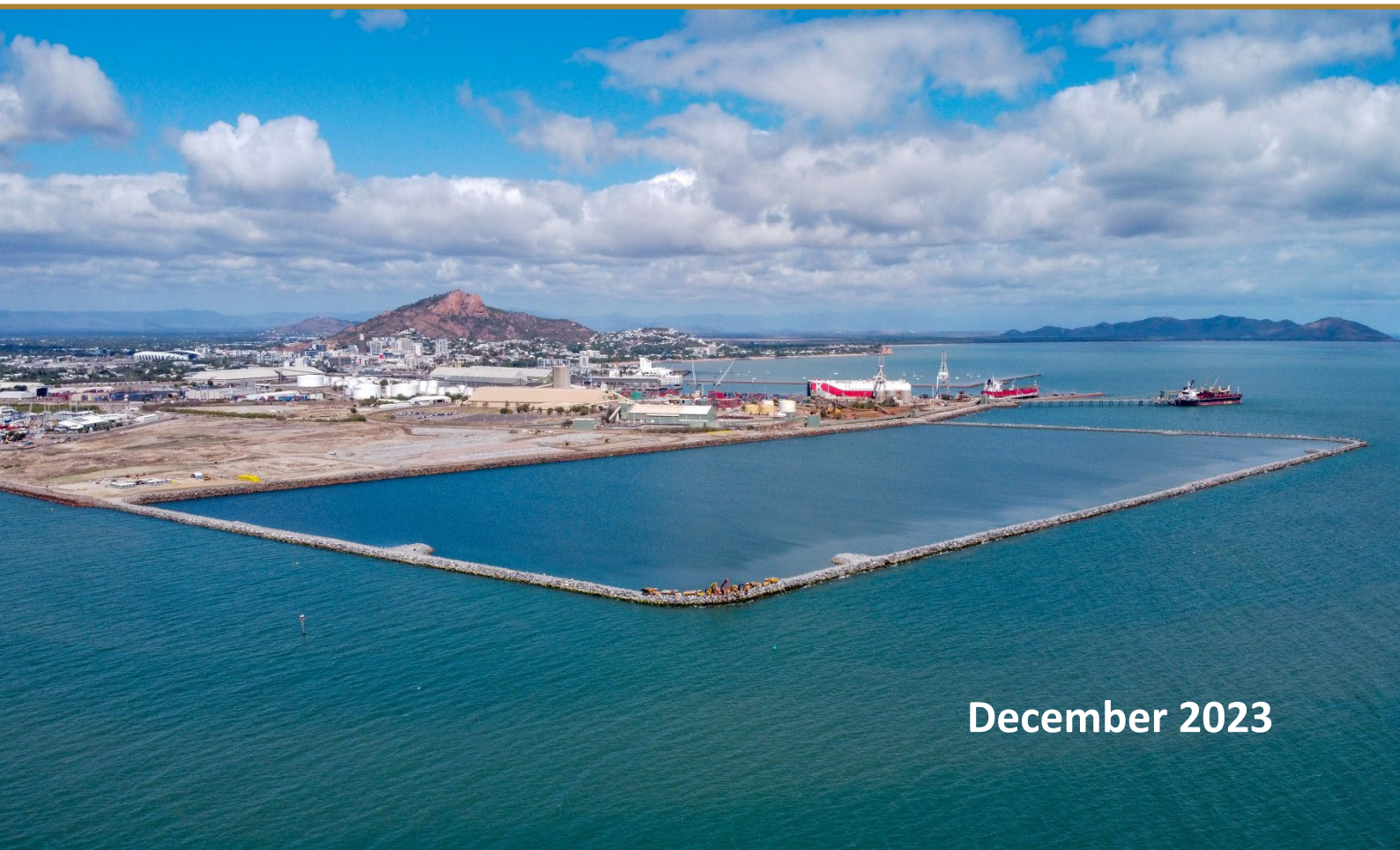
PORT OF TOWNSVILLE

TOWNSVILLE PORT EXPANSION CHANNEL UPGRADE PROJECT

MARINE ENVIRONMENTAL MANAGEMENT PLAN



December 2023

DOCUMENT CONTROL SHEET

Revision history

Revision No.	Date	Changed by	Nature of amendment
0	21/02/20	T Smith	Submitted version
1	17/11/20	M. Louden	Submitted version
2	29/06/2021	T Smith	Revised Appendix J – Environmental Procedure for Pile Driving
3	16/09/2021	T Smith	Revised to incorporate dredging activity
4	10/11/2021	T Smith	Revised Appendix I – Environmental Procedure for Pile Driving
5	17/05/2022	T Smith	Revised Appendix I – Environmental Procedure for Pile Driving and minor administrative changes.
6	21/02/2023	T Smith	Update to tailwater management arrangements and minor administrative changes.
7	02/11/2023	T Smith	Revised to incorporate Eastern Entrance Widening, and remove Diagonal Breakwater works from the plan and other minor amendments
8	05/12/2023	T Smith	Revised Appendix H – Invasive Marine Pest Monitoring Plan, Appendix I – Environmental Procedure for Pile Driving and version control changes

DOCUMENT APPROVAL

Approval of the MEMP (R7), via condition 38 notification to DCCEEW occurred on 6 November 2023.

This version of the MEMP (R7) was published on the CU Project's website on 6 November 2023.

This document has been prepared to meet the Commonwealth Government's EPBC Approval No. 2011/5979 Conditions and the Queensland's Coordinator General's Conditions for the Port of Townsville Limited's Port Expansion Project (ACN 130 077 673).

DECLARATION OF ACCURACY

EPBC Number	2011/5979
Project Name	Port of Townsville Port Expansion Project
Approval Holder	Port of Townsville Limited
ACN / ABN	130 077 673 / 44 411 774 236
Approved Action	To expand the Port of Townsville, in Townsville Queensland. The action is for dredging, land reclamation and construction of infrastructure.
Location of the Action	Townsville, Queensland

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed

Full name (please print)

David McLoughlin

Organisation (please print)

Port of Townsville Limited

Date 06 / 12 / 2023

GLOSSARY

AEIS	Townsville Port Expansion Project: Additional Information to the Environmental Impact Statement - Final (June 2017).
ASS	Acid Sulphate Soil
Berth	Any dock, pier, jetty, quay, wharf, marine terminal or similar structure, (whether floating or not) connected to the shore, at which a ship may tie up, not including floating plant, jack-up barge, or other similar structure not connected to the shore
Bunkering	The act of moving fuel on or off board a vessel/ship
Capital Dredge Material	Material (clays, silts and sands) derived from capital dredging
Capital Dredging	As defined in the NAGD, being 'dredging for navigation, to enlarge or deepen existing channels and port areas or to create new ones'
CU Project	Channel Upgrade Project
CEMP	Construction Environmental Management Plan
CROC	Compliance Regulatory Oversight Committee
CSEP	The Community and Stakeholder Engagement Plan developed for the CU Project
CSSPPP	Construction Ship-Sourced Pollution Prevention Plan
CVTMP	Construction Vessel Traffic Management Plan
Department / DCCEEW	The Australian Government Department of Climate Change, Energy, the Environment and Water, or any other agency administering the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) from time to time
DES	The Queensland Government Department of Environment and Science, or any other state agency regulating coastal developments and dredging from time to time
DMP	Dredge Management Plan
EIS	Port Expansion Project Environmental Impact Statement (March 2013)
EMS	Environmental Management System
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Emergency	Any circumstance which causes, or gives rise to a risk of, serious injury or damage to a person, property or the environment
Exclusion Zone	For pile driving activities, a radius, from the centre of the pile to be driven, around pile driving operations to minimise the risks of physiological impacts to marine fauna, based on current scientific evidence. The zone must be visually observed at all times during piling driving operations, and where pile driving operations must cease if marine fauna are observed within the relevant radius. For general construction activities, a radius from the active workfront or the furthest extent of the construction equipment (e.g. extended dredge arm/bucket).
Extreme Weather Events	Includes but not limited to periods of high rainfall, strong winds, very high tides and cyclones

ITAC	Independent Technical Advisory Committee
Listed Dolphin Species	Australian snubfin dolphin (*Orcaella heinsohni*) and Australian humpback dolphin (*Sousa sahulensis*). Note: definition amended to replace Indo-Pacific humpback dolphin (*Sousa chinensis*) with *Sousa sahulensis* based on revised speciation and listing - https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=87942
Listed Turtle Species	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*)
Marine Megafauna	Listed turtle species, dugongs (*Dugong dugon*), listed dolphin species, and all other Cetaceans
Marine Megafauna Observer	Members of the Port or contractor construction team who are suitably trained in marine megafauna observation techniques for key construction activities to observe and identify when megafauna are within set exclusion distances from work fronts.
Master	A person having command or charge of the vessel
MEMP	Marine Environmental Management Plan
Minister	The Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and includes a delegate of the Minister
MNES	Matter of National Environmental Significance: In the context of this approval: Great Barrier Reef World Heritage Area, Great Barrier Reef National Heritage place, listed turtle species, listed dolphin species and all other Cetaceans, Dugong (*Dugong dugon*), Commonwealth marine area and the Great Barrier Reef Marine Park
NAGD	*National Assessment Guidelines for Dredging (2009)*, as amended or substituted
Near miss	An unplanned event which occurred that did not result in environmental harm, but had the potential to do so.
Observation Zone	The zone whereby the movement of marine fauna should be monitored to determine whether they are approaching or entering the Exclusion Zone around construction works.
OEMP	Operations Environmental Management Plan
PASS	Potential Acid Sulphate Soils
PEP	Port Expansion Project
Port	Port of Townsville Limited
Preliminary Works	Includes works of a temporary nature necessary to undertake investigations and to prepare the project area for development
Re-strike testing activities	Testing of an installed pile to confirm that the pile has been installed to the appropriate engineering standards
SDS	Safety Data Sheet

Significant	An event that is important, notable or of consequence, having regard to its context or intensity, and is not temporary in nature.
SMS	Vessel Safety Management System
Suitably qualified marine observer(s)	As defined in EPBC Act Approval # 2011-5979 - a dedicated and suitably trained person, with demonstrated experience in marine fauna observation, identification and monitoring of marine fauna, distance estimation and reporting. The marine observer must only be tasked with undertaking visual observations for marine fauna whilst they are engaged to do so, and must not have any other duties while engaging in visual observations. This is applicable to piling activities only.
TSS	Total Suspended Solids
Vessel	A Ship, as defined under the Transport Operations (Marine Pollution) Act 1995 (TOMPA) and a Domestic Commercial Vessel, as defined under the "National Law"

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1 INTRODUCTION

Port of Townsville Limited (Port) is a Government Owned Corporation established under the *Government Owned Corporations Act 1993* (Qld) which manages the Port of Townsville. The Port is located on Cleveland Bay, approximately three kilometres east of the city centre in Townsville, North Queensland (Figure 1). It is a multi-purpose port that handles predominantly bulk and general cargo with a land and sea jurisdiction in excess of 450 km^2. The Port is situated in the Great Barrier Reef World Heritage Area, outside of the Great Barrier Reef Marine Park. Surrounding the Port of Townsville is Cleveland Bay and the community of Townsville. Townsville is a long-established township with a history of urbanisation and industrial activities in the Ross River and Ross Creek drainage system.

The Townsville Port Expansion Channel Upgrade Project (CU Project) is Stage 1 of the Port's long-term Port Expansion Project (PEP). The PEP aims to create a series of strategic assets which will address current capacity constraints and accommodate future growth in trade over a planning horizon to 2040. It includes development of port infrastructure, namely work to "top of wharf" facilities; capital dredging; reclamation; breakwaters and revetments; berths; access roads; rail loop; and trunk services and utilities. It does not include the development of "above wharf" infrastructure such as terminal pavements; ship-loaders and unloaders; product conveyors; storage buildings for products; rail loaders and unloaders; stacking and reclaiming equipment; storage tanks; and pipelines, which will be subject to separate statutory assessment and approval requirements prior to the start of their operations.

1.1 SCOPE

The CU Project involves the supply and haulage of marine-grade armour rock; the construction of a reclamation area; realignment of the existing Breakwater; the construction of a temporary offloading facility; capital dredging and placement of capital dredge material in the reclamation area; and movement and installation of navigation aids. This Marine Environmental Management Plan (**MEMP**) outlines the environmental management requirements to reduce the potential for negative impacts on Matter of National Environmental Significance (MNES) associated with the CU Project's activities in the marine environment, particularly:

- Construction of the rockwalls to form the reclamation area;
- Construction and use of the temporary offloading facility, including dredging and piling works;
- Realignment of the Inner Harbour Entrance, including realignment of an existing breakwater, to cater for the Platypus Channel widening at the Inner Harbour entrance;
- Capital dredging to Widen the Channel;
- Placement of capital dredge material in the reclamation area; and
- Management of capital dredge tailwater at the reclamation area.

Preparation and implementation of this MEMP is a requirement of Condition 12 of Controlled Activity Approval EPBC 2011/5979.

For the purposes of this plan, these works have been grouped into two main categories:

1) construction and reclamation, relating to works for the construction, filling and dewatering of the reclamation area and the construction of other in-water infrastructure; and,
2) dredging, relating to all dredging works, including dredging to support the construction of other infrastructure (e.g. Temporary offloading facility).

This reflects the on ground distinction of responsibilities of contractor teams associated with the CU Project delivery.

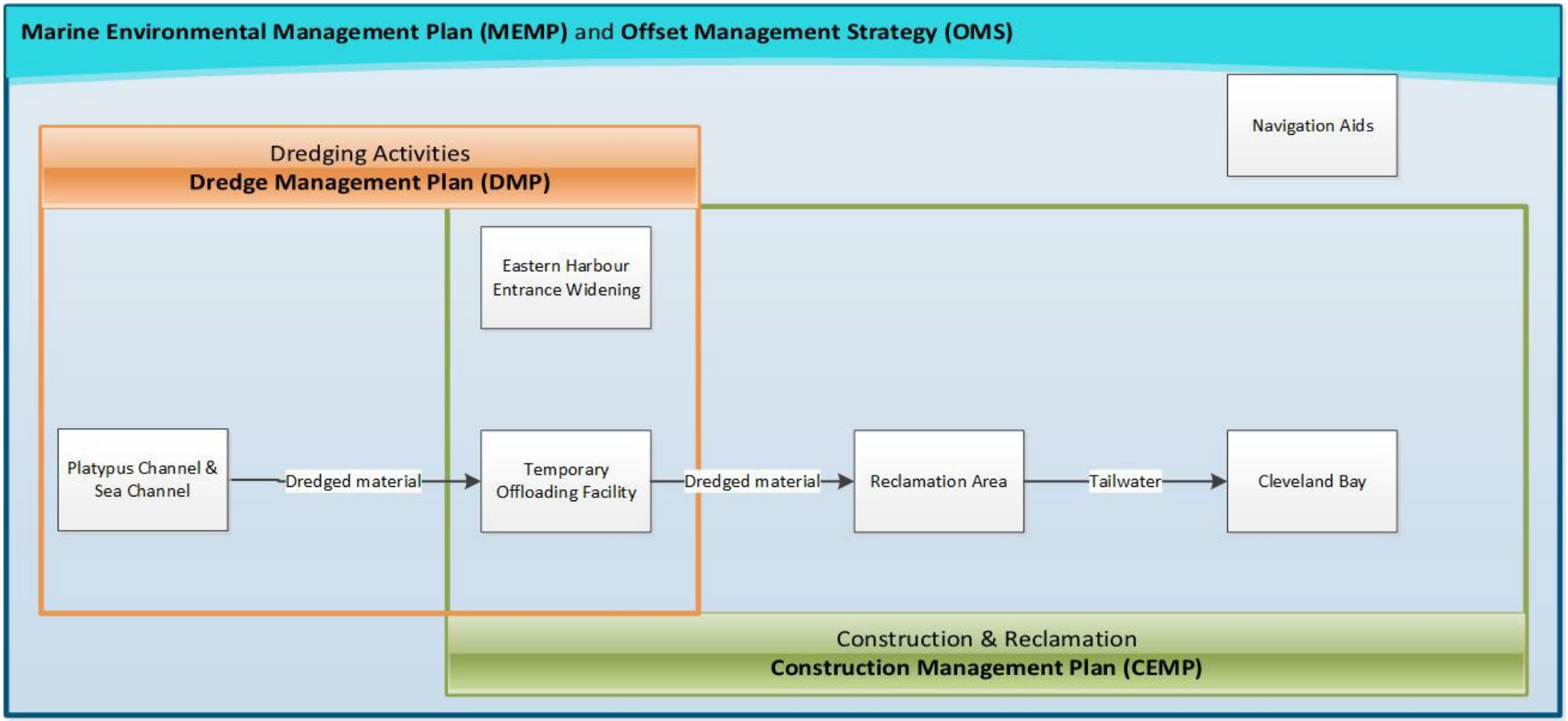
This MEMP is only one of a number of management plans which will be implemented in the CU Project as listed in Table 1 and shown in Figure 2.

Figure 1: Locality Plan of the Port of Townsville & CU Project

Table 1: Phases of CU Project & Associated Management Plans

PHASE	MANAGEMENT PLAN	DESCRIPTION OF CONTENT
Rockwall & Reclamation	Offset Management Strategy (APPROVED)	Outlines the offset management strategy for the construction of the rockwall
	Construction Environmental Management Plan (**CEMP**) (APPROVED)	Outlines the overview of the rockwall construction and reclamation activities and associated environmental management requirements and contingency plans for extreme weather events
	Marine Environmental Management Plan (**MEMP**) (APPROVED)	Outlines the environmental management requirements for MNES from activities in the marine environment
	Construction Vessel Traffic Management Plan (**CVTMP**), incorporating the Construction Ship-Sourced Pollution Prevention Plan (**CSSPPP**) (APPROVED)	Outlines the navigational safety and environmental requirements for all vessels during the construction activities. Outlines the environmental requirements to prevent pollution from vessels during the construction activities
	Inshore Dolphin Monitoring Plan (APPROVED)	Outlines the monitoring program for the inshore dolphins
Capital Dredging	Updated Offset Management Strategy (APPROVED)	Outlines the offset management strategy for the capital dredging
	Updated Construction Environmental Management Plan (**CEMP**) (APPROVED)	Outlines the overview of construction and reclamation activities for the rockwall, Breakwater modification and temporary offloading facility construction and associated environmental management requirements and contingency plans for extreme weather events
	Dredge Management Plan (**DMP**) (APPROVED)	Outlines the overview of the capital dredging activities and associated environmental management requirements and contingency plans for extreme weather events
	Updated Marine Environmental Management Plan (**MEMP**) (APPROVED)	Outlines the environmental management requirements for MNES in relation to the capital dredging activities
	Inshore Dolphin Monitoring Plan (APPROVED)	Outlines the monitoring program for the inshore dolphins
Operations	Operations Environmental Management Plan (**OEMP**)	Outlines the environmental requirements for operational activities associated with the expanded future outer harbour operations (to be completed)

Figure 2: Structure of Management Plans Compared to CU Project Activities



1.2 PURPOSE AND OBJECTIVES

The purpose of the MEMP is to manage risk and reduce the potential for negative impacts on MNES associated with the CU Project's activities in the marine environment. This will be achieved through the identification of key risks and impacts associated with the project activities and the establishment of appropriate and preferred environmental management and controls to address these risks.

It is to be noted that as per Condition 13 of EPBC 2011/5979, the MEMP is being submitted in stages for the PEP. This MEMP applies to the CU Project only, as part of Stage 1 of the broader PEP.

The key environmental values likely to be affected by the construction activities associated with the CU Project were identified in the PEP Environmental Impact Statement (EIS) and re-assessed in the PEP Additional Information to the Environmental Impact Statement (AEIS). For each key value identified, the environmental management controls to address potential risks and impacts have been provided in this MEMP.

This MEMP has been developed from, and is consistent with, the description and assessment contained within the PEP EIS and AEIS, and sets out the framework for management, mitigation and monitoring of relevant impacts associated with construction activities. It has been developed to include measures that the Port believes are necessary for protection of MNES in the marine environment and to incorporate additional actions/controls as required by approvals/permits/licences that relate to the CU Project.

This MEMP addresses the marine environmental aspects associated with the CU Project only, including:

- avoiding or minimising impacts to MNES from construction activities in the marine environment;
- avoiding or minimising pollution of the marine environment;
- managing risks associated with extreme weather events; and
- avoiding vessel accidents and oil spills from vessels associated with the action.

The principal objectives of this MEMP are to:

- Outline and provide a description of construction, reclamation and dredging activities, methodologies and timing, as covered under this MEMP;
- Identify MNES present in Cleveland Bay and specifically the area of the proposed action;
- Identify potential and actual environmental impacts associated with the proposed action;
- Describe the Port's commitments regarding environmental performance and the reduction of adverse impacts on MNES;
- Specify the actions that will be taken to implement the commitments (such as monitoring);
- Provide an action plan to enable delivery of the environmental commitments so that these are achieved and implemented; and
- Identify corrective actions to rectify any deviation from performance standards.

1.3 LEGISLATIVE REQUIREMENTS

Environmental assessment for the proposed PEP was undertaken in accordance with the requirements of the Queensland *State Development and Public Works Organisation Act 1971* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as it was considered likely to have impacts on the following MNES:

- World Heritage properties (EPBC Act sections 12 and 15A);
- National Heritage places (EPBC Act sections 15B and 15C);
- Wetlands of international importance (EPBC Act sections 16 and 17B);
- Listed threatened species and communities (EPBC Act sections 18 and 18A);
- Listed migratory species (EPBC Act sections 20 and 20A);
- Commonwealth marine areas (EPBC Act sections 23 and 24A); and
- Great Barrier Reef Marine Park (EPBC Act sections 24B and 24C).

Descriptions of each MNES and a summary of previous survey results for threatened and migratory marine fauna species and their habitats are provided in the EIS / AEIS.

This MEMP has been developed cognisant of legislative requirements set out in Commonwealth and State Government Acts and Regulations, including Acts implementing relevant international conventions where relevant. Port Notices and the Port Land Use Plan have also been taken into account. An overview of the relevant legislation is provided in Appendix A.

1.4 APPROVALS

The following approvals have been obtained for PEP and the CU Project.

Commonwealth Approvals

- EPBC Approval No. 2011/5979 issued 5 February 2018.

Appendix B lists the conditions from this approval relevant to this MEMP.

State Approvals

- Coordinator-General's Evaluation Report on the Environmental Impact Statement for the Townsville Port Expansion Project issued September 2017 (and all associated operational development permits); and
- Development Permit DA0190 POTL/CU / 1905-11091 SRA for Operational Work for Tidal Works (Townsville Port Expansion Project Rock Wall and Reclamation Works), issued June 2019.
- Development Permit DA0197 POTL/CU / 03-21840 SRA for Operational Work for Tidal Works for Temporary Unloading Facility, issued May 2021
- Development Permit 2103-21834 SDA for Operational Work for Tidal Works for Diagonal Breakwater, issued June 2021
- Development Permit 2103-21775 SDA for MCU for ERA 16 and Operational Works – Tidal Works within a Coastal Management District (for the purpose of capital dredging) and Marine plant disturbance, issued June 2021
- Environmental Authority (EA) SDA EA0002890 for capital dredging and placement activities, issued June 2021.
- Development Permit 2306-35238SRA/DA0208 for Tidal Works for Partial Demolition of Eastern Breakwater, issued August 2023.
- Development Approval – 2308-36219 SDA Operational Works – Tidal Works for dredging of Eastern Entrance widening issued October 2023).

No specific requirement relevant to the establishment of MEMP is required under the State approvals. As noted previously, a number of the actions and controls directed under the conditions of the state approvals will be contained in other management plans and will be implemented via those plans. However, this MEMP demonstrates how the Port will meet the general environmental duty under stated legislation.

1.5 REVISIONS

The first version (R0) of this MEMP was approved on 26 February 2020 to provide management of the construction of the rockwall to create the reclamation area. This MEMP (R0) was prepared to cover the rockwall only as at the time the CU project commenced, capital dredging was more than 12 months from commencing and the final arrangements for dredging had not been resolved. A minor amendment was made to the plan in November 2020 (R1).

The third version (R2) was amended on 29 June 2021 and incorporated a revised Appendix J – Environmental Procedure for Pile Driving. This Appendix was revised to incorporate established Exclusion and Observation Zones for pile driving activities associated with the offloading facility.

The fourth version(R3) was amended in September 2021 to incorporate updates to include all marine based works associated with the CU Project – including capital dredging, construction works associated with the temporary offloading facility, repositioning of channel navigational aids, as well as the works associated with the construction of the diagonal breakwater / western breakwater realignment.

The following two amendments, R4 (November 2021) and R5 (May 2022), incorporate minor amendments to update references to the Environmental Procedure for Pile Driving where revised/amended marine megafauna exclusion zones have been incorporated. These amendments also incorporate minor administrative updates that update the current project status.

Version R6 (February 2023) incorporated updates associated with tailwater management and discharge in line with how this is implemented. These changes did not change the overall management and approach for tailwater, but provided more detail around the operational controls and tailwater discharge monitoring program, now these have been finalised. This amendment also incorporates minor administrative updates that update the current project status.

Version R7 incorporated the works for the realignment of the Inner Harbour entrance widening Eastern side (Eastern breakwater partial demolition) and removal of the works on the western side (Diagonal Breakwater). Primarily the amendment was to update the project description only, as the environmental risk and management controls apply equally between the Diagonal Breakwater works and the Eastern Breakwater works. It should be noted that this shift included a reduction in the amount of dredging and rockwall demolition and construction works required – as such the risk was lower with the change in approach. Other minor amendments were also made through this amendment, primarily updates to program and revisions to align with activities undertaken.

Version R8 – this document, incorporate minor amendments to update references to the Invasive Marine Pest Monitoring Plan (Appendix H) and the Environmental Procedure for Pile Driving (Appendix I) as both of these sub-plans have been updated.

2 PROJECT DESCRIPTION

2.1 KEY ELEMENTS

The CU Project construction activities in the marine environment primarily involves:

- Creation of a 62-hectare reclamation area via the construction of rockwalls forming a receival pond for beneficial re-use of all capital dredge material from the channel widening works;
- Capital dredging works of approximately 3.9 million cubic metres from the channels using a mechanical dredge, involving:
    - On its western side to widen the Platypus Channel from 92 metres width to 180 metres for the main section of the channel and 248 meters at the harbour entrance tapering to 135 metres (at the seaward end);
    - On its eastern side to widen the Sea Channel from 92 metres to 120 metres along its length;
- Installation and operation of a temporary offloading facility to allow transfer of dredged material from the dredge barges to the reclamation area;
- Reclamation activities, including the placement of dredged material within the reclamation area and discharge of tailwater into Cleveland Bay;
- Realignment of the Inner Harbour Entrance, including realignment of an existing breakwater, to allow for widening of the Platypus Channel at the harbour entrance; and
- Installation of navigation aids in alignment with the new channel configuration.

The construction, reclamation and dredging will occur inside the existing port limits, the designated water areas in which navigation falls under the control of the Regional Harbour Master (RHM). The reclamation area forms part of Lot 794 on SP308904 adjacent to the northern extent of the East Port area (Lot 791 on EP2348, which is Strategic Port Land), while the temporary offloading facility and activities will occur adjacent to Lot 794.

The layout of the reclamation area, including the boundaries of Lot 794, is shown in Figure 3. This area and the channel widening footprint are also shown in Figure 4. Layout of the temporary offloading facility (shown in Figure 5) and the Eastern Harbour Entrance Widening works (shown in Figure 6) identify location and works involved in these aspects of the project.

The capital dredge campaign will last approximately 2 – 2.5 years and dredge approximately 3.9 million cubic metres of material from the channels using a mechanical backhoe dredge. Dredging is intended to be undertaken by mechanical BHD. All the capital dredge material will be placed within the new reclamation area as part of land reclamation activities. Dewatering and ground improvement of emplaced sediments within this area will be undertaken.

Whilst the majority of dredging will occur in the Platypus Channel, the initial phase of dredging undertaken was to create the approach channel to the temporary unloading facility to allow access for the barges to unload dredge material. Prior to completion of the Temporary Unloading Facility early dredging works used the existing offloading facilities at other locations within the port. With offloading occurring via the Temporary Unloading Facility once this was constructed.

Construction of the unloading facility required piling works that were undertaken as per POT2157 Environmental Procedure for Pile Driving (Appendix I) which reflects Conditions 15 to 22 of EPBC 2011/5979.

Repositioning of the navigation aids in alignment with the new channels will be completed in conjunction with Maritime Safety Queensland. These works would also be completed under EPBC 2011/5979, including adoption of the Environmental Procedure for Pile Driving (Appendix I) in this document.

Figure 3: Lot Plan for CU Project Rockwall Construction & Reclamation Activities

Figure 4: Site Plan for CU Project Capital Dredging Activities –Platypus & Sea Channels

Figure 5: Site Plan for Temporary Offloading Facility (adjacent to new rockwall)

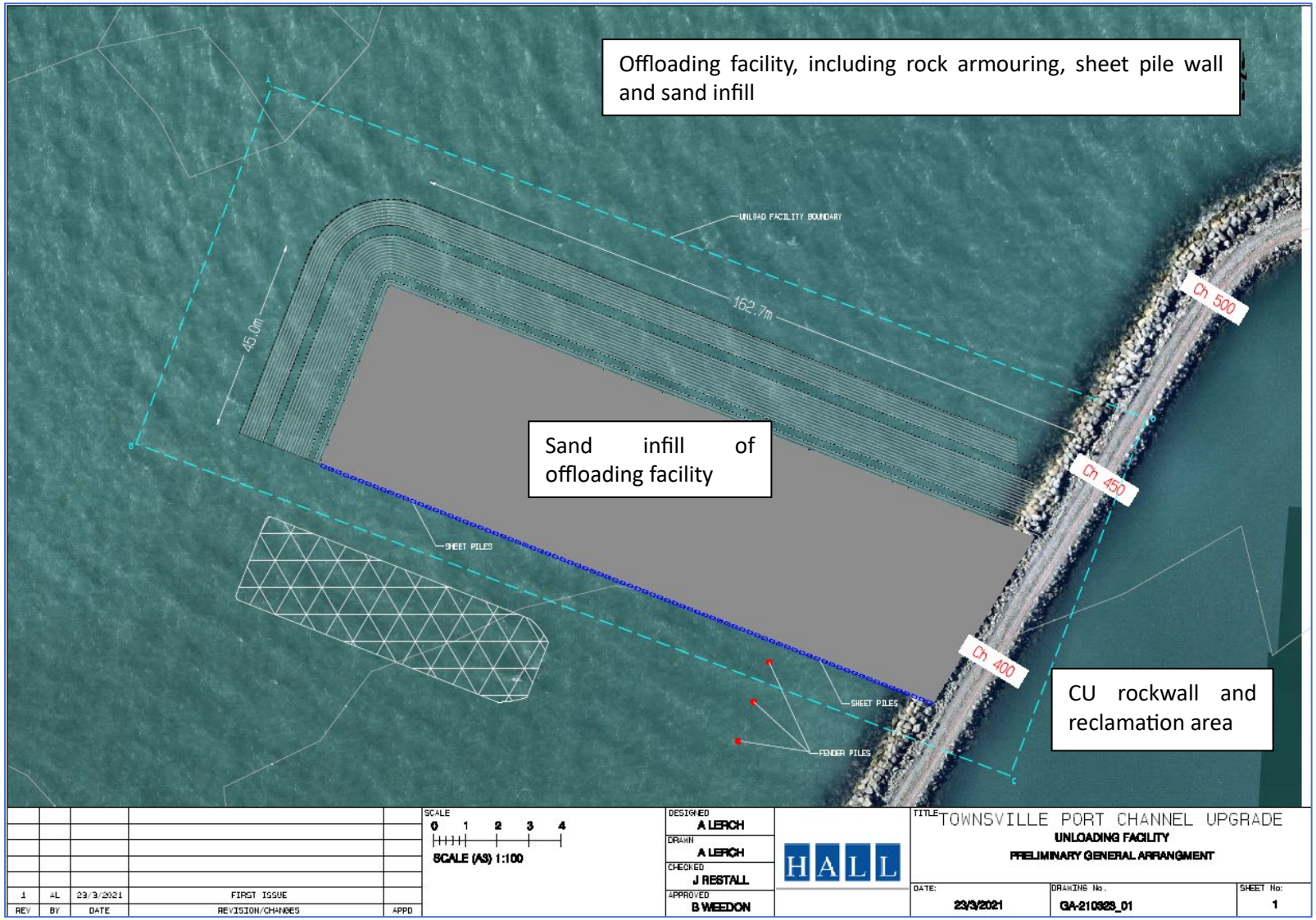
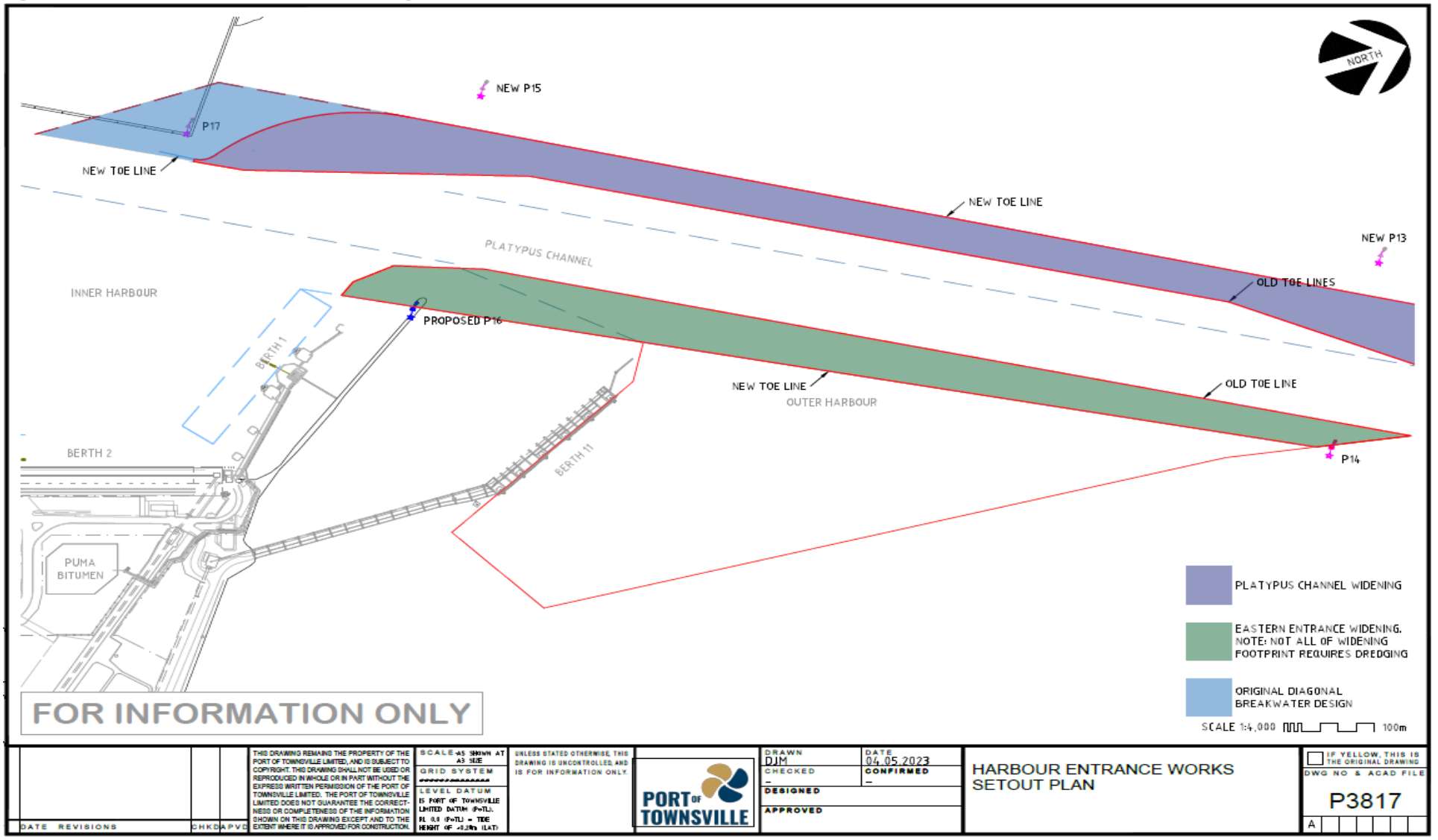
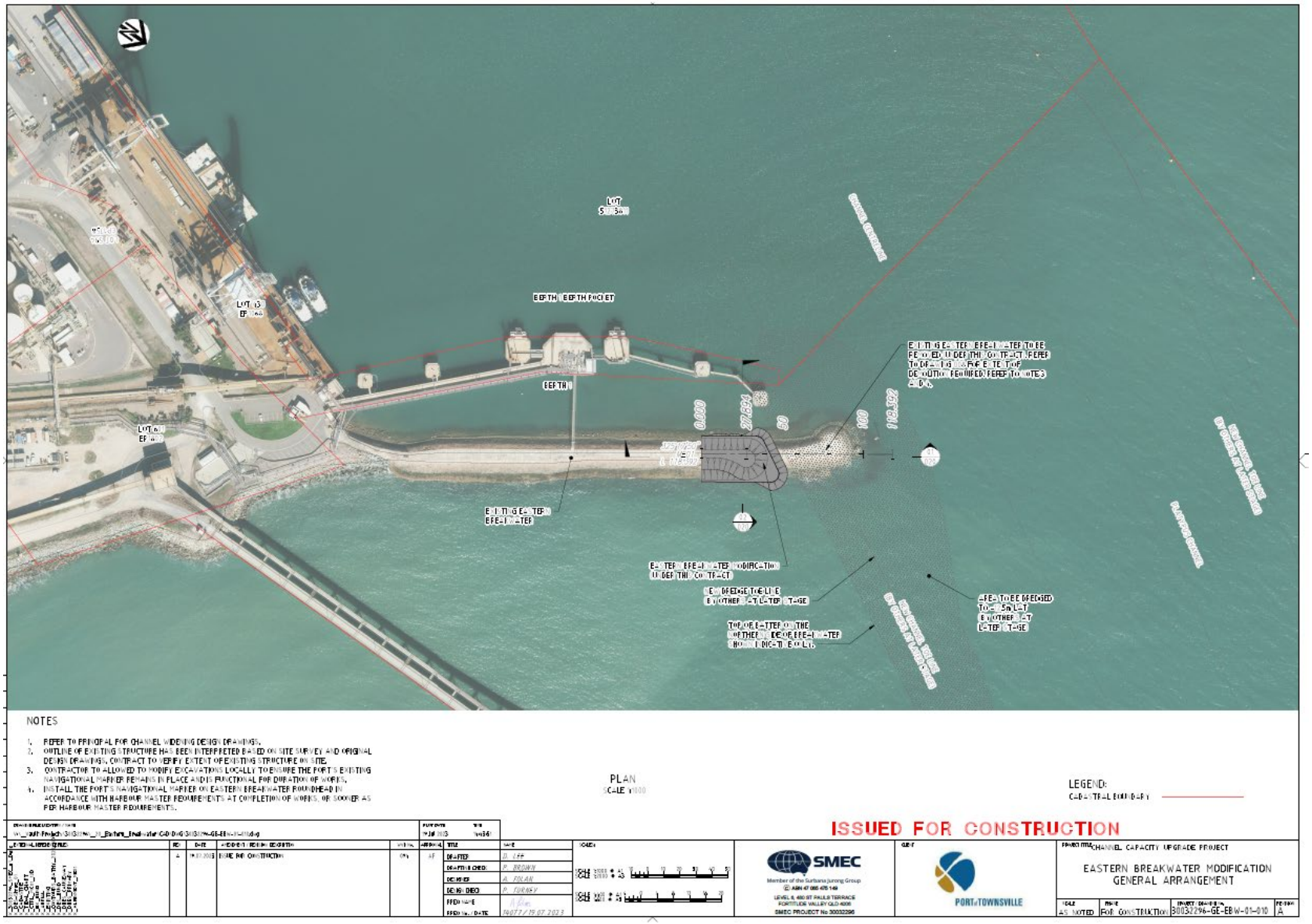


Figure 6: Eastern Harbour Entrance widening





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Only electronic copy on server is controlled. To ensure paper copy is current, check revision number against entry in Qudos - Master Document List			Revision	8
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2.2 MARINE ACTIVITIES

This section provides a high-level overview of the marine activities associated with the CU Project. This is not intended to be a detailed description of these activities – the CEMP and the DMP for the project will provide detailed methodology information on the construction and reclamation and dredging works, respectively.

2.2.1 CONSTRUCTION ACTIVITIES

Rockwall and Reclamation Area

The CU Project involved the construction of approximately 2.2km of external rockwall on the North Eastern side of the existing port area. This construction commenced in March 2020 and was completed in June 2021, prior to commencement of capital dredging.

Rockwall construction occurred from the land side, with articulated vehicles moving material into the leading area of the wall construction where bulldozers and excavators placed the rockwall material into the sea. Construction of the rockwall featured the following:

- Construction of the new rockwall commenced perpendicular to the existing reclamation wall with the interface being prepared by removing the existing primary armour only and retaining the existing core and secondary armour.
- The eastern most wall commenced first (next to Ross River), as this wall generally fronts the prevailing swells and winds and generated a leeward shelter as it progressed. In parallel, the construction teams commenced the western wall, with wall construction meeting along the Northern wall.
- Heavy duty geotextile was laid fully along the inside perimeter of the whole new bund wall, and was also placed at the interface and wrapped on the inside between the new and existing walls to ensure continuity in the sedimentation control system for the new reclamation.
- Completion of rockwall, including the installation of geotextile and primary outside armour, was completed by June 2021. Completion of the wall was sequenced in with commencement of the capital dredge campaign – no capital dredging occurred until the rockwall was finalised.
- On-site rockwall construction activities generally occurred during daylight hours Monday to Sunday, noting minor works was required outside of these times for short periods.

The rockwall construction design was subject to multiple design criteria assessments, covering a range of factors including design life, geotechnical and rock stability and settlement design. The outcomes of these assessments then compared to relevant Australian Standards or design guidelines, to confirm the basis for design. These requirements and standards are detailed in the Reclamation Integrity Plan, a sub-plan of the CU Project CEMP and the final constructed rockwall was certified by a Registered Professional Engineer of Queensland (RPEQ).

Once dredge materials are brought to the reclamation area by barge, civil equipment unloads the capital dredge material and places it in the reclamation area. Dewatering and ground improvement of emplaced sediments within the reclamation area will be undertaken and covered as part of the tailwater management plan as included as part of the CEMP.

Temporary Unloading Facility

The CU Project required the development of a temporary facility for the unloading of capital dredged material from the dredge barges to the reclamation area. The facility consists of an unloading platform constructed perpendicular to the CU reclamation area and an access channel and swing basin to allow for all-tide safe access by tugs and barges. The facility incorporates a rock breakwater on the ocean side (including geofabric

layer), sheet piling to create the unloading area and infill of the facility with sand and gravel to create a working platform. These facilities are temporary and will be removed.

The unloading facility was constructed from the land side using articulated vehicles and excavators for the breakwater, with marine-based plant to install piling. Construction used stockpiled rock and sand from the reclamation construction works/Port lands, with new material imported to site from local quarries as required.

Sheetpiles and cylinder piles (for tieback and mooring arrangements) were installed in accordance with the Environmental Procedure for Pile Driving (Appendix I) Rev 2.

The design of the facility and breakwater was subject to design criteria assessments, based primarily on weather and tidal conditions and geotechnical and rock stability and in accordance with relevant Australian Standards or design guidelines. Note that these works are separate to the rockwall construction, are temporary in nature and therefore are not addressed in the Reclamation Integrity Plan.

For the dredging undertaken before the completion of the unloading facility (e.g. for the facility access), dredge material was unloaded at existing facilities within the port, which is used for similar barge loading and unloading. From these facilities, the dredged material was transported to the new reclamation area for placement by articulated dump trucks. Additional management controls were implemented for this dredging and handling of dredge material to minimise loss of material to waters at the unloading location, and to address spillage from the dump trucks during transit to the placement area.

Eastern Harbour Entrance Widening

The Eastern Harbour Entrance Widening works under the CU project involves dredging to widen the eastern side of the entrance to the Inner Harbour, (See Figure 6). To accommodate this widening, these works involve:

- Shortening of the Eastern Breakwater by approximately 70m, with a round head structure to be constructed at the terminal end of the breakwater to ensure integrity of the wall; and
- Dredging to move the eastern toe of the Platypus Channel a distance of approximately 60m to the East, from Berth 11 to the Berth 1 berth pocket; and
- Relocation of lateral beacon P16.

The Eastern Harbour Entrance Widening works will be completed using land based plant for the rockwall works and the BHD Woomera for the dredging component. Re-use of the rock removed from the breakwater will be prioritised where possible, or stockpiled on Port land for future use on Port infrastructure. All land based works will be completed in accordance with this CEMP and relevant components of the MEMP.

All dredging will be completed using the same dredge (Woomera) and vessel fleet used for the CU Project with application of the same management controls as detailed in the DMP and MEMP.

Diagonal Breakwater Construction

Earlier Management plans outlined details for the diagonal breakwater works. These works are no longer intended to be delivered under the CU Project with the Eastern Harbour Entrance Widening works being undertaken as detailed above.

2.2.2 DREDGING ACTIVITIES

Capital Dredging

The CU Project involves the capital dredging of approximately 3.9M m^3 to widen the Platypus Channel and Sea Channel and incorporates dredging required for the construction of the Eastern Harbour Entrance Widening and temporary offloading facility. This dredging is being undertaken by 'backacter' dredge, a form of mechanical backhoe dredge.

The backacter dredge consists of a pontoon-mounted excavator and operates in specific 'cuts' based on design depth and excavator reach. The backacter is moved to a cut and then secured in place by pontoon spuds, the spuds penetrate up to 0.3 m into the sea bottom. All material is excavated by the excavator and placed into flat-top barges moored adjacent to the backacter. Once a cut is complete, the backacter spuds are then lifted and the dredge moves to the next cut location.

The works are supported by 2-3 flat-top barges and tugboats for movement of dredged material. Once barges are full, they move to the offloading facility where they are unloaded using excavators on the offloading facility. To ensure uninterrupted dredging and loading, the next barge moves into place beside the dredge once the first has left. The number of barges and supporting tugs to be used will vary during the CU Project due to changing production rates, offloading rates, sailing distance, sea state and other factors. The exact number will be based on optimising dredging time and minimising the potential for delays.

The same backacter dredge was used for the dredging of the offloading facility access and basin. This material was unloaded at an existing facility within the port, currently used for similar barge loading and unloading. All dredge material was placed in the newly constructed reclamation area.

2.2.3 RECLAMATION ACTIVITIES

Placement and Management of Capital Dredged Material

All capital dredged material is being placed in the reclamation area. The general sequence of placement consists of the following:

- Placement of dredged material in barges moored alongside backacter dredge;
- Movement of barges to temporary offloading facility;
- Removal of material from barges to articulated dump trucks by excavator at the offloading facility;
- Movement of dump trucks from unloading facility to placement locations at the reclamation;
- Placement of material; and
- Movement of material by bulldozer.

Geotechnically competent material (e.g. stiff clays) was preferentially placed against the rockwall. Material containing potential acid sulfate soils (PASS) will be placed/treated as required by the ASS Management Plan (Appendix E of CEMP). All other material will be placed as part of a general sequence of filling. The exact placement sequence will be determined on a day-by-day basis based on the nature of the dredged material and the state of the reclamation.

During reclamation, it will be necessary to discharge tailwater to ensure appropriate freeboard is maintained in the reclamation. Tailwater discharges will be through tailwater pipes, located at the north eastern end of the reclamation. Discharges will be managed in accordance with performance limits, with releases only occurring where tailwater meets the relevant criteria.

Once the reclamation is at final height adjacent to the new rockwall, crest protection for the constructed rockwalls will be undertaken. This will involve the placement of a geotextile layer, ballast rock and armour stone on the reclamation side of the wall. As part of these works, some of the dredged material placed along the wall will be excavated to allow access to install the geotextile layer. These works are to be undertaken by land-based excavator.

Marine Plant

The capital dredging works will be undertaken by the *Woomera* backacter dredge, operated by Hall Contracting. The works will be supported by 2-3 flat-top barges and tugboats for movement of dredged material. Additionally, a series of auxiliary vessels will be used throughout construction and dredging works, including tugs, crew multicat and survey vessels. Piling works for the offloading facility was undertaken from small piling barges and associated tugs.

2.2.4 NAVIGATIONAL AIDS RE-POSITIONING

As a consequence of the capital dredging to widen both channels, the lateral beacons and lead lights that support ship movement through the channels need to be re-positioned to support safe navigation. Approximately half of the channel lateral beacons will need to be removed and reinstalled outside of the toe of the widened channel. Some rationalisation of the number of beacons requiring re-positioning has occurred. Lead lights at the land end and sea end of the channels will also need to be re-positioned to identify the centreline of the new channels. The beacons are piled into the seabed, and therefore the old beacons will require vibration to remove and piling to re-position them. The beacons are owned by Maritime Safety Queensland (MSQ), the Port will work in collaboration with MSQ to facilitate this work. The re-positioning works require piling, to be undertaken in accordance with the Environmental Procedure for Pile Driving (Appendix I – Rev 3).

3 ENVIRONMENTAL MANAGEMENT SYSTEM

The Port Environmental Management System (EMS) complies with all applicable requirements contained in ISO 14001:2015 and encompasses environmental operations conducted at all Port facilities. Port Management are committed to the development and implementation of the EMS and to the facilitation of the continual improvement of environmental performance by:

- Integrating environmental considerations and risk-based thinking into decision making and work practices;
- Providing an effective mix of resources to achieve sustainable development and outcomes;
- Utilising systems which act to minimise the risk of environmental impacts through the identification reporting, assessment, monitoring and control of environmental risks; and
- Maintaining a high level of environmental awareness throughout the Corporation and the wider port Community.

This MEMP includes the work elements necessary to satisfy environmental requirements in the construction phase of the CU Project and generally complies with applicable elements of the Port's EMS. Executive management responsibilities, incident management, emergency response, non-conformances, environmental training, monitoring, reporting, auditing and complaint handling for the CU Project will be controlled in accordance with the Port's EMS and other integrated management documents. CU Project environmental records will be controlled in accordance with the Port's integrated management system and will be:

- Kept as objective evidence of compliance with environmental requirements; and
- Maintained according to the Port's Recordkeeping Procedure.

Continuous improvement is a mandatory requirement of the Port's EMS. As part of the continuous improvement, this MEMP will be reviewed at least annually by the CU Environment Manager and/or Environment Advisor, and amended where necessary to ensure the Plan remains relevant and achieves the required objectives, inclusive of identification and implementation of any new or changing environmental risks and mitigation actions. Future amendments will take into account the scope and purpose of this document and the conditions of the existing approvals.

3.1 ENVIRONMENTAL POLICY

The Port's Environmental Policy (Figure 7) identifies the Port's key environmental objectives and sets the direction of the EMS and environmental management within the organisation, including at the construction site. The Environmental Policy is:

- Displayed at prominent locations in the workplace of Port site personnel;
- Communicated to all Port site personnel during induction and training; and
- Reviewed and updated regularly.

All Port site personnel, contractors and visitors must comply with the spirit and intent of the policy and with the requirements stated below from the *Environmental Protection Act 1994*.

Figure 7: Environmental Policy

PORT OF TOWNSVILLE

ENVIRONMENTAL POLICY

Port of Townsville Limited operates the Ports of Townsville and Lucinda in North Queensland, which sit within the Great Barrier Reef World Heritage Area. Our vision is to be Australia's Port for the future, creating prosperity for our communities and value for our customers and shareholders, through world-leading sustainable operations.

We will do this by:

- Building meaningful and lasting relationships with our stakeholders
- Driving change and innovation to continuously improve
- Respecting each other and the community we live in
- Operating with the highest standards of integrity, transparency and fairness

Adopting an integrated and systematic approach we are committed to:

- Integrating environmental considerations and life cycle thinking into decision making and work practices related to the Port's core functions.
- Maintaining a high level of environmental awareness throughout the Port and the wider port community.
- Requiring and encouraging employees to work in an environmentally responsible manner.
- Implementing systems which act to minimise the risk of environmental harm through the identification, reporting, assessment, monitoring and control of environmental risks.
- Maintain a framework for setting and reviewing environmental objectives and targets and measuring the Port's performance.
- Maintain systems for assessing the environmental impacts associated with the Port's activities.
- Complying with all relevant legislation, codes of practice and standards.
- Conducting core functions in a manner that will minimise waste, prevent pollution, promote efficient use of resources through life cycle thinking, reduce environmental impacts, and continually improve environmental and management system performance.
- Providing adequate resources and training to facilitate the fulfilment of the Port's environmental responsibilities and ecosystem protection.

The Port's Board, Executive and management are responsible for providing the leadership to support the development and implementation of this Policy and for ensuring it is effectively applied.

This policy will be regularly reviewed following legislative or organisational changes, or as a minimum, every three years.

RANEE CROSBY
CHIEF EXECUTIVE OFFICER
12 June 2023

	Info Classification	Official	Doc Type	POL - Policy	Document No.	POT-2376
	Documents are considered uncontrolled once removed from their source location. Refer to the CDMS published library for the current version.				Revision	1
					Publish Date	12/06/2023
					Page	1 of 1

4 GOVERNANCE & MANAGEMENT REVIEW

4.1 DEVELOPMENT OF THE MEMP

The MEMP has been developed in consultation with key stakeholders including:

- Construction teams and works designers.
- Representatives of the Traditional Owners, the Gurambilbarra Wulgurukaba people who are identified as the Native Title claimants of the land/sea covering the Project area;
- The Port's Community Liaison Group (CLG), which comprises a number of community representatives;
- Environmental, engineering and modelling consultants (where applicable);
- The CU Project ITAC, which comprises scientific and technical experts engaged to provide oversight on the scientific and technical aspects of the project (see Section 4.6); and
- The Commonwealth Department of Climate Change, Energy, the Environment and Water, (DCCEEW).

Traditional Owners were consulted in accordance with Condition 25 of EPBC Approval No. 2011/5979 during the development. This consultation involved the following:

- An initial presentation to Traditional Owners on the CU Project on 20 February 2018;
- The original MEMP was presented to a meeting of the nominated Traditional Owners representatives on 30 May 2019. Comments raised were noted during the meeting and addressed in the MEMP where required. A copy of all comments made by the Traditional Owners Working Group was provided to the Minister with the MEMP in early 2020;
- Further consultation with Traditional Owners in regards to the broader scope including the Dredging activity occurred on 9 December 2020 and 31 March 2021.

4.2 INDEPENDENT PEER REVIEW OF THE MEMP

In accordance with Condition 31 of EPBC Approval No. 2011/5979, the original MEMP and associated monitoring plans were independently peer reviewed by GHD Pty Ltd (who have not been directly involved with either the rockwall design or construction planning) on 23 July 2019 before submission to the Minister for approval. This review included an analysis of the effectiveness of the outcomes, targets or management measures identified in the MEMP (Condition 32). A copy of all advice and recommendations made by the independent peer reviewer, including feedback on the Port changes, was provided to the Minister with the MEMP at time of submission of Revision R0 (per Condition 33). The MEMP was also provided to ITAC on 15 January 2020 for review.

Relevant monitoring plans (i.e. Megafauna Monitoring Plan, Inshore Dolphin Monitoring Plan) associated with the MEMP were reviewed by the CU Project ITAC in 2019 and approved by DCCEEW on 26 February 2020; with no further peer review conducted given those plans had not changed.

Revision R3 of the MEMP was peer reviewed by Dr Janet Lanyon from the School of Biological Sciences at the University of Queensland. All advice and recommendations made by the independent peer reviewer, including feedback on the changes made by the Port, was provided to the Minister with the MEMP at time of submission (per Condition 33). The CU Project ITAC was also supplied with a copy of the MEMP on 15 April 2021 for comment. Revisions that included minor administrative updates only are not peer reviewed, however appendices may be subject to peer review (e.g. Appendix I in this version has been peer reviewed).

4.3 FINALISATION & APPROVAL OF MEMP

The revised MEMP (R3) incorporating dredging and reclamation activities was submitted on 17/09/2021 for the Commonwealth Minister for the Environment's approval to meet the submission timing requirements of EPBC Approval No. 2011/5979 Condition 12. This was formally approved on 25 October 2021.

Further minor amendments to the MEMP have been made under condition 38 and submitted to the Department. The current version of the MEMP (R6) included minor updates and was submitted to the Department under condition 38.

This version of the MEMP is submitted to the Department under condition 38.

4.4 IMPLEMENTATION

A copy of the approved MEMP will be kept on-site and implemented for the duration of the works and be easily accessible. This MEMP will not be implemented or amended in any way that contravenes any conditions of any development approval / permit or environmental authority. The Principal's Site Representative must ensure that all measures necessary to ensure compliance with any conditions of any development approval / EPBC Act Approval / permit or environmental authority are taken / installed / maintained and operated.

The MEMP will include a number of activities and strategies incorporated in the CEMP and the DMP and the MEMP will be revised in line with any amendments to relevant aspects of these Management Plans.

4.5 ORGANISATIONAL STRUCTURE & RESPONSIBILITIES

A clear organisational structure for the CU Project including key responsibilities and reporting lines is presented in Figure 8. Authorities and responsibilities for the environmental management of the relevant construction activities are defined and communicated in Position Descriptions and CU Project documentation. The key responsibilities and authorities are included below. Appendix C lists contact details relevant for the Project.

Project Management

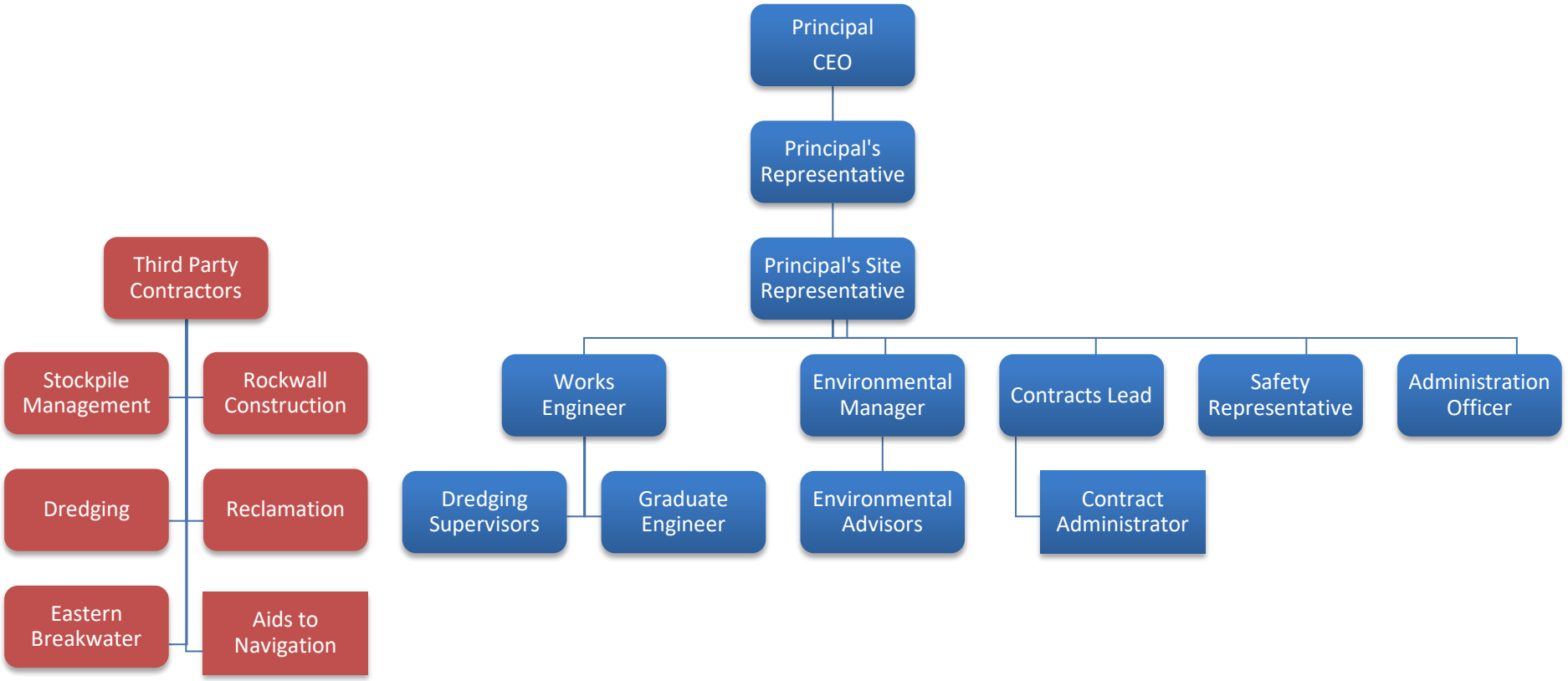
The Principal's Representative has key responsibilities to:

- Represent the Port's interests and requirements in the CU Project;
- Oversee the CU Project and its execution; and
- Provide final approval of all project documentation, including this MEMP.

The Principal's Site Representative's key responsibilities are to:

- Manage the CU Project and its execution, including providing adequate resources for environmental management requirements;
- Ensure that project responsibilities and authorities are defined and communicated;
- Ensure all actions and responsibilities are completed as per Project documentation; and
- Report to senior management on the performance of the project.
- Ensure that all CU Project personnel operate in accordance with the Safety Management Plan, this CEMP, statutory approvals and legislative requirements, Australian Standards and any relevant Code of Practice and/or Industry Standard; and
- Ensure all CU Project personnel are appropriately qualified and trained.

Figure 8: CU Project Organisational Chart



The Environment Manager CU's key responsibilities are to:

- Ensure that all relevant licenses / permits / approvals are in place prior to any works being undertaken;
- Ensure that all CU Project personnel, including contractors, are familiar with the environmental management arrangements, this MEMP, statutory approvals and legislative requirements, Australian Standards and any relevant Code of Practice and/or Industry Standard and are aware of all requirements and their responsibilities;
- Monitor and review technical, environmental and quality performance of the project including the implementation of this MEMP (and other management plans), refining procedures as necessary to ensure relevant management measures are implemented effectively and adaptive management / corrective actions are taken in a timely manner;
- Facilitate regular environmental inspections by the Environmental Advisors CU and on-site monitoring as required under management and monitoring plans;
- Take action to resolve environmental non-conformances and incidents;
- Lead engagement and collaboration with CU Environmental Advisors (two-way information flow etc), followed by review, collation and integration of recommendations from Environmental Advisors (and /or ITAC) for action and reporting;
- Report to the Principal's Site Representative on the performance of the project and technical, environmental and quality non-conformances etc; and
- Liaise with regulators including reporting environmental incidents and complaints to the relevant regulator(s).

The Environmental Advisor/s CU's key responsibilities are to:

- Support the CU Project Team in day-to-day management of environmental performance;
- Review compliance with all environmental legislative requirements, approvals, permits and management plans and liaise with relevant regulators;
- Ensure that all CU Project personnel receive appropriate environmental induction and training and are aware of their environmental responsibilities;
- Ensure environmental monitoring is completed in accordance with approved management and monitoring plans;
- Monitor, investigate and report on environmental performance, environmental incidents, environmental complaints and environmental non-conformances and ensure corrective actions are implemented within reasonable timeframes as required by the CU Project's Environmental Management Plans (including this MEMP);
- Conduct environmental inspections and audits and report to the Manager Environment CU on the environmental performance and improvement opportunities;
- Review contractor environmental management plans;
- Verify that environmental non-conformances, incidents and complaints are recorded, and written reports provided and liaise with the Principal's Site Representative and Manager Environment CU to confirm the nature and adequacy of any corrective actions required; and
- Ensure that environmental records and files are collected and maintained.

The Works Engineer CU's key responsibilities are to:

- Oversee day-to-day construction, reclamation and dredging activities under the direction of the Principal's Site Representative, including providing sufficient resources to ensure the MEMP (and other CU Project Environmental Management Plans) controls are implemented effectively;

- Ensure all CU Project personnel under their direction are appropriately qualified and trained;
- Report all environmental non-conformances and incidents to the Manager Environment CU and/or Environmental Advisors CU and facilitate any investigations; and
- Coordinate the response to environmental non-conformances, incidents and complaints through implementation of corrective actions, where necessary.

Project Contractors

All contractors will report to the CU Project management and have management systems in place to meet or exceed the Port's requirements.

The key environmental responsibilities of all CU Project Contractors, including sub-contractors, are to:

- Manage day-to-day the construction, dredging and reclamation activities, including providing sufficient resources to ensure the MEMP controls are implemented effectively;
- Ensure that all personnel operate in accordance with the Safety Management Plan, this MEMP (including relevant appendices), statutory approvals and legislative requirements, Australian Standards and any relevant Code of Practice and/or Industry Standard;
- Ensure all staff are appropriately inducted and trained;
- Comply with the Port environmental policy;
- Maintain appropriate qualifications;
- Seek necessary guidance and advice regarding environmental requirements;
- Ensure that all equipment is maintained and "fit for purpose" of the required task;
- Implement Contractor management plans that include the undertaking of site and / or operational monitoring (where required) and conducting environmental inspections and audits of the site and relevant works;
- Facilitate regular environmental inspections by the Environmental Advisors CU and Port on-site monitoring as required under management and monitoring plans;
- Report environmental non-conformances, incidents, complaints and any corrective actions taken to the Construction Team CU and/or Environment Team CU;
- Coordinate the response to environmental non-conformances, incidents and complaints through implementation of corrective actions, where necessary; and
- Be trained and competent in emergency and incident response processes for likely environmental emergencies and incidents.

4.6 INDEPENDENT TECHNICAL ADVISORY COMMITTEE (ITAC)

Under the Queensland Coordinator General's Evaluation Report (CGER) stated conditions, an Independent Technical Advisory Committee (ITAC) is required to be established to form part of the governance structure of the CU's Capital dredge campaign at the Port of Townsville. As per Table 2, the ITAC's role is to provide:

- independent, expert-based input into the scientific basis underlying the REMP and the contingency measures in the DMP;
- to provide advice regarding the scopes of work for the ecological surveys and the development of water quality and ecological trigger levels with consideration of the current condition and tolerances of coral and seagrasses;

- to review and endorse the REMP, particularly the control and impact monitoring locations, the monitoring design and trigger levels for corrective actions; and the contingency measures in the DMP;
- to provide independent oversight of the implementation of the RMP; and
- to review the environmental performance of the CU Project's capital dredge campaign against trigger levels and to evaluate corrective actions implemented.

Table 2: ITAC Roles and Responsibilities

POSITION	RESPONSIBILITY
ITAC Chair	• Facilitate ITAC meetings • Review incoming correspondence • Provide correspondence on behalf of the ITAC • Present at community forums as required • On advice from the ITAC or in the event of a serious complaint, advising the Dredging Inference Assessment Team on mitigation actions, including weather dredging should cease.
Seagrass Specialist	• Provide expert technical input on Seagrass and expert input into ITAC feedback in accordance with the objectives of the ITAC • Involvement in DIAT meetings as required.
Coral Specialist	• Provide expert technical input on Corals and expert input into ITAC feedback in accordance with the objectives of the ITAC • Involvement in DIAT meetings as required.
Marine Megafauna Specialist	• Provide technical input on marine megafauna and expert input into ITAC feedback in accordance with the objectives of the ITAC • Involvement in DIAT meetings as required.
Marine Water Quality Specialist	• Provide technical input on marine water quality and expert input into ITAC feedback in accordance with the objectives of the ITAC • Involvement in DIAT meetings as required.
Dredging Specialist	• Provide input on water quality contingency measures and appropriate responses in case of trigger levels being reached and provide expert input into ITAC feedback in accordance with the objectives of the ITAC • Involvement in DIAT meetings as required.
Hydrodynamic specialist	• Provide technical input into hydrodynamic modelling and expert input into ITAC feedback in accordance with the objectives of the ITAC • Involvement in DIAT meetings as required.

4.7 PERSONNEL INDUCTION, TRAINING, AWARENESS & COMPETENCE

All personnel engage with the CU Project will have appropriate qualifications and experience to undertake their works. Additionally, all CU Project personnel including contractors must complete compulsory induction prior to commencing work at the site. This covers general environmental management requirements, site-specific and work-specific risks, and site-wide controls and mitigation measures. The environmental component of the induction will include, but not be limited to:

- Relevant legislation and approvals, General Environmental Duty and Duty to Notify, General Biosecurity Duty and Cultural Heritage Duty of Care responsibilities and the implications of failing to fulfil these duties;
- Key sensitive areas, Great Barrier Reef World Heritage Area and MNES;
- Environmental values and management requirements and responsibilities under the MEMP (and other environmental management plans);

- Implementation of mitigation measures and corrective actions and reporting of environmental incidents and complaints;
- Environmental emergency response procedures (i.e. spill kit locations) and training in the use of this equipment; and
- Staff code of conduct and behaviour.

An induction register will be maintained to record induction attendance for all staff, contractors and visitors. All project personnel attending the induction will be instructed that all external communication pertaining to the Project is to be conducted by the Contractor's Representative or the Principal's Site Representative for Dredging and Reclamation Works, communication by others is only on consultation with and authorisation by the Port of Townsville Chief Infrastructure Officer.

To assist with managing environmental risks associated with the works, understanding the required mitigation measures and corrective actions, certain roles require specific training. Training records will be maintained and kept on site for the duration of the CU project, up to and including the post works completion report.

All CU Project personnel will attend regular toolbox talks which will include raising environmental awareness and educating personnel on environmental issues related to all aspects of construction.

4.8 CONTINUOUS IMPROVEMENT

This MEMP will be subject to regular review.

It is a "living document" which requires review at least annually during the construction phase (in association with the Annual Compliance Reporting function). The MEMP review will be conducted by the CU Environment Manager and/or Environment Advisor. During delivery, review and amendment will also be completed as necessary to ensure the Plan remains relevant and achieves the required objectives, inclusive of identification and implementation of any new or changing environmental risks and mitigation actions. Recommendations on improvements or amendments will be reported as part of the annual reporting process.

Feedback mechanisms will be in place for the duration of the CU Project to enable this MEMP to be updated and responsive to learning from any incidents, complaints and ongoing monitoring results.

A key trigger for review of the MEMP and associated management actions will be as a result of the adaptive management arrangements associated with the key monitoring activities that will be implemented to support the project. As noted in all monitoring and sub-management plans, where the monitoring undertaken identifies the need for revised management actions, the MEMP will be revised to incorporate the adaptive management arrangements.

Other triggers for MEMP review may include:

- Changes to organisational structure, roles and responsibilities;
- Changes in environmental legislation and/or policies; and
- New technologies / innovation relevant to applied methods and mitigation measures that provide innovative means of executing activities in order to meet performance criteria;
- Complaints;
- failure to meet deliverables e.g., through equipment failure, technical difficulties, extreme weather events; or
- failure to meet Project performance criteria.

Changes to the MEMP may be developed and implemented in consultation with relevant regulators and other stakeholders over time. All changes are to ensure the approval conditions are met and be approved by the CU Project Manager, prior to implementation and provided to or approved by relevant regulatory agencies as per the project approvals.

If the revised MEMP meets Condition 38 of EPBC Approval No. 2011/5979, DCCEEW will be notified in writing and provided with an electronic copy of the revised plan. Otherwise, revised MEMP will be submitted to the Minister for approval.

4.9 ENVIRONMENTAL EMERGENCY CONTACTS AND PROCEDURES

Environmental incident and emergencies will be managed in accordance with the Project and Contractor Emergency Response Plans (including vessel SMS). The Port plan is part of the Port Emergency Response Strategy and will address a range of emergency situations and relevant procedures, including Cyclone preparedness and response.

Specific response activities are also identified in the relevant element with this MEMP, the CEMP and the DMP.

Key Project contacts are listed in Appendix C. Environmental emergencies will be reported to the relevant line manager in the first instance for initial response. The CU Environment Team (Environment Manager CU, Environmental Advisor CU) will be notified and provide technical advice and input on the incident and the response. As per all emergencies within the port, notification to the Port Tower/Duty Officer will be made.

The Principal's Representative will also be notified and provide a key role in notification and reporting to Port Executive and relevant regulators.

4.10 ENVIRONMENTAL INCIDENTS

All CU Project personnel and contractors will report all environmental incidents and near misses (i.e. events that occur that could have negatively affected the environment) to the CU Environment Team (Environment Manager CU, Environmental Advisors CU) (Key Project contacts are listed in Appendix C). Examples of environmental incidents/near misses include:

- Fuel/Chemical spills;
- Fire and/or explosions;
- Vessel incidents or interactions with marine megafauna;
- Minor sediment and erosion control failure; and
- Uncontrolled release of stormwater/tailwater from the reclamation area.

Near misses will be reported to the Port as these are pre-cursors to incidents and provide an avenue to proactively mitigate potential incidents before environmental harm is caused.

The Dredge and Reclamation contractor and the Eastern Harbour Entrance widening land based contactor are required to report all environmental incidents to the Port of Townsville as soon as practicable and no later than 12 hours after occurrence.

An Environmental Incident Investigation will be completed, where any impacts will be assessed and corrective actions will be implemented. An Environmental Incident Investigation Form (POT1979) may be used or format as per the relevant contractor's process. The Environmental Advisor CU is responsible for maintaining a

Register of Incidents; investigating incidents and near misses; maintaining records of incident and near miss investigations, including corrective actions undertaken and persons/regulators notified.

The Manager Environment CU will report significant environmental incidents to the appropriate regulator within statutory timeframes. Any marine megafauna interactions (marine animal strike, marine stranding or an injured, sick or dead turtle, dugong, dolphin or whale) will be reported to the Qld Department of Environment and Sciences (on 1300 130 372). The Manager Environment CU will also inform the ITAC of environment incidents as part of regular ITAC reporting activities. The Manager Environment CU will liaise with DES or GBRMPA immediately to identify rescue options in case of an injured animal, with all project staff (Port and Contractors) to assist in the capture of injured animals following advice from regulators.

Note that issue-specific corrective actions are also provided in Section 7 in relation to individual environmental management elements.

4.11 ENVIRONMENTAL INSPECTIONS, NON-CONFORMANCES & PREVENTATIVE/CORRECTIVE ACTIONS

Project worksite inspections will be carried out routinely by the Contractors, with verification checks undertaken by the port. These inspections will be documented, and deficiencies/non-conformances recorded. Non-conformances/deficiencies include:

- An incident or near miss with actual or potential environmental impact on MNES;
- Substantiated complaints regarding the project construction activities in the marine environment;
- Not meeting an objective or performance criteria in the MEMP, and
- Environmental inspections not undertaken within the nominated timeframe.

The Contractors will be is responsible for identifying and implementing any preventative and/or corrective actions in response to any non-conformances/deficiencies. This will be completed in collaboration with Port, overseen and endorsed by the Environment Manager CU and/or Principal's Site Representative. New preventative and corrective actions will be incorporated into the MEMP where appropriate.

4.12 MONITORING

Monitoring for each element is detailed in Section 7, with Section 8 providing the specific monitoring programs being implemented for particular MNES. This monitoring will enable:

a) Development of baseline, or pre-construction, environmental information from which trends and changes in the environmental quality during the CU Project can be detected; and

b) Early detection of environmental management issues during construction activities.

All monitoring equipment will be maintained and calibrated in accordance with the manufacturer's instructions and operated by an appropriately qualified person.

Records of all monitoring will be maintained as per section 4.15.

4.13 AUDITING

Environmental audits of the construction activities of the CU Project will be scheduled and conducted in accordance with the Port's EMS requirements. The audit's objectives will be to verify compliance with relevant

Project Management Plans, applicable environmental permits, approvals and regulations. Auditing will occur as a minimum annually, with specific aspects of the construction activity to be audited as required in response to specific risks or incidents of concerns being identified. Audits will be undertaken within the Port Quality Management Framework.

Audits of the requirements of the MEMP (including legislative changes) will be undertaken by a suitably qualified or experienced person. This is to ensure that the measures, responsibilities and corrective actions remain achievable, effective and suitable to the construction activities at all times.

Records of on-going site monitoring, inspections etc. will be maintained for review by regulators. Permanent records will be kept on-site and updated regularly, to enable audit/review.

4.14 REPORTING

As required in legislative conditions, an annual report will be produced by the Environmental Advisors CU within three months of every 12 month anniversary of commencement of the action on 4 March 2020. The report will provide detail of the Compliance with the conditions of the EPBC Approval 2011/5979 including an overview of environmental incidents, complaints or impacts related to MNES and corrective actions as needed, noting exception reporting occurs throughout the year.

Copies of this annual report(s) will be kept on-site, will be published on the CU Project website in accordance with Condition 36 of EPBC Approval No. 2011/5979 and will be available for regulatory inspection.

The Port will report to DCCEEW (or successor agency) any exceedance of performance criteria, along with the implemented risk management, adaptive management strategies, corrective actions or emergency response measures, within 21 days of an exceedance or action/response.

4.15 RECORDS

During construction activities in the marine environment, records relevant to the MEMP will be maintained as objective evidence of compliance with environmental requirements. All records will be maintained according to the Port's Record Keeping Procedures or as required by the legislative conditions. All MEMP records will be retained electronically, including but not limited to:

a) Induction and any specific environmental training records;
b) MEMP reviews and version control;
c) Monitoring data sheets, calibration records, results and internal and external environmental reports; and
d) Environmental incidents, complaints, exceedances of performance criteria and/or early warning triggers, and non-conformance and corrective action reports.

Records will allow auditing and encourage the use of preventative action, as well as corrective action following any non-conformances or early warning triggers. Records will be made available to the regulators as requested.

4.16 INTERNAL COMMUNICATION

MEMP requirements will be included in contractor tool box and pre-start meetings where relevant. As part of this meeting, the proposed activities will be reviewed with consideration given to changes in conditions such as weather, which may increase the potential for environmental impacts.

4.17 COMMUNITY & STAKEHOLDER ENGAGEMENT

Contact details for the CU Project are:

Telephone: 1800 531 561

Email: cugeneral@townsvilleport.com.au.

Address: PO Box 1031, Townsville QLD 4810

Contact can also be made electronically via the Port's website "Contact Us" page (https://www.townsville-port.com.au/contact/).

A Community and Stakeholder Engagement Plan (CSEP) has been developed which details the engagement methods which will be used during the CU Project. This document is published on the Port's website (https://www.townsville-port.com.au/projects-development/channel-upgrade/management-monitoring-plans/). Relevant information on the implementation of the MEMP will be communicated through the mechanisms established in the CSEP.

4.18 COMPLAINTS HANDLING

Complaints represent an opportunity for improvement and enhancement of environmental performance. All complaints relating to the CU Project, including those from members of the public, stakeholder groups and regulators, will be investigated and responded to in accordance with the complaints process detailed in the CU Project's CSEP. Complaints received directly by the Corporate Affairs and Capital Works PR Officer must be recorded, including investigations undertaken, conclusions formed and actions taken. Complaints can be made verbally, via email or via the "Complaint Lodgement Page" https://www.townsville-port.com.au/community/lodge-a-complaint/ on the Port's website. The Corporate Affairs and Capital Works PR Officer will notify the CU Project Team Line Managers who will assign a lead (pending on nature of complaint), to investigate and implement corrective measures where required.

The Corporate Affairs and Capital Works PR Officer is responsible for maintaining the Register of Complaints. Notification regarding the complaint and any associated response will be provided to Port Management in a timely fashion and all outcomes of complaint(s) will be communicated to Port Management for further review. The outcome of the investigation and corrective actions, where required, will be communicated to the complainant to close out the issues raised.

5 MATTER OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

This MEMP has been developed to address key risks from the approved action on Matter of National Environmental Significance (MNES). Key MNES for this project include:

- World Heritage Properties;
- National Heritage place;
- Listed threatened species and communities;
- Listed Migratory Species;
- Commonwealth marine areas; and
- the Great Barrier Reef Marine Park.

Table 3 lists the key species of each megafauna taxa identified to have been observed within the area of the port as part of the EIS/AEIS:

Table 3: Key Species of Megafauna Taxa

TAXA	SPECIES
Listed Turtle Species	Loggerhead turtle (*Caretta caretta*)
	Leatherback turtle (*Dermochelys coriacea*)
	Olive ridley turtle (*Lepidochelys olivacea*).
	Green turtle (*Chelonia mydas*)
	Hawksbill turtle (*Eretmochelys imbricate*)
	Flatback turtle (*Natator depressus*).
Dugong	Dugong (*Dugong dugon*)
Listed Dolphin Species	Australian snubfin dolphin (*Orcaella heinsohni*)
	Australian humpback dolphin (*Sousa sahulensis*)*.
Other Cetaceans	Whales, especially humpback whale
Listed and Migratory Shorebirds	Various

* definition amended to replace Indo-Pacific humpback dolphin (*Sousa chinensis*) with *Sousa sahulensis* based on revised speciation and listing - https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=87942

6 MEMP ACTIVITIES & ELEMENTS

There are several activities taking place during the CU Project which have the potential to impact on the marine environment, including but not limited to:

- Land-based and marine rockwall construction, including construction of reclamation area perimeter bund, the Eastern breakwater works and the temporary offloading facility;
- Construction and use of the temporary offloading facility, including dredging and piling works;
- Capital dredging using marine vessels and plant;
- Placement and movement of capital dredge material into and around the reclamation area;
- Piling for the re-positioning of navigational aids; and
- Management of capital dredge tailwater at the reclamation area.

This section of the MEMP comprises the environmental elements, as identified in the EIS / AEIS, with potential environmental issues, risks and impacts associated with project activities in the marine environment.

Where relevant, this MEMP refers to other documents that are relevant to the activity, such as the CEMP (POT 2099), DMP (POT2095) and Offset Management Strategy (POT 2094). This MEMP will be revised in line with any amendments to relevant aspects of the other management plans to ensure consistency across the suite of management plans relevant to the project.

Mitigation of some potential impacts, such as the removal of seagrass in the capital dredge footprint, will be addressed through offsetting opportunities rather than construction management measures, and are not included in detail in this MEMP (see Offset Management Strategy POT 2094).

6.1 RISK ASSESSMENT OF ENVIRONMENT ELEMENTS

A number of construction activities have the potential to impact on environmental values in the marine environment and MNES to varying levels. The risk posed to key elements has been assessed for the CU Project, based on the risk management guidelines within the Port's Quality Management System (risk tables reproduced in Appendix D).

The residual risk level for each element has been detailed in Table 4. These elements and risks have been subject to detailed analysis in the EIS and AEIS, with key issues to be addressed by this MEMP also identified in the EPBC Approval conditions.

The residual risk level identified for each element is in relation to the CU Project specifically; and therefore, may be refined in the context of scope of works being delivered in the CU Project from the AEIS assessment. This residual risk level has been included in each element to ensure that it effectively links to actual mitigation and management actions.

Management measures for these risks are set out in Chapter 7.

Table 4: Risk Overview for the key Activities and Elements.

ELEMENT	PRIMARY IMPACTING PROCESS	POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE (RISK RATING)	MITIGATION MEASURES	RESIDUAL RISK (LIKELIHOOD/ CONSEQUENCE)
Land contamination impacts	Failure of integrity of the rockwall has the potential to release dredge material to the marine environment.	Release of dredged material. Release of contaminants to marine environment.	Sensitive receptors, in close proximity to rockwall Marine megafauna	Possible / Major (Substantial)	Refer to sections 7.3.2 and 7.2.4	Substantial (Possible/ Major)
	PASS material, if not handled correctly, could result in contamination of the land and release of contaminants to the marine environment.			Possible/ Insignificant (broad scale) (Low)		Low (Possible/ Insignificant)
	Spills and leaks of dangerous goods/hazardous materials can cause soil contamination and release of contaminants to the marine environment.			Likely / Minor (local scale) (Medium)		Low (Likely/ Insignificant)
Dredging and construction footprint impacts	The dredging and construction of the reclamation, breakwater realignment and temporary offloading facility removes, and fragments habitat used by megafauna in Cleveland Bay. Seagrass meadows outside of the approved dredging, reclamation, breakwater realignment and offloading facility footprints are destroyed removing habitat for megafauna.	Direct loss of seagrass outside of the dredge footprint / approved impact area	Sensitive marine habitats (seagrass) – outside the approved dredging and construction footprints Marine megafauna	Unlikely / Minor (Low)	Refer to section 7.3.1 and 7.4.1	Low (Rare/ minor)
Water quality (stormwater & tailwater)	Sediment in stormwater run-off from construction activities leading to increased turbidity of marine waters.	Release of contaminants to marine environment leading to impacts on:	Sensitive receptors, in close proximity to rockwall Marine Megafauna	Likely / Minor (local scale) (Medium)	Refer to sections 7.3.3, 7.3.4 and 7.2.4	Low (Possible / Insignificant)
	Exposure and potential release of sediments and contaminants from construction activities and stormwater.			Likely / Minor (local scale) (Medium)		Low (Likely / Insignificant)

ELEMENT	PRIMARY IMPACTING PROCESS	POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE (RISK RATING)	MITIGATION MEASURES	RESIDUAL RISK (LIKELIHOOD/ CONSEQUENCE)
	Stormwater contamination may arise due to leaks and spills of fuel/oil and other hazardous materials or dangerous goods.	• marine water and marine sediments • indirect impacts on marine life, and • indirect potential impacts to human health.	Indirect on human health	Likely / Minor (local scale) (Medium)		Low (Likely / Insignificant)
	Discharge of tailwater may create turbid plumes potentially immediately adjacent to the tailwater discharge point.			Possible / Minor (local scale) (Medium)		Medium (Possible/ Minor)
Water quality (dredge plume)	Dredging and transferring dredged material may lead to mobilisation and/or spill of sediment into the marine environment causing turbid plumes.	Release of contaminants to marine environment leading to impacts on: • marine water and marine sediments; • indirect impacts on marine life; and • indirect potential impacts to human health.	Sensitive receptors in close proximity to dredging and offloading footprints Marine megafauna Indirect on human health	Likely / Minor (local scale) (Medium) Unlikely / Minor (broader scale) (Low)	Refer to section 7.4.2	Low (Unlikely/ Minor)
Vessel strike and accidents	Increased vessel movements may increase Interactions between project related vessels and marine megafauna.	Interactions and strikes with vessels may result in disturbance, injury or death of marine megafauna.	Marine megafauna	Unlikely / Major (Medium)	Refer to section 7.2.1	Medium (Unlikely/ Serious)
	Increased vessel movements may increase vessel strikes with marine megafauna.			Unlikely / Major (Medium)		Low (Rare/ Serious)
Vehicle strike and accident	During construction of the reclamation, offloading facility and breakwater, where crest levels are at or near high tide, marine	Interaction and strikes during construction may	Marine turtles	Possible / Serious (Medium)	Refer to section 7.3.6	Low (Rare/ Serious)

ELEMENT	PRIMARY IMPACTING PROCESS	POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE (RISK RATING)	MITIGATION MEASURES	RESIDUAL RISK (LIKELIHOOD/ CONSEQUENCE)
	turtles could access areas where construction vehicles and plant are operating.	result in disturbance, injury or death of marine turtles.				
Construction impact/ strike	Interaction between excavation and placement of rock material for reclamation, breakwater realignment and offloading facility and marine megafauna.	Interactions and strikes during construction may result in disturbance, injury or death of marine megafauna. Noise and vibration may lead to behavioural disturbance to marine megafauna, including temporarily avoiding affected area.	Marine megafauna	Possible / Major (Substantial)	Refer to section 7.3.6 and 7.3.8	Medium (Unlikely/ Serious)
	Equipment strikes with marine megafauna during rockwall and offloading facility construction and/or breakwater realignment.			Possible / Major (Substantial)		Medium (Unlikely/ Serious)
	Underwater noise emissions and vibration from construction activities.			Possible / Major (Substantial)		Low (unlikely/ Minor)
Terrestrial fauna (avifauna)	Construction activities (vehicle movements and earthworks) causing direct impact	Direct impacts may result in disturbance/ injury/ mortality of terrestrial fauna. Noise and light disturbance may lead to disorientation and behavioural disturbance to fauna and surrounding avian habitats.	Shorebirds	Possible / Serious (Medium)	Refer to section 7.3.7	Low (Rare/ Serious)
	Noise emissions and vibration from construction activities			Possible / Serious (Medium)		Low (Unlikely/ Minor)
	Light spill from the construction site and plant and equipment			Likely / Serious (Substantial)		Medium (Possible/ Minor)

ELEMENT	PRIMARY IMPACTING PROCESS	POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE (RISK RATING)	MITIGATION MEASURES	RESIDUAL RISK (LIKELIHOOD/ CONSEQUENCE)
Invasive marine pests / introduced species	Incorrect handling, storage of materials and waste and stormwater management may encourage pests and provide breeding habitats for mosquitos.	Encouraging pests and mosquitos can lead to human health impacts.	Shorebirds Human comfort/ health	Possible / Minor (Medium)	Refer to sections 7.2.5 and 7.2.2	Low (Possible/ Insignificant)
	All construction and dredge-related vessels brought in from outside the Port may potentially carry marine pests in their ballast water or hulls.	Marine pests have the potential to adversely impact on the marine ecology.	Marine habitats	Possible / Serious (Medium)		Low (Rare/ Serious)
Noise and vibration from vessels	Increased vessel movements have the potential to increase underwater noise emissions and cause vibrations.	Increased noise and vibration may result in impacts to the marine environment, including megafauna.	Marine megafauna	Unlikely / Minor (Low)	Refer to section 7.2.3	Low (Rare/ Minor)
Noise and vibration from dredging, reclamation and piling activities	Noise and vibration generated during dredging or construction activities (particularly piling works)	Increased noise and vibration resulting in injury or mortality to marine megafauna	Marine megafauna in close proximity to construction and dredging footprints.	Possible / Serious (Medium)	Refer to section 7.3.8 and 7.4.4	Medium (Unlikely/ Serious)
	On-site construction plant and equipment (e.g. piling works) may increase noise emissions.	Increased noise and vibration resulting in marine megafauna temporarily avoiding the area		Likely / Minor (Medium)		Low (Unlikely/ Minor)
Hazardous materials handling and storage	Incorrect storage and handling of hazardous substances may result in release to surrounding lands/ marine environment.	Release to waters may affect marine water quality, marine species or the quality of their habitats.	Sensitive receptors, in close proximity to construction and dredging footprints Marine megafauna	Unlikely / Minor (Low)	Refer to section 7.2.4	Low (Unlikely/ Insignificant)
	Spills or leakage of fuel/oil and other hazardous materials or dangerous goods may cause soil contamination.			Unlikely / Minor (Low)		Low (likely/ Insignificant)

ELEMENT	PRIMARY IMPACTING PROCESS	POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE (RISK RATING)	MITIGATION MEASURES	RESIDUAL RISK (LIKELIHOOD/ CONSEQUENCE)
	Incidents may occur whereby contaminants are accidentally released to surrounding land and/or the marine environment.			Likely / Minor (Medium)		Low (Likely/ Insignificant)
Waste Management	Incorrect handling and storage may introduce wastes into the marine environment.	Release of waste may increase the risk of entanglement and/or ingestion by marine megafauna.	Marine megafauna	Possible / Minor (Medium)	Refer to section 7.2.5	Low (Unlikely/ Minor)
Cultural heritage (indigenous/ general)	Construction activities have the potential to disturb/ destroy items of cultural significance.	Disturbance of culturally significant items.	Traditional owners	Unlikely / Serious (Medium)	Refer to section 7.2.6	Medium (Unlikely/ Minor)
	Disturbance or loss of significant Traditional Owner cultural heritage values, artefacts or places may occur.			Possible / Serious (Medium)		Medium (Unlikely/ Minor)
	Degradation or loss of general cultural heritage items or places may occur.	Loss or diminishing of cultural values	Non-traditional cultural heritage	Rare / Minor (low)		Low (Rare/ Minor)
Artificial light	Artificial light from construction activities or port activities may impact.	Artificial light may adversely affect marine and terrestrial fauna, including behavioural change.	Marine megafauna Terrestrial fauna	Likely / Serious (Substantial)	Refer to section 7.2.7	Medium (Possible/ Minor)

6.2 UNCERTAINTY ASSOCIATED WITH MEMP SUCCESS

The CU Project will not be without uncertainties that could influence the ability of the Port to fully implement the MEMP and associated actions. These uncertainties are varied, with the key risks to the achievement of the plan detailed in Table 5. Control measures and risk ratings are also presented. It should be noted that these uncertainties are associated with project management arrangements, whereas the Contingency Plans detailed in Section 10 are focused on activity risks and response plans.

Table 5: Key uncertainties associated with Management of the CU Project.

ELEMENT	IMPACTING PROCESS/ POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE	MITIGATION MEASURES	RESIDUAL RISK
Data uncertainty / Inaccuracy	Failure to anticipate impacting activities due to data or information inaccuracies Environmental impacts occur due to incomplete understanding/ misunderstanding of impact	Sensitive receptors of Cleveland Bay	Likely / Major (High)	The Port will use experienced contractors to design and implement monitoring programs to ensure accuracy and rigorousness. Extensive data collection occurred prior to commencement and externally reviewed through EIS/AEIS. Baseline data collected from key monitoring programs prior to commencement for comparison. Adaptive framework to inform ongoing review of appropriate triggers and baselines during the program as new information is collected. Expert input into ongoing monitoring programs to ensure robustness of data, particularly through ITAC review and involvement and through peer review of monitoring plans.	Low (Rare/Serious)
Failure to deliver controls detailed in the plan	Management Controls not delivering mitigation measures Environmental impacts occur due to failure to implement adequate controls.	Sensitive Receptors of Cleveland Bay	Likely / Major (Substantial)	The Port will engage experienced contractors to deliver the key construction fronts. The Port will implement a comprehensive monitoring and auditing program to review and confirm compliance with implementation of the controls in the plan.	Medium (Possible / Serious)

ELEMENT	IMPACTING PROCESS/ POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE	MITIGATION MEASURES	RESIDUAL RISK
				Implementation of key monitoring programs of sensitive receptors to monitor for any potential environmental impacts from the project.	
	Breach of approval condition	Compliance record /Public Reputation		Annual compliance review against approval conditions and approved documents (Management Plans etc) will be undertaken to demonstrate compliance. Dedicated environmental resources on the Project, by contractors and Port. CU Environmental staff (Manager and Advisors) remain across all approval requirements to ensure continuation in the absence of a staff member. Oversight by Port, ITAC and Project regulatory committee	
Project monitoring not delivered	Monitoring programs not implemented due to lack of commitment, funding and resourcing Monitoring program not conducted due to failure to engage contractors or contractor poor performance Environmental impacts occur due to incomplete understanding of impact	Sensitive receptors of Cleveland Bay Consultant responsibilities Compliance & complaints record	Likely / Serious (Medium)	The Port will use experienced contractors to design and implement monitoring programs to ensure accuracy and rigorousness. Baseline data collected from key monitoring programs prior to commencement for comparison. Expert input into ongoing monitoring programs to ensure robustness of data, particularly through ITAC review and involvement and through peer review of monitoring plans. Detailed contract management process for key monitoring programs to ensure delivery of the program and identification of any limitations early. CU Environmental staff (Manager and Advisors) remain across all monitoring programs to ensure continuation of programs in the absence of a staff member.	Low (Rare/Serious)
Loss of funding commitment to deliver project	Project ceases part way through delivery, or	Workforce	Unlikely / Major (Medium)	Funding arrangements established prior to project commencement, including significant Government funding commitments (both Qld and Commonwealth)	Low (Unlikely / Minor)

ELEMENT	IMPACTING PROCESS/ POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE	MITIGATION MEASURES	RESIDUAL RISK
	delivery reduced due to loss of funding. Environmental impacts occur due to incomplete delivery of project and controls.	Sensitive receptors of Cleveland Bay		Regular reporting to Government to justify funding and demonstrating delivery of the project. The Port commitment to deliver project and will be responsible for any funding shortfall.	
	Breach of approval condition	Compliance record / Public reputation		Annual compliance review against approval conditions and approved documents (management plans etc) will be undertaken to demonstrate compliance. Dedicated environmental resources on the Project, by contractors and Port. CU Environmental staff (Manager and Advisors) remain across all approval requirements to ensure continuation in the absence of a staff member. Oversight by Port, ITAC and Project regulatory committee	
Severe / Extreme weather	Severe and extreme weather events result in damage to partially constructed infrastructure, which in turn can impact on MNES and marine environment Severe/extreme weather results in loss of contaminants and sediment to the marine environment Damage to the constructed rockwall can	Port infrastructure Sensitive Receptors of Cleveland Bay Port employees, Port contractors, Port monitoring consultants	Likely / Major (High)	Implement The Port Cyclone Response Plan which establishes clear actions and steps to be taken in the preparation for, response to and recovery from a cyclone event for the Port of Townsville. Where possible, key construction activities to be planned to commence and be mostly completed in dry seasons where risk of severe weather is reduced. Reclamation integrity plan incorporates severe weather contingency arrangements to minimise impact. Key construction fronts designed to accommodate and withstand standard severe weather events.	Medium (Possible /Serious)

ELEMENT	IMPACTING PROCESS/ POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE	MITIGATION MEASURES	RESIDUAL RISK
	result in release of dredge material to the marine environment. Severe/extreme weather events impacting upon the Port /contractors /monitoring consultants and equipment – significantly delaying deliverables Severe/extreme weather results in reduced resilience in the coral/seagrass community in Cleveland Bay			Experienced contractors engaged to deliver the key construction fronts. The Port's Cyclone Response Plan enacted to ensure all Port staff are safe and equipment removed where practical prior to extreme events. Contingency monitoring events for sensitive receptors (seagrass/ coral) CU Environmental staff (Manager and Advisors) remain across all monitoring programs to ensure continuation of programs in the absence of a staff member.	
Pandemic outbreak (e.g. Covid 19)	Management controls not delivered due to lack of access to site/ personnel movement controlled. Environmental impacts occur due to incomplete delivery of project and controls.	Port employees, Port contractors, Port monitoring consultants Sensitive receptors of Cleveland Bay	Likely / Serious (Medium)	The Port will engage experienced contractors to deliver the key construction fronts, with locally based staff during works. Contractors develop Covid 19 response plans to provide contingency and continuity should border restrictions apply. Implementation of key monitoring programs of sensitive receptors to monitor for any potential environmental impacts from the project.	Low (Rare/Serious)
	Monitoring program not conducted due to failure to be able to access site/personnel movement controlled	Sensitive receptors of Cleveland Bay	Likely / Serious (Medium)	Contractors develop Covid 19 response plans to provide contingency and continuity should border restrictions apply. Detailed contract management process for key monitoring programs to ensure delivery of the program and identification of any limitations early.	Low (Rare/Serious)

ELEMENT	IMPACTING PROCESS/ POTENTIAL IMPACT	RISK RECEPTOR	RAW LIKELIHOOD / CONSEQUENCE	MITIGATION MEASURES	RESIDUAL RISK
				CU Environmental staff (Manager and Advisors) remain across all monitoring programs to ensure continuation of programs in the absence of a staff member.	
	Breach of approval condition	Compliance record/ Public reputation	Likely / Serious (Medium)	Annual compliance review against approval conditions and approved documents (Management Plans etc) will be undertaken to demonstrate compliance. Dedicated environmental resources on the Project, by contractors and Port. Oversight by Port, ITAC and Project regulatory committee	Low (Rare/Serious)

7 MANAGEMENT ACTIONS

7.1 RISK ASSESSMENT OF ENVIRONMENT ELEMENTS

The following section of the MEMP identifies the key environmental threats associated with the activities in the marine environment that have the potential to impact on the key MNES. For each environmental threat, management and mitigation measures to address the issue are documented along with overall associated performance objectives, performance criteria, monitoring, reporting, corrective actions and emergency response measures Table 6.

Table 6: MEMP Element Assessment Structure

COMPONENT	DESCRIPTION OF CONTENT
Element	The environmental issue at the site requiring management consideration, response strategies and actions during construction activities.
Objective	The guiding performance objective that applies to the element.
Residual Risk level	The assessed level of residual risk posed from the CU Project on the Element (based on EIS/AEIS assessment). Note: Only the highest residual risk rating from Table 4 is included in the following element tables; recognising that it is more precautionary to identify the highest risk for each element.
Aspects & Impacts	The construction activities and potential environmental impacts that apply to the element.
Mitigation Measures	The mechanisms and management actions through which the objective will be achieved.
Performance Criteria	The measurable performance criteria (outcomes/indicators) by which the success of the achievement of the objective will be determined.
Monitoring / Auditing	The process of measuring actual performance, or how well the objective has been achieved, including the format, timing and responsibility for auditing of the monitoring results.
Reporting	The format, timing and responsibility for reporting of monitoring and audit results.
Corrective Actions	The actions to be implemented in the case where a performance criterion is not met. Note: The contractor will lead implementation of corrective actions unless responsibility is noted as an alternate responsible party.
Responsibility	The site personnel involved in the various tasks required for each element.
Adaptive Management Program	The process for systemic changes to management arrangements in response to listed events (non-conformances, incidents, periodic reviews etc).

The following sections have been separated into the three sets of management actions for ease of reference:

- **General Management** – this relates to management actions that are common to both construction, and reclamation and dredging works (e.g. marine pest management, underwater noise) and therefore apply across all aspects of the CU Project. This includes actions to relocate the navigational aids and the operation of support vessels.
- **Construction and Reclamation** – this relates to management actions specific to construction works, consisting of the construction of the rockwall and reclamation area, installation and removal of the temporary offloading facility, re-location of the channel navigational aids and the shortening of the Eastern Breakwater. This also includes all reclamation works, including the transfer of material from the temporary offloading facility to the reclamation area, movement of material within reclamation area, and tailwater discharge.
- **Dredging** – this relates to the capital dredging works as well as dredging the access and basin for the temporary offloading facility, and the transfer of dredged material to and from barges.

For ease of reference, the division of management actions across these sections is shown in Table 7, including a cross-reference to the POT 2157 Environmental Procedure for Pile Driving (Appendix I). The elements within each group are set out in Table 8.

Table 7: Structure of Actions Across Work Categories

ACTIVITY		GENERAL MANAGEMENT	CONSTRUCTION & RECLAMATION	DREDGING	PILING PROCEDURE
Construction & reclamation	Construction of the rockwalls to form the reclamation area	✓	✓		
	Construction of the temporary offloading facility	✓	✓		✓
	Partial removal of Eastern Breakwater and new round head construction	✓	✓		
	Placement of capital dredge material in the reclamation area	✓	✓		
	Management of capital dredge tailwater at the reclamation area	✓	✓		
	Re-positioning of Navigational Aids	✓	✓		✓
Dredging	Capital dredging of Sea Channel and Platypus Channel	✓		✓	
	Capital dredging of Eastern Harbour Entrance widening	✓		✓	
	Dredging of access and basin for temporary offloading facility	✓		✓	

Table 8: Elements per Management Group

GROUP	ELEMENTS
General Management	• Vessel strike and accidents • Invasive pests/introduced species (marine) • Noise and vibration from vessels • Hazardous materials handling and storage • Waste management • Cultural heritage (indigenous/general) • Artificial light
Construction & Reclamation	• Land contamination impacts • Construction footprint impacts • Water quality (stormwater & tailwater) • Invasive pests/introduced species (terrestrial) • Construction impact/strike (including vehicle strike and accidents) • Noise and vibration from construction and piling* • Terrestrial avifauna
Dredging	• Dredging footprint impacts • Water quality (dredge plume) • Direct Impacts or Strike from the dredge equipment • Noise and vibration from dredging

* Appendix I provides additional controls relevant to piling procedures.

As the MEMP will be implemented in parallel with the CEMP and DMP, where these management plans are relevant to a particular management element, a cross-reference is provided.

7.2 GENERAL MANAGEMENT

7.2.1 GM1: MINIMISE VESSEL STRIKE AND ACCIDENTS

This element relates to the management of all vessel movements during construction, reclamation and dredging works. This element corresponds to CEMP Section 5.4.4 and 5.4.5 – Marine and Terrestrial Ecology and DMP Section 11.4 – Marine Ecology.

Note that to the extent of any inconsistency between this element and the DMP regarding the management of dredge vessel movements, the DMP will prevail.

ELEMENT	VESSEL STRIKE AND ACCIDENTS	
Residual Risk level MEDIUM	**Objectives** - To avoid impacts from project related vessels, including vessel strike and accidents - To avoid the risk of disturbance or injury to marine megafauna resulting from project related vessels associated with construction and dredging, including vessel strikes and accidents. - To establish and maintain awareness of the importance of protecting marine megafauna	
Aspects and Impacts – Interactions between project related vessels and marine megafauna may result in disturbance or injury to marine megafauna. – Vessel strikes to marine megafauna may result in injury or death of individuals.		
Performance Criteria / Indicators A. No injury or loss of marine megafauna because of project vessel operations. B. Vessel masters and crew to complete training in marine megafauna observation and response procedures. C. All works are managed in accordance with the MEMP, the *Nature Conservation Act 1992* and any other relevant approvals, standard, guidelines and statutory requirements, including no movement of vessels within required distances of megafauna. D. No substantiated complaints are received from regulators or the community in relation to marine megafauna issues.		
Mitigation		**Responsibility**
– Ensure vessel masters and crew are trained in marine megafauna observation and mitigation techniques (to meet Performance Criteria A, B and C).		Manager Environment CU (port personnel) Contractors (contractors personnel)
– Maintain active awareness of marine megafauna throughout daily construction activities, including within the exclusion zone, noting observations for megafauna in low light/night time or during rough conditions will be restricted*(to meet Performance Criteria A, C and D).		Contractors Marine Megafauna Observer
– Adopt marine megafauna observation and response procedures (to meet Performance Criteria A to D), including: ○ Maintaining a lookout for cetaceans, dugongs and turtles while vessels are operating; and ○ In the event that megafauna is sighted within 150m from dolphins, turtles and dugongs, and 300m from whales, adjusting vessel speed and direction, within the safety constraints of the vessel, to avoid approaching or impacting on the observed individuals, which are likely to move to the nearest deepwater, ○ Ensure vessels remain: ▪ For whales: 100 metres around, extending to 300 metres in front of and behind, an individual. ▪ For dolphins, dugongs and turtles: 50 metres around, extending to 150 metres in front of and behind an individual.		Contractors CU Project team Environment Advisor CU Marine Megafauna Observer
– Enforce vessel speed limits where appropriate (i.e. less than 6 knots in waters less than 2.5m depth or within 100m of shoreline) to reduce		Contractors Construction Team CU

potential for marine megafauna collision (to meet Performance Criteria A). Note that this may be exceeded during emergencies or for vessels requiring higher speed to maintain navigational safety.	
– Limit vessel usage near sensitive habitat areas (i.e. permanent seagrass meadows, Ross River Sandspit area etc) to prevent disturbance to sensitive receptors (to meet Performance Criteria A and C).	Contractors Construction Team CU
Training (to meet Performance Criteria A to D)	
– Ensure that the relevant vessel crews undertake environmental awareness and training covering the requirements of the MEMP regarding marine megafauna/ecology.	Contractors Manager Environment CU
– Provide appropriate training and information to all vessel crew on marine megafauna management requirements during induction.	Contractors
Monitoring / Auditing	**Responsibility**
– Conduct monitoring in accordance with Inshore Dolphin and Marine Megafauna Monitoring Plans (POT 2154 Appendix E, POT 2155 Appendix F) before, during and after completion of the project, and analyse the results in comparison to the performance criteria and approval conditions.	Environmental Advisor CU
– Conduct observations for marine megafauna by vessel masters and crew during vessel operations on each vessel, including maintaining a log of when megafauna is sighted, and action is taken to avoid interaction. The log should include observations on conditions, time of day and distance and height from observer.	Contractors
– Review marine strandings data quarterly (where available) to identify any death or injury to megafauna that could be attributed to CU construction activities.	Manager Environment CU
– Undertake regular site and vessel inspections to monitor for issues that may adversely impact on marine megafauna.	Environmental Advisor CU / Contractor
– Review/audit toolbox/pre-start records for discussions on vessel operation and marine megafauna interaction	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to D are not met at any point throughout construction, dredging and reclamation, the following corrective actions must be undertaken:

- Implement emergency response measures as per vessel safety management system (SMS) in the event of a marine megafauna injury or incident; and:
  - Liaise with DES or other relevant body (i.e. GBRMPA) immediately to identify rescue options and develop future corrective actions if injury to marine megafauna occurs.
  - Assist in capture of injured animals following advice from regulators.
- The Manager Environment CU will commence an investigation into incidents relating to marine megafauna vessel strikes and accidents within 24 hours, including reporting to the appropriate regulator within required statutory timeframes.
- Implement revised control measures (modified observation process and/or further exclusion zones) immediately where performance criteria are not met, or marine megafauna issues are identified or have the potential to occur in the future.
- The Environmental Advisor CU/Manager Environment CU will respond to all complaints in relation to marine megafauna within five business days and address concerns as required.
- Any impacts identified via the marine megafauna and inshore dolphins monitoring plans as a result of construction vessel activities will be reported via the specific monitoring plans and inform reviews of the relevant management plans.
- Undertake a review of the MEMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show impacts to marine megafauna.
- Implement any other corrective actions and mitigation measures as directed by the appropriate regulator.

Reporting

- Vessel masters will maintain an activity log, recording the type of activities at different times to demonstrate undertaking of observations and to assist with the retrospective investigation of any incidents / complaints.

- All vessel crew will inform the Master as soon as possible in the event of a significant marine megafauna disturbance issue, or vessel strike/accident and the Master will investigate and report to the Principal's Site Representative.
- Vessel masters will maintain a record of sighted animals indicating the sighting of each individual animal and actions taken.
- Record and report immediately any incident involving marine megafauna interactions (marine animal strike, marine stranding or an injured, sick or dead turtle, dugong, dolphin or whale) will be reported to the Qld DES (on 1300 130 372). This reporting requirement is irrespective of whether the megafauna is dead or alive.
- Compile an incident report of all the details of any incident or near miss involving marine megafauna.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.
- Maintain records of all inductions and training undertaken by vessel Masters, crews and marine megafauna observers that included relevant marine megafauna management requirements.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with marine ecology and MNES, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with vessel usage and marine MNES, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

* while the ability to observe megafauna at night or in rough conditions may be limited, this is offset by the reduced risk of interaction through the use of a backhoe dredge only (stationary, slow and steady movement) and no TSHD.

7.2.2 GM2: MINIMISE IMPACTS FROM INVASIVE MARINE PEST SPECIES

This element relates to the management of ballast water exchanges and vessel movements to reduce the risk of introduction and spread of invasive species in the marine environment. This element corresponds to CEMP Section 5.4.6 – Weed & Pest Management, and DMP Section 11.5 – Vessel Operations – Ballast water management and invasive marine pests.

Note that to the extent of any inconsistency between this element and the DMP regarding the management of ballast water exchanges and pest management, the DMP will prevail.

ELEMENT	INVASIVE PESTS/INTRODUCED SPECIES (MARINE)	
Residual Risk Level LOW	**Objectives** - To avoid the risk of translocation of introduced or invasive marine pest species in ballast water - To avoid the risk of marine pest species on the hulls of all vessels associated with the project. - Ensure compliance with all quarantine and biosecurity measures for bio-fouling and ballast management is achieved	
Aspects and Impacts – Introduction of vessels from areas containing invasive marine species may cause the introduction of these species to Cleveland Bay through hull fouling and ballast water exchange. – Project related vessels and equipment arrive to site without adequate pest management prior to use on the CU project. – White Colonial Sea Squirt has been identified in the Townsville Marine Precinct where support vessels for the project may be moored.		
Performance Criteria / Indicators A. All works are managed in accordance with the obligations under the relevant management plans and any other relevant approvals, standards, guidelines and statutory requirements. B. No new invasive marine species infestations from dredging related vessels. C. All ballast water exchange is undertaken in accordance with legislative and requirements of the Regional Harbour Master and the relevant project management plans.		
Mitigation		**Responsibility**
– Prior to leaving the port of origin, thoroughly clean dredging vessels and inspect for invasive marine species and to ensure that sediments, organic matter, or water is not transported to the Townsville port area (Criteria B).		Contractors
– All vessels are to be free of White Colonial Sea Squirt before commencing operations for the CU Project; and maintained as such for the duration of the project.		Contractors Contractors
– In accordance with the International Maritime Organisation (IMO) Ballast Water Convention 2004, the contractor will ensure the following occurs during transit to the Port of Townsville: – No deep water ballast exchanges to occur within the GBRMP. – Any ballast tanks holding seawaters to be exchanged with a minimum of 150% of design volume with seawaters at a location as distant from the coastline or other shallow (<100 m) areas as possible but not less than five nautical miles from the coast. – Any waters held in barge hoppers during transit to Townsville is to be treated as for other ballast water – Abide by any rules for ballast water exchange and biosecurity set by the Regional Harbour Master and Biosecurity regulatory agencies at the Port of Townsville (Criteria A to C). – Those responsible for any vessels associated with CU capital dredging activities, in accordance with the National Bio-fouling Management Guidance for Non-Trading Vessels (Australian Government 2008), will: o Assess the biofouling risk of the vessel prior to departing from the port of origin;		

ELEMENT	INVASIVE PESTS/INTRODUCED SPECIES (MARINE)	
	○ Undertake regular inspections of areas most prone to biofouling (e.g. damaged paint, propellers, bow and stern thrusters, sea chests and cooling pipes); ○ Implement a regular schedule for maintenance and dry docking to apply antifouling coatings; ○ Regularly ensure marine growth prevention systems are operating efficiently and effectively; ○ Inspect vessel hulls, hoppers and/or dredge gear to ensure that no material which may transport organisms (sediments, organic material, or waters) is retained.	
	– Contractors to be notified of any biosecurity detections or incursions in the area reported to the Port that may move to the site areas.	Environmental Advisor CU
	– Post project, Port to be notified if any IMPs are identified on vessels used on the project.	Contractors
Training (to meet Performance criteria A to C)		
	– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements for pest management.	Contractors Manager Environment CU
Monitoring and Auditing		**Responsibility**
	– Visually monitor for the presence and abundance of introduced marine pests in the project site/work areas, and on project related vessels.	Contractors Environmental Advisor CU
	– Implement the Invasive Marine Species Monitoring Program for the CU Project.	Environmental Advisor CU
	– Monitor NIMPIS database and DAF detections information bulletins to stay informed with regards to recent detections (emerging pests) within Qld.	Environmental Advisor CU/ Contractor
	– Review/audit toolbox/pre-start records for discussions on IMPs	Environmental Advisor CU
Corrective actions Where Performance Criteria A to C are not met at any point throughout construction, the following Corrective Actions must be undertaken: – Contractors to engage with the Port and Biosecurity regulatory agencies to respond to any introduction or spread of invasive marine species. – Contractors to treat and remove any marine pests encountered on project related vessels or other equipment in accordance with regulator instructions, both before commencing and during capital dredging. – Contractors to implement appropriate control measures where marine pest infestation or their potential to spread is identified in order to prevent reoccurrences. – Undertake a review of the MEMP/CEMP, to determine if further controls are needed where investigations show new or expanded pest infestation. – Implement any other corrective actions as directed by the appropriate regulators.		
Reporting – The Contractor will maintain an activity log, recording the type of activities occurring at different times to demonstrate undertaking of observations and to assist with the retrospective investigation of any incidents / complaints. – The Contractor will maintain a log of ballast water exchanges in accordance with Regional Harbour Master and regulatory agency requirements. – Identification of detections of invasive marine pests, including through the Invasive Marine Pest Monitoring Plan, NIMPIS database and DAF detections information bulletins, to be reported to the Project Manager and the Principal's Site Representative. – All CU Project personnel will inform the Manager Environment CU and Principal's Site Representative of any pest outbreaks or potential infestations/incursions. The Manager Environment CU will investigate and report to the Principal's Representative, with any additional investigation(s) undertaken as required.		
Adaptive management program - The Environmental Advisor will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with introduced marine pests, additional to any activities the contractor implements;		

ELEMENT	INVASIVE PESTS/INTRODUCED SPECIES (MARINE)

- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with pests, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should monitoring and auditing specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.2.3 GM3: MINIMISE IMPACTS FROM NOISE AND VIBRATION FROM VESSELS

This element relates to the management of vessel-based works to reduce noise and vibration during the CU Project but excludes noise and vibration directly caused by construction activities, piling and dredging. This element corresponds to CEMP Section 5.4.8 – Minimise Impacts from Noise and Vibration.

ELEMENT	NOISE & VIBRATION - VESSELS	
Residual Risk Level LOW	**Objectives** – To avoid or minimise impacts to MNES from noise or vibration associated with vessels. – To meet all noise and vibration standards relating to marine vessels. – To protect the acoustic amenity and reduce nuisance noise that may impact on marine megafauna.	
Aspects and Impacts – Vessels associated with the construction, dredging and reclamation works have the potential to increase noise emissions. – Noise emissions and vibration may lead to behavioural disturbance in marine megafauna or marine megafauna temporarily avoiding affected area.		
Performance Criteria / Indicators A. No incidents of project vessels causing direct or residual noise impacts to MNES, as measured through: o the Inshore Dolphin Monitoring Plan (Appendix E, POT 2154); o the Marine Megafauna Monitoring Plan (Appendix F, POT 2155); and o the Shorebird Monitoring Plan (Appendix G, POT 2156). B. No injury or loss of marine megafauna because of construction-related vessel noise. C. No significant long-term behavioural impacts to marine megafauna from noise from construction vessels.		
Mitigation		**Responsibility**
– Ensure that engines and equipment on-board the vessels are properly maintained in good working order through carrying out routine and preventative maintenance (to meet Performance Criteria A, B and C).		Contractors
– Maintain and operate all equipment on-board the vessels in an efficient manner (to meet Performance Criteria B).		Contractors
– Review the results of each monitoring survey to capture any potentially negative trends forming in behavioural patterns associated with the construction vessel activities (to meet Performance Criteria A).		Environmental Advisor CU
– Consider noise mitigation when operating vessels (where appropriate) (to meet Performance Criteria C), including: • Selecting low-noise plant and equipment and maintain in good working order; • Keeping equipment well maintained according to manufacturer's instructions and recommendations; • Shutting down plant/ equipment which are used intermittently in the intervening periods between works or throttling down to minimum; • Shutting down plant and equipment when not in use; and • Ensuring that only necessary power levels are used to complete activities.		Contractors
– Adopt marine megafauna observation and response procedures to minimise vessel noise disturbance, (to meet Performance Criteria A and B) including: • Maintaining a lookout for marine megafauna while vessels are operating (recognising observations for megafauna in low light/night time or during rough conditions will be restricted*); • Adjusting vessel speed and direction, within the safety constraints of the vessel, to avoid approaching or impacting on the observed individuals (which are likely to move to the nearest deepwater) in the event that megafauna is sighted, when within		Contractors Construction Team CU Manager Environment CU

150m from dolphins, turtles and dugongs, and 300m from whales;
- Ensure vessels remain:
  - For whales: 100 metres around, extending to 300 metres in front of and behind, an individual.
  - For dolphins, dugongs and turtles: 50 metres around, extending to 150 metres in front of and behind an individual.
- Enforce vessel speed limits where appropriate (i.e. less than 6 knots in waters less than 2.5m depth or within 100m of shoreline) to reduce potential marine megafauna collision.

Noting that this may be exceeded during emergencies or for vessels requiring higher speed to maintain navigational safety.

Training (to meet Performance Criteria A and B)	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of this MEMP regarding noise and vibration controls.	Contractors Construction Team CU
– Provide appropriate training to vessel crew responsible for marine megafauna spotting prior to commencement of vessel operations.	Contractors Manager Environment CU
Monitoring / Auditing	**Responsibility**
– Conduct observations of marine megafauna by vessel masters and crew on each construction-related vessel. The log should include observations on conditions, time of day and distance and height from observer.	Contractors
– Undertake regular audits / inspections to identity the need for noise suppression measures and the effectiveness of measures undertaken.	Environmental Advisor CU/ Contractors
– Undertake Inshore Dolphin and Marine Megafauna Monitoring Plans (POT 2154 Appendix E, POT 2155 Appendix F) to determine if any project related impacts occur on megafauna behaviour.	Environmental Advisor CU
– Review marine strandings data quarterly (here available) to identify any death or injury to megafauna that could be attributed to CU vessel operations through the Marine Megafauna Monitoring Plan (POT 2155 Appendix F).	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on vessel operation and marine megafauna interaction	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to C are not met at any point throughout works, the following corrective actions must be undertaken:

- The Manager Environment CU will commence an investigation into all incidents or complaints relating to potential noise/vibration impacts on marine megafauna from project vessels within 24 hours, including reporting to the appropriate regulator within required statutory timeframes.
- For acute impacts to marine megafauna from noise or vibration, Manager Environment CU will liaise with DES immediately to identify rescue options and develop future corrective actions if injury to marine megafauna occurs; and assist in capture of injured animals where required following advice from regulators.
- Undertake a review of the MEMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts to marine megafauna.
- Implement additional control measures (i.e. revised exclusion zones) where noise related performance criteria are exceeded or potential MNES / marine ecology issues are indicated.
- Implement any other corrective actions as directed by the appropriate regulators.

Reporting

- The vessel Master will maintain an activity log, recording the type of activities occurring at different times to demonstrate undertaking of observations and to assist with the retrospective investigation of any incidents / complaints.
- All vessel crew will inform the Master as soon as possible in the event of a vessel noise issue that may lead to impact on marine megafauna and the Master will investigate and report to the Principal's Site Representative.

- Vessel master to maintain a record of sighted animals indicating the sighting of each individual animal and actions taken.
- Report down-time due to marine megafauna interactions in the vessel log.
- Vessel masters to record and report immediately to Port any incident involving marine megafauna interactions (marine animal strike, marine stranding or an injured, sick or dead turtle, dugong, dolphin or whale). Port will report to the Qld DES (on 1300 130 372). This reporting requirement is irrespective of whether the megafauna is dead or alive.
- Compile an incident report of all the details of any incident or near miss. The Manager Environment CU will inform the regulators within statutory timeframes in the event of a significant noise issue.
- Any impacts identified via the marine megafauna, inshore dolphins and shorebirds monitoring plans due to noise from vessels will be reported via the specific monitoring plans and inform reviews of the relevant Management Plan.
- The Manager Environment CU report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with vessel noise aspects, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with noise impacts from vessel operations, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

* while the ability to observe megafauna at night or in rough conditions may be limited, this is offset by the reduced risk of interaction through the use of a backhoe dredge only (stationary, slow and steady movement) and no TSHD.

7.2.4 GM4: MINIMISE IMPACTS FROM HAZARDOUS MATERIALS HANDLING AND STORAGE

This element relates to the management of hazardous materials associated with all construction, reclamation and dredging works, including the management of hydrocarbons. This element corresponds to CEMP Section 5.4.9 Minimise impacts from Hazardous Materials Handling and Storage and DMP Section 11.7 Vessel Operations – Hazardous material / liquid waste discharges.

Note that refuelling/bunkering of vessels will be subject to existing procedures and controls of the Port, including the Port Procedures and Information for Shipping published by the Department of Transport and Main Roads.

ELEMENT	HAZARDOUS MATERIALS HANDLING & STORAGE
Residual Risk Level MEDIUM	**Objectives** – To minimise the risks associated with the handling and storage of hazardous materials used in construction, reclamation and dredging activities, from impacting on MNES, particularly marine megafauna.
Aspects and Impacts – Potential impacts to the environment and terrestrial or marine megafauna (MNES) from exposure to hazards and hazardous materials. – Incorrect storage and handling of hazardous substances and wastes including regulated waste may result in contamination of the marine environment. – Spills or leakage of fuel/oil and other hazardous materials or dangerous goods may cause contamination of the marine environment. – Incidents may occur whereby contaminants are accidentally released which may adversely impact the surrounding marine environment.	
Performance Criteria / Indicators A. All works are managed in accordance with the relevant management plans (MEMP, CEMP and DMP), the *Environmental Protection Act 1994* and any other relevant approvals, standards, guidelines and statutory requirements. B. Fuel / chemical storage is kept in a secure area, and bunded to prevent spills. C. All spills are reported to Port and adequately contained and promptly cleaned up. D. No marine or stormwater contamination from leaks and spills on land or on-board vessels. E. No injury to marine megafauna because of the handling and storage of hazardous materials. F. No inappropriate storage or disposal of hazardous waste.	
Mitigation	**Responsibility**
– Hold and maintain relevant statutory licenses, permits and/or approvals prior to the storage and use of hazardous goods (particularly licensed dangerous goods) if required (to meet Performance Criteria A).	Contractors
– Undertake storage and transport of chemicals, fuel/oil, hazardous/dangerous goods in accordance with relevant manufacturer's instructions, Australian standards, guidelines and legislation (to meet Performance Criteria A, B, C, D, E and F), including: • AS1940 The Storage and Handling of Flammable and Combustible Liquids; • AS4452 The Storage and Handling of Toxic Substances; and • Dangerous goods provisions of the *Work Health and Safety Act 2011* and other legislative requirements.	Contractors
– Ensure storage areas include appropriate bunding to contain spillages in accordance with applicable standards and are covered, where practical, to prevent stormwater/wave infiltration (to meet Performance Criteria B).	Contractors
– Locate storage areas as far away from the marine environment as practical (to meet Performance Criteria B and C).	Contractors
– Maintain records on chemicals, fuel, dangerous goods and hazardous materials used during construction activities as required by safety data sheets (SDS) (to meet Performance Criteria A and F).	Contractors

– Keep safety data sheets (SDSs) for hazardous materials readily available in a prominent location and manage hazardous products in accordance with the SDS requirements (to meet Performance Criteria A).	Contractors
– Minimise the use of hazardous materials and implement alternatives where feasible (to meet Performance Criteria A and F).	Contractors
– Plan the delivery of hazardous materials to site in line with construction requirements to avoid the need to store significant quantities of hazardous materials on site (to meet Performance Criteria A and F).	Contractors
– Refuelling/bunkering of vessels to be conducted in compliance with the MSQ Port Procedures requirements and Port procedures and controls.	Contractors
– Minimise the risk of fuel/oil spills by undertaking regular inspections and maintenance of plant and equipment at or above manufacturers requirements (to meet Performance Criteria B, C and D), including: • Routine inspection of plant and equipment; and • Maintenance of site plant and equipment in accordance with manufacturer's recommendations. • Ensuring service records are up to date and the equipment has the applicable permits, licences and insurances.	Contractors
– Conduct plant and equipment maintenance and refuelling only in designated areas (to meet Performance Criteria C, D and E).	Contractors
– Conduct vessel refuelling/bunkering at designated areas in accordance with Port Procedures and Information for Shipping – Port of Townsville and other relevant protocols implemented by the Regional Harbour Master and Port (to meet Performance Criteria D and E).	Contractors
– Undertake collection and transportation of designated hazardous wastes by an appropriately licensed contractor only (to meet Performance Criteria A and F).	Contractors
– Minimise the risk of contaminant spills by developing and implementing specific hazardous material handling procedures based on vessel and construction activities (to meet Performance Criteria A, B and F).	Contractors
– Maintain appropriate spill kits, spill control materials (e.g. booms, absorbent materials), personal protective equipment and relevant operator instructions / emergency procedures for the management of hazardous materials on all vessels, in a conveniently location so that spills can be quickly responded to (to meet Performance Criteria A, C, D, E and F).	Contractors
– Implement emergency response procedures for fuel, oil and chemical use including as a minimum the use of appropriate spill response kits, the involvement of adequately trained personnel and the incorporation of a contact protocol for emergency services and the notification of regulators (to meet Performance Criteria A and C).	Contractors
– Make available first aid and firefighting equipment at the site (to meet Performance Criteria A).	Contractors
Training (to meet Performance Criteria A to F)	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of the MEMP, DMP and CEMP regarding hazardous materials handling and storage and spill response	Contractors Manager Environment CU
– Ensure that relevant personnel are trained in spill response, including the use of spill kits and spill control materials.	Contractors
Monitoring and Auditing	**Responsibility**
– Undertake routine inspections to monitor construction site for compliance with hazardous material handling and storage requirements, including maintenance of spill kits, checking for leaks, spillage and damage to bunded/storage/refuelling areas and plant and equipment.	Contractors Environmental Advisor CU

– Undertake regular visual inspections of hazardous waste storage containers to determine their integrity and identify if any spills or leakage has or is occurring.	Contractors Environmental Advisor CU
– Undertake visual inspections of fuel transferring equipment and surrounding water during and after fuel transfer.	Contractors
– Inspect the SDS register regularly for currency and completeness.	Contractors Safety Officer CU
– Undertake checks of compliance against the relevant management plan through auditing processes (Section 4.13).	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on hazardous material storage and handling where issues arise	Environmental Advisor CU

Corrective actions

Where Performance Criteria A to F are not met throughout construction and reclamation, the following corrective actions must be undertaken:

- Maintain and repair any damage to storage areas and/or bunds promptly.
- Implement additional control measures as soon as practicable where performance criteria are exceeded or hazardous materials issues are identified.
- The Manager Environment CU will commence an investigation into all incidents relating to hazardous materials and/or fuel bunkering and undertake appropriate corrective or remedial actions, as required to render the area safe and avoid or minimise environmental harm.
- The Manager Environment CU will respond to all complaints in relation to hazardous materials within five business days and address concerns as required.
- Contractor to review fuelling practices and rectify immediately if an unintentional release or spill occurs.
- Undertake a review of the management plans (e.g. CEMP) to determine if further controls are required where investigations show control measures are not fit for purpose.
- Contractor to review procedures, if procedures breakdown or a spill occurs and train staff about appropriate responses.
- Implement any other corrective actions and mitigation measures as directed by the appropriate regulators.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to assist with the retrospective investigation of any incidents / complaints / land contamination issues.
- All CU Project personnel will inform the Manager Environment CU and/or Principal's Site Representative immediately of any incidents caused by the handling and storage of hazardous materials resulting in potential or actual environmental harm. The Manager Environment CU will investigate and report to the Principal's Representative with any additional investigation(s) undertaken as required.
- The Manager Environment CU will report to the appropriate regulators any release of contaminants or other significant incident (if not reported directly by Contractors), including any follow up actions/remediation/adaptive management undertaken.
- Provide incident reports detailing any spills or incidents involving hazardous waste, fuel bunkering and clean-up operations as per Environmental Incident procedures.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger auditing and reporting activities in association with hazardous materials handling and storage, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with hazardous materials on site, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring and auditing specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
  - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
  - performance reports indicate performance targets/indicators may not be achieved; and
  - according to approved timeframes; or the impacts of significant environmental incidents.

7.2.5 GM5: MINIMISE IMPACTS FROM WASTE GENERATION AND MANAGEMENT

This element relates to the management of waste from all construction, reclamation and dredging works, including minimisation of waste generation. This element corresponds to CEMP Section 5.4.10 Minimise impacts from waste generation and management and DMP 11.8 Vessel operations – Solid waste management.

ELEMENT	WASTE MANAGEMENT	
Residual Risk Level LOW	**Objective** – To avoid impacts from general waste impacting upon MNES from construction, reclamation and dredging activities – To appropriately handle, store, recycle and dispose of all waste materials generated during construction, reclamation and dredging activities to prevent impacts on MNES, particularly marine megafauna. – To prevent litter or waste generated by the construction activities from causing a hazard or nuisance.	
Aspects and Impacts – Construction, reclamation and dredging activities will generate waste (i.e. packaging, general waste, effluent). – Incorrect handling and storage of waste may result in the introduction of wastes into the marine environment. – Incorrect handling and storage of waste may encourage pests (7.3.5).		
Performance Criteria / Indicators A. All waste is managed in accordance with the relevant management plans (CEMP POT 2099, DMP POT 2095), the *Environmental Protection Act 1994* and any other relevant approvals, standards, guidelines and statutory requirements. B. No injury of death to marine megafauna / MNES because of waste generated from construction, reclamation and dredging activities. C. No substantiated complaints are received from regulators or the community in relation to waste issues.		
Mitigation		**Responsibility**
– Adopt the waste management hierarchy (i.e. avoid, re-use, recycle, energy recover and dispose) (to meet Performance Criteria A).		Contractors
– Avoid impacts to MNES, (to meet Performance Criteria B), by: • Minimising the amount of any materials required to be brought and stored on site, including on vessels; and • Implementing options to reduce the amount of packaging on procured goods.		Contractors
– Store all general waste, recyclable wastes and non-recyclable materials/wastes (including foods, regulated and hazardous wastes) in separate bins or areas as appropriate. Ensure regular collection by a licensed waste contractor and recycling/disposal off-site in a licensed facility (to meet Performance Criteria A).		Contractors
– Store hazardous wastes and storage containers in an appropriately bunded area (see Section 7.2.4) (to meet Performance Criteria A, B and C).		Contractors
– Secure waste disposal bins and fit with secure lids to prevent waste material being blown into stormwater or the marine environment during storage or handling (to meet Performance Criteria A, B and C).		Contractors
– Keep waste, which has the propensity to blow away or attract Pests and native fauna, in receptacles with lids (to meet Performance Criteria A and B).		Contractors
– Conduct general waste transport in a manner that does not cause littering or unlawful waste disposal or generate excessive odours (to meet Performance Criteria A, B and C).		Contractors
Training (to meet Performance Criteria A, B and C) – Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of the MEMP, DMP and CEMP regarding waste management.		Contractors Manager Environment CU

Monitoring and Auditing	**Responsibility**
– Undertake regular inspections of on-site facilities to ensure all waste is being stored, handled, disposed and transported in accordance with regulations.	Environmental Advisor CU
– Undertake regular visual inspections of waste storage containers to determine their integrity and identify if any spills or leaks have occurred.	Environmental Advisor CU
– Undertake inspections of the effectiveness of waste management controls before and after extreme weather events or significant rainfall events.	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on minimising waste generation and management where issues arise	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to C are not met at any point throughout construction and reclamation, the following corrective actions must be undertaken:

- Retrieve any waste material lost to stormwater or the marine environment, if practicable.
- Review waste management practices causing material loss and take immediate action to rectify.
- Implement additional waste management control measures and training where performance criteria are exceeded or waste issues are identified.
- The Manager Environment CU will commence an investigation into all incidents in relation to waste management within five business days, including reporting to the appropriate regulator, where MNES are involved, within statutory timeframes.
- The Manager Environment CU will respond to all complaints received in relation to waste management within five business days and address valid concerns as required.
- Undertake a review of the MEMP/CEMP to determine if further controls are needed where investigations show unacceptable waste issues.
- Implement any other corrective actions as directed by the appropriate regulators.

Reporting

- The Contractor will maintain a waste tracking system, recording the movement of waste to assist with the retrospective investigation of any incidents / complaints.
- All CU Project personnel will inform the Manager Environment CU and/or Works Engineer CU as soon as possible in the event of significant waste management issue. The Manager Environment CU will investigate and report to the Principal's Representative with any additional investigation(s) undertaken as required.
- The Manager Environment CU report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor will effectively coordinate, schedule and/or trigger auditing and reporting activities in association with waste management, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with construction related wastes, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring and auditing specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
  - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
  - performance reports indicate performance targets/indicators may not be achieved; and
  - according to approved timeframes; or the impacts of significant environmental incidents.

7.2.6 GM6: MINIMISE IMPACTS TO CULTURAL HERITAGE

This element relates to the management of construction, reclamation and dredging activities to avoid and minimise impacts to cultural heritage. This element corresponds to CEMP Section 5.4.13/5.4.14 Cultural heritage (Traditional owner and General) and DMP Section 11.9 Cultural Heritage.

ELEMENT	CULTURAL HERITAGE
Residual Risk Level MEDIUM	**Objective** – To conduct all construction activities in accordance with the *Aboriginal and Cultural Heritage Act 2003* Duty of Care Guidelines – To avoid disturbance of significant Traditional Owner values, artefacts or places during construction and dredging activities.
Aspects and Impacts – Construction and dredging activities have the potential to impact on MNES that have significance from a cultural heritage perspective. – Disturbance or loss of significant Traditional Owner cultural heritage values may occur.	
Performance Criteria / Indicators A. All works are managed in accordance with the relevant management plans, the applicable Commonwealth and State legislation and standards and any other relevant approvals, standards, guidelines and statutory requirements. B. No loss or disturbance of significant Traditional Owner values resulting from construction activities. C. No substantiated complaints from the regulators or people likely to be affected by damage to Traditional Owner areas or sites.	
Mitigation	**Responsibility**
– Implement the existing Cultural Heritage Management Plan developed in consultation with Traditional Owners (to meet Performance Criteria B).	Port Legal Section
– Engage in ongoing consultation with Traditional Owners in accordance with the Cultural Heritage Management Plan (to meet Performance Criteria A).	Construction Team CU Contractors
– Provide cultural heritage induction to relevant Project personnel prior to commencement of work (to meet Performance Criteria B and C).	Port Legal Section
– Where Traditional Owner cultural heritage values (associated with MNES) are impacted during construction activities, works are to cease immediately in the vicinity (minimum radius of 20m) of the location pending a review by Traditional Owner representative(s) (to meet Performance Criteria A).	Contractors Construction Team CU
– Cease work immediately (within 100 m of the remains) if human skeletal material is discovered during construction activities. Contact immediately the Queensland Police, Cultural Heritage Coordination Unit (Department of Environment and Science (DES)) and Traditional Owner representative(s).	Contractors Construction Team CU
– Works in the area are not to recommence in the vicinity of the location until agreed actions are implemented or Traditional Owner representative/s confirm issue is resolved (to meet Performance Criteria A, B and C).	Contractors Construction Team CU
Training (to meet Performance Criteria A, B and C).	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of the MEMP regarding cultural heritage.	Contractors Manager Environment CU
Monitoring and Auditing	**Responsibility**
– Undertake site inspections to assess the implementation of the mitigation measures to confirm that specific controls and work practices are employed and effective.	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on cultural heritage matters if changes to arrangements are required.	Environmental Advisor CU

Corrective actions

- Port Legal Section to investigate all incidents in relation to cultural heritage within five business days of initial notification and implement recommended and appropriate management actions.
- Port Legal Section to respond to all complaints relating to cultural heritage within five business days and address valid concerns as required.
- Port Legal Section to review the Cultural Heritage Management Plan and consultation protocol if there are risks of unexpected adverse impacts or in response to complaints.
- Follow advice provided after site inspections by a representative from the Traditional Owners.
- Undertake a review of the MEMP/CEMP and implement further controls where investigations show non-conformances in relation to cultural heritage or cultural heritage issues are identified or have the potential to occur in the future and rectify in an appropriate manner and in consultation with the Traditional Owners.
- Implement any other corrective actions as directed by the appropriate regulators.

Reporting

- As per the requirements outlined in the CHMP or as directed following a discovery or an item or object
- All CU Project personnel will notify the Manager Environment CU and/or Principal's Site Representative immediately of any actions that have the potential to impact on matters of cultural heritage significance. The Port Legal Section will investigate and report to the Principal's Representative.
- The Manager Environment CU and the Port Legal Unit will inform the Traditional Owners / DES of any suspected Traditional Owner discoveries in accordance with the Cultural Heritage Management Plan.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger risk management, auditing and reporting activities, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with Traditional owner cultural heritage, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring and auditing specified in this element demonstrate a risk to the environment or MNES; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.2.7 GM7: MINIMISE IMPACTS FROM ARTIFICIAL LIGHT

This element relates to the management of artificial light impacts from construction, reclamation and dredging activities to avoid and minimise impacts to MNES. This element corresponds to CEMP Section 5.4.15 – Visual Amenity & Lighting and to DMP Section 11.6 Vessel operations – Emissions.

Dredging and reclamation works will occur at all hours and would require lighting at all times for dredging operations, vessels, at the temporary offloading facility and active parts of the reclamation area to allow for safe working conditions.

ELEMENT	ARTIFICIAL LIGHT
Residual Risk Level MEDIUM	**Objective** – To minimise temporary/potentially adverse light impacts on MNES, particularly marine megafauna, associated with construction activities. – To avoid light pollution generated for construction activities.
Aspects and Impacts – Light spill from construction, reclamation and dredging activities may disturb or negatively impact on MNES, particularly marine and terrestrial megafauna.	
Performance Criteria / Indicators A. No significant long-term behavioural impacts to marine megafauna or terrestrial avifauna due to light disturbance from the construction activities, as measured through: - the Inshore Dolphin Monitoring Plan (Appendix E, POT 2154); - the Marine Megafauna Monitoring Plan (Appendix F, POT 2155); and - the Shorebird Monitoring Plan (Appendix G, POT 2156). B. All works are managed in accordance with the relevant management plans (CEMP, DMP), the applicable Commonwealth and State legislation and standards and any other relevant approvals, standards, guidelines and statutory requirements. C. Minimal light spill outside of Port operational areas, whilst maintaining suitable and safe navigational lighting throughout construction and reclamation D. No substantiated complaints are received from regulators or the community in relation to visual amenity or lighting.	
Mitigation	**Responsibility**
– Manage lighting design, installation and orientation to reduce light spill, ensuring it remains compliant with Operational Health and Safety and maritime safety requirements (to meet Performance Criteria A).	Contractors Construction Team CU
– Where safe to do so, design and orientate lighting on the construction site, (to meet Performance Criteria C and D) to: • Reduce light spill from the site in the direction of shorebird habitat on the spit at the mouth of Ross River; and • Reduce light spill from the site onto the surrounding marine environment.	Contractors Environment Manager CU
– Comply with relevant guidelines for exterior lighting, such as AS4282: Control of the Obtrusive Effects of Outdoor Lighting to minimise light spill (to meet Performance Criteria B and C).	Contractors
– Apply light spill control measures where it is determined there is a high risk to marine and / or terrestrial fauna (to meet Performance Criteria A and B).	Contractors
– Light levels from the dredging works will be limited to those lights that are necessary for the safe operation of the vessel and the health and safety of those on board	
– Rockwall construction activities will be primarily daylight operations (to meet Performance Criteria A to D).	Contractors Environment Manager CU
– For operations occurring at night, ensure direction of light is away from sensitive areas (e.g. shorebird roosting sites) where possible.	Contractors Environment Manager CU

– Review the results of each monitoring survey to capture any potentially negative trends forming in behavioural patterns (particularly shorebirds) associated with the construction works lighting (to meet Performance Criteria A)	Environmental Advisor CU
Training (to meet Performance Criteria A to D).	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements regarding lighting issues.	Contractors Manager Environment CU
Monitoring and Auditing	**Responsibility**
– Undertake regular inspection of areas surrounding the port development area, particularly following changed lighting conditions e.g. at different phases of the CU Project to assess any light spill.	Contractors Environmental Advisor CU
– Conduct monitoring in accordance with the Inshore Dolphin, Marine Megafauna and Shorebird Monitoring Plans (Appendix E, Appendix F, Appendix G) to determine if any project related impacts occur on megafauna and/or shorebird behaviour.	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on artificial light impacts and management where issues arise	Environmental Advisor CU

Corrective actions

Where Performance Criteria A to D are not met at any point throughout construction and reclamation, the following corrective actions must be undertaken:

- Review and modify lighting management practices if any adverse impacts are observed / reported.
- The Manager Environment CU will commence an investigation into all incidents in relation to lighting impacts to MNES within five business days including reporting to the appropriate regulator within statutory timeframes.
- The Manager Environment CU will respond to all complaints or issues noted in relation to lighting impacts within five business days and address valid concerns as required.
- Undertake a review of the MEMP/CEMP and implement further controls where investigations show unacceptable impacts from lighting.
- Implement any other corrective actions as directed by the appropriate regulators.

Reporting

- All CU Project personnel will inform the Manager Environment CU and/or Principal's Site Representative of any incidents regarding light spill or potential impacts on the marine environment. The Manager Environment CU will investigate and report to the Principal's Representative with any additional investigation(s) undertaken as required.
- The Manager Environment CU provide a report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with project lighting and light spill, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with construction lighting impacts, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring and auditing specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
        - performance reports indicate performance targets/indicators may not be achieved; and
        - according to approved timeframes; or the impacts of significant environmental incidents.

7.3 CONSTRUCTION

7.3.1 CR1: MINIMISE IMPACTS FROM CONSTRUCTION FOOTPRINT

This element relates to the direct loss of habitat associated with the footprint of CU Project rockwall structures. Note that losses for seagrass within the construction footprint will require offsetting, as per the POT 2094 Offset Management Strategy.

ELEMENT	CONSTRUCTION FOOTPRINT
Residual Risk level LOW	**Objective** To minimise the impact of the reclamation, breakwater shortening and offloading facility footprints on MNES, particularly marine megafauna.
Aspects and Impacts – The construction of the land reclamation, breakwater shortening and offloading facility removes, or fragments habitat used by megafauna in Cleveland Bay – Seagrass meadows in the construction footprints are destroyed removing habitat for megafauna. – Removal of habitat may result in long term disturbance or behavioural change to marine megafauna.	
Performance Criteria / Indicators A. All construction and reclamation works are kept within the boundary of the approved areas. B. Any seagrass meadows in the rockwall footprints surveyed and quantified (via the Seagrass Footprint Survey, 2018). C. If seagrass meadows are found in the construction footprints, they are offset to the satisfaction of the regulators.	
Mitigation – Reclamation footprint restricted to location and size as per EPBC Act approval 2011-5979, as shown in Figure 3 (to meet Performance Criteria A). Breakwater shortening and offloading facility footprints restricted to the location and size set out in operational development permits (once obtained).	**Responsibility** Contractors Manager Environment CU
Monitoring / Auditing – Undertake a survey of the reclamation area before the commencement of construction to determine the presence and density of seagrass within the construction footprints (as per EPBC Act Approval Condition 9). Completed in 2018. – Construction and reclamation works will be spatially/cadastral surveyed to ensure works remain within the approved footprint. For the rockwall, this includes survey as per the Reclamation Integrity Plan within the CEMP POT 2099). – Construction and reclamation works will be subject to RPEQ certification 'for construction drawings' and 'as constructed drawings'.	**Responsibility** Manager Environment CU Construction Team CU Construction Team CU
Corrective Actions Where Performance Criteria A to D are not met at any point throughout construction, the following corrective actions must be undertaken: – Where performance criteria are exceeded, the Manager Environment CU will commence a formal investigation of the exceedance within 5 business days of identification of exceedance, including reporting to the appropriate regulator within statutory timeframes. – Principal's Site Representative / Works Engineer CU to investigate any incidents where material is found to be placed outside of the approved footprints. – Rock associated with the construction works found to be outside of the approved footprint to be removed unless otherwise agreed.	
Reporting – The Contractor will maintain an activity log, recording the type of activities at different times to assist with the retrospective investigation of any incidents / complaints. – The Works Engineer CU will ensure regular spatial surveys of the construction works are undertaken to ensure it remains within the identified alignment.	

- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with the construction footprint aspects, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with construction footprints, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will address the consequences of significant environmental incidents;
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.3.2 CR2: MINIMISE IMPACTS FROM LAND CONTAMINATION

This element relates to the placement of material within the reclamation area as well as controlling other potential sources of contaminants. This element corresponds to POT 2099 CEMP Section 5.4.1 – Land; and supporting plans.

ELEMENT	MINIMISE IMPACTS FROM LAND CONTAMINATION
Residual Risk level SUBSTANTIAL	**Objective** To avoid environmental harm as a result of reclamation activities from instability of rock walls, Potential Acid Sulphate Soils (PASS) and contaminated Soil.
Aspects and Impacts – Collapses or failures of the structural integrity of the rock walls may release dredge material and cause adverse impacts in the marine environment (sections 7.3.3 and 7.3.4). – Disturbed capital dredge material or excavated PASS material or imported soil/fill placed in the reclamation area may cause potential land contamination that leaches into Cleveland Bay. – Spills or leakage of fuel/oil and other hazardous materials or dangerous goods may cause soil contamination (Section 7.2.4) and release of contaminants to the marine environment.	
Performance Criteria / Indicators A. All works are managed in accordance with the relevant management plan (CEMP POT 2099), the applicable Commonwealth and State legislation and standards and any other relevant approvals, standards, guidelines (NAGD, NEPM, Queensland Acid Sulfate Soil Technical Manual) and statutory requirements. B. PASS and contamination management procedures are implemented. C. Tailwater monitoring results are within release levels. D. All rock or fill material from external sources brought into site will meet design specifications and relevant environmental standards. E. No substantiated complaints are received from regulators or the community in relation to water quality impacts from the reclamation.	
Mitigation	**Responsibility**
– Undertake an analysis of the sediment to be dredged in capital dredge areas (against the NAGD standards), before commencement of dredging, to determine contamination status/management requirements including the Holocene soils to confirm PASS status/management requirements (to meet Performance Criteria A and B).	Manager Environment CU
– The movement of PASS material (if found) during the dredging works, will be loading into Hopper Barges, unloaded at the Temporary Unloading Facility and then transported and placed by trucks within the reclamation (back underwater) within 12 hours. By placing the material into the reclamation area within this time frame, PASS material, will remain saturated, preventing oxidisation for occurring. (to meet Performance Criteria A and B).	Contractors
– Place dredge material carefully to limit the extent of heaving and formation of mud waves from the existing soft soil seabed (typically <1.5 m thick) to below the mid-water level using confining pressure and encapsulation (to meet Performance Criteria A and E).	Contractors
– Ensure preferential placement and treatment of PASS in dedicated storage area within reclamation (to meet Performance Criteria B)	Contractors
– Implement and maintain a relevant Acid Sulfate Soil and Contamination Management Plan (POT 2100) for management and monitoring of the rock wall construction and reclamation to inform CU Project personnel of the risks and management requirements for PASS (to meet Performance Criteria A to E).	Contractors Construction Team CU Environmental Advisor CU
– Implement the Tailwater Management Plan (POT 2101) including appropriate trigger levels and protocols for the release of tailwater (to meet Performance Criteria C).	Contractors Environmental Advisor CU
– Implement the Reclamation Integrity Monitoring Plan for monitoring the integrity of rock walls (to meet Performance Criteria A and D).	Principal's Site Representative

– Reclamation ponds to be lined with geofabric prior to deposition of dredge material to contain materials and potential contaminants (to meet Performance Criteria A).	Works Engineer CU
Training (to meet Performance Criteria A to E)	
- Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements for PASS and contaminated soil management.	Contractors Manager Environment CU
Monitoring / Auditing	**Responsibility**
- Tailwater monitoring conducted as per Tailwater Management Plan (POT 2101).	Contractors Environmental Advisor CU
- Monitoring conducted as per the Acid Sulphate Soil and Contamination Management Plan (POT 2100).	Contractors Environmental Advisor CU
- Conduct monitoring in accordance with the Reclamation Integrity Plan.	Works Engineer CU
- Undertake regular sites inspections to monitor land contamination to determine the effectiveness of mitigation measures.	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on ASS and Tailwater monitoring and management where issues arise	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to E are not met at any point throughout construction and reclamation, the following corrective actions must be undertaken:

- Manage any material impacted by spills and/or contamination through Contractor spill responses procedures.
- Undertake a review of reclamation management practices if pH and/or dissolved oxygen drops in tailwater within the reclamation area.
- Review reclamation management practices if adverse impacts are observed.
- Treat any PASS impacted areas in accordance with accordance with the mitigation actions outlined in the Acid Sulphate Soil and Contamination Management Plan (POT 2100).
- The Manager Environment CU will commence an investigation into all incidents in relation to land contamination within five business days, including reporting to the appropriate regulator, where MNES are involved, within statutory timeframes
- The Manager Environment CU will respond to all complaints in relation to land contamination within five business days and address valid concerns as required.
- Undertake a review of both the MEMP and CEMP and associated plans to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts from land contamination issues.
- Implement any other corrective actions as directed by regulators.

Reporting

- The Contractor will maintain a log of placement location of barge loads, particularly barge loads with PASS material, for specific management and monitoring as per the ASSCMP.
- The Contractor will maintain an activity log, recording the type of activities occurring at different times to assist with the retrospective investigation of any incidents / complaints / land contamination issues.
- All CU Project personnel will inform the Manager Environment CU and/or Principal's Site Representative as soon as possible in the event of a significant land contamination or PASS control issue. The Manager Environment CU will report to the Principal's Representative with any additional investigation(s) undertaken as required.
- Reporting of tailwater release, monitoring and management as established in the Tailwater Management Plan.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with the CEMP Land aspects, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with land contamination from construction activities and reclamation

integrity, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;

- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved;
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.3.3 CR3: MINIMISE IMPACTS TO WATER QUALITY (STORMWATER)

This element relates to the management of construction works to prevent the release of contaminants into the marine environment, primarily through stormwater runoff from landside construction areas. This corresponds to POT 2099 CEMP Section 5.4.2 – Stormwater, Sediment & Erosion Control and supporting plans.

ELEMENT	WATER QUALITY (STORMWATER)
Residual Risk level LOW	**Objectives** – To avoid or minimise turbidity impacts to MNES in the marine environment from construction activities. – To minimise the risks associated with sediments generated by construction activities entering stormwater released from construction sites from impacting on MNES.

Aspects and Impacts

- Earthworks activities will expose soil that may increase erosion leading to increased suspended sediment concentration in stormwater runoff.
- Rock stockpiling activities and rock truck haulage may increase the suspended sediment concentration in stormwater.
- Shortening of the eastern breakwater may expose a small amount of fines within the breakwater which may increase the localised suspended sediment concentration in marine water.
- Exposure and potential release of sediments and contaminants from construction activities and stormwater to marine water and marine sediments may have adverse direct or indirect impacts on marine life.
- Rain events / wet season can lead to sediment-laden stormwater leaving the construction site and entering the marine environment, which may impact upon the localised water quality.

Performance Criteria / Indicators

A. All works are managed in accordance with the relevant management plans (including project CEMP POT 2099, Stormwater, Sediment and Erosion Control Plan POT 2137, and Acid Sulfate Soil Contamination Management Plan POT 2100), the *Soil Erosion and Sediment Control – Engineering Guidelines for Queensland Construction Sites* (The Institution of Engineers, Australia (Qld)), the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*, best earthworks practice and any other relevant approvals, standards, guidelines and statutory requirements (such as IECA 2008).
B. No exceedance of surface water release limits stipulated in the Queensland State Government Approval, or limits set out in the CU Site Monitoring Plan (POT 2103).
C. No impact to water quality in the receiving environment as a result of contaminated stormwater, or ineffective sediment and erosion control as identified through the site monitoring plan (POT 2103).
D. No failure of sediment and erosion controls (i.e. controls are maintained, fit for purpose or rectified before next event) in normal wet season conditions/events.
E. No complaints are received from regulators or the community in relation to stormwater management or sediment and erosion control issues.

Mitigation	**Responsibility**
– Implement the site specific Stormwater, Sediment and Erosion Control Plan (POT 2137), in accordance with the International Erosion Control Association's "Best Practice Erosion and Sediment Control" guidelines (to meet Performance Criteria A).	Contractors Construction Team CU Environmental Advisor CU
– Standard mitigation measures related to sediment plume from works involving the placement or removal of rock and other material from the marine environment are to be implemented, including (to meet Performance Criteria C): • Minimising fines contents in rock prior to being placed (where practical); • Rock materials to be placed/pushed by excavators rather than end dumped into the water; • Operators will undertake visual monitoring of the surrounding environment for any extensive visible plumes created by the in water works and modify works accordingly; • Other sediment plume mitigations as required by regulators	Contractors

– Implement the CU Site Monitoring Plan (POT2103) to provide routine and event based monitoring to predict potential water quality issues (to meet Performance Criteria B).	Environmental Advisor CU
Training (to meet Performance Criteria A to E)	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements regarding stormwater management and sediment and erosion control.	Contractors Manager Environment CU
Monitoring / Auditing	**Responsibility**
– Conduct monitoring and observation of weather conditions and alerts relevant to the site, including extreme weather events.	Contractors Construction Team CU
- Conduct monitoring in accordance with the CU Site Monitoring Plan, including review of any results against the standards stated in the plan.	Environmental Advisor CU
– Undertake regular site inspections to check for damage to sediment and erosion controls and the effectiveness of sediment and erosion control measures in accordance with the CU Stormwater & Sediment Erosion Control Plan.	Environmental Advisor CU Construction Team CU
– Undertake regular inspections of stormwater run-off areas to check for cleanliness and potential for contaminants to impact on water quality and effectiveness of stormwater and sediment and erosion control measures, particularly after significant rainfall events.	Environmental Advisor CU
– Conduct visual observations of the settling ponds to check for scum formations, oil spills etc.	Contractors Environmental Advisor CU
– Undertake regular site inspections to check for damage to reclamation area and the effectiveness of geofabric control measures on the bund walls.	Construction Team CU Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on stormwater contamination and management where issues arise	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to E are not met at any point throughout construction and reclamation, the following corrective actions must be undertaken:

- Where stormwater controls are observed to be ineffective, or site monitoring results in exceedance of water quality guidelines, sediment and erosion control structures/procedures are to be fixed within 5 business days (where safe to do so). This will include: re-instating silt fences and bunds, and compaction and covering of loose/unconsolidated material.
- Implement additional control measures (i.e. silt curtain) if operationally viable where in water works create excessive sediment plumes.
- The Manager Environment CU will investigate all incidents in relating to stormwater, sediment and erosion control, or tailwater management issues within five business days of an exceedance, including reporting to the appropriate regulator within Statutory timeframes.
- The Manager Environment CU will respond to all complaints in relation to stormwater management or sediment and erosion control issues within five business days and address valid concerns, as required.
- Undertake a review of the MEMP, CEMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts from stormwater quality or failure of sediment and erosion controls.
- Implement any other corrective actions as directed by regulators.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to assist with retrospective investigation of incidents / complaints.
- All CU Project personnel will inform the Manager Environment CU and Principal's Site Representative as soon as possible in the event of a stormwater or sediment and erosion control issue, an uncontrolled stormwater release and/or uncontained spill. The Manager Environment CU will report to the Principal's Representative, with any additional investigation(s) undertaken as required.
- The Environmental Advisor CU will maintain monitoring results in a database for each monitoring event. On completion of the CU Project, the database will be stored in accordance with legal record retention requirements.
- The Environmental Advisor CU will prepare a final monitoring report at the end of the CU Project.

- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with stormwater, sediment and erosion control, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with stormwater contamination and sediment and erosion control, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.3.4 CR4: MINIMISE IMPACTS TO WATER QUALITY (TAILWATER)

This element relates to the management of tailwater discharges from the reclamation area. This corresponds to POT 2099 CEMP Section 5.4.3 – Tailwater and supporting plans.

ELEMENT	WATER QUALITY (TAILWATER)
Residual Risk level MEDIUM	**Objectives** – To avoid or minimise turbidity impacts to MNES in the marine environment from tailwater releases. – To ensure the release of tailwater (discharge waters from the reclamation area) to the environment is of an acceptable standard.
Aspects and Impacts – The capital dredge material will be mechanically placed into the reclamation area, with tailwater moving through the site to the approved tailwater discharge location into Cleveland Bay. – The release of tailwater has the potential to adversely impact on the adjacent marine water and sediment quality.	
Performance Criteria / Indicators A. All works are managed in accordance with the relevant management plans (including project CEMP POT 2099, Tailwater Management Plan POT 2101, and Acid Sulfate Soil Contamination Management Plan POT 2100), the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* and any other relevant approvals, standards, guidelines and statutory requirements. B. No exceedance of surface water release limits stipulated in the Queensland State Government Approval, or limits set out in the CU Tailwater Management Plan (POT 2101). C. No impact to water quality in the receiving environment through tailwater releases as identified through the tailwater management plan (POT 2101). D. No substantiated complaints are received from regulators or the community in relation to tailwater issues.	
Mitigation	**Responsibility**
– Direct and control all active tailwater releases through the approved tailwater discharge location, only when tailwater is within release limits (to meet Performance Criteria A to D).	Contractors
– Implement the Tailwater Management Plan (POT2101) (to meet Performance Criteria A to C), comprising: • Turbidity/Total Suspended Solids (TSS)/pH/Dissolved Oxygen (DO) sampling in proximity to the tailwater pipe; • Appropriate triggers and protocols e.g. monitor water quality of standing water within the reclamation area prior to a controlled release; and • Plume validation monitoring of turbidity/TSS/metals in receiving waters adjacent to the tailwater outlet.	Contractors Environmental Advisor CU
– Cease operation of the reclamation activity and move equipment to a safe location in the event of extreme weather conditions (e.g. cyclone) (to meet Performance Criteria A, B, C and D).	Contractor
– Manage ASS and PASS in accordance with the Acid Sulfate Soil and Contamination Management Plan (POT 2100) (to meet Performance Criteria A and B).	Contractors Construction Team CU
– For seepage, prevent potential piping of sediment fines through the suitably designed wall of the reclamation area with tailwater management controls (i.e. tailwater prevented from entering the sea by use of rock geotextile fabric filter layer on bund walls or other control measures) (to meet Performance Criteria A to D).	Contractors Construction Team CU
– Review the on-site control measures promptly, if turbidity/TSS/pH/DO in the tailwater exceeds the performance criteria, to ensure that all reasonable and practicable measures are being taken in terms of both reclamation operations and the hydrologic and sediment loading in the reclamation pond(s) (to meet Performance Criteria A to D).	Contractors Environmental Advisor CU Construction Team CU
Training (to meet Performance Criteria A to D)	

– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements regarding tailwater management.	Contractors Manager Environment CU
Monitoring / Auditing	**Responsibility**
– Conduct monitoring and observation of weather conditions and alerts relevant to the site, including extreme weather events.	Contractors
– Conduct monitoring in accordance with the Tailwater Management Plan and analyse the results in comparison to the Queensland State Government approval conditions.	Contractors (within reclamation) Environmental Advisor CU (receiving environment)
– Conduct monitoring of the spatial extent of the mixing zone during tailwater release events for plume validation (i.e. within first 40 business days of discharge commencing only).	Environmental Advisor CU
– Conduct tailwater plume validation monitoring and analyse the results to verify modelling results (i.e. within first 40 business days of discharge commencing only).	Environmental Advisor CU
– Undertake regular site inspections to check for damage to reclamation area and the effectiveness of geofabric control measures on the bund walls.	Contractors Environmental Advisor CU
– Undertake regular inspections of the site to check for effectiveness of tailwater control measures, particularly after significant rainfall events.	Contractors Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on tailwater monitoring and management where issues arise	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to D are not met at any point throughout dredging and discharge, the following corrective actions must be undertaken:

- The Environmental Advisor CU/Manager Environment CU will investigate all incidents in relating to or tailwater management issues within five business days of an exceedance, including reporting to the appropriate regulator within statutory timeframes.
- The Environmental Advisor CU/Manager Environment CU will respond to all complaints in relation to tailwater management issues within five business days and address valid concerns, as required.
- Undertake a review of the MEMP, DMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts from tailwater management.
- Specific to Performance Criteria B - Implement the following corrective actions if continual turbidity/TSS/pH/DO exceedances are observed:
    - Increase tailwater residence time in the reclamation pond;
    - Install of additional settling pond(s) to allow further settlement before being released, or instal internal bund walls if required;
    - Modify decanting rates via the tailwater release pipes and ensure hydraulic efficiency; and/or
    - Install additional controls in the reclamation pond or other controls that can regulate wind and wave action in the settling pond(s).
- Specific to Performance Criteria C - Implement the following corrective actions if the tailwater pH is outside of the specified range:
    - Add lime or other mechanism to increase pH and monitor pH during dosing to limit risk of over dosing; and/or
    - Review implementation of ASS/PASS treatment measures to ensure effectiveness.
- Implement any other corrective actions as directed by regulators.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring during various times of the day, especially tailwater pump operating times, to assist with retrospective investigation of incidents / complaints.
- All CU Project personnel will inform the Manager Environment CU and Principal's Site Representative as soon as possible in the event of a tailwater discharge issue. The Manager Environment CU will report to the Principal's Representative, with any additional investigation(s) undertaken as required.
- The Environmental Advisor CU will maintain monitoring results in a database for each monitoring event. On completion of the CU Project, the database will be stored in accordance with legal record retention requirements.

- The Environmental Advisor CU will develop a report within 40 Business days of commencing tailwater releases to identify and describe any adverse impacts to receiving water environmental values (including suitability of tailwater release limits) due to authorised tailwater releases.
- The Environmental Advisor CU will report tailwater performance regularly to relevant committees.
- Reporting of tailwater release, monitoring and management as established in the Tailwater Management Plan.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with tailwater management, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with tailwater management, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.3.5 CR5: MINIMISE IMPACTS FROM INVASIVE PESTS AND INTRODUCED SPECIES (TERRESTRIAL)

This element relates to the management of pest species associated with landside construction works that may pose a threat to the environment, including avifauna. This element corresponds to CEMP Section 5.4.6 Weed and Animal Pest Management.

ELEMENT	INVASIVE PESTS INTRODUCED SPECIES
Residual Risk Level LOW	**Objectives** To implement effective pest species management controls and avoid the increase of existing pest populations at the Project site.

Aspects and Impacts

- Incorrect handling, storage of materials and waste and stormwater management may encourage pests and/or pest animals.

Performance Criteria / Indicators

A. All works are managed in accordance with the obligations under the relevant management plans and any other relevant approvals, standards, guidelines and statutory requirements.
B. Existing populations of introduced pests are controlled.
C. No new pest infestations from construction activities.

Mitigation	**Responsibility**
– Avoid conditions favourable to pest species (to meet performance Criteria A to C) by: • Keeping the construction site area free of food waste or other attractants to pests such as mice, rats, dogs, cats and cane toads; and • Undertaking appropriate waste management measures (Section 7.2.5). • Implement appropriate pest control measures where necessary (i.e. when pest species are identified on the site).	Works Engineer CU Contractors
– Contractors to be notified of any biosecurity detections or incursions in the area reported to the Port that may result move to the site areas.	Environmental Advisor CU
Training (to meet Performance criteria A to C)	
– Ensure that the appropriate CU Project personnel undertake environmental awareness and training covering the requirements for pest management.	Contractors Manager Environment CU
Monitoring and Auditing	**Responsibility**
– Monitor the presence and abundance of introduced pests in the construction site.	Contractor Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on terrestrial invasive pests and introduced species where issues arise	Environmental Advisor CU

Corrective actions

Where Performance Criteria A to C are not met at any point throughout construction, the following Corrective Actions must be undertaken:

- Contractors to engage licensed pest control contractor(s) to control pest numbers if required.
- Contractors to implement appropriate control measures where pest infestation or their potential to spread is identified in order to prevent reoccurrences.
- The Manager Environment CU to investigate all incidents or complaints in relation to pest infestation within five business days and undertaken appropriate actions.
- Undertake a review of the MEMP/CEMP, to determine if further controls are needed where investigations show new or expanded pest infestation.
- Implement any other corrective actions as directed by the appropriate regulators.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to assist with the retrospective investigation of any incidents / complaints.
- All CU Project personnel will inform the Manager Environment CU and Principal's Site Representative of any pest outbreaks or potential infestations/incursions. The Manager Environment CU will investigate and report to the Principal's Representative, with any additional investigation(s) undertaken as required.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with animal pest management, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with pests, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should monitoring and auditing specified in this element demonstrate a risk to the environment or MNES;
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved;
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.3.6 CR6: MINIMISE CONSTRUCTION IMPACTS OR STRIKE

This element relates to the managing the risk of direct impacts of construction activities on marine megafauna, including from the movement of construction vehicles and the placement of rock and other construction material in the water. It excludes strike risks associated with construction vessels which are managed under Section 7.2.1. This element corresponds to relevant element of POT 2099 CEMP Section 5.4.4 – Marine Ecology.

ELEMENT	CONSTRUCTION IMPACT OR STRIKE
Residual Risk level MEDIUM	**Objectives** - To avoid Impacts from construction activities involving animal strike and accidents - To avoid the risk of disturbance or injury to marine megafauna resulting from construction activities involving animal strike and accidents. - To avoid adverse direct and indirect impacts on MNES, particularly marine megafauna from construction activities. - To manage risks associated with extreme weather events on MNES during construction activities; - To establish and maintain awareness of the importance of protecting marine megafauna.
Aspects and Impacts – Interactions between placement of construction and rockwall material and marine megafauna may result in disturbance or injury to marine megafauna. – Equipment and construction machinery strike during construction activities to marine megafauna may result in injury or death of individuals, especially for areas trafficked by construction vehicles which are accessible to susceptible megafauna (especially marine turtles) (e.g. works at or near high water). – Construction works cease mid construction due to extreme weather events and partially constructed or unprotected wall is impacted leading to rock movement during extreme events.	
Performance Criteria / Indicators A. No injury or loss of marine megafauna because of construction activities. B. No significant long-term behavioural impacts to marine megafauna from construction activities as measured/determined through the Inshore Dolphin and Megafauna Monitoring Plans (POT 2154 Appendix E, POT 2155 Appendix F). C. Relevant CU Project personnel to complete an induction that includes marine megafauna management requirements. D. All works are managed in accordance with the relevant management plans (including POT 2099 Construction Environmental Management Plan), the Nature Conservation Act 1992 and any other relevant approvals, standard, guidelines and statutory requirements. E. No substantiated complaints received from regulators or the community in relation to marine megafauna issues. F. Project scheduling to include adaptive management for the North Queensland wet season; and the potential for extreme weather events occurring during the construction timeline.	
Mitigation	**Responsibility**
– Ensure construction crews are suitably trained in marine megafauna observation and mitigation techniques for key construction activities (i.e. main work fronts) to identify where megafauna are within set distances during vessel operations (to meet Performance Criteria A and C).	Contractors
– Implement marine megafauna observation and response procedures (to meet Performance Criteria A and C), including: • Conducting checks for marine megafauna in the immediate vicinity of the construction works, directly before works (i.e. rock is placed in the water) commences each day or are recommenced after breaks. Pre-commencement checks to also be conducted prior to new work activities in the water commence; • Applying observation zones for marine megafauna during construction activities of 300m for whale and 150m for dolphins, dugongs and turtles.	Contractors Construction Team CU Environmental Advisor CU

• Stopping construction/rock placement when marine megafauna are observed within the exclusion zone of 100m (for whales) and 50 m (for dolphins, dugongs and turtles) of the work front; until the animals have moved further than 100m/50m from the work front, are travelling away from the workfront or have not been sighted for 30 minutes within the exclusion zone; and • Maintaining a trained marine megafauna observer for marine megafauna during construction activities, including megafauna in areas trafficked by construction equipment.	
– Monitor the reclamation area during lead up to, and enclosure of rockwall to identify if any marine megafauna are in danger of, or are, entrapped. Implement a protocol to remove individuals safely if entrapment occurs (to meet Performance Criteria A).	Contractors Environmental Advisor CU
– Review the results of each monitoring survey conducted under the Inshore Dolphin and Megafauna Monitoring Plans to capture any potentially negative trends forming in behavioural patterns associated with the construction works (to meet Performance Criteria B).	Environmental Advisor CU
– Create contingency planning into the Work Schedule to minimise the potential time the core rock is exposed (i.e. not covered by armour rock) during the North Queensland Wet season (to meet Performance Criteria F).	Contractors Construction Team CU
Training (to meet Performance Criteria A to F)	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of the CEMP/MEMP regarding marine megafauna/ecology.	Contractors Manager Environment CU
– Provide appropriate training to construction personnel responsible for marine megafauna spotting prior to undertaking construction activities.	Contractors Manager Environment CU
– Provide appropriate information to all CU Project personnel on marine megafauna management requirements during induction.	Contractors Manager Environment CU
Monitoring / Auditing	**Responsibility**
– Conduct monitoring in accordance with Inshore Dolphin and Marine Megafauna Monitoring Plans (POT 2154 Appendix E, POT 2155 Appendix F) before, during, and after completion of the project, to determine if any project related impacts occur on megafauna diversity, distribution and behaviour.	Environmental Advisor CU
– Conduct observations for marine megafauna prior to commencing, and during, key construction activities and pause works if marine megafauna enter exclusion zones. Continue to monitor the megafauna presence until they have exited the exclusion zone.	Contractors Marine Megafauna Observer Environmental Advisor CU Manager Environment CU
– Undertake checks of Contractors' compliance with the CEMP/MEMP.	Environmental Advisor CU
– Undertake regular site and equipment inspections to monitor for issues that may adversely impact on MNES or marine megafauna.	Contractors Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on construction impacts and marine megafauna interaction	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to F are not met at any point throughout construction and reclamation, the following corrective actions must be undertaken:

- Implement emergency and response measures in the event of a marine megafauna injury or incident; and:
  - Liaise with DES or other relevant body (i.e. GBRMPA) immediately to identify rescue options and develop future corrective actions if injury to marine megafauna occurs; and
  - Assist in capture of injured animals following advice from regulators.
- The Manager Environment CU will commence an investigation into incidents (as per section 4.10) relating to marine megafauna injury/incidents within 24 hours of initial notification, including reporting to the appropriate regulator within required statutory timeframes.

- Implement revised control measures (modified observation process and/or further exclusion zones) immediately where performance criteria are not met or marine megafauna issues are identified or have the potential to occur in the future.
- The Environmental Advisor CU/Manager Environment CU respond to all complaints (as per section 4.18) in relation to MNES/marine megafauna within two business days and address valid concerns as required.
- Any impacts identified via the marine megafauna and inshore dolphins monitoring plans as a result of construction activities will be reported via the specific monitoring plans and inform reviews of the relevant management plans.
- Undertake a review of the MEMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts to marine megafauna.
- Implement any other corrective actions and mitigation measures as directed by the appropriate regulator.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to demonstrate undertaking of observations and to assist with the retrospective investigation of any incidents / complaints.
- All CU Project Personnel will inform the Manager Environment CU and/or Principal's Site Representative as soon as possible in the event of a significant marine megafauna disturbance issue. The Manager Environment CU will investigate and report to the Principal's Representative.
- Maintain a record of sighted animals indicating the sighting of each individual animal and actions taken.
- Report down-time due to marine megafauna interactions in the construction log.
- Record and report immediately any incident involving marine megafauna interactions (marine animal strike, marine stranding or an injured, sick or dead turtle, dugong, dolphin or whale) will be reported to the Qld DES (on 1300 130 372). This reporting requirement is irrespective of whether the megafauna is dead or alive.
- Compile an incident report of all the details of any incident or near miss involving marine megafauna.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.
- Maintain records of all inductions and training undertaken by vessel Masters, crews and marine megafauna observers that included relevant marine megafauna management requirements.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with marine ecology and MNES, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with construction activities and marine MNES, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.3.7 CR7: MINIMISE IMPACTS TO TERRESTRIAL FAUNA

This element relates to the management of impacts from landside works that could impact terrestrial fauna that also utilise the marine environment, such as avifauna. This element corresponds to CEMP Section 5.4.5 Terrestrial Ecology.

ELEMENT	TERRESTRIAL ECOLOGY
Residual Risk Level MEDIUM	**Objectives** - To conduct construction activities in a manner that minimises adverse impacts on terrestrial fauna and flora. - To avoid injury to and death of terrestrial fauna, particularly avifauna from construction activities. - To avoid or minimise the level of noise and light spill during construction activities on adjacent habitat areas used by shorebirds.
Aspects and Impacts – Construction activities such as vehicle movements and earthworks may result in disturbance/injury/mortality of terrestrial fauna, particularly avifauna (Section 7.3.6). – Noise emissions and vibration may lead to behavioural disturbance in terrestrial fauna (Section 7.3.8). – Light spill from the construction site and plant and equipment may lead to disturbance to surrounding avian habitats (Section 7.2.7). – Introduction and/or spread of animal pests may adversely impact on terrestrial fauna (Section 7.3.5).	
Performance Criteria / Indicators A. All works are managed in accordance with the relevant management plans (CEMP, MEMP), the *Environmental Protection Act 1994* and any other relevant approvals, standards, guidelines and statutory requirements. B. No incidents of harm or mortality to terrestrial fauna as a result of construction activities. C. No significant long-term distribution or diversity impacts to terrestrial fauna (avifauna) at off port sites (primarily Ross River sandspit) as a result of construction activities, as measured by the Shorebird Monitoring Program (Appendix G, POT 2156). D. No substantiated complaints are received from regulators or the community in relation to terrestrial fauna issues. It is to be noted that use of the Port land by shorebirds is opportunistic given it is to be developed and therefore this Element is for diversity and abundance across the study area (not just the Port land).	
Mitigation	**Responsibility**
– Enforce site traffic management arrangements including speed limits to reduce avifauna collision (to meet Performance Criteria B).	Works Engineer CU
– Restrict rock haul truck movements delivering rock to stockpile area to daylight hours to prevent disturbance to terrestrial fauna, particularly avifauna (to meet Performance Criteria A to D).	Works Engineer CU
– Limit disturbance of existing port lands for the project to maintain opportunistic habitat for avifauna; noting the reclamation works once completed will create more opportunistic avifauna habitat (to meet Performance Criteria C and D).	Works Engineer CU
– Implement procedures on the handling and reporting of injured fauna (to meet Performance Criteria A and D).	Environmental Advisor CU
– Ensure the CEMP and MEMP have been implemented on site (to meet Performance Criteria A).	Environmental Advisor CU
– Review the results of each monitoring survey to capture any potentially negative trends forming in behavioural patterns associated with the construction works (to meet Performance Criteria C).	Environmental Advisor CU
Training (to meet Performance Criteria A to D)	
– Ensure that the relevant Project personnel undertake environmental awareness training covering the requirements regarding terrestrial fauna.	Contractors Manager Environment CU
Monitoring and Auditing	**Responsibility**
– Conduct monitoring in accordance with Shorebird Monitoring Plan (POT 2156 Appendix G) before and during construction, to monitor for adverse	Environmental Advisor CU

impacts on shorebird populations and determine if any project related impacts occur on avifauna distribution and diversity.	
– Undertake regular site inspections for injured wildlife and record any incident(s).	Contractors Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on construction impacts on terrestrial fauna where issues arise	Environmental Advisor CU

Corrective actions

Where Performance Criteria A to D are not met at any point throughout construction and reclamation, the following corrective actions must be undertaken:

- The Manager Environment CU will commence an investigation of all incidents in relation to terrestrial fauna and/or flora within five business days and undertake appropriate actions, including reporting to the appropriate regulator within required statutory timeframes where MNES are involved.
- The Manager Environment CU will respond to all complaints in relation to terrestrial fauna and/or flora within five business days and address valid concerns as required.
- Implement revised control measures terrestrial fauna disturbance issues are identified (e.g.by way of further training, exclusion zones, further speed restrictions – depending upon exceedance locations and details of the issue).
- Undertake a review of the CEMP and MEMP and associated plans, to determine if further controls or mitigation measures are needed, where investigations show unacceptable impacts to terrestrial fauna.
- Implement any other corrective actions or mitigation measures as directed by the appropriate regulators.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to assist with the retrospective investigation of any incidents / complaints.
- All CU Project personnel will inform the Manager Environment CU and/or Principal's Site Representative as soon as possible in the event of a significant terrestrial fauna disturbance. The Manager Environment CU will investigate and report to the Principal's Representative, with any additional investigation(s) also undertake as required.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.
- Any impacts identified via the shorebirds monitoring plan as a result of construction activities will be reported via that monitoring plan and inform reviews of the MEMP and CEMP.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with terrestrial ecology and MNES, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with terrestrial ecology impacts, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.3.8 CR8: MINIMISE IMPACTS FROM NOISE AND VIBRATION FROM CONSTRUCTION AND PILING

This element relates to the management of noise caused by construction activities, including the movement of landside equipment, in-water works, and piling. It does not include noise associated with vessel movements as these are covered in Section 7.2.3. This element corresponds to CEMP Section 5.4.8– Noise and Vibration, 5.4.4 – Marine Ecology, and 5.4.5 Terrestrial Ecology.

ELEMENT	NOISE & VIBRATION – CONSTRUCTION
Residual Risk Level MEDIUM	**Objective** – To avoid or minimise impacts to MNES from noise or vibration associated with construction, reclamation and piling activities. – To meet all noise and vibration standards relating to reclamation and piling activities, to minimise impacts on MNES, particularly marine megafauna and terrestrial fauna.
Aspects and Impacts – Noise and vibration generated during construction activities may lead to behavioural disturbance to terrestrial or marine megafauna temporarily avoiding affected area. – On-site construction plant and equipment during construction works, particularly during piling works, have the potential to increase noise emissions and cause vibrations that may disturb the surrounding natural environment / marine megafauna (MNES).	
Performance Criteria / Indicators A. All works are managed in accordance with the relevant management plans (POT2135 MEMP, POT 2099 CEMP), the *Environmental Protection and Biodiversity Conservation Act* approval, the *Environmental Protection (Noise) Policy 2019* and *Environmental Protection Regulation 2019* and any other relevant approvals, standards, guidelines and statutory requirements. B. No significant long-term behavioural impacts to megafauna or shorebirds from reclamation and piling activities, as measured through: ○ the Inshore Dolphin Monitoring Plan (Appendix E, POT 2154); ○ The Marine Megafauna Monitoring Plan (Appendix F, POT 2155); and ○ The Shorebird Monitoring Plan (Appendix G, POT 2156). C. No piling occurs while marine megafauna are within the Exclusion Zone. D. No injury or loss of marine or terrestrial megafauna due to noise or vibration from reclamation or piling activities.	
Mitigation	**Responsibility**
Rock Placement and Reclamation:	
– Movement of construction vehicles (non-reclamation) within 1km of Ross River Sandspit limited to daylight hours to prevent noise disturbance to roosting avifauna (to meet Performance Criteria D).	Contractors Construction Team CU
– Ensure that engines and construction equipment are properly maintained in good working order through carrying out routine and preventative maintenance (to meet Performance Criteria A).	Contractors
– Consider noise mitigation when operating construction equipment (where appropriate) (to meet Performance Criteria A and B), including: • Selecting low-noise plant and equipment and maintain in good working order; • Installing high-quality mufflers and appropriate silencers that meet design specifications on plant and equipment where required; • Shutting down plant and equipment which are used intermittently in the intervening periods between works or throttling down to minimum; • Shutting down plant and equipment when not in use; and • Ensuring that only necessary power levels are used to complete capital-dredging related activities.	Contractors
– Avoid megafauna interactions or impacts by undertaking marine megafauna observations prior to start-up and during construction (to meet Performance	Contractors Construction Team CU Environmental Advisor CU

Criteria A to D), applying an observation zone during construction activities of 300m for whales and 150m for dolphins, dugongs and turtles: 150m. – Stopping construction/rock placement when marine megafauna are observed within the exclusion zone of 100m for whales and, 50 m for dolphins, dugongs and turtles of the work front; until the animals have moved further than 100m/50m from the work front or have not been sighted for 30 minutes. – Orientate noise emitting equipment away from foreshore whilst ensuring that Health and Safety requirements including Navigation Safety are maintained to minimise impacts on shorebirds (to meet Performance Criteria B).	Contractors
Piling: – Implement the Environmental Procedure for Pile Driving (Appendix I) for all pile driving works to manage noise and vibrations risks to marine megafauna (to meet Performance Criteria A to D), including: • Implementing the defined Observation Zones for pile driving operations; • Establishing an Exclusion Zone to minimise the risk to marine megafauna from pile driving operations; • Undertake initial underwater noise monitoring at the commencement of piling to validate the Exclusion Zone implemented. • Ensuring pre-start visual observations for marine megafauna are undertaken across the Observation and Exclusion Zones by a suitably qualified marine observer for at least 30 minutes prior to commencement of pile driving operations, and during pile driving operations. • Only commence pile driving operations if marine megafauna have not been sighted in the Exclusion Zone for 30 minutes; • Initiate soft start procedures at the commencement of pile driving operations with a gradual increase in piling impact energy of no more than 50% of full impact energy for 10 minutes, including after breaks in piling of 30 minutes or more; • Implementation of stand-by procedures if marine megafauna are sighted within the Observation Zone during the soft-start or normal operations; • Ceasing pile driving operations if marine megafauna are observed in, or about to enter, the Exclusion Zone; • Do not re-commence pile driving operations if marine megafauna is sighted in the Observation Zone and is travelling in the direction of the Exclusion Zone; • Not commencing pile driving operations between the hours of sunset and sunrise. Pile driving that has commenced before sunset (or a period of low visibility) may continue after sunset, unless pile driving operations have been suspended for more than 15 minutes.	Contractors Environmental Advisor CU
– The requirements of the Environmental Procedure for Pile Driving (as detailed above) must also be applied to re-strike testing activities. A maximum of 15 full force blows of the pile hammer may be applied to each test pile on a maximum of two re-strike test events per test pile (to meet Performance Criteria D).	Contractors Environmental Advisor CU
– Consider alternative piling methods, e.g. screw-type piling in place of impact piling if these alternative methods are available and feasible and provide equivalent or better protection to marine megafauna (to meet Performance Criteria D).	Contractors / Environmental Advisor CU
– If alternative piling methods are to be implemented, the MEMP and associated Environmental Procedure for Pile Driving will be updated to include the alternative mitigation measures, peer reviewed and approval of	Manager Environment CU

the revised MEMP sought in accordance with EPBC Act Approval Condition 23 (to meet Performance Criteria B and D).	
– Review the results of each monitoring survey (e.g. Inshore Dolphin, Shorebirds) to capture any potentially negative trends forming in fauna behavioural patterns associated with the construction works (to meet Performance Criteria B)	Environmental Advisor CU
Training (to meet Performance Criteria A to D).	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of this MEMP, particularly: • appropriate training to construction crews in relation to noise and vibration. • appropriate training to construction crew responsible for marine megafauna spotting prior to commencement of construction activities.	Contractor Manager Environment CU
- Ensure Suitably Qualified Marine Observers engaged for piling work observations are fully trained in conducting observations	Contractor Manager Environment CU
Monitoring / Auditing	**Responsibility**
– Records of visual observations by marine megafauna observers during pile driving operations.	Contractors
– Undertake regular inspections/audits to identity the need for noise and vibration suppression measures and the effectiveness of measures undertaken.	Environmental Advisor CU
– Conduct monitoring in accordance with the Inshore Dolphin, Marine Megafauna and Shorebird Monitoring Plans (Appendix E, Appendix F, Appendix G).	Environmental Advisor CU
– Monitor and adjust where necessary, elements of piling such as reducing the height and weight of the impact hammer.	Contractors
– Conduct observations for marine megafauna by marine megafauna observers prior to commencing and during construction activities and cease works if marine megafauna enter Exclusion Zones.	Contractors
– For piling, continue observations for marine megafauna across the Observation Zone by a suitably qualified marine observer before and during pile driving operations.	Contractors
– Review/audit toolbox/pre-start records for discussions on noise and vibration impacts from construction activities on marine megafauna where issues arise	Environmental Advisor CU
Corrective actions Where Performance Criteria A to D are not met at any point throughout construction, reclamation and piling, the following corrective actions must be undertaken: – The Manager Environment CU will commence an investigation into all incidents relating to potential noise impacts on marine megafauna and shorebirds within five business days, including reporting to the appropriator regulator within statutory timeframes. – Undertake a review of the CEMP/MEMP to determine if further controls are needed where investigations show unacceptable noise or vibration levels from reclamation or piling activities. – Implement additional control measures, including reviewing and modifying plant, equipment and construction practices, in a timely manner where noise or vibration performance criteria are exceeded or are identified. – The Environmental Advisor CU/Manager Environment CU will respond to all complaints in relation to noise or vibration impacts within five business days and address valid concerns as required. – Implement any other corrective actions as directed by regulators.	
Reporting – The Contractor will maintain an activity log, recording the type of activities occurring at different times to demonstrate undertaking of observations and to assist with the retrospective investigation of any incidents / complaints. – All CU Project personnel will inform the Manager Environment CU and/or Principal's Site Representative as soon as possible in the event of a significant noise or vibration management issue that could disturb human,	

marine or terrestrial ecology. The Manager Environment CU will investigate and report to the Principal's Representative, with any additional investigation(s) undertaken as required.

- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.
- Any impacts identified via the marine megafauna, inshore dolphins and shorebirds monitoring plans because of construction activities including piling will be reported via the specific monitoring plans and inform reviews of the relevant Management Plan (MEMP and CEMP).

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with construction noise aspects, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with noise impacts from construction activities, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.4 DREDGING

7.4.1 DR1: MINIMISE IMPACTS FROM DREDGING FOOTPRINT

This element corresponds to DMP Section 11.3 Marine Ecology – Benthic Habitat

ELEMENT	DREDGING FOOTPRINT
Residual Risk level	**Objective**
MEDIUM	To minimise the impact of the dredging footprint on MNES, particularly marine megafauna.

Aspects and Impacts

- The dredging removes or fragments habitat used by megafauna in Cleveland Bay
- Seagrass meadows in the dredging footprint are destroyed removing habitat for megafauna.
- Removal of habitat may result in long term disturbance or behavioural change to marine megafauna.

Performance Criteria / Indicators

A. All dredging works are kept within the boundary of the approved areas.
B. Any seagrass meadows in the impact footprint surveyed and quantified (via the Seagrass Dredging Footprint Survey, 2020).
C. If seagrass meadows are found in the dredging footprint, they are offset to the satisfaction of the regulators.

Mitigation	**Responsibility**
– Capital dredging footprint restricted to location and size as per EPBC Act approval 2011-5979 and State operational dredging approval (once issued) (to meet Performance Criteria A).	Manager Environment CU
– Dredging for eastern harbour entrance widening and offloading facility restricted to the location and size set out in operational development permits (once obtained).	Manager Environment CU
– If seagrass meadows are found within the dredging footprints, they will be subject to project offset requirements (to meet Performance Criteria B and C).	Manager Environment CU

Monitoring / Auditing	**Responsibility**
– Undertake a survey of the dredging areas before the commencement of construction to determine the presence and density of seagrass within the construction footprints (as per EPBC Act Approval Condition 9). Completed in 2020.	Manager Environment CU
– Dredging works will be spatially/cadastral surveyed to ensure works remain within the approved footprint.	Contractor Construction Team CU

Corrective Actions

Where Performance Criteria A to C are not met at any point throughout construction, the following corrective actions must be undertaken:

- The Manager Environment CU to commence an investigation of the exceedance within five business days of identification of exceedance, including reporting to the appropriate regulator within statutory timeframes.
- Principal's Site Representative to investigate any incidents where works are found to have occurred outside of the approved footprints.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to assist with the retrospective investigation of any incidents / complaints.
- The Contractor will conduct regular spatial surveys of the dredging works to ensure it remains within the identified alignment.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with the dredging, additional to any activities the contractor implements;

- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with construction footprints, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will address the consequences of significant environmental incidents;
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.4.2 DR2: MINIMISE IMPACTS TO WATER QUALITY (DREDGING)

This element relates to the management of plume impacts cause during dredging, loading and unloading activities. This element corresponds to DMP Section 11.2 Marine Water Quality – Dredge Related Impacts.

This element should be read in conjunction with the DMP which sets specific management and monitoring actions for dredging to address water quality impacts.

ELEMENT	WATER QUALITY (DREDGING)	
Residual Risk level LOW	**Objectives** – To avoid or minimise turbidity impacts to MNES in the marine environment from dredging and movement of dredged material into reclamation area.	
Aspects and Impacts – Capital dredging using a mechanical (backhoe) dredge will cause the mobilisation of sediment at the seabed and throughout the water column with the potential to adversely impact on the adjacent marine water quality. – Rehandling of dredged material to and from barges will cause spill of suspended material into surface water with the potential to adversely impact on the adjacent marine water quality. – Dredge material may incidentally fall onto the barge decks as material is being placed within the hoppers by the backhoe dredge. The barge decks will require washing down to ensure a safe working surface for barge workers on the deck.		
Performance Criteria / Indicators A. Marine water quality performance limits for receiving environments set under relevant permits and authorities are not exceeded due to dredge related activities. B. All capital dredging and transfer of dredge material is undertaken and managed in accordance with this document (POT 2095). C. In-water validation of the modelling shows an equal of lesser impact than what was modelled D. No substantiated complaints are received in regards to water quality impacts from the capital dredging or transfer of material from the dredge to the temporary offloading facility.		
Mitigation		**Responsibility**
– In the event of extreme weather conditions (e.g. cyclone), cease dredging and rehandling and move vessels to a safe location (to meet Performance Criteria A, B, C and D).		Contractors
– Ensure vessels are appropriately aligned, within safety precautions, to minimise spill of dredged material when rehandling.		Contractors
– The use of an appropriate dredge bucket is used to ensure a clean cut; and the dredge bucket is maintained in good condition, including changing the teeth before they are fully worn.		Contractors
– Hoisting of the bucket must be undertaken in a controlled manner to minimise spillage		Contractors
– Dredge monitoring system implemented at all times to provide live / on line information such as dredge vessel position, position of bucket, actual seabed levels, design depth, design width etc. to accurately target the approved dredge material.		Contractors
– Regular survey of the dredge areas to minimise over dredging as well as to minimise any remedial dredging [i.e. dredge too shallow/ not wide enough]		Contractors
– Visual monitoring of the waters surrounding the dredge and barges for any excessive visible plume created by dredging activities, with dredging activities modified as necessary to minimise plume generation.		Contractors
– Do not overfill barges with dredge material to minimise risk of spill.		Contractors
– Cleaning of spilled dredge material from the barge decks is only to occur within the dredge footprint beside the dredge, and before the barge is taken to the temporary offloading facility. This will ensure any turbidity created during the wash board remain in the adjacent waters to the BHD		Contractors
– Ensure barge containing dredged material is brought as close as possible to the offloading facility to minimise risk that spilt material will directly enter		Contractors

the marine environment. Avoid swinging of laden excavator arm over open water.	
– Any material spilt on the offloading facility to be recovered wherever practicable.	Contractors
– Active monitoring of the water quality dashboard to monitor water quality parameters at sensitive receptor sites within the Cleveland Bay.	Contractors Environment Manager CU Environmental Advisor CU
– Review on-site control measures promptly if turbidity plumes are seen beyond the expected modelling parameters	Contractors Environmental Advisor CU
Training (to meet Performance Criteria A to D)	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements regarding dredge management.	Contractors Manager Environment CU
Monitoring / Auditing	**Responsibility**
– Conduct monitoring and observation of weather conditions and alerts relevant to the site, including extreme weather events.	Contractors
- Conduct monitoring in accordance with the DMP (POT2095), including review of real time monitoring results against the standards stated in the plan.	Contractors Manager Environment CU Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on dredging water quality issues and response actions where issues arise	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to D are not met at any point dredging, the following corrective actions must be undertaken:

- Implement trigger-based management measures identified in the DMP (POT2095), including cessation of works where Level 3 triggers are met.
- The Environmental Advisor CU/Manager Environment CU will investigate all incidents in relating to or dredge plume issues within the specified exceedance response timeframes in the DMP, including reporting to the appropriate regulator within statutory timeframes.
- The Environmental Advisor CU/Manager Environment CU will respond to all complaints in relation to dredge plume management issues within five business days and address valid concerns, as required.
- Undertake a review of the MEMP, DMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts from dredging.
- Implement any other corrective actions as directed by regulators.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to assist with retrospective investigation of incidents / complaints.
- All CU Project personnel will inform the Manager Environment CU and/or Principal's Site Representative as soon as possible in the event of a dredge plume issue. The Manager Environment CU will report to the Principal's Representative, with any additional investigation(s) undertaken as required.
- The Environmental Advisor CU will report receiving environment performance regularly to relevant committees.
- The Environmental Advisor CU will prepare an annual report which will identify any exceedances of performance criteria, any significant changes to the receiving environment and any corrective actions taken or to be implemented. The surveillance report will be submitted to Port senior management and to regulators.
- The Environmental Advisor CU will prepare a final monitoring report at the end of the CU Project.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with dredging management, additional to any activities the contractor implements;

- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with dredge water quality management, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

7.4.3 DR3: MINIMISE DIRECT IMPACTS OR STRIKE FROM THE DREDGE EQUIPMENT

This element relates to the managing the risk of direct impacts of dredging equipment on marine megafauna. It excludes strike risks associated with construction vessels which are managed under Section 7.2.1. This element corresponds to relevant element of DMP Section 11.4 Marine Ecology – Marine Megafauna.

ELEMENT	DIRECT IMPACTS OR STRIKE FROM THE DREDGE EQUIPMENT
Residual Risk level MEDIUM	**Objectives** - To avoid the risk of disturbance or injury to marine megafauna resulting from dredging activities involving animal strike and accidents. - To avoid adverse direct and indirect impacts on MNES, particularly marine megafauna from dredging activities. - To establish and maintain awareness of the importance of protecting marine megafauna.
Aspects and Impacts – Interactions between dredging activities and marine megafauna may result in disturbance or injury to marine megafauna. – Machinery strikes during dredging activities to marine megafauna may result in injury or death of individuals.	
Performance Criteria / Indicators A. No injury, capture of, or loss of protected marine megafauna because of dredging activities. B. No significant long-term behavioural impacts to marine megafauna from dredging activities as measured/determined through the Inshore Dolphin and Megafauna Monitoring Plans (POT 2154 Appendix E, POT 2155 Appendix F). C. Relevant CU Project personnel to complete an induction that includes marine megafauna management requirements. D. All works are managed in accordance with the relevant management plan (including Dredge Management Plan (POT2095), the Nature Conservation Act 1992 and any other relevant approvals, standard, guidelines and statutory requirements. E. No substantiated complaints received from regulators or the community in relation to marine megafauna issues.	
Mitigation	**Responsibility**
– Ensure dredging crews are suitably trained in marine megafauna observation techniques to identify where megafauna are within set distances during dredging operations (to meet Performance Criteria A and C).	Contractors Manager Environment CU
– Implement marine megafauna observation and response procedures (to meet Performance Criteria A and C), including: • Conducting checks for marine megafauna in the immediate vicinity of the dredging works, especially when placing spuds or commencing dredging activities, noting observations for megafauna in low light/night time or during rough conditions will be restricted*; • Applying observation zones during dredging activities of 300m for whales and 150m for dolphins, dugongs and turtles: 150m. • Ceasing dredging works when marine megafauna are observed within the exclusion zone of 100m (for whales) and 50 m (for dolphins, dugongs and turtles) of the furthest extent of the dredging equipment (including extended dredge arm/bucket); until the animals have moved further than 100m/50m from the equipment or have not been sighted for 30 minutes within the exclusion zone; and • Maintaining a trained marine megafauna observer for marine megafauna during dredging activities (noting observations for megafauna in low light/night time or during rough conditions will be restricted*), who will take necessary action where risk of interaction exists.	Contractors Construction Team CU Environmental Advisor CU

• Opportunistically inspect dredge bucket and barge loads for captured marine megafauna and/or remains.	
– Review the results of each monitoring survey conducted under the Inshore Dolphin and Megafauna Monitoring Plans to capture any potentially negative trends forming in behavioural patterns associated with the dredging works (to meet Performance Criteria B).	Environmental Advisor CU
– Ensure the DMP has also been implemented on site (to meet Performance Criteria D).	Contractors Manager environment CU Construction Team CU
Training (to meet Performance Criteria A to F)	
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of the DMP/MEMP regarding marine megafauna/ecology.	Contractors Manager Environment CU
– Provide appropriate training to construction personnel responsible for marine megafauna spotting prior to undertaking dredging activities.	Contractors Manager Environment CU
– Provide appropriate information to all CU Project personnel on marine megafauna management requirements during induction.	Contractors Manager Environment CU
Monitoring / Auditing	**Responsibility**
– Conduct monitoring in accordance with Inshore Dolphin and Marine Megafauna Monitoring Plans (POT 2154 Appendix E, POT 2155 Appendix F) before, during, and after completion of the project, to determine if any project related impacts occur on megafauna diversity, distribution and behaviour.	Environmental Advisor CU
– Conduct observations for marine megafauna prior to commencing, and during, dredging activities and cease works if marine megafauna enter exclusion zones. A log is to be maintained of when megafauna is sighted (both inside and out of the observation zone) to record any/all action taken to avoid interaction. The log should include observations on conditions, time of day and distance and height from observer.	Contractors Marine Megafauna Observer Manager Environment CU Environmental Advisor CU
– Undertake checks of compliance with the DMP/MEMP by the Contractors.	Environmental Advisor CU
– Undertake regular site and equipment inspections to monitor for issues that may adversely impact on MNES or marine megafauna.	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on dredging operations and marine megafauna impacts or strike where issues arise	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to F are not met at any point throughout construction and reclamation, the following corrective actions must be undertaken:

- Implement emergency and response measures in the event of a marine megafauna injury or incident; and:
  - Liaise with DES or other relevant body (i.e. GBRMPA) immediately to identify rescue options and develop future corrective actions if injury to marine megafauna occurs; and
  - Assist in capture of injured animals following advice from regulators.
- The Manager Environment CU will commence an investigation into incidents (as per section 4.10) relating to marine megafauna injury/incidents within 24 hours of initial notification, including reporting to the appropriate regulator within required statutory timeframes.
- Implement revised control measures (modified observation process and/or extended exclusion zones) immediately where performance criteria are not met or marine megafauna issues are identified or have the potential to occur in the future.
- The Environmental Advisor CU/Manager Environment CU respond to all complaints (as per section 4.18) in relation to MNES/marine megafauna within five business days and address valid concerns as required.
- Any impacts identified via the marine megafauna and inshore dolphins monitoring plans as a result of dredging activities will be reported via the specific monitoring plans and inform reviews of the relevant management plans.
- Undertake a review of the MEMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts to marine megafauna.
- Implement any other corrective actions and mitigation measures as directed by the appropriate regulator.

Reporting

- The Contractor will maintain an activity log, recording the type of activities occurring at different times to demonstrate undertaking of observations and to assist with the retrospective investigation of any incidents / complaints.
- All CU Project Personnel will inform the Manager Environment CU and/or Principal's Site Representative as soon as possible in the event of a significant marine megafauna disturbance issue. The Manager Environment CU will investigate and report to the Principal's Representative.
- Maintain a record of sighted animals indicating the sighting of each individual animal and actions taken.
- Report down-time due to marine megafauna interactions in the dredge log.
- Record and report immediately any incident involving marine megafauna interactions (marine animal strike, marine stranding or an injured, sick or dead turtle, dugong, dolphin or whale) will be reported to the Qld DES (on 1300 130 372). This reporting requirement is irrespective of whether the megafauna is dead or alive.
- Compile an incident report of all the details of any incident or near miss involving marine megafauna.
- The Manager Environment CU will report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.
- Maintain records of all inductions and training undertaken by vessel Masters, crews and marine megafauna observers that included relevant marine megafauna management requirements.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with marine ecology and MNES, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with dredging activities and marine MNES, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:
    - where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
    - performance reports indicate performance targets/indicators may not be achieved; and
    - according to approved timeframes; or the impacts of significant environmental incidents.

* while the ability to observe megafauna at night or in rough conditions may be limited, this is offset by the reduced risk of interaction through the use of a backhoe dredge only (stationary, slow and steady movement) and no TSHD.

7.4.4 DR4: MINIMISE IMPACTS FROM NOISE AND VIBRATION (DREDGING)

This element relates to the management of noise associated with dredging, other than vessel operation, including the noise caused by excavation of the seafloor and associated with use of spuds to move the backacter. Noise associated with general vessel operations are covered in Section 7.2.3. This element corresponds to DMP Section 11.6 Vessel Operations - Emissions.

ELEMENT	NOISE AND VIBRATION (DREDGING)	
Residual Risk level MEDIUM	**Objectives** – To avoid or minimise noise and vibration impacts caused by seafloor dredging and operation of dredge vessel spuds.	
Aspects and Impacts – Excavation of seafloor material will cause the generation of underwater noise and vibration, especially for stiff material, with the potential to adversely impact on nearby megafauna. – Insertion and removal of spuds will cause the generation of underwater noise and vibration with the potential to adversely impact on nearby megafauna.		
Performance Criteria / Indicators A. No incidents of dredging and spud operation causing direct or residual noise impacts to MNES, as measured through: o the Inshore Dolphin Monitoring Plan (Appendix E, POT 2154); o the Marine Megafauna Monitoring Plan (Appendix F, POT 2155); and o the Shorebird Monitoring Plan (Appendix G, POT 2156). B. No injury or loss of marine megafauna because of dredging-related vessel noise. C. No significant long-term behavioural impacts to marine megafauna from noise from dredging.		
Mitigation		**Responsibility**
– Ensure construction crews are suitably trained in marine megafauna observation techniques to identify where megafauna are within set distances during vessel operations (to meet Performance Criteria A, B and C).		Contractors Construction Team CU Manager Environment CU
– Implement marine megafauna observation and response procedures (to meet Performance Criteria A and C), including: • Conducting checks for marine megafauna in the immediate vicinity of the dredging works, noting observations for megafauna in low light/night time or during rough conditions will be restricted*; • Applying observation zones during dredging activities of 300m for whales and 150m for dolphins, dugongs and turtles. • Ceasing dredging works when marine megafauna are observed within the exclusion zone of 100m (for whales) and 50 m (for dolphins, dugongs and turtles) of the furthest extent of the dredging equipment (including extended dredge arm/bucket); until the animals have moved further than 100m/50m from the equipment or have not been sighted for 30 minutes within the exclusion zone.		
– No pile driving of spuds associated with movement of the backacter dredge.		Contractors
Training (to meet Performance Criteria A, B to C)		
– Ensure that the relevant Project personnel undertake environmental awareness and training covering the requirements of this MEMP regarding noise and vibration controls.		Contractors Construction Team CU
– Provide appropriate training to dredge crew responsible for marine megafauna spotting prior to commencement of dredging.		Contractors Manager Environment CU
Monitoring / Auditing		**Responsibility**
– Conduct observations of marine megafauna by dredge masters and crew. prior to commencing, and during, dredging activities and cease works if marine megafauna enter exclusion zones. A log is to be maintained of when megafauna is sighted (both inside and out of the observation zone) to record any/all action taken to avoid interaction. The log should include		Contractors

observations on conditions, time of day and distance and height from observer.	
– Undertake regular audits / inspections to identity the need for noise suppression measures and the effectiveness of measures undertaken.	Environmental Advisor CU
– Undertake Inshore Dolphin and Marine Megafauna Monitoring Plans (POT 2154 Appendix E, POT 2155 Appendix F) before, during, and after (for some) completion of the project, to determine if any project related impacts occur on megafauna behaviour.	Environmental Advisor CU
– Review/audit toolbox/pre-start records for discussions on dredging noise and vibration management where issues arise	Environmental Advisor CU

Corrective Actions

Where Performance Criteria A to C are not met at any point throughout works, the following corrective actions must be undertaken:

- The Manager Environment CU will commence an investigation into all incidents or complaints relating to potential noise/vibration impacts on marine megafauna within five business days including reporting to the appropriate regulator within required statutory timeframes.
- For acute impacts to marine megafauna from noise or vibration, Manager Environment CU will liaise with DES immediately to identify rescue options and develop future corrective actions if injury to marine megafauna occurs; and Assist in capture of injured animals following advice from regulators.
- Undertake a review of the MEMP and associated plans, to determine if further controls or mitigation measures are needed where investigations show unacceptable impacts to marine megafauna.
- Implement any other corrective actions as directed by the appropriate regulators.

Reporting

- The vessel Master will maintain an activity log, recording the type of activities occurring at different times to demonstrate undertaking of observations and to assist with the retrospective investigation of any incidents / complaints.
- All vessel crew will inform the Master as soon as possible in the event of a vessel noise issue that may lead to impact on marine megafauna and the Master will investigate and report to the Principal's Site Representative.
- Maintain a record of sighted animals indicating the sighting of each individual animal and actions taken.
- Report down-time due to marine megafauna interactions in the vessel log.
- Record and report immediately any incident involving marine megafauna interactions (marine animal strike, marine stranding or an injured, sick or dead turtle, dugong, dolphin or whale) will be reported to the Qld DES (on 1300 130 372). This reporting requirement is irrespective of whether the megafauna is dead or alive.
- Compile an incident report of all the details of any incident or near miss. The Manager Environment CU will inform the regulators in a timely manner in the event of a significant noise issue.
- Any impacts identified via the marine megafauna, inshore dolphins and shorebirds monitoring plans because of noise from dredging will be reported via the specific monitoring plans and inform reviews of the relevant Management Plan.
- The Manager Environment CU report to DCCEEW (or successor agency) any exceedance of the MNES performance criteria, including any implementation of MNES risk management, adaptive management strategies, corrective actions and emergency response measures implemented, within 21 days of the initial incident/exceedance notification.

Adaptive management program

- The Environmental Advisor CU will effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities in association with vessel noise aspects, additional to any activities the contractor implements;
- The Manager Environment CU will periodically (min 6 monthly) review the effectiveness of management measures and risks associated with impacts from noise and vibration from dredging, including in response to the risk level, changing circumstances or the results from implementing contingency response/corrective actions;
- The Manager Environment CU will implement corrective actions and amended mitigation measures should the monitoring programs specified in this element demonstrate a risk to the environment or MNES.
- The Manager Environment CU will address the consequences of significant environmental incidents; and
- The Manager Environment CU will review the plan under the following circumstances:

- where new data/information is collected, as a result of implementing this plan and from new information from external sources (e.g. academic literature, EPBC policy statements);
- performance reports indicate performance targets/indicators may not be achieved; and
- according to approved timeframes; or the impacts of significant environmental incidents.

* while the ability to observe megafauna at night or in rough conditions may be limited, this is offset by the reduced risk of interaction through the use of a backhoe dredge only (stationary, slow and steady movement) and no TSHD.

8 SUMMARY OF MATTERS OF NATIONAL ECOLOGICAL SIGNIFICANCE MANAGEMENT

For ease of reference, Table 9 summarises the project specific management controls, performance criteria, early warning triggers and corrective actions relevant to MNES for construction and dredging. This table incorporates relevant aspects from the Environmental Elements tables in Sections 6 and 7.

Table 9: Summary of MNES Management aspects (separated by relevant Plan/Sub-plan)

MEMP

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
To avoid or minimise impacts to MNES by preventing or minimising impacts from construction and operational activities in the marine environment	No injury or fatality to marine megafauna as a result of the construction activities.	Ensure suitably trained Marine Megafauna Observers for construction activities to undertake visual observation of marine megafauna around construction fronts. Conduct daily pre-start checks, or pre-start checks following breaks or changed activities, for marine megafauna in the nominated observation zone prior to commencing construction activities. Maintain active awareness of marine megafauna throughout daily construction activities, including within the exclusion zone. Cease all construction activities if marine megafauna enter the deemed exclusion zones as specified in the MEMP (POT 2135) to avoid injury or loss of megafauna.	Marine megafauna exclusions zones are implemented for the duration of construction. Underwater noise assessments confirm the exclusion zones being implemented are appropriate. 100% of personnel undertaking marine megafauna observations are suitably trained. Construction works are ceased on 100% of occasions when marine megafauna are observed within the relevant exclusion zone. Site based inspections/audits of marine megafauna observers do not identify any significant non-conformances. Daily megafauna logs maintained by megafauna observers. Daily megafauna logs audited by the Port regularly.	Change in site personnel involved in activities that require marine megafauna observation. Daily megafauna logs missing or not present for all days of operation. Non-conformance identified from audits relating to marine megafauna observation. Abrupt changes / decreases in recorded stop works frequency. Any reported marine megafauna stranding or deaths in Cleveland Bay. Any injured marine megafauna in the vicinity of the construction activities Annual results of CU megafauna monitoring programs (i.e. Inshore Dolphins, Shorebirds etc).	All marine megafauna observers undergo refresher training. Review of onboarding process / training matrix for new employees. Number of megafauna observation audits increased to ensure no further non-conformances. Attend Toolbox meetings with construction contractors. Escalation through contractual process if consecutive CAR raised relating to marine megafauna observation. Engagement of relevant marine megafauna experts to review best approach to removing trapped megafauna.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
		Works do not commence until the marine megafauna has exited the exclusion zone, or a period of 30 minutes has elapsed **since** the last sighting of the animal in the exclusion zone. Monitor the rockwall/revetment area during lead up to, and enclosure of rockwall areas to identify if any marine megafauna are in danger of, or are, entrapped.	No complaints received in relation to rockwall construction impacts on marine megafauna. No marine megafauna stranding reports associated with rockwall construction activities. Protocol followed to remove individuals safely if entrapment occurs.		
	No significant long-term distribution impacts to inshore dolphins.	Ensure suitably trained Marine Megafauna Observers for the construction activities (piling, rockwall placement, dredging) to undertake visual observation of inshore dolphins around construction fronts. Cease all relevant activities (rockwall placement, dredging, vessel movement) if inshore dolphins enter exclusion zones as specified in the MEMP (POT 2135) to avoid injury or loss of inshore dolphins.	100% of personnel undertaking marine megafauna observations are suitably trained. Construction works are ceased on 100% of occasions when inshore dolphins are observed within the relevant exclusion zone. No marine megafauna stranding reports (for inshore dolphins) associated with rockwall or dredging construction activities. Daily megafauna logs maintained by marine megafauna observers. Daily megafauna logs audited by the Port regularly.	Non-conformance identified from audits relating to marine megafauna observation. Any change in inshore dolphin diversity or distribution in known habitat areas. Any reported inshore dolphin stranding or deaths in Cleveland Bay. Any injured inshore dolphins in the vicinity of the rockwall or dredging construction activities	Refresher training for marine megafauna observers. Number of megafauna observation audits increased to ensure no further non-conformances. Investigate inshore dolphin strandings to determine cause/s. Attend Toolbox meetings with construction contractors. Consultation with ITAC / Department.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
		Works do not commence until any inshore dolphins have exited the exclusion zone, or a period of 30 minutes has elapsed since the last sighting of the animal in the exclusion zone. Regular reviews / audits undertaken for marine megafauna observers.	No complaints received in relation to impacts to inshore dolphins from rockwall and dredging construction activities.	Cleveland Bay ambient water quality data indicates pre-cursor concerns for inshore dolphin abundance and health. Any reduction in the sightings of inshore dolphins in Cleveland Bay, outside of expected population fluctuations, in Inshore Dolphin Monitoring Program.	
	All reclamation works are kept within the boundary of the approved area.	Reclamation footprint restricted to location and size as per EPBC Act approval 2011-5979. Reclamation works will be spatially/cadastral surveyed to ensure works remain within the approved reclamation footprint (under the Reclamation Integrity Plan within the CEMP POT 2099).	100% of rockwall and reclamation works are kept within the boundary of the approved area. All rockwall position assessments under the Reclamation Integrity Plan confirm rockwall rocks are within the development footprint.	Rock quantities not matching those expected. Routine on site audits identifies a potential deviation in rockwall construction alignment Contractor Toolbox meetings identifies concerns with placement or construction methodologies.	Revisit the construction methodology. Increase frequency of surveys. Identification and removal of any rocks or structures outside of the development footprint Escalation through contractual process.
	No significant long-term behavioural impacts to marine megafauna from construction activities.	Suitably trained Marine Megafauna Observers undertake visual observation of marine megafauna around active construction fronts and vessel movements. Activity ceased for rockwall and dredging construction	100% of personnel undertaking marine megafauna observations are suitably trained. Underwater noise assessments confirm the exclusion zones being implemented are appropriate.	Piling operations are placed in stand-by to shut down if marine megafauna are sighted in the observation zone. Rockwall Construction works, dredging or Piling do not cease when marine	Confirm reasons for decreasing trend, additional survey is necessary. Number of megafauna observation audits increased to ensure no further non-conformances.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
		activities if marine megafauna enter the exclusion zones as specified in the MEMP (POT 2135). Works do not commence until the marine megafauna has exited the exclusion zone, or a period of 30 minutes has elapsed since the last sighting of the animal in the exclusion zone Consider noise mitigation when operating construction plant and equipment. Active awareness maintained of marine megafauna throughout daily construction activities, including within the exclusion zone. Underwater noise monitoring for rock dumping and piling noise.	Construction works are ceased on 100% of occasions when marine megafauna are observed within the relevant exclusion zone. Pile driving procedure implemented 100% of the time. Audits of marine megafauna observers and pile driving procedure do not identify any non-conformances. Daily megafauna logs maintained by marine megafauna observers. Daily megafauna logs audited by the Port regularly.	megafauna are observed in the exclusion zone. Any change in dolphin behaviour and/or reduced presence in known habitat areas. Any reduction in the sightings of marine megafauna (turtles, dolphins) in Cleveland Bay. Annual results of CU megafauna monitoring programs (i.e. Inshore Dolphins, Shorebirds etc).	Consultation with ITAC / Department. Review observation zones, exclusion zones based on Underwater noise assessments and provide recommendation to ITAC
To avoid or minimise impacts to MNES by avoiding or minimising pollution of the marine environment.	Discharges of pollution including waste, light, noise and hazardous materials are avoided or minimised.	Only project required material is bought/retained onsite. All bins are fitted with secure lids to prevent waste material being blown into the marine environment during storage or handling.	Site inspections of waste storage containers result in 100% compliance with industry standards. Site inspections of on-site facilities result in 100% compliance of correct waste	Any reported marine megafauna stranding or deaths in Cleveland Bay. Any injured marine megafauna in the vicinity of the rockwall and dredging construction activities	Review site management practices and CEMP Maintain and repair any damage to storage areas and/or bunds promptly.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
	Where discharges occur, these are controlled and minimised effectively. Where discharge-related impacts to megafauna/MNES are detected, they are reported in a timely manner to facilitate and inform appropriate responsive action.	Storage areas include appropriate bunding to contain spillages in accordance with applicable standards and are covered to prevent stormwater/wave infiltration. Site specific emergency response procedures and equipment (spill boom). Fuel / chemical storage is kept in a secure area, and bunded to prevent spills.	storage, handling, disposal and transporting standards. 100% of fuel/chemical storage and hazardous material handling is compliant with appropriate standards. All spills reported and adequately contained and promptly cleaned up.	Any reduction in the sightings of Marine megafauna (turtles, dolphins) in Cleveland Bay. Multiple minor spills occur on site. Non-conformances with on-site storage arrangements have been identified in inspections/ audits. Contractor toolbox meetings identifies waste management / storage issues or concerns. Annual results of CU megafauna monitoring programs (i.e. Inshore Dolphins, Shorebirds etc).	Investigate any incidents relating to hazardous materials and/or fuel bunkering and undertake appropriate corrective or remedial actions, as required to render the area safe and avoid or minimise environmental harm. Review procedures, if procedures breakdown or a spill occurs and train staff about appropriate responses.
To avoid and minimise impacts to MNES by managing risks associated with extreme weather events to construction activities.	Risks to megafauna/MNES that may result from the effects of extreme weather events on construction activities, are identified. Identified risks are assessed and	Implement the Port Cyclone Response Plan. Implement Site Cyclone plan which includes ceasing operation of the construction site and relocation of equipment to a safe location in the event of extreme weather conditions (e.g. cyclone).	Conduct monitoring and observation of weather conditions and alerts relevant to the site, including extreme weather events. The Port Cyclone emergency response procedure implementation and 100% of CU Project related actions completed (Condition Green – 1 November).	Monitor the Bureau of Meteorology Tropical Cyclone for warning. Project contractors do not enact cyclone response actions as per the Port cyclone procedures. Monitor the Townsville Regional Harbour Master, and Local Disaster	Revisit construction timeframe and planning should impact to the construction work fronts occur as a result of extreme weather events. Revise construction sequence and armouring should impact to the construction work fronts occur as a result of extreme weather events.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
	managed where reasonable and practicable. Where risks are realised, impacts to megafauna/MNES are reported in a timely manner to facilitate appropriate responsive action.	Where possible, schedule key construction activities to commence and be mostly completed in dry seasons where risk of severe weather is reduced. Work Schedule incorporates contingency to minimise the time the core rock is exposed (i.e. not covered by armour rock) during the North Queensland Wet season. Follow the Reclamation Integrity Plan for severe weather contingency arrangements to minimise impact. Key construction fronts designed to accommodate and withstand standard severe weather events.	The Port Cyclone emergency response procedure implementation and 100% of CU Project related actions completed (Condition Yellow – Intensifying risk of cyclone).	Management Group alerts for disaster alert activation. Construction program deviates from construction schedule When safe to do so after an event, undertaken stormwater monitoring to identify any pre-curser to impact.	Review the Port Cyclone Response Plan Attend Construction Toolbox meetings for Learning Moments and Improvements. After impact, assess impact to the site and construction fronts (when safe to do so) e.g. Reinstate any rocks moved from approved placement area, including retrieving any rocks outside the approved footprint. Reinstalling stormwater treatment (as per stormwater, sediment, and erosion control plan).
	Identify and report natural/ non-project related impacts to MNES from extreme weather events (e.g. flood impacts, bleaching events).	Fully implement the scientifically robust monitoring programs for key aspects (inshore dolphins, seagrass, coral and marine water), including the use of baseline and reference site. Regular reporting from monitoring programs	100% of instances are communicated / referred to ITAC. 100% of monitoring programs undertaken.	GBRMPA water quality data indicate change; Reef Outlook report identifies local or regional shifts; Healthy Reef updates identify concerns;	On advice from the ITAC: Undertake additional or reactive Monitoring, Review Trigger Levels, Review monitoring plans, Report findings to the relevant Departments.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
		ITAC to review and provide advice on data from monitoring programs and ITAC members expert knowledge		Any reported marine megafauna stranding or deaths in Cleveland Bay. Any injured marine megafauna in the vicinity of the rockwall or dredging construction activities ITAC Specialist identifies changes in their field; Any impacts to the nature and distribution of seagrass in Cleveland Bay other than EPBC Act approved.	
Avoid vessel accidents and oil spills from vessels associated with the action;	No injury or fatality to marine megafauna because of project vessel operations. Where detected, impacts to megafauna/MNES from project vessels, including spills, are reported in a timely manner to facilitate appropriate responsive action.	All vessel masters and crew associated with the rockwall and dredging construction activities are trained in marine megafauna observation and mitigation techniques. Implement marine megafauna observation and response procedures, including: Maintaining a lookout for cetaceans and turtles while vessels are operating; Adjusting vessel speed and direction, within the safety constraints of the vessel, to avoid impact on the observed	100% of personnel undertaking marine megafauna observations undertake marine megafauna awareness training, incorporating observation and mitigation techniques. Marine megafauna observation and vessel response procedures are implemented on 100% of occasions when marine megafauna are observed. Daily marine megafauna observation logs are maintained by vessel masters.	Vessels do not respond as per vessel response procedures when marine megafauna are observed. Change in site personnel involved in activities that require marine megafauna observation. Daily megafauna logs missing or not present for all days of operation. Non-conformance identified from audits relating to	Refresher training for marine megafauna observers. Review of onboarding process / training matrix. Increase frequency of audits undertaken on Marine megafauna observations to ensure no further non-conformances. Attend Toolbox meetings with construction contractors.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
		individuals in the event that megafauna is sighted, including remaining greater than 150m from dolphins, turtles and dugongs, and 300m from whales. Enforce vessel speed limits where appropriate (i.e. less than 6 knots in waters less than 2.5m depth or within 100m of shoreline) to reduce potential for marine megafauna collision. Implement the approved Construction Vessel traffic management plan for rockwall and dredging construction activities. Limit vessel usage near sensitive habitat areas to prevent disturbance to sensitive receptors.	Daily megafauna logs audited by the Port regularly. No complaints received in relation to rockwall construction or dredging vessels impacts on marine megafauna. No marine megafauna stranding reports associated with rockwall or dredging construction vessels.	marine megafauna observation. Any reported marine megafauna stranding or deaths in Cleveland Bay. Any injured marine megafauna in the vicinity of the rockwall or dredging construction activities Annual results of CU megafauna monitoring programs (i.e. Inshore Dolphins, Shorebirds etc).	Escalation through contractual process if consecutive CAR / non-conformances raised relating to marine megafauna observation.
	No marine water contamination from leaks and spills on-board vessels.	Maintain an appropriate spill kit, personal protective equipment and relevant operator instructions / emergency procedures for the management of hazardous materials, fuel and chemicals on all vessels.	Vessel inspections result in 100% compliance of hazardous waste storage containers meeting industry standards. Vessel inspections result in 100% compliance for fuel transferring	Non-conformances with on-site storage arrangements have been identified. Non-conformances with fuel transferring equipment and procedure are identified.	Improvement in Management practices (bunkering procedures, chemical storage). Maintain and repair any damage to storage areas and/or bunds promptly.

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
		Spills response procedures are in place and implemented. Conduct plant and equipment maintenance and refuelling only in designated areas where practical. Fuel / chemical storage is kept in a secure area and bunded on board vessels to prevent spills. Contractors to establish and implement a bunkering procedure in compliance with Port and MSQ requirements.	and equipment meeting industry standards. All spills are self-reported to the Port, and effectively contained and cleaned up.	Small volume spills or spills that do not reach marine water occur on multiple occasions.	Review fuelling practices and rectify immediately if an unintentional release or spill occurs. Attend Toolbox meetings with construction contractors Increase frequency of audits undertaken on vessels to ensure no further non-conformances. Review procedures, if procedures breakdown or a spill occurs and train staff about appropriate responses.

INSHORE DOLPHIN MONITORING PROGRAM:

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
Provide for the identification of residual adverse impacts to listed dolphin species in Cleveland Bay, in cases where impacts cannot be managed	Inshore dolphin populations in Cleveland Bay are monitored to measure and detect trends and changes to the population and behaviour.	Fully implement scientifically robust inshore dolphin monitoring programs, including the use of pre construction and far field reference site, to identify project related impacts. Engage ITAC with inshore dolphin monitoring results, including Temporal and Spatial data, for review.	100% of data, annual and final reports and datasets/spatial layers, supplied by agreed milestone dates each year following data analysis 100% of all surveys at the identified periods are undertaking at the scheduled time.	Surveys delayed due to weather Any reported dolphin stranding or deaths in Cleveland Bay. Any injured dolphin in the vicinity of the rockwall or dredging construction activities	Undertake follow up surveys as soon as practical (if possible) Review monitoring plans and reschedule survey accordingly. Escalation through contractual process if consecutive CAR / non conformances raised relating

			Undertake Annual Program Review to identify trends and areas of potential concern to ensure all appropriate management controls or mitigations implemented	Any change in dolphin behaviour, diversity or distribution in known habitat areas	to marine megafauna observation
	No significant long term impacts to the distribution of inshore dolphins	Ensure suitably trained Marine Megafauna Observers for the construction activities (piling, dredging, rockwall placement) to undertake visual observation of inshore dolphins around construction fronts. Cease all relevant activities (rockwall placement, vessel movement, dredging) if inshore dolphins enter exclusion zones as specified in the MEMP (POT 2135) to avoid injury or loss of inshore dolphins. Works do not commence until any inshore dolphins have exited the exclusion zone, or a period of 30 minutes has elapsed since the last sighting of the animal in the exclusion zone.	100% of personnel undertaking marine megafauna observations are suitably trained. Construction works are ceased on 100% of occasions when inshore dolphins are observed within the relevant exclusion zone. No marine megafauna stranding reports (for inshore dolphins) associated with rockwall or dredging construction activities. Daily megafauna logs maintained by marine megafauna observers Daily megafauna logs audited by the Port regularly. No complaints received in relation to impacts to inshore dolphins from rockwall or dredging construction activities.	Non-conformance identified from audits relating to marine megafauna observation Any change in dolphin diversity or distribution in known habitat areas. Any reported dolphin stranding or deaths in Cleveland Bay. Any injured dolphins in the vicinity of the rockwall or dredging construction activities. Cleveland Bay ambient water quality data indicates pre-cursor concerns for inshore dolphin abundance and health. Any reduction in recorded sightings of inshore dolphins in Cleveland Bay	Refresher training for marine megafauna observers. Number of megafauna observation audits increased to ensure no further non-conformances. Investigate marine megafauna stranding's to determine cause, location Attend Toolbox meetings with construction contractors Investigate ambient water quality information, with input from the ITAC, to determine possible flow on impact on inshore dolphins.

ENVIRONMENTAL PROCEDURE FOR PILE DRIVING:

OBJECTIVE	PERFORMANCE CRITERIA	CONTROLS	PERFORMANCE INDICATORS	EARLY-WARNING TRIGGER LEVELS	CORRECTIVE ACTIONS
To minimise the risk of physiological impacts to marine fauna from pile driving operations	No significant long-term behavioural impacts to megafauna identified from piling activities No injury or loss of marine megafauna due to noise or vibration resulting from reclamation or piling activities	Establish an Exclusion Zone, based on noise modelling and relevant scientific evidence, to minimise the risk of physiological impacts to marine megafauna from pile driving operations. Implement the Environmental Procedure for Pile Driving for all piling works. Ensure suitably trained, dedicated Marine Megafauna Observers for the piling activities to undertake visual observation of marine megafauna Ensuring pre-start visual observations for marine megafauna are undertaken across the Observation Zone by a suitably qualified marine observer for at least 30 mins prior to commencement of pile driving operations, and during pile driving operations. Only commence pile driving operations if marine megafauna have not been	Undertake initial underwater noise monitoring at the commencement of piling to validate the Exclusion Zone implemented. Inspections/audits are undertaken to identity the need for noise and vibration suppression measures and the effectiveness of measures implemented. Underwater noise assessments confirm the Exclusion Zone for piling being implemented is appropriate. 100% of personnel undertaking marine megafauna observations are suitably trained. Dedicated marine megafauna observers are in place for 100% of piling activities. Piling works are ceased on 100% of occasions when marine megafauna are observed within the Exclusion Zone. Pile driving procedure implemented 100% of the time.	Marine megafauna observer for piling activities identified to have been assigned additional tasks/not fully dedicated. Non-conformance identified from audits relating to marine megafauna observation Daily megafauna logs missing or not present for all days of operation Any reduction in marine megafauna sightings (turtles, dolphins) in Cleveland Bay. Any reported marine megafauna stranding or deaths in Cleveland Bay. Any injured marine megafauna in the vicinity of the piling construction activities Any change in dolphin behaviour and/or reduced presence in known habitat areas	Revisit the piling methodology, including monitoring and adjusting elements of piling such as reducing the height and weight of the impact hammer. Consultation with ITAC / Department Review Observation Zones, Exclusion Zones based on Underwater noise assessments and provide recommendation to ITAC Refresher training for marine megafauna observers. Increase frequency of audits undertaken on marine megafauna observations to ensure no further non-conformances. Attendance Toolbox meetings with construction contractors Escalation through contractual process if consecutive CAR / non-conformances raised relating

		sighted in the Exclusion Zone for 30 mins; Ceasing pile driving operations if marine megafauna are observed in, or about to enter, the Exclusion Zone; Not commencing pile driving operations between the hours of sunset and sunrise. Pile driving that has commenced before sunset (or a period of low visibility) may continue after sunset, unless pile driving operations have been suspended for more than 15 minutes.	Daily megafauna logs maintained by marine megafauna observers Daily megafauna logs audited by the Port regularly	Annual results of CU megafauna monitoring programs (i.e. Inshore Dolphins, Shorebirds etc).	to marine megafauna observation

9 MONITORING PROGRAMS RELEVANT TO MNES

A number of monitoring programs are required under the EPBC Act approval (EPBC 2011/5979) to support the measurement and management of potential impacts on a number of MNES. This section provides a summary overview of the key monitoring programs being implemented for the CU Project.

9.1 INSHORE DOLPHIN MONITORING PLAN

The Port has established an Inshore Dolphin Monitoring Program to support the CU Project. The objectives of the Inshore Dolphin Monitoring Plan are to:

- Provide consistent and scientifically valid monitoring methodologies to be able to determine trends and identification of stressors with the potential to cause adverse impacts for these species as consistent with the *Coordinated National Research Framework to Inform the Conservation and Management of Australia's Tropical Inshore Dolphins* (Department of the Environment, 2015).
- Provide a baseline assessment on the distribution, abundance and habitat use of the Australian snubfin dolphin and Australian humpback dolphin species in areas of Cleveland Bay that may be directly or indirectly impacted by the CU Project and adjacent non-impacted sites.
- Monitor and report on changes, beyond natural spatial and temporal variation, to the population and behaviour of the Australian snubfin dolphin and Australian humpback dolphin species throughout construction, pile driving operations and dredging activities for the CU Project, and a sufficient period of time post-construction to identify any changes in population and behaviour of the identified dolphin species as a result of the said activities.
- Provide recommendations on key areas of adverse impact and potential mitigation measures, including the identification of residual adverse impacts in Cleveland Bay which cannot be managed.

This monitoring plan has been established and a copy of the Inshore Dolphin Monitoring Plan is at Appendix E.

9.2 MARINE MEGAFAUNA MONITORING PLAN

The Port has established a Marine Megafauna Monitoring Plan to support the CU Project. As specified in the EPBC Act approval, this plan is focused specifically on listed turtle species, dugongs (*Dugong dugon*), and all other cetaceans. Inshore Dolphins are not a focus of this plan given they are subject to a specific plan.

The overarching objective of the Marine Megafauna Monitoring Plan is to monitor for, and provide increased understanding of, potential impacts to marine megafauna from marine activities associated with marine construction and dredging.

The Marine Megafauna Monitoring Plan will fulfil this by:

- Providing an understanding of the pre-construction conditions, depending on natural abundance of each species, of selected aspects of marine megafauna and their key habitats prior to commencement of Project activities;
- Identifying potential impacts from dredging and construction activities and provide a framework for increasing understanding of the magnitude of these potential impacts, and in particular, whether activities are being undertaken within approved impact limits (i.e. confirm EIS predictions of potential impacts);

- Monitoring and reporting on selected aspects of marine megafauna, during dredging and construction activities in the marine environment, to provide an increased understanding of the marine megafauna response to potential impact pathways,
- Providing recommendations on key areas of potential impact to allow the implementation of mitigation measures, if impacts are beyond what was predicted in the EIS (approved);
- Increasing understanding and scientific knowledge of marine megafauna within Cleveland Bay (where relevant).

This monitoring plan has been established and a copy of the Marine Megafauna Monitoring Plan is at Appendix F.

9.3 SHOREBIRD MONITORING PLAN

The Port has established a Shorebird Monitoring Plan to support the CU Project. The objectives of the Shorebird Monitoring Plan are to:

- Develop a Shorebird Monitoring Program to monitor potential impacts to shorebirds before and during construction activities.
- Conduct a pre- CU Project construction activities survey of shorebirds in the Project area and on the nearby Ross River sandspit to identify and record the abundance of each bird species.
- Monitor and report on changes to shorebird roosting and foraging, beyond natural spatial and temporal variation, during the Project construction activities in the marine environment, to identify any impacts from the project on shorebirds.
- Provide recommendations on key areas of actual impact and potential mitigation measures should impacts be detected.
- Contribute to improving public awareness on local avifauna biodiversity and species richness in the vicinity of the project area.

This monitoring plan has been established and a copy of the Shorebird Monitoring Plan is at Appendix G.

9.4 INVASIVE MARINE PESTS MONITORING PLAN

The Port currently implements an invasive marine pests (IMP) monitoring plan for whole of Port surveillance of invasive marine pest monitoring. This program has been developed in conjunction with the Queensland Government Department of Agriculture and Fisheries (DAF), and is based on the outcomes of the Queensland Seaports E-DNA Surveillance (Q-SEAS) marine pest pilot program in 2019-2020. The Q-SEAS pilot program focused on providing a consistent and coordinated framework and surveillance network for the early detection of marine pests at Queensland's seaports. This provides a means for early identification and proactive management which is risk-based, adaptable, implementable, transformative and cost-effective; and in alignment with the Australian Government's Marine Pest Plan 2018-2023.

This program is focused on detecting the presence of invasive marine species across the Port of Townsville.

The CU Invasive Marine Pest (IMP) Monitoring Plan has been developed to nest in with the whole of Port IMP monitoring program, building on and extending that program by including monitoring locations in the high risk areas for IMPs from CU project activities. The CU IMP Monitoring Plan incorporated sites located adjacent to the proposed temporary offloading platform and near the Breakwater modification construction footprint as key risk sites for IMPs. The monitoring sites have been revised in 2023, with the Duckpond site removed given

the program of works no longer includes the Diagonal Breakwater works (it was located downstream of these works) and a new site located at the TUF to more directly monitoring risks from IMPs during marine works.

The monitoring program has also provided an opportunity for pre-construction works monitoring. Further, routine monitoring and observations (e.g. visual observations of dredge equipment and offloading structures) will be conducted periodically to provide additional detection capability of any IMPs.

Primarily the dredging equipment is expected to be sourced from within Australia, and likely within Queensland. Therefore the risk of international IMP transfer within the CU Project is considered low. Any IMP risks will be due to inter-port movement translocating IMPs if they are present in those ports. While the dredge equipment will be fully inspected and cleaned prior to mobilising to Townsville, the IMP plan incorporates a small number of monitoring sites to provide for detection of any potential incursions. This scaled monitoring is in line with a risk based approach to monitoring for Invasive Marine Pest.

Any dredging or support plant sourced internationally will need to comply with the state and federal biosecurity requirements prior to entry to Australian waters. This will also trigger a review of the risk assessment conducted in relation to international IMP transfer, with associated monitoring plan adjustments if deemed warranted.

Implementation of the Q-SEAS based program ensures that this CU IMP Monitoring Plan is aligned with the National Marine Pest Strategy (CoA, 2019) and the outcomes of the 2015 ABARES review "Monitoring for marine pests: A review of the design and use of Australia's National Monitoring Strategy and identification of possible improvements. The Port is an active participant in IMP detection and management and as a result, will remain advised of any new detections (emerging pests) during the life of the project via the National Introduced Marine Pest Information System (NIMPIS) database and Qld DAF detections information notices.

This monitoring plan has been established and updated, with a copy of the Invasive Marine Pest Monitoring Plan is provided at Appendix H.

9.5 ENVIRONMENTAL PROCEDURE FOR PILE DRIVING

The Port has established an Environmental Procedure for Pile Driving to specifically address establishing adequate controls to monitor and mitigate impacts associated with pile driving. This includes monitoring and reporting by suitably qualified marine observers for megafauna presence prior to and during piling activities. Records will be kept of all observations of marine megafauna in association with the pile driving activities.

The Environmental Procedure for Pile Driving is included at Appendix I. This Procedure incorporates established Exclusion and Observation Zones for pile driving activities associated with the offloading facility and channel navigational beacons, based on noise modelling and relevant scientific evidence associated with the piling activities planned.

This Procedure was updated in November 2021(R2) to incorporate revised Exclusion Zones for impact piling of sheet piles associated with construction of the Unloading Facility.

This Procedure was updated in May 2022 (R3) to incorporate Exclusion Zones for navigational beacon piling conducted in May 2022.

This Procedure has been updated in December 2023 (R4) to incorporate revised Exclusion Zones for navigational beacon piling to be conducted in early 2024.

9.6 MONITORING PLAN REPORTING

Regular reporting and monitoring updates will be a key feature of the implementation of these monitoring plans. Contractors will be responsible for analysis of the monitoring data at defined intervals and providing interpretation of the monitoring results achieved and any areas of concern. This will include recommendations on likely causes/stressors, necessary management action/s or monitoring program modification should the monitoring data show concerns.

These interim monitoring reports will be considered by the CU Project team as part of the overall adaptive management of the project. As outlined in the relevant management plans, these reports will be a fundamental input to reviews of the relevant management arrangements and corrective actions.

The interim monitoring reports will also be presented to the Port CU Project ITAC for review and consideration. Particularly where there are monitoring results indicating areas of concern or population impacts, the ITAC will consider the results against trigger levels and other legislative criteria and provide advice to the Port CU Project team on the most appropriate response strategies or evaluate the corrective actions proposed to be implemented. The ITAC advice will further contribute to the Port revision of the relevant management controls and corrective actions to minimise impact on the relevant aspect of the marine environment and will be communicated to the regulatory oversight committee (CROC) and/or regulatory bodies as appropriate.

All changes to management arrangements as a result of these monitoring programs will be captured and documented within the relevant management plans, including reference in this MEMP, and the varied management arrangement incorporated into the on ground practices.

Copies of all report(s) will be kept on-site and will be available for regulatory inspection. If requested by the regulators, all survey data and information will be submitted within 30 business days of the request, or within a timeframe agreed by the relevant regulator in writing.

10 CONTINGENCY PLANS

As part of its Quality Management System, the Port has established contingency and emergency response plans for a range of emergencies and incidents, including marine and land incidents and natural disasters. Relevant considerations and contingency plans associated with the project are incorporated into these broader Port contingency and emergency response plans. Additionally, a number of the CU Project specific operational management plans address specific contingency procedures for identified emergencies / incidents where they have been identified as key requirement. Table 10 details the contingency plans in place for the CU Project.

Table 10: CU Project Contingency Plan

CONTINGENCY	RESPONSE	RESPONSIBILITY	TIMEFRAME
Cyclone or other extreme weather event	Implement Contractor's and/or the Port Cyclone Response Plan which details the Port's authorities and responsibilities for the management of infrastructure, vessels, port users, tenants and personnel during a cyclone or other extreme weather event. This plan establishes clear actions and steps to be taken in the preparation for, response to and recovery from a cyclone event for the Port of Townsville. Specific requirements for the CU Project equipment, including monitoring equipment deployed as part of the project, will be incorporated into this document. In addition, the RHM has established requirements for all vessels in the event of a cyclone that will be applicable to any construction and reclamation vessels.	Contractor Principal's Site Representative	As detailed in the cyclone readiness chart
Breach in reclamation structure	Implement CU Reclamation Integrity Management Plan	Principal's Site Representative	Immediately
Securing of water management systems in the event of extreme (severe) weather forecast	Implementation of the CU Tailwater Management Plan and the Stormwater and Erosion Control Plan; including preparatory maintenance of management systems and drains prior to wet season commencement, Water management systems (bunds, stormwater drains) will be fit for purpose designed to withstand moderate weather conditions.	Contractor Principal's Site Representative	Prior to extreme (severe) weather (where possible)
Equipment falls into water	Implement Safe Work Methods as detailed in Project specific Safe Work Method Statements for rockwall or dredging construction/ reclamation activities.	Contractor	Immediately
Uncontrolled tailwater release	Implement mitigation actions in Tailwater Management Plan	Contractor Manager Environment CU	Immediately

Marine megafauna incident	In all situations, should a marine megafauna interaction or incident occur, the activity will be ceased while the animal and its injuries are assessed. Where it is safe to do, reasonable efforts will be made by the construction and reclamation crews to assist any marine megafauna following any incident. An incident report will be completed, with corrective actions to be considered and implemented to minimise the risk of the incident being repeated. All interactions will be recorded and reported immediately.	Contractor Principal's Site Representative Manager Environment CU	Immediately
Non-CU Project related impacts on MNES (Given the length of this project, it is possible an environmental incident or impact on MNES could occur that is not directly associated with the project activities (i.e. megafauna mortality, seagrass dieback from a cyclone event etc)	In the event of such a non-project related incident, the Port will discuss these impacts within the core and project teams, with the Port ITAC and other relevant parties (i.e. monitoring contractors) to review known information of the cause and extent of the incident and impact. As part of the adaptive management of the project, consideration will be made of any relevant modifications that could be made to the project activities which may assist in minimising the pressure on and providing significant improvement to the recovery and response of the relevant MNES. Any changes to the project activities to address non-project impacts will have a financial or program impact to the project. Should such changes be proposed, the Port will engage with the relevant regulators prior to making changes to discuss the proposed changes and the likely benefits to be achieved	Port Environmental & Planning Team	To be determined according to the nature of the incident / impact

APPENDIX A

COMMONWEALTH & STATE LEGISLATION

LEVEL	TITLE	RELEVANCE
Commonwealth	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984*	Regulates the preservation and protection against desecration of areas and objects that are of Aboriginal or Torres Strait Island significance.
	Biosecurity Act 2015	Manages biosecurity threats to plant, animal and human health.
	*Environment Protection and Biodiversity Conservation Act 1999 (**EPBC Act**)*	Protects and manages nationally significant environmental and heritage matters, including the Great Barrier Reef World Heritage Area.
	Great Barrier Reef Marine Park Act 1975 and regulations / zoning plans	Establishes a framework for the establishment, control, management and development of the Great Barrier Reef Marine Park Authority.
	Maritime Transport and Offshore Facilities Security Act 2003	Establishes a requirement for maritime security plans for certain port facilities, including the Port of Townsville, which establish security zones and access procedures.
	Native Title Act 1993	Requires native title notification to undertake works, including the use of Unallocated State Land.
	Protection of the Sea (Prevention of Pollution from Ships) Act 1983	Regulates the prevention of accidental and operational marine environment pollution from shipping.
State	*Aboriginal Cultural Heritage Act 2003*	Establishes a duty of care to take all reasonable and practicable measures to ensure activities do not harm Aboriginal cultural heritage.
	Coastal Protection and Management Act 1995	Provides the framework for integrated management of the coastal zone, including the assessment and approval of tidal works structures and operational works under tidal water. All methods of land placement of dredge material remove sediments from the active marine system and consequently are assessed in the light of coastal processes and management requirements.
	Environmental Protection Act 1994 and regulations / policies	Regulates relevant environmental approvals and development approvals, including for dredging-related operations and general environmental protection requirements.
	Fisheries Act 1994 and regulations	Protects commercial and recreational fisheries resources and their habitats, including assessment and approval of disturbance or removal of protected marine and tidal plant species, including seagrasses, mangroves and salt-marsh from the Queensland Department of Agriculture, Fisheries and Forestry. It also prohibits work in a declared Fish Habitat Area without approval and declares Dugong Protection Areas. A declared Fish Habitat Area (Cleveland Bay FHA-071) exists within Townsville port limits but outside the dredge areas and Dredge Material Placement Areas. The whole of Cleveland Bay is a declared Dugong Protection Area.
	Land Act 1994 / Land Title Act 1994	Provides for the allocation of tenure over state land, including Unallocated State Land such as land below the high water mark where dredging occurs.

	Marine Parks Act 2004 and Marine Parks (Great Barrier Reef) Zoning Plan	Provides for the State's management of the coastal marine area along the Great Barrier Reef coast, including the state marine park.
	Native Title (Qld) Act 1993	Requires native title notification to undertake works, including the use of Unallocated State Land.
State	*Nature Conservation Act 1992*	Declares and manages protected areas, including the Great Barrier Reef World Heritage Area and provides for the protection of certain flora and fauna.
	Planning Act 2016 and the *State Planning Policy* and assessment provisions	Requires certain developments within the port limits to be assessed for their environment effects and to be approved through the associated State Assessment and Referral Agency system.
	Queensland Heritage Act 1992	Provides for the conservation of Queensland's historical cultural heritage.
	State Development and Public Works Organisation Act 1971	Defines "significant projects" as coordinated projects and allows the Coordinator General to decide whether such projects require a formal EIS or a more simplified Impact Assessment Report.
	Sustainable Ports Development Act 2015	Aims to provide for the protection of the Great Barrier Reef World Heritage Area, through management port-related development in and adjacent to the area
	Transport Infrastructure Act 1994	Requires the Port to establish, manage and operate efficient port facilities and services, including the provision of safe navigational channels and to prepare land use plans for management and development in port areas.
	Transport Operations (Marine Pollution) Act 1995	Outlines the requirements for ship-sourced pollution management in Queensland.
	Transport Operations (Marine Safety) Act 1994	Regulates the operation of commercial vessels in Queensland waters.

OBLIGATIONS UNDER THE ENVIRONMENTAL PROTECTION ACT 1994

General Environmental Duty

Section 319 of the *Environmental Protection Act 1994* states that every person has a general environmental duty, which requires that a person must not carry out any activity that causes or is likely to cause environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm. The following must be considered when deciding measures to be taken to fulfil the general environmental duty:

a) The nature of the harm or potential harm;

b) The sensitivity of the receiving environment;

c) The current state of technical knowledge for the activity;

d) The likelihood of successful application of the different measures that might be taken; and

e) The financial implications of the different measures as they would relate to the type of activity.

The general environmental duty is a defence to offences related to causing unlawful environmental harm. If defendants can show that the harm happened while a lawful activity, apart from this Act, was being carried out and they fulfilled their general environmental duty, then they cannot be found guilty of causing unlawful environmental harm. A person is not prosecuted for failing to fulfil their general environmental duty. However,

an environmental protection order can be issued to secure compliance with the general environmental duty and if this is not complied with, the person can be prosecuted.

Duty to Notify

Section 320 of the *Environmental Protection Act 1994* states a person must report the event, no later than 24 hours after becoming aware of serious or material environmental harm being caused or threatened by an activity that they are involved in, unless the harm is authorised by the regulator. Failure to fulfil this duty to notify of environmental harm is an offence and can lead to prosecution.

Offence to Cause Serious or Material Environmental Harm

Sections 437 to 439 of the *Environmental Protection Act 1994* state that a person must not wilfully and/or unlawfully cause serious environmental harm or material environmental harm. Serious environmental harm is environmental harm (other than environmental nuisance):

a) that is irreversible, of a high impact or widespread; or

b) caused to:

   (i) an area of high conservation value; or

   (ii) an area of special significance, such as the Great Barrier Reef World Heritage Area; or

c) that causes actual or potential loss or damage to property of an amount of, or amounts totalling, more than the threshold amount; or

d) that results in costs of more than the threshold amount being incurred in taking appropriate action to:

   (i) prevent or minimise the harm; and

   (ii) rehabilitate or restore the environment to its condition before the harm.

Material environmental harm is environmental harm (other than environmental nuisance):

a) that is not trivial or negligible in nature, extent or context; or

b) that causes actual or potential loss or damage to property of an amount of, or amounts totalling, more than the threshold amount but less than the maximum amount; or

c) that results in costs of more than the threshold amount but less than the maximum amount being incurred in taking appropriate action to:

   (i) prevent or minimise the harm; and

   (ii) rehabilitate or restore the environment to its condition before the harm.

Offence to Cause Environmental Nuisance

Section 440 of the *Environmental Protection Act 1994* states that that a person must not wilfully and/or unlawfully cause environmental nuisance. Environmental nuisance is unreasonable interference or likely interference with an environmental value caused by—

a) aerosols, fumes, light, noise, odour, particles or smoke; or

b) an unhealthy, offensive or unsightly condition because of contamination; or

c) another way prescribed by regulation.

Offence to Contaminate Water

Section 440ZG of the *Environmental Protection Act 1994* states that a person must not unlawfully deposit a prescribed water contaminant in waters or unlawfully release stormwater run-off into waters, including

stormwater drains. Prescribed water contaminants include sand, soil, silt or mud and a contaminant which is likely to cause environmental harm if it enters waters.

Offence to Cause Environmental Harm or Nuisance with Contaminant

Section 443 of the *Environmental Protection Act 1994* states that a person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or to cause environmental nuisance. A contaminant can be:

- A gas, liquid or solid; or
- An odour; or
- An organism (whether alive or dead), including a virus; or
- Energy, including noise, heat, radioactivity and electromagnetic radiation; or
- A combination of contaminants.

APPENDIX B

EPBC APPROVAL CONDITIONS REFERENCE TABLE

MEMP relevant EPBC Approval Conditions

REF	COND. NO.	CONDITION REQUIREMENT	PLAN REFERENCE	DEMONSTRATION OF HOW THE PLAN ADDRESSES THE CONDITION REQUIREMENT
1	8	The person taking the action must ensure that: • the reclamation area does not exceed 110 hectares at **stage** 1 of the action in accordance with Appendix 8; • the reclamation area does not exceed 152 hectares in total, in accordance with Appendix C; and • the design, materials and methods of construction for the reclamation area must prevent water quality impacts from leaching material through the bund wall, release of tailwater and storm-water run-off.	7.3.2 7.3.3 7.3.4	Sections 7.3.2, 7.3.3 and 7.3.4 (Land Contamination, Water quality – Stormwater and Tailwater) address actions associated with impacts from the reclamation footprint and reclamation integrity. This includes tailwater monitoring to demonstrate prevention of water quality impacts from tailwater.
2	9	The person taking the action must ensure that a survey of the reclamation area in Appendix 8 is undertaken before the **commencement** of the action, and a survey of the final reclamation area shown in Appendix C is undertaken before the **commencement of stage** 2 of the action, to determine the presence and density of seagrass within the reclamation footprint.	7.3.1	Section 7.3.1 details the monitoring requirement to survey the reclamation area footprint for seagrass prior to commencement.
3	12	The person taking the action must submit a Marine Environmental Management Plan (MEMP) for the Minister's approval, which includes measures to mitigate impacts to MNES from activities in the marine environment, before the commencement of the action. The person taking the action must not commence the action unless the Minister has approved the MEMP. The MEMP must be prepared in accordance with the Department's Environmental Management Plan Guidelines, and include at least the following:	4.3 Document Control Sheet	Section 4.3 and the document approval page details the submitting and approval of the MEMP to the Department. The action is not commenced until the MEMP is approved.
4	12a)	clearly defined objectives and performance criteria to: • avoid or minimise impacts to MNES from construction and operational activities in the marine environment; • avoid or minimise pollution of the marine environment; • manage risks associated with extreme weather events; and • avoid vessel accidents and oil spills from vessels associated with the action;	7	Section 7 details all environmental elements associated with the construction activities in the marine environment. Objectives and performance criteria for each element is detailed in the sub-sections.

5	12b	specific and auditable mitigation and management measures to avoid and minimise impacts to MNES, including: controls, performance indicators, early-warning trigger levels, risk management, adaptive management strategies, corrective actions, and emergency response measures;	7	Section 7 details all environmental elements associated with the construction activities in the marine environment. All mitigation and management measures for each element detailed in the individual sub-sections
6	12c	mitigation and management measures to mitigate impacts from noise, artificial light, vessel strike, invasive marine species, vessel accidents, storm-water runoff, chemical and fuel management, and accidental release of waste and/or other contaminant spills into the marine environment;	7	Section 7 details mitigation and management measures for each of the elements specified in this condition, with details provided in the individual sub-sections
7	12d	a program to monitor the potential impacts to marine fauna before and during construction activities in the marine environment;	9.2 Appendix F	Section 9.2 and Appendix F provide details of the monitoring program to be implemented for monitoring of impacts to Marine Megafauna.
8	12e	a program to monitor the potential impacts to shorebirds before and during construction activities in the marine environment;	9.3 Appendix G	Section 9.3 and Appendix G provide details of the monitoring program to be implemented for monitoring of impacts to shorebirds.
9	12f	a program to monitor the Port Expansion Project area for the presence of invasive marine species. The invasive marine species monitoring program must be based on nationally agreed methodologies and standards (such as the Australian Marine Pest Monitoring Manual (version 2.0, 2010), as amended or substituted);	9.4; Appendix H	Section 9.4 and Appendix H provide details of the monitoring program to be implemented for monitoring the presence of invasive marine species.
10	12g	contingency plans should undesirable or unforeseen impacts occur, including as a result of extreme weather events or any additional pressures that may impact MNES;	10	Section 10 details contingency plans for key potential emergencies and incidents associated with activities in the marine environment that may increase the risk to MNES.
11	12h	mechanisms for the regular review of the performance of the MEMP in achieving its objectives and to support continuous improvement;	4.8 4.13	Section 4.8 and 4.13 outline the approach for regular review of the MEMP, including at least annual reviews and regular auditing.
12	12i	procedures for reporting to the Department on outcomes of monitoring, performance monitoring, and periodic reviews of the MEMP;	4.14	Section 4.14 outlines the approach for reporting to the Department on the outcomes of MEMP delivery, monitoring and reviews/auditing of the MEMP.
13	12j	mechanisms for stakeholder consultation on the implementation of the MEMP; and	4.1 4.8 4.17	Section 4.1, 4.8 and 4.17 detail the consultation with stakeholders undertaken in the development of the MEMP, linking to

				stakeholder consultation/engagement mechanisms (Section 4.17) moving forwards.
14	12k	an outline of the governance structure, including roles and responsibilities for implementing the MEMP.	4; detailed in 4.5	Section 4, especially Section 4.5 (Organisational structural and responsibilities) provides details of the internal Port governance structure. This includes detailing the responsibilities of key roles with implementation of the MEMP.
15	13	The MEMP may be submitted to the Minister in stages, but the MEMP must be submitted before the commencement of each stage, and the respective stages must not commence until the Minister has approved the respective version of the MEMP.	1.1 1.2	Section 1.1 and 1.2 outline the approach of submitting the MEMP in stages, related to the relevant phase of construction activity.
16	14	The approved MEMP, or subsequent version of the MEMP as provided for under Condition 38, must be implemented.	4.4	Section 4.4 details the implementation of the MEMP and the responsibility for ensuring the MEMP actions are installed, taken and maintained.
17	15	The person taking the action must establish an exclusion zone to minimise the risk of physiological impacts to marine fauna from pile driving operations. The exclusion zone must be based on noise modelling and relevant scientific evidence. The exclusion zone must be peer reviewed by a suitably qualified independent expert and included in the MEMP required by Condition 12 and submitted for the Minister's approval. The person taking the action must not commence pile driving operations unless the Minister has approved the MEMP.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates the establishment of an Exclusion Zone supported by scientific evidence.
18	16	The person taking the action must ensure that pre-start visual observations for marine fauna are undertaken across the entire observation zone. The visual observations must be undertaken by a suitably qualified marine observer for at least 30 minutes immediately preceding the commencement of pile driving operations, and during pile driving operations. Records must be kept of marine observers engaged for visual observations.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates the requirement for pre-start observations.
19	17	The person taking the action can only commence pile driving operations if marine fauna have not been sighted within the exclusion zone at the completion of the 30 minute pre-start visual observations in Condition 16.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates the requirement to

				only commence once marine megafauna have not been sighted in the Exclusion Zone.
20	18	The person taking the action must initiate soft-start procedures at the commencement of pile driving operations, with a gradual increase in piling impact energy of no more than 50% of full impact energy for 10 minutes. The soft-start procedure must be implemented after breaks in piling of 30 minutes or more.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates soft start procedures at commencement/recommencement of piling.
21	19	The person taking the action must implement stand-by procedures if marine fauna are sighted within the observation zone during the soft-start or normal operation procedures. The operator of the piling equipment must be placed on stand-by to shutdown the piling equipment.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates stand by procedures if marine megafauna are sighted in the Observation Zone.
22	20	The person taking the action must cease pile driving operations if marine fauna are observed in, or about to enter the exclusion zone. Pile driving operations must not commence again until all marine fauna are observed to move outside the exclusion zone and 30 minutes have passed since the last sighting of the marine fauna within the exclusion zone.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates cessation of piling where marine megafauna are sighted in, or about to enter, the Exclusion Zone.
23	21	The person taking the action must not commence pile driving operations between the hours of sunset and sunrise. Pile driving operations commenced before sunset or before a period of low visibility may continue between the hours of sunset and sunrise, unless pile driving operations have been suspended for more than 15 minutes.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates the requirement for piling not to occur between sunset and sunrise
24	22	The person taking the action must also apply Conditions 16, 17, 19, 20 and 21 to re-strike testing activities. A maximum of 15 full force blows of the pile hammer may be applied to each test pile on a maximum of two re-strike test events per test pile.	7.3.8 9.5 Appendix I	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna. Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that incorporates the arrangements for re-strike testing activities.
25	23	The person taking the action may undertake an alternate procedure to Conditions 15 — 22, if the alternate procedure provides equivalent or better protection to marine fauna from pile driving operations. The alternate	7.3.8 9.5	Section 7.3.8 detail the management measures to address impacts from piling on MNES, particularly marine megafauna.

		procedure must be outlined in the MEMP, peer reviewed by a suitably qualified independent expert, and submitted for the Minister's approval. The person taking the action must not commence pile driving operations unless the Minister has approved the MEMP, outlining the alternate procedures in accordance with this Condition.	Appendix I	Section 9.5 and Appendix I provide details of the Environmental Procedure for Pile Driving that identifies the requirements to be followed if an alternate piling procedure is to be undertaken.
26	25	The person taking the action must provide an opportunity for Indigenous people to comment on the management plans and strategies specified in this approval during their preparation. The person taking the action must provide to the Minister a copy of the outcomes of consultation with Indigenous people, and an explanation of how any comments have been addressed in the management plans and strategies.	4.1 4.17	Section 4.1 and 4.17 detail the consultation with indigenous stakeholders undertaken in the development of the MEMP, linking to stakeholder consultation/engagement mechanisms (Section 4.17) moving forwards.
27	31	Unless otherwise agreed in writing by the Minister, each plan or strategy specified in the conditions must be independently peer reviewed before submission to the Minister for approval.	4.2	Section 4.2 details the peer review undertaken for the MEMP and associated sub-plans.
28	32	The reviews undertaken for Condition 31 must include an analysis of the effectiveness of the avoidance and mitigation measures in meeting the outcomes, targets or management measures identified in the plan/s or strategies being reviewed.	4.2	Section 4.2 details the peer review undertaken for the MEMP and associated sub-plans.
29	33	Unless otherwise specified in these conditions or notified in writing by the Minister, the person taking the action must provide to the Minister a copy of all advice and recommendations made by the independent peer reviewer(s) with the plan or strategy, and an explanation of how the advice and recommendations will be implemented, or an explanation of why the person taking the action does not propose to implement certain recommendations.	4.2	Section 4.2 details the peer review undertaken for the MEMP and associated sub-plans. The peer review comments and the Port advice and response has been supplied to the Department as part of the Management Plan approval process.
30	35	The person taking the action must maintain accurate records substantiating all activities associated with, or relevant to, the conditions of approval, including measures taken to implement the management plans and strategy required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval.	4.15	Section 4.15 outlines the records management system in operation for the CU Project in line with the Port Quality Management System.

		Note: Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media."		
31	36	Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published.	4.14	Section 4.14 details the annual reporting for the project, covering a compliance review against the Approval conditions, outcomes of environmental monitoring and MEMP periodic review results.
32	38	The person taking the action may choose to revise a management plan approved by the Minister under Conditions 5, 10 and 12 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact. If the person taking the action makes this choice they must: a. notify the Department in writing that the approved plan has been revised and provide the Department with an electronic copy of the revised plan; b. implement the revised plan from the date that the plan or strategy is submitted to the Department; and c. for the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised plan would not be likely to have a new or increased impact.	4.8	Section 4.8 identifies the option of amending the MEMP without submitting it for approval and specifies the steps to be taken if this option is implemented.
33	39	The person taking the action may revoke their choice under Condition 38 at any time by notice to the Department. If the person taking the action revokes the choice to implement a revised plan, without approval under section 143A of the Act, the plan approved by the Minister must be implemented.	4.8	Section 4.8 identifies the option of amending the MEMP without submitting it for approval and specifies the steps to be taken if this option is implemented.
34	40	Condition 38 does not apply if the revisions to the approved plan or strategy include changes to environmental offsets provided under the plan or strategy in relation to a matter protected by a controlling provision for the action, unless otherwise agreed in writing by the Minister. This does not otherwise limit the circumstances in which the taking of the action in accordance with a revised plan or strategy would, or would not, be likely to have new or increased impacts.	4.8	Section 4.8 identifies the option of amending the MEMP without submitting it for approval only where condition 38 applies.

35	41	If the Minister gives a notice to the person taking the action that the Minister is satisfied that the taking of the action in accordance with the revised plan would be likely to have a new or increased impact, then: ○ Condition 38 does not apply, or ceases to apply, in relation to the revised plan; and ○ the person taking the action must implement the plan approved by the Minister.	4.8	Section 4.8 identifies the option of amending the MEMP without submitting it for approval only where condition 38 applies.
36	42	Conditions 38, 39, 40 and 41 are not intended to limit the operation of section 143A of the EPBC Act which allows the person taking the action to submit a revised plan to the Minister for approval.	4.8	Section 4.8 identifies the option of amending the MEMP without submitting it for approval only where condition 38 applies.
37	44	Unless otherwise agreed to in writing by the Minister, the person taking the action must publish all management plans, reports and strategies referred to in these conditions of approval on their website. Each management plan, report and strategy must be published on the website within 1 month of being approved by the Minister or being submitted under Condition 38a).	Document Control Sheet	The document control sheet (pg. 2) identifies the date when the MEMP and associated sub-plans were published on the Port website.

APPENDIX C

CONTACT DETAILS FOR CU PROJECT

POSITION	ORGANISATION	PHONE NUMBERS	EMAIL
Principal's Representative	Port	1800 531 561	cugeneral@townsville-port.com.au
Principal's Site Representative	Port	1800 531 561	cugeneral@townsville-port.com.au
Environment Manager CU	Port	1800 531 561	cugeneral@townsville-port.com.au
Works Engineer CU	Port	1800 531 561	cugeneral@townsville-port.com.au
Environmental Advisor CU	Port	1800 531 561	cugeneral@townsville-port.com.au
Environmental Advisor CU	Port	1800 531 561	cugeneral@townsville-port.com.au
Safety Advisor CU	Port	1800 531 561	cugeneral@townsville-port.com.au
Port Tower	Port Duty Officer	07 4781 1683	
Regional Harbour Master	Maritime Safety Queensland	07 4421 8100	townsville.maritime@msq.qld.gov.au

APPENDIX D

EXTRACT FROM POT 442 – RISK MANAGEMENT GUIDELINES

ANNEXURE A – QUALITATIVE MEASURES OF CONSEQUENCE OR IMPACT

Rank		Operations (Trade)	Financial Loss	Asset Loss	Interruption to Services	Reputation, Image & Political Implications	Performance	Criminal Penalty	Information Security	Safety	Health	ENVIRONMENT	
												Nature & Extent of Potential / Actual Environmental Harm	Frequency, Intensity, Duration, Offensiveness of Activity
1	Insignificant	Insignificant impacts on operations and trade. No navigation closure. Insignificant delays.	$0 - $50K	Little or no impact on assets	< ½ day	Unsubstantiated, low impact, low profile or no news items. No political implications.	Up to 5% variation to KPI	Pecuniary	Can be dealt with by routine operations.	Minor temporary – irritation, first aid treatment required.	Reversible health effects of concern.	Environmental Nuisance resulting in insignificant impacts on the natural receiving environment, plants and/or wildlife. No impact on community or business.	Low frequency / intensity / duration activity (days). No substantiated offensive amenity impacts on surrounding area.
2	Minor	Minor impact on operations and trade. No navigation closure but minor revenue loss due to loading or unloading delays.	$50K - $500K	Minor loss or damage to assets	½ - 1 day	Substantiated, low impact, low news profile. Minor political implications resulting in minor local media attention.	5 -10% variation to KPI	Pecuniary	May threaten the efficiency or effectiveness of some aspect of the infrastructure but would be dealt with internally.	Minor temporary – medical treatment required.	Severe reversible health effects of concern.	Environmental Nuisance resulting in minor adverse impacts on or unreasonable interference with the natural receiving environment, plants and/or wildlife, but noticeable effect on amenity. Minimal impact on community or businesses.	Minor frequency / intensity / duration activity carried out during normal operating hours over a short term (weeks). Minor amenity impacts experienced within surrounding area with potential to trigger complaints.
3	Serious	Temporary navigation closure or prolonged restriction of navigation.	$500K - $5m	Major damage to assets	1 day – 1 week	Substantiated, public embarrassment, moderate impact, moderate (local) media attention. Political implications resulting in directions given by the shareholding Ministers.	10-25% variation to KPI	Imprisonment	Would not threaten the infrastructure but would mean that the program could be subject to significant review or changed ways of operating.	Major permanent – loss of body part or function.	Short term health problems or irreversible health effects of concern.	Actual or potential Material Environmental Harm resulting in noticeable adverse or unreasonable impact on the natural environment, plants and/or wildlife within surrounding area. Noticeable impact on community or businesses.	Medium frequency / intensity / duration activity carried out for a significant period of time on most days or over a period of months. Adverse amenity impacts on community giving rise to multiple/sustained substantiated complaints.
4	Major	Temporary closure of a navigation channel affecting movements to the port for several days. Ensuing loss of trade.	$5m - $10m	Significant loss of assets	1 week – 1 month	Substantiated, public embarrassment, high impact, high (local and national) news profile, third party actions. Political implications resulting in state/ national inquiry.	25-50% variation to KPI	Imprisonment	May threaten the survival or continued effective functioning of the infrastructure or project and require top-level management intervention.	Major permanent– single fatality, total blindness, quadriplegia.	Health impacts, long term/chronic health problems or life threatening or disabling illness.	Material Environmental Harm resulting in significant adverse or unreasonable impact on the natural receiving environment, plants and/or wildlife over an extensive area as a result of the duration or magnitude or nature of impact. Extended disruption/impact to community or businesses. Potential exists to remedy the impact if the activity is ceased or impact is reversible.	High frequency / intensity / duration activity carried out during most hours of the day or impact is long term (years). Significant adverse impacts on community.
5	Catastrophic	Port closes, navigation seriously disrupted for an extended period. Serious and long term loss of trade.	>$10m	Complete loss of assets	> 1 month	Substantiated, public embarrassment, very high multiple impacts, high widespread (national and international) news profile, third party actions. Political implications resulting in state/ national inquiry. Significant national and worldwide attention from governments and media condemning activity.	>50% variation to KPI	Imprisonment	May threaten the survival of not only the infrastructure but also the business, possibly causing major problems for clients.	Multiple fatalities	Long term, permanent or irreversible health problems. Chronic health affects too many people.	Serious Environmental Harm resulting in irreversible, high or widespread adverse impact on the natural receiving environment/high conservation or special significance area. Severe and protracted disruption/impact to community or businesses. Irreversible loss of amenity experienced.	Permanent high frequency / intensity / duration activity carried out 24/7. Serious adverse impacts on community.

ANNEXURE B – QUALITATIVE MEASURE OF LIKELIHOOD

LEVEL	DESCRIPTOR	DESCRIPTION	ONGOING ACTIVITIES	PROJECTS
1	Rare	May only occur in exceptional circumstances	Unlikely in the life of the facility	0.1% chance
2	Unlikely	Could occur at some time	Once in 20 years	1% chance
3	Possible	Might occur at some time	Once in 5 years	10% chance
4	Likely	Will probably occur in most circumstances	Once per year	50% chance
5	Almost Certain	Expected to occur in most circumstances	Many times per year, continuous	99% chance

ANNEXURE C – RISK EVALUATION FACTORS

	Consequence	**Insignificant**	**Minor**	**Serious**	**Major**	**Catastrophic**
Likelihood	***Score***	***1***	***2***	***3***	***4***	***5***
Rare	***1***	**L** ***1***	**L** ***2***	**L** ***3***	**L** ***4***	**M** ***5***
Unlikely	***2***	**L** ***2***	**L** ***4***	**M** ***6***	**M** ***8***	**S** ***10***
Possible	***3***	**L** ***3***	**M** ***6***	**M** ***9***	**S** ***12***	**H** ***15***
Likely	***4***	**L** ***4***	**M** ***8***	**S** ***12***	**H** ***16***	**E** ***20***
Almost Certain	***5***	**M** ***5***	**S** ***10***	**H** ***15***	**E** ***20***	**E** ***25***

APPENDIX E

INSHORE DOLPHIN MONITORING PLAN POT 2154

APPENDIX F

MARINE MEGAFAUNA MONITORING PLAN POT 2155

APPENDIX G

SHOREBIRD MONITORING PLAN POT 2156

APPENDIX H

INVASIVE MARINE PEST MONITORING PLAN POT 2158

APPENDIX I

ENVIRONMENTAL PROCEDURE FOR PILE DRIVING POT 2157

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