beach wrack surveys will be completed. RTA will continue to work with Biosecurity Queensland to confirm management measures are consistent with other Queensland Ports and if required update management measures accordingly as part of an adaptive management strategy.

The Australian marine pest monitoring manual (AMPMM) is currently being updated (marine pest sectorial committee, pers comms) and an early detection port monitoring program is being trialled within Queensland (A. Ramage, DAF Biosecurity Queensland, pers comms). Accordingly RTA has been consulting with DAF Biosecurity Queensland around the monitoring program to be implemented to ensure consistency with other Ports and meeting the expectation along with inclusion of recent learning not included in the AMPMM. Consultation with DAF Biosecurity Queensland will continue in regard to updates to the AMPMM.

Marine pest monitoring data would be made available online and via request in accordance with EPBC Act approval reporting conditions, and provided to Biosecurity Queensland. RTA would continue to liaise with Biosecurity Queensland, who are a partner in the Reef Integrated Monitoring and Reporting Program being established under the Reef 2050 Long-term Sustainability Management Plan, in regards to provision of data and any potential linkages to the integrated program.

In the event of an incursion being identified during the monitoring program accountability for the management of an incursion would be transferred to DAF. RTA would work with DAF to respond as directed through adaptive management measures depending upon the type and nature of the marine pest incursion.

7.3 Marine Pollution

Numerous waste materials will be generated through mining activities of the Project and on vessels and may include oil, sewage, garbage, steel scrap, aluminium, electrical cables, maintenance parts, sewage and other liquid wastes. These have the potential to impact the environment including posing a health risk to animals (eg ingestion and entanglement), adjacent habitats such as seagrass (smothering) and to water quality. Some of these wastes are classified as regulated waste, as listed in the *Queensland Environment Protected Regulation 2000* and requires appropriate storage, transport, disposal and tracking. All chemical substances used must be recorded in a chemical register, which identifies the chemical properties of the substance, storage and handling requirements and any potential for environmental harm.

Waste reception services will be provided at the Port of Weipa for local vessels to dispose of all waste generated for the project, (excluding quarantine waste). Waste generated will be appropriately segregated into appropriate bins with lids. Waste will be transported to Evans Landing Waste Facility. Waste that cannot be disposed of at the local facility will be placed in appropriate containers or tanks and transported (e.g. barged) to appropriate recycling, reuse or waste facilities as per the facilities management practices. There are no waste offloading facilities at Chith Export Facility.

Quarantine waste cannot be accepted with the existing waste management facilities at Port of Weipa (NQBP 2012). International vessels that arrive directly at Weipa or Boyd Port will undergo an AQIS inspection where all international waste will be bagged and marked appropriately. Vessels will be required to keep waste on-board the vessel until it can be disposed of in accordance with methods approved by AQIS.

All waste or sewage will be disposed at an appropriate facility and in accordance with MARPOL and if disposed locally in accordance with Queensland legislative requirements. The following pollution prevention and waste management measures will be implemented:

- No disposal of wastes within the marine environment.

- Segregation of waste into scrap steel, oily wastes, recyclable wastes (paper, cardboard, aluminium cans) and general wastes.
- Waste skips and bins will be fitted with lids.
- All bins shall be clearly labelled including waste oil storage tanks.
- All employees and contractors involved in the handling, transfer, storage, and disposal of oil and hazardous substances will be trained in the relevant regulatory requirements.
- All wastes received at site shall be removed from site for disposal at a landfill or recycling. Regulated wastes shall be transported and received by a licensed operator under the applicable legislation

The RTA fleet consists of relatively new ships, and hold covers are regularly inspected and kept in a good state of repair. With these controls it is considered that the potential for any dust discharges during the voyage is very low.

Vessel holds would not be washed between consecutive voyages, thereby avoiding the risk of discharge of cargo residues in hold washwater.

Routine of inspections of Project facilities and vessels would be conducted as specified within Section 7.8**.** All marine pollution incidents would be reported and investigated in accordance with the environmental management framework (Section 3.3). Adaptive management strategies for marine pollution management will include review of the findings of all inspections and investigations for potential to improve implementation of management controls for Project marine and shipping activities.

7.3.1 Working Over Water

Numerous marine works activities will be required to occur over water to maintain the Chith Export Facility and River Facilities which may result in the accidental release of marine debris eg dropping equipment or garbage. To prevent accidental release of marine debris the following procedures will be implemented:

- Work platform floor will have minimal size gaps to minimise the risk of materials and equipment being dropped from work platforms;
- Tool/material storage boxes will be located on work platforms;
- Where safe and appropriate, tool lanyards will be used;
- Where appropriate, magnetic based storage trays are to be used for small items;
- Materials and equipment will remain attached to rigging at all time until confirmed secure;
- Regular maintenance of structure coatings using low contaminant materials; and
- Spill kits to be readily available at work front.

7.3.2 Vessel Discharge and Waste Management

Some specific provisions that will be applied to vessels with regard to the MARPOL pollution categories are as follows:

7.3.2.1 MARPOL Annex I: Oil

- All discharges of oil, oil residues and oily mixtures from vessels will be contractually banned within the Weipa Port Limits.
- No waste will be received at the Port of Amrun.
- Outside of these limits any discharge of oil from vessels must be in strict compliance with MARPOL, the *Protection of Sea (Prevention of Pollution from Ships) Act* (PS(PPS) Act) and the *Transport Operations (Marine Pollution) Act* (TOMP Act) and Regulation (i.e. <15ppm oil content in any discharge of oily water from machinery spaces only).
- All vessels will be contractually required to comply in full with the construction, equipment and operational requirements of MARPOL Annex I and to have the relevant MARPOL-mandated documentation such as Oil Record Book, IOPP Certificate and SOPEP, as applicable to the vessel type and size. Waste oil will be held in segregated waste containers on each vessel.
- All waste oil received in Weipa from vessels will be managed in accordance with relevant legislation (Queensland Environment Protection Act & Environment Protection (Waste Management) Regulation).
- No Bunkering will be conducted at the Port of Amrun.

7.3.2.2 MARPOL Annex II: Noxious liquid substances carried in bulk

It is not anticipated that any liquid substances other than fuel and oil will be carried in bulk for operational activities. Should this occur, all vessels will be contractually required to comply with all relevant Australian and Queensland legislation for the transport, handling, transfer and disposal of the substance in question.

7.3.2.3 MARPOL Annex III: Harmful Substances in Packaged Form (Dangerous Goods)

- Any harmful substances carried in packaged form by vessels will be packaged, labelled, loaded, carried, offloaded, stored and disposed of in compliance with MARPOL Annex III, the International Maritime Dangerous Goods (IMDG) Code and the implementing Australian and Queensland legislation.
- All vessels will be contractually required to comply with the prohibition on discharges of harmful substances carried in packaged form, including discharge of packages themselves and leakage from packages.
- All vessels will be contractually required to carry and to submit to the relevant port state authority (MSQ) the relevant MARPOL-mandated documentation for harmful substances carried in packaged form, such as Stowage Plan and Harmful Substances Manifest.

7.3.2.4 MARPOL Annex IV: Sewage

- All discharges of sewage from vessels will be contractually banned within the Weipa and Port of Amrun Limits.
- No sewage will be accepted at Port of Amrun facilities.
- Outside of these limits any discharge of sewage from vessels must be in strict compliance with MARPOL, the PS(PPS) Act and the TOMP Act and Regulation.
- All vessels will be vetted by RTA to confirm they have adequate sewage treatment, management and/or holding facilities prior to contracting.
- If on board facilities are not available, sewage will be pumped from the vessel to a waste management tug or direct to vacuum truck at Evans Landing or Humbug Point. From here it

would be disposed of by an accredited waste management company at Lorim Point Sewage Treatment Plant or a suitable Sewage Treatment Facility.

- Any sewage not treated on board or not received by the waste reception services in Weipa will be retained on board until it can be disposed of in accordance with MARPOL, Australian and Queensland legislation.

7.3.2.5 MARPOL Annex V: Garbage

- No garbage will be accepted at the Port of Amrun or be discharged within the Port of Amrun limits.
- All discharges of MARPOL-defined garbage, including cargo (bauxite) residues, from vessels is contractually banned within the Port of Weipa and Port of Amrun Limits.
- Clean-up procedures will be implemented for vessels at berth at the Chith Export Facility which include that no bauxite residue is to be washed over the side of the vessel. The Chith Export Facility ship loader has been designed and will be operated to minimise bauxite dust and spillage onto vessels (as detailed **in** Section 7.3.4**.**)
- Outside of the Port of Weipa and Port of Amrun limits and while at sea, any discharge of garbage from vessels must be in strict compliance with MARPOL, the PS(PPS) Act and the TOMP Act and Regulation (i.e. zero discharges <3nm from nearest land, only food waste ground to <25mm >3nm from nearest land and only food waste (not ground) >12nm from nearest land).
- All vessels will be contractually required to have the relevant MARPOL-mandated documentation such as Garbage Management Plan and Garbage Record Book as applicable to the vessel type and size.
- Waste will be held in segregated waste bins on board the vessel. The waste will then be transported to a barge, tug or waste management area for disposal at a suitable waste management facility
- All garbage received from vessels will be managed in strict accordance with relevant legislation (Queensland Environment Protection Act & Environment Protection (Waste Management) Regulation).
- No quarantine waste facilities available at Weipa.; as such no garbage will be received from international vessels. Garbage is managed in strict accordance with the Quarantine Act under the Maritime Arrivals Reporting System (**http://www.agriculture.gov.au/biosecurity/avm/vessels/mars#mars-benefits**).

7.3.2.6 MARPOL Annex VI: Air Emissions

All vessels will be contractually required to comply in full with the requirements of MARPOL Annex VI as applicable to the vessel type and size.

7.3.3 Spill Management

7.3.3.1 Spill Management Controls

Operational spill management controls is a legislative requirement for all vessels to prevent oil and other spills into habitats for MNES at Port of Weipa, Port of Amrun and while at sea include:

- Daily inspection logged for oil and grease spills or bauxite spills to the environment.
- Complying with vessel traffic management controls (**Section 7.1**).
- Regular and documented maintenance of all vessels and equipment (e.g. ship loader).

- Relevant employees and contractors involved in the storage, handling, transfer and disposal of fuel and other materials will be trained to ensure they are aware of their responsibilities systems, processes and procedures.
- Relevant contractors will be required to undertake spill response training and appropriate training exercises in accordance with their plans.
- Secondary containment provided for hydraulic equipment.
- Properly trained and certified crew.
- AIS on all vessels.
- Regular drills and exercises for crews for vessel crew and Port spill response team.

Bauxite unloading activities at the Port of Gladstone and managed by Port of Gladstone and are outside the scope of the Project EPBC Act approval. However bauxite loading and unloading would be subject to the existing strict controls relating to the processes for vessel berthing, machinery management and maintenance, managing the process to minimise structural strain on the ship, and the risk of unloading equipment damaging cargo holds. Following loading and unloading, any cargo residues on deck would be recovered as far as possible, after which the decks would be cleaned of any remaining minimal residue prior to the vessel sailing from port. The ship loading and unloading controls are backed up by training, work instructions and procedures in place at Port of Gladstone ports.

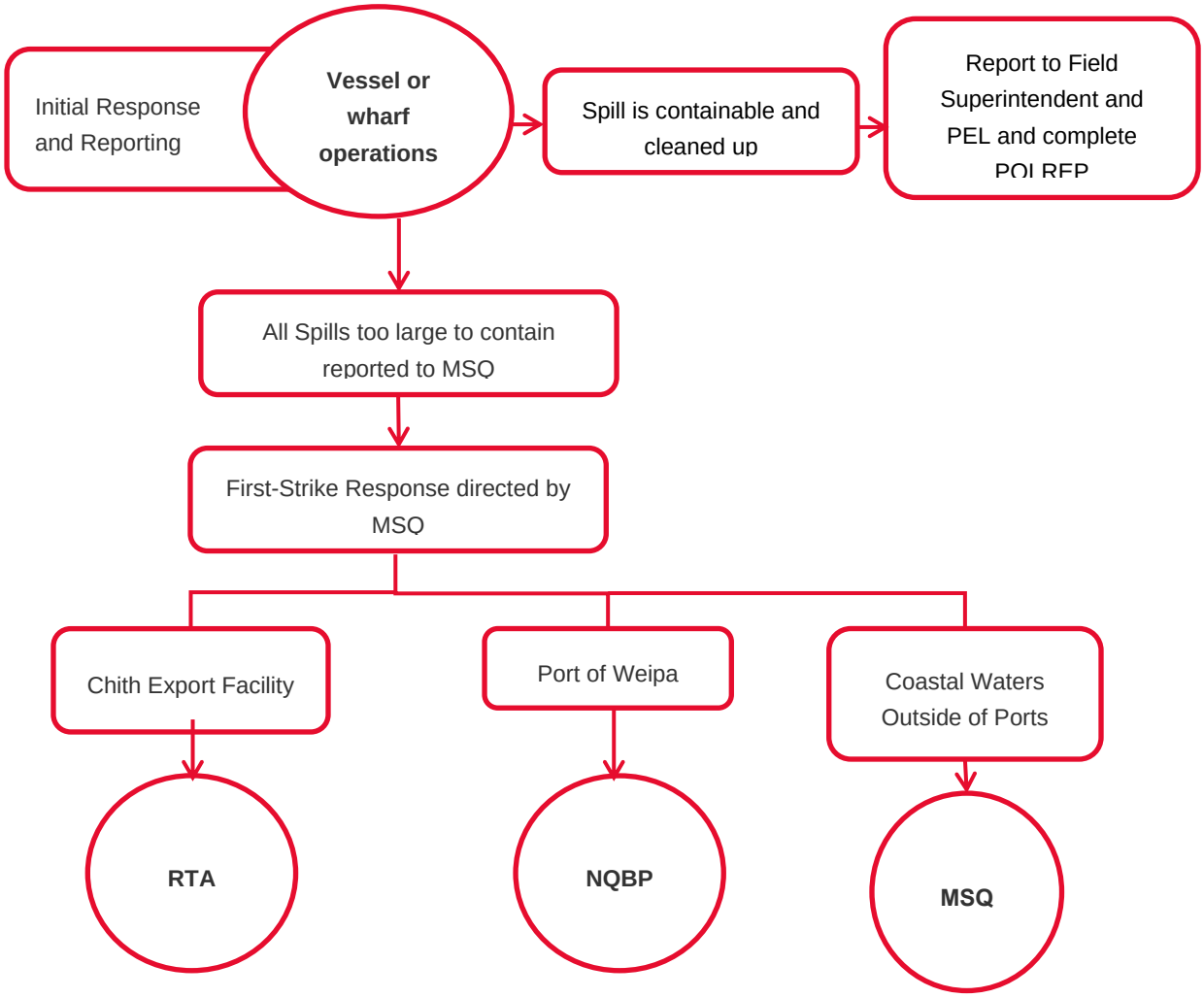
7.3.3.2 Spill Response

In the unlikely event of a spill MSQ is the lead agency for responding to ship-sourced oil spills that impact or are likely to impact Queensland coastal waters, under section 8(1)(b)(ii) of the *Maritime Safety Queensland Act 2002*. MSQ has an agreement with NQBP at the Port of Weipa and RTA at Port of Amrun to ensure that in the event of an Incident within port limits, a First-Strike Response capability is available for prompt deployment, which is consistent with the risk profile for the Port. MSQ directs initiation of response. A summary of requirements is below:

- Vessels spillage – A Shipboard Oil Pollution Emergency Plan (SOPEP) must be developed for all vessels with initial spill response kits available. The plan includes of how to report a notifiable incident and a detailed description of immediate actions to be taken by persons on board to minimise or control any discharge including deployment of spill booms or other measures defined within the plan. In the event of a ship spill in any locality the vessel will make the initial response steps and associated clean up. They will report to MSQ who will direct any further spill response.
- Port of Weipa – An incident from land or vessel is reported by NQBP through to MSQ as part of POLREP requirements as soon as practicable. MSQ will direct the first strike response through NQBP.
- Port of Amrun – An incident from land or vessel is reported by RTA through to MSQ as part of POLREP requirements as soon as practicable. MSQ will direct the first response through RTA.

A summary of the roles and responsibilities in the event of an incident are summarised below.

Roles and Responsibilities in the Event of a Marine Spill



7.3.4 Marine Pollution Reporting (POLREP)

POLREPs are required for any illegal vessel discharge to the marine environment. Discharges will be reported to the relevant authority which is MSQ and AMSA. Any vessel discharges in Queensland of any size to the marine environment will be reported to MSQ using POLREP. This can be accessed online **http://www.msq.qld.gov.au/Marine-pollution/Contingency-plans.aspx** and will be submitted by email to MSQ and AMSA.

7.3.5 Chith Export Facility Bauxite Spillage

The Chith Export Facility wharf, jetty and ship loader have been designed and will be operated to minimise dust generation and spillage to the surrounding MNES habitats. The mitigation measures implemented are considerate of the potential severe weather events within the region. These measures would include the following:

- A catch tray would be positioned under the ship loader tripper to catch spillage from the inclined section of belt. The material collected from the tripper catch tray would be directed to the head end sump and then pumped onshore to a sediment holding pond.
- Three stage belt scraping with water sprays would be positioned at the conveyor head pulley and tripper head-pulley to clean the belt. The scrapings and the water used for belt cleaning would be directed into the head end sump for pumping onshore into sedimentation dams.
- The wharf conveyor is designed with variable speed drives to provide controlled belt starting, thereby minimising the potential for bauxite spillage.
- Belt drift switches would be installed on the wharf and ship loading conveyor that shuts down the conveyor drives if a belt moves from the designed position. Training idlers that track the belts would also be installed.
- A sealed maintenance area would be provided at the end of the wharf so the ship loading boom can be serviced and cleaned within a bunded area. Runoff from this sealed maintenance area would report to the head end sump for pumping back to shore.
- Operational protocols to:
    - Run conveyor belts at optimal rates and angles to reduce the probability of 'bogging' chutes
    - Stop ship-loading boom conveyor prior to movement of the ship loader during ship loading.
- Operational wet season procedures to:
    - Stop loading in heavy rain
    - Keep belts running empty in the rain to stop excess water pooling on the belts
    - Remove excess water from the belt before starting.
- Rainwater covers and containment systems for shiploader conveyors.
- Blocked chute probes that automatically stop the movement of belts when product has accumulated at transfer points.
- Skirting and hungry boards to capture the ore on the belts at transfer points.
- Software interlocks ensure ship loader is over a boat before releasing product and ensure conveyor operations are stopped when sumps are full.

7.4 Lighting

Lighting at the Port of Amrun and specifically the Chith Export facility uses the following techniques to achieve effective, efficient and turtle friendly lighting:

- The light source of the fixture shall have minimum visibility from the beach.
- Minimise light horizon changes on and over the beach.
- The light fixture shall direct light down and away from the beach. Fluorescent or high intensity lighting of any sort shall not be used outdoors.
- Minimise lighting to that essential for safe and efficient operations.
- Ensure non-essential lighting is switched off or dimmed when there are no vessels at berth or being piloted, or personnel working in the facility.

- Shielding and/ or recessing of lights.
- Minimize the mounting height and optimise the light orientation to ensure lighting spill is minimised.
- Energy efficient light fixtures shall be used.
- Day/night switches, proximity sensor switches, as well as time switches.
- Lighting and communications poles shall be fitted with bird deterrent devices to prevent birds from nesting on the pole and light fixtures.
- Lighting design on the Export facility incorporates “turtle friendly” lighting, which requires lights to minimize output wavelengths below 550nm. This means all blue, green and yellow parts of the light spectrum are to be filtered out for all light fittings. Therefore, all Export facility lights will exhibit an amber colour. The use of turtle sensitive lighting shall give consideration to safety and navigation requirements.

The following additional management measures will be implemented for vessels during peak turtle nesting season at the Chith Export Facility:

- Lighting will be limited to that required for safe operation of the vessels.
- Crew on the tugs will be required to check for hatchling congregation around the vessel and turn off any non-safety related lighting until hatchlings disperse. This will be made as a requirement in the tugs operational handbook.

Visual monitoring of light levels from Chith Export Facility and associated vessels and identification of marine turtle congregation around pilot vessels or vessels operating at night would be conducted. If monitoring results indicate that controls have not been adequately implemented, then corrective actions would be developed to address the non-compliance.

Offset programs for Marine Turtles (RTA 2016a) and (RTA 2016b) were developed to offset the impacts of the port operations on nesting marine turtles. The Feral Pig Management Offset Strategy and Marine Turtle Offset Plan include feral pig control activities on all accessible nesting beaches on the Amrun Project mining lease north (approximately 27 km of nesting beach) and south (approximately 32 km of nesting beach) of the Port. The offset program will continue during 2018 and in subsequent years. The offset program will directly address terrestrial predation which is a key threat to nesting turtles and monitoring program will directly contribute to the measure of success for the Olive Ridley Turtles which is to understand the trends in nesting turtle abundance for this stock.

7.5 Recreational Activities

The Foreshore Access Management Plan (FAMP) has been developed to comply with Conditions C6 and C16 of the Project’s Environmental Authority (EA). The plan also addresses the overall conditions of the EPBC Approval (eg managing impacts to listed turtle species). The plan restricts access for unpermitted persons to foreshore areas between Ina Creek and Winda Winda Creek.

The FAMP defines access permit requirements to protect cultural and environmental aspects of foreshore areas by controlling access of Project personnel and activities, as well as to monitor, respond to, investigate and report breaches. The FAMP will be implemented over the operational phase of the Project and would include the following management measures to reduce the potential impact on marine turtles associated with the recreational use of the beach by the workforce:

- Recreational access to beaches would be forbidden without a permit;
- Recreational access to beaches would not be permitted at night;
- Vehicle driving would be restricted to drivers trained in turtle nest identification to avoid nesting sites;
- Behavioural standards are established within the FAMP; and
- Area inductions would include behavioural standards for beach access to prevent impacts to nesting marine turtles or nests;

Adaptive management strategies for impacts to marine turtles would include investigation of any breaches of the FAMP and foreshore access permit system with appropriate corrective actions implemented including disciplinary action, and modification of access permit conditions.

7.6 Elasmobranch Sightings

In accordance with Condition 6(l) of the EPBC approval, DAWE will be notified within five business days of any confirmed or suspected observations by Project personnel of the following elasmobranch species:

- Dwarf Sawfish (*Pristis clavata*);
- Green Sawfish (*Pristis zijsron*);
- Freshwater Sawfish (*Pristis microdon*); and
- Speartooth Shark (*Glyphis glyphis*).

Personnel assigned to coastal marine facilities will receive induction information on these elasmobranch species and instructed to report confirmed or suspected observations through their line managers. Any injured or dead individuals of these species observed will be reported to DoE.

7.7 Estuarine Crocodile Relocation

The relocation of Estuarine Crocodiles within the SoE Project area may be required if safety concerns arise. The identification and relocation of Estuarine Crocodiles that may pose a safety risk will be conducted as follows.

- If an Estuarine Crocodile is located in an area that is determined to pose a safety risk, the sighting will be reported by HSE Manager to Croc Watch as soon as possible on 1300 130 372.
- The administering authority will record and investigate the report and take appropriate action based in consultation with RTA on the safety risk posed by the individual Estuarine Crocodile.
- If the administering authority determines that the individual Estuarine Crocodile poses an unacceptable risk, it will be listed as a ‘crocodile of concern’.
- A ‘crocodile of concern’ is defined by the administering authority as an Estuarine Crocodile which:
    - is found south of the Boyne River (near Gladstone);
    - has attacked, or is about to attack, or is behaving aggressively towards, a person;
    - is determined by the administering authority to pose a potential threat to human safety or wellbeing because of its location or behaviour;

- has passed a crocodile prevention barrier and has attacked, or is about to attack, or is behaving aggressively towards, stock, working dogs or aquaculture fisheries resources; or,
- is two metres or greater in length and located in a defined urban area (**Crocodile Urban Management Areas**) unless it is just moving through the area or the area is well-known crocodile habitat.

- A 'crocodile of concern' will be targeted for removal from the wild and taken to a zoo or crocodile farm, or in some cases humanely euthanized. Only administering authority staff or individuals licensed to remove Estuarine Crocodiles may capture and remove an individual from the wild.

Inductions of for personnel who will be working within the SoE Project Area will include information on Croc Wise behaviour. Inductions will be delivered by suitably qualified personnel.

7.8 Summary of Potential Impacts Management and Monitoring Methods

Table 13 provides action plans to manage the potential impacts and the mitigation, management and monitoring measures to be implemented.

Table 13 Action Plan for Operational Marine and Shipping Activities

Potential Impact	Avoidance, Mitigation and Management Measures	Monitoring	Residual Risk (consequence/ likelihood risk)	Management Objective / Goal / Targets	Performance Indicators	Timeframe (Activity)	Corrective Actions and contingency measures	Responsibility
Vessel strike	Management measures are detailed in **Section 7.1.1**	Monitoring of marine fauna by crew when vessel underway	Negligible / Rare - Low	Vessel Speed Requirements IMO Guidance document for minimising the risk of ship strikes with cetaceans, MEPC.1/Circ.674, dated 31 July 2009. Zero marine fauna vessel strikes associated with shipping activities	Number of marine fauna vessel strikes associated with shipping. Number of non-compliances with vessel speed requirements (including ferries and barges not slowing to 6 knots in water depths of 2.5m or less). Number of times ferries and barges do not follow specified transit lanes.	During Travelling	Any injured or dead listed species will be reported to marine stranding hotline through RSPCA Queensland on 1300 ANIMAL Notification to DAWE contact for protected species injury or death. Any breaches or near miss to be reported, investigated and appropriate corrective actions implemented. Appropriate discipline actions implemented. Increased training and awareness if required.	Vessel master RTA Line Managers Rio Tinto Shipping, Manager Marine
Underwater noise	Management measures are detailed in **Section 7.1.2**	Vessel inspections by HSE team.	Negligible / Unlikely – Low	All shipping (Rio Tinto owned and contracted) has the appropriate mitigation measures applied to reduce underwater noise. All contracted shipping has appropriate underwater noise mitigation measures included in their contract.	Percentage of vessels on site assessed through vessel inspections as compliant to management measures. Number of non-compliances with vessel speed requirements (including ferries and barges not slowing to 6 knots in water depths of 2.5m or less). Number of times ferries and barges do not follow specified transit lanes.	During Travelling	Check regular maintenance is being conducted on all project related vessels. Breaches to be investigated and appropriate corrective actions implemented.	Vessel master RTA Weipa Line Managers Rio Tinto Shipping, Manager Marine
Turbidity	Management measures are detailed in **Section 7.1.3**	Vessel propulsion use when at berth will be monitored by HSE team.	Negligible / Unlikely – Low	Water quality impacts are restricted to the vessel berthing only Zero incidents of unnecessary vessel propulsion while at berth	Number of times vessels are observed to remain at berth with propulsion systems on.	At berth	Breaches to be investigated and appropriate corrective actions implemented.	Vessel master RTA Weipa Line Managers Rio Tinto Shipping, Manager Marine
Shipping activities through GBR	Management measures are detailed in **Section 7.1.4**	Monitoring is completed by MSQ and marine operations tracking	Negligible / Unlikely – Low	All shipping complies with requirements outlined in legislation Zero shipping incidents from Project related shipping	Numbers of incidents recorded annually.	During shipping activities	Breaches to be investigated and appropriate corrective actions implemented.	Vessel master Rio Tinto Shipping, Manager Marine
Marine Pests	Management measures are detailed in **Section 7.2**	Marine pest monitoring including baseline and routine monitoring	Major / Rare - High	No marine pests established in the Amrun Port or Port of Weipa as a result of Project related shipping activities. Zero non-compliance with Quarantine Regulations 2000.	Number of marine pests species established in the Amrun Port or Port of Weipa as a result of Project related shipping activities. Number of non-compliances with Quarantine Regulations 2000.	Managed during mobilisation and demobilisation of vessels. Monitoring throughout shipping activities.	Any breaches to be reported, investigated and appropriate corrective actions implemented as per **Section 7.2**. Review current marine pest assessment practices and amend as necessary. Increase training and awareness if required.	Vessel master RTA Weipa Line Managers Rio Tinto Shipping, Manager Marine HSE Manager
Marine Pollution – Waste	Management measures are detailed in **Section 7.3 and 7.3.1 and 7.3.2**	Daily inspection completed by vessel master. Weekly inspections by HSE Team.	Negligible / Possible – Low	All waste management and disposal in accordance with project management plan, MARPOL, Commonwealth and State regulations No waste disposed of incorrectly and any spilled debris removed	Number of non-conformances Areas disturbed due to waste	Ongoing	Any breaches identified are to be investigated and appropriate corrective actions implemented.	Vessel master RTA Weipa Line Managers Rio Tinto Shipping, Manager Marine

Potential Impact	Avoidance, Mitigation and Management Measures	Monitoring	Residual Risk (consequence/ likelihood risk)	Management Objective / Goal / Targets	Performance Indicators	Timeframe (Activity)	Corrective Actions and contingency measures	Responsibility
Marine Pollution – Spill	Management measures are detailed in **Section 7.3.2 and 7.3.3**	Inspections of work area and equipment occurring during working hours. Daily inspection completed by vessel master.	Moderate / Unlikely – Moderate	Zero spills Zero non-compliance with waste regulations If a spill occurs, all oil spills are contained and are responded to and cleaned up in a timely manner.	Number and quantity of vessel discharges from Project related shipping. Number and quantities of incidents Number of non-compliances with national and international regulations	Ongoing	Implement appropriate spill response measures and comply with agency requests. Any spills or discharges of wastes to be reported, investigated and appropriate corrective actions implemented. Breaches to be investigated and appropriate corrective actions implemented. Increase training and awareness if required.	Vessel master RTA Weipa Line Managers Rio Tinto Shipping, Manager Marine
Marine Pollution – Chith Export Facility bauxite spill	Management measures are detailed in **Section 7.3.4**	Inspections of work area and equipment occurring during working hours. Weekly inspections by HSE Team.	Negligible / Possible – Low	Zero spills No occurrences of spillage controls not being implemented All spills are responded to and if recoverable spill is cleaned up in a timely manner.	Number of times bauxite spills occur Number of times spillage controls are not implemented	During bauxite ship loading	Responded to spills and if recoverable spill is cleaned up in a timely manner. Any spills or discharges of wastes to be reported, investigated and appropriate corrective actions implemented. Breaches to be investigated and appropriate corrective actions implemented. Increase training and awareness if required.	RTA Weipa Line Managers – Chith Export Facility
Marine Pollution – bauxite spillage-shipping	Management measures are detailed in **Section 7.3.3**	Inspections of work area and equipment occurring during working hours. Daily inspection completed by vessel master.	Minor / Unlikely – Low	Zero spills All spills are responded to and if recoverable spill is cleaned up in a timely manner.	Number and quantity of vessel discharges from Project related shipping. Number and quantities of incidents Number of non-compliances with national and international regulations	Ongoing	Implement appropriate spill response measures and comply with agency requests. Any spills or discharges of wastes to be reported, investigated and appropriate corrective actions implemented. Breaches to be investigated and appropriate corrective actions implemented. Increase training and awareness if required.	Vessel master Rio Tinto Shipping, Manager Marine
Lighting	Management measures are detailed in **Section 7.4** Marine Turtle Offset Program detailed in **Section 5.1.4.2**	Visual monitoring of light levels from Chith Export Facility and associated vessels. Visual identification of marine turtle congregation around pilot vessels or vessels operating at night.	Minor / Unlikely - Low	No records of marine turtles and/or their hatchlings aggregating around shipping. No interference with nesting due to operational shipping activities. No records of non-approved lighting being used on Chith Export facility. No use or installation of lighting at Chith Export Facility / Port of Amrun without prior approval by environmental team.	Number of incidence of marine turtles and/or their hatchlings aggregating around Port related shipping.	Ongoing	Breaches to be investigated and appropriate corrective actions implemented. Increase training of lighting management.	Vessel Master RTA Weipa Line Managers – Chith Export Facility HSE Manager

Potential Impact	**Avoidance, Mitigation and Management Measures**	**Monitoring**	**Residual Risk (consequence/ likelihood risk)**	**Management Objective / Goal / Targets**	**Performance Indicators**	**Timeframe (Activity)**	**Corrective Actions and contingency measures**	**Responsibility**
Recreational Activities	Management measures are detailed in **Section 7.5**	Foreshore area to be surveyed to ensure compliance with Foreshore Access Permit system.	Minor / Unlikely – Low	Zero non-compliance with Foreshore Access Permit system	Number of non-compliances with Foreshore Access Permit system	Ongoing	Breaches to be investigated and appropriate corrective actions implemented including potential disciplinary action, and modification of access permit conditions. Increase training of behavioural standards for foreshore access.	RTA Weipa Line Managers HSE Manager

8. Traditional Owner employment opportunities

RTA has committed to working collaboratively with Traditional Owners, through the relevant Western Cape Communities Co-existence Agreement (WCCCA) Sub-Committees and the WCCCA Coordinating Committee to further increase representation of local Aboriginal people, and in particular, the Wik & Wik Waya Traditional Owners across the workforce. For this reason, focussed work, in collaboration with Traditional Owners and the Members of the WCCCA Employment, Training, Environment and Heritage Sub-Committee will be undertaken, to understand the current challenges, the outcomes achieved to date and the development of strategies specific to the needs of this community.

In addition, RTA as a signatory to the Western Cape Regional Partnership Agreement (RPA) is actively working with the RPA working group on employment and training to identify opportunities where industry, Governments and local Aboriginal people can strategically partner to develop relevant skills and employment pathways prior to and during the construction phase of the Amrun Project.

Traditional Owner employment opportunities associated with marine works and shipping will be available in the following Land and Sea Management Programmes, which are part of the Communities, Heritage and Environmental Management Plan (SoE Communities, Heritage and Environment Working Group, 2014):

- Feral Pig Management Offset Strategy.
- Foreshore Access Permit System.
- Inshore Dolphin Offset Strategy.

In addition, through the existing Indigenous Land Use Agreement, opportunities for employment of Traditional Owners are identified through and employment and training plan. This plan identifies work opportunities and roles within these work opportunities that may be filled by Traditional Owners. Traditional Owners that may be capable of filling these roles are then identified with RTA supporting identified candidates to become appropriately skilled to fill the identified roles. RTA supports the employment of Traditional Owners if they are appropriately skilled and qualified to fulfil the role requirements.

As part of RTA's reporting obligations under the Indigenous Land Use Agreement, quarterly review reports on Indigenous employment and training obligations are made to Traditional Owners. Annual reports on compliance with this OMSMP, including implementation of Traditional Owner employment opportunities, and the number of local Traditional Owners employed in the implementation of this plan will be provided to DAWE and published on the RTA website (refer Section 3.6).

9. Traditional Owner consultation

Traditional Owner consultation will occur in accordance with the process under the Indigenous Land Use Agreement during the preparation of this Plan. This consultation involved the following:

- the Plan has been lodged with the Western Cape Communities Coexistence Agreement (WCCCA) Environment and Heritage Committee in July 2018 and subsequently to the Coordinating Committee and would seek that the Committee formally note that the management plans had been presented to the WCCCA. No comments have been received from Traditional Owners in regard to the Plan;
- the Plan would then be subsequently presented to a meeting of the Communities, Heritage and Environment Management Plan (CHEMP) Working Group;

10. Regulatory Agency consultation

In accordance with EPBC Act Approval Condition 9 the OMSMP must be developed in consultation with relevant Commonwealth agencies, including the AMSA and the GBRMPA and state agencies including MSQ. Outcomes of consultation are presented in **Table 14** and include:

- a draft of Plan was lodged with AMSA, GBRMPA and MSQ (RHM) in July 2018.
- comments were received from AMSA, GBRMPA and the MSQ (RHM), and have been addressed within this plan as summarised below.
- No large material updates have been identified for risks or changed for controls and accordingly no submissions have been made to the regulators for this update.

Table 14 Regulatory Agency Consultation and RTA Responses

Comment	RTA Response
Agency: GBRMPA	
Reference should be made within your Management Plan to the North East Shipping Management Plan developed by AMSA. This Plan is being implemented in the Great Barrier Reef Region. According to the AMSA website, *'The development of this plan provides an excellent opportunity for the resources sector, and other industries that rely on sea freight, to look at current and proposed shipping management arrangements and also to play our part in ensuring that that mineral and energy-related shipping continues to be conducted in a safe and environmentally sound manner.'*	Section 6.1.4 has been updated with reference to the North East Shipping Management Plan including RTAs approach to implementation of the plan.
Section 6.2 and Section 7.2.1. I note you mention the potential for monitoring for marine pests as part of Biosecurity Queensland's practice at GBR ports. Since your approval was granted, a Reef Integrated Monitoring and Reporting Program is being established under the Reef 2050 Long-term Sustainability Management Plan. I would encourage you to consider linkages between any of your marine pest monitoring and the Integrated Monitoring program within the Reef. If you need a point of contact for the Integrated Monitoring Program please email rimmrep@gbrmpa.gov.au.	Section 7.2 has been updated to reflect how RTA have been consulting with Biosecurity Queensland in regards to the Integrated Program and the reference to DES was corrected.
Page 30 – DEHP should be updated to DES (Department of Environment and Science). They had a name change after the last Queensland election.	Reference to DEHP has been corrected to DES
Section 3.8. GBRMPA is comfortable with the proposed management arrangements and would not feel the need to review minor amendments to this Management Plan in relation to shipping within the Great Barrier Reef.	Noted, RTA will provide further updates to the plan only if they include significant amendments in relation to shipping within the Great Barrier Reef.
Agency: MSQ (RHM)	

Figure 2: Declared Depth Departure Area is -13.6m Declared Depth Berth Pocket is – 15.9m	The declared depth has been corrected within **Figure 2**. The previous declared depth was the original proposed depth for the Port of Amrun.
Section 2.2.3:.Fuel does not come from Darwin it is sourced overseas, usually Singapore or Korea	This statement is correct in regards to the fuel procurement source however vessels transporting fuel to Weipa only commence their voyage from Darwin, which has been clarified in footnote to **Table 2**.
Section 2.2.3:.This does not read correctly you state 55% of vessels sail to Gladstone but in the previous sentence you state “Most bauxite from Weipa is shipped to Gladstone” the two statements are incompatible	Section 2.2.3 has also been updated to more clearly identify that 55% of vessels from Port of Weipa sailed to Gladstone in 2017.
Agency: AMSA	
Section 7.3.2: Note that ‘Cargo Residues’ is included in the MARPOL V definition of ‘Garbage’. How is Cargo Residue managed while alongside and prior to the vessel departing the vessel	Section 7.3.2 has been updated identify that Cargo Residues are include in MARPOL V definition of garbage. Reference has been added to Port operational procedures which will be implemented which state that no bauxite residue is to be washed over the side of the vessels while at berth.

References

ANZECC/ARMCANZ (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Strategy*. Australian and New Zealand Environment Conservation Council and Agricultural Resource Management Council of Australia and New Zealand, Canberra.

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Appendix A Letter of approval for management plan from Minister

Australian Government
Department of Agriculture, Water and the Environment

Glenn Woodrow
Principal Advisor Environment
RTA Weipa Pty Ltd
123 Albert Street
BRISBANE QLD 4000

South of Embley bauxite mine and port development (EPBC 2010/5642) – Approval of revised Operations Marine and Shipping Management Plan

Dear Mr Woodrow

Thank you for your letter dated 19 February 2021 and subsequent correspondence to the Department seeking approval of the *South of Embley Project – Operations Marine and Shipping Management Plan, April 2021* in accordance with conditions 5 to 10 of EPBC Act Approval 2010/5642.

As a delegate of the Minister for the Environment, I have decided to approve the *South of Embley Project – Operations Marine and Shipping Management Plan, April 2021.* As required under condition 11 of EPBC Act Approval 2010/5642, this plan must now be implemented.

In accordance with condition 72 of EPBC Act approval 2010/5642, if the approval holder wants to act other than in accordance with this approved plan, it must submit a revised plan for approval. Until the Minister (or her delegate) has approved the revised plan, the approved version of the plan must continue to be implemented.

Should you require any further information please contact Panna Patel,
Post Approvals Officer, Post Approvals Section, on (02) 6275 9299 or by email:
post.approvals@environment.gov.au.

Yours sincerely

Dwaine McMaugh
Director, Post Approvals Section,
Environment Assessments (Vic, Tas) and Post Approvals Branch

6 July 2021