ENVIRONMENT
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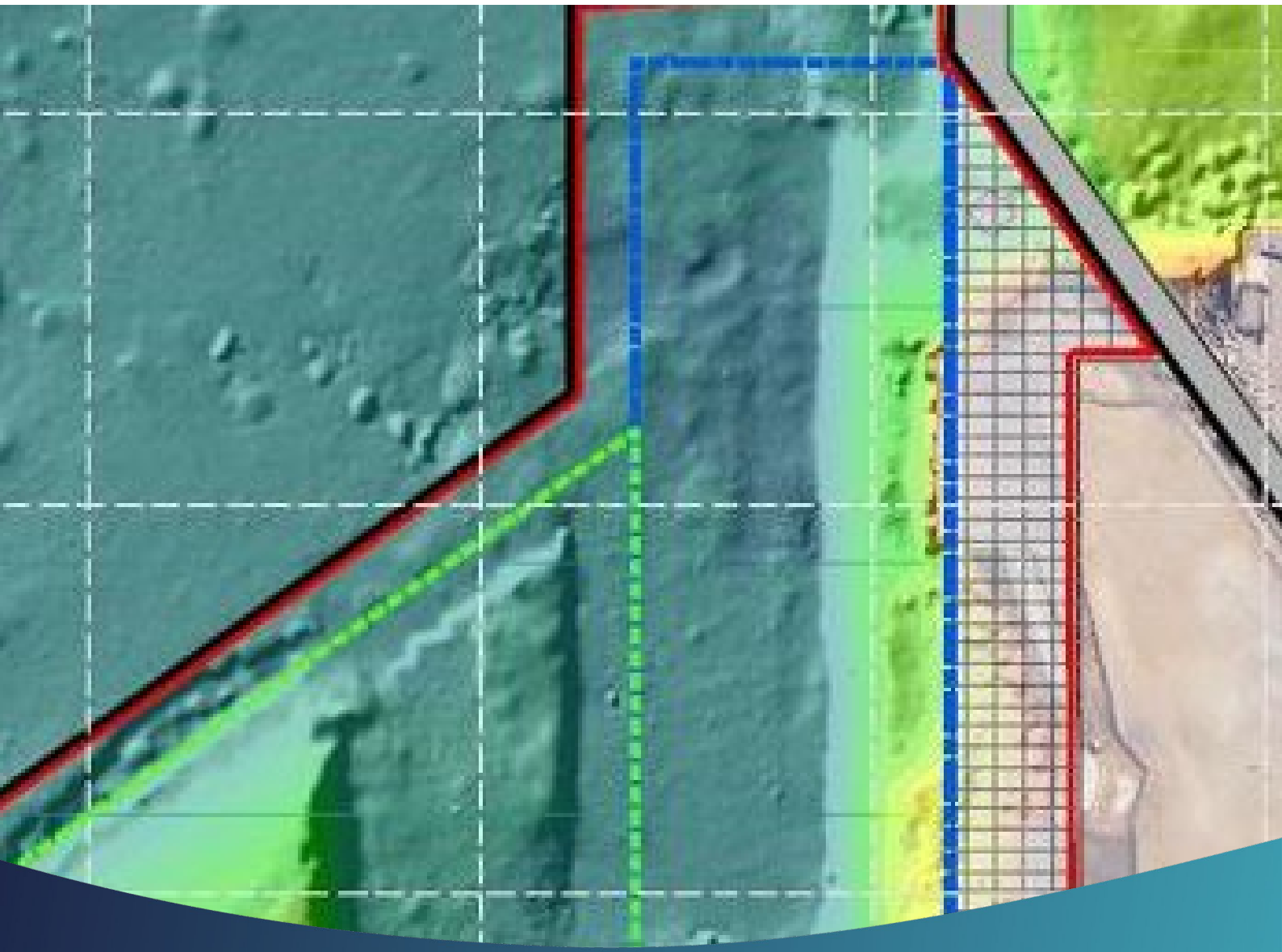
# Dampier Cargo Wharf Extension and Landside Redevelopment Project

## Construction Environmental Management Plan

MARINE



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## Important Note



## DECLARATION OF ACCURACY

I, Dan Pedersen:

1. Confirm that pursuant to section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), I have no reason to believe that the Construction Environmental management Plan (CEMP) is false or misleading in a material particular.

1. Am an employee of Pilbara Ports Authority and am authorised by Pilbara Ports Authority to submit this CEMP in furtherance by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) of the approval under the EPBC Act.

Signature

Full name: Dan Pedersen

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## Acronyms and Abbreviations

| Acronyms/Abbreviation | Description |
|---|---|
| CEMP | Construction Environmental Management Plan |
| CHMP | Cultural Heritage Management Plan |
| DEMP | Dredge Environmental Management Plan |
| DCW | Dampier Cargo Wharf |
| DCCEEW | Department of Climate Change, Energy, the Environment and Water |
| DoT | Department of Transport |
| DPIRD | Department of Primary Industry and Regional Development |
| DWER | Department of Water and Environmental Regulation |
| EPA | Environmental Protection Authority |
| EPBC | Environmental Protection and Biodiversity Conservation Act |
| ERD | Environmental Review Document |
| Ha | Hectare |
| Km | Kilometer |
| m | Metre |
| MFO | Marine Fauna Observer |
| MARPOL | Maritime Organization International Convention for the Pollution from Ships |
| MNES | Matters of National Environmental Significance |
| OMMP | Ongoing Marine Monitoring Program |
| PPA | Pilbara Ports Authority |
| RAMSAR | Ramsar Convention on Wetlands of International Importance |
| TEC | Threatened Ecological Community |
| VTS | Vessel Traffic Services |

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# Tables

# 1. Introduction

Construction activities undertaken by Pilbara Ports Authority (**PPA**), for the development of the land backed wharf extension at the Dampier Cargo Wharf (**DCW**) have the potential to impact negatively on several key environmental factors if they are not managed appropriately. PPA has a responsibility under the *Environmental Protection Act 1986* (**EP Act**) to manage environmental impacts associated with the proposed construction activities.

## 1.1. Project Summary

PPA is the proponent for the Dampier Cargo Wharf Extension and Landside Redevelopment Project (**the Project**). PPA is proposing to construct and operate a land-backed wharf extension to the DCW at the Port of Dampier (**the Port**). The ultimate scope of the Project incorporates the development of a new (adjoining) southern section of wharf and associated mooring dolphin, wharf connecting structure, dredged berth pocket and vessel manoeuvring area (Figure 1). The design of the wharf structure is yet to be finalised; however, key construction elements of the Project may include pile driving works, stabilisation of the shoreline via construction of rock revetment or a retaining wall and construction of a concrete deck. The proposed Development Envelope (**DE**) and Project Footprint are shown in Figure 1. The Project location and regional setting is shown in Figure 2.

A short description of the Project is provided in Table 1 and the Project's physical, construction and operational elements are provided below in Table 2.

Table 1 General proposal content description

| **Proposal title** | Dampier Cargo Wharf Extension and Landside Redevelopment Project |
|---|---|
| **Proponent name** | Pilbara Ports Authority |
| **Short description** | The Proposal is for the construction and operation of a land-backed wharf extension to the DCW at the Port of Dampier. The Project incorporates the development of a new (adjoining) southern section of wharf, dredged berth pocket and vessel manoeuvring area. The Project will enable larger vessels (up to Panamax class) to access the terminal and facilitate new trades and products being handled at the Port. |

Table 2 Proposal content elements

| Proposal element | Location / description | Maximum extent, capacity or range |
|---|---|---|
| **Physical elements** | | |
| Land-backed wharf Extension | Figure 1 | • 325 m wharf face with a wharf connecting structure. |
| Berth pocket and vessel manoeuvring area | Figure 1 | • Total dredge footprint of 8.4 hectares (**ha**).<br>• Berth pocket to design depth of -13.2 m Chart Datum (**CD**). |

| Proposal element | Location / description | Maximum extent, capacity or range |
|---|---|---|
| | | • Vessel manoeuvring area to design depth of -11 m CD (*Note that up to 1m of over-dredge may be required to achieve these design depths)* |
| **Construction elements** | | |
| Construction of the DCW Extension Project | Figure 1 | • Pile driving works: up to 470 steel piles of up to 1800 mm diameter and installation of a concrete wharf deck.<br>• Construction of rock revetment and installation to form the wharf deck and associated mooring dolphin. |
| Capital Dredging | Figure 1 | • Up to 380,000 $m^3$ of capital dredging will be undertaken using a backactor dredge. |
| Drilling and blasting | Figure 1 | • Approximately 100,000 $m^3$ of granophyre rock material to the south and east of the Project dredging area will be broken up using drilling and blasting techniques. |
| Disposal of material | Port waters | • Dredge spoil, including blasted rock material to be placed at established spoil grounds located in Port waters including Spoil Ground 2B, Spoil Ground A/B and East Lewis Island Spoil Ground (ELI Spoil Ground). Suitable rock material may be beneficially reused for other approved Port projects and / or be placed within established Spoil Grounds within the Port. Where possible, PPA will seek to place rock material in such a way within ELI Spoil Ground that it can be colonised by corals. |
| **Operational elements** | | |
| Vessels and wharf | Figure 1 | • Enable larger vessels (Panamax class) to access the terminal and facilitate new trades and products being handled at the Port. |
| Ongoing maintenance dredging | Figure 1 | • In accordance with PPA's 5-year SDP for maintenance dredging (SD2019/3962) and approved Long-Term Dredge Management Plan. |

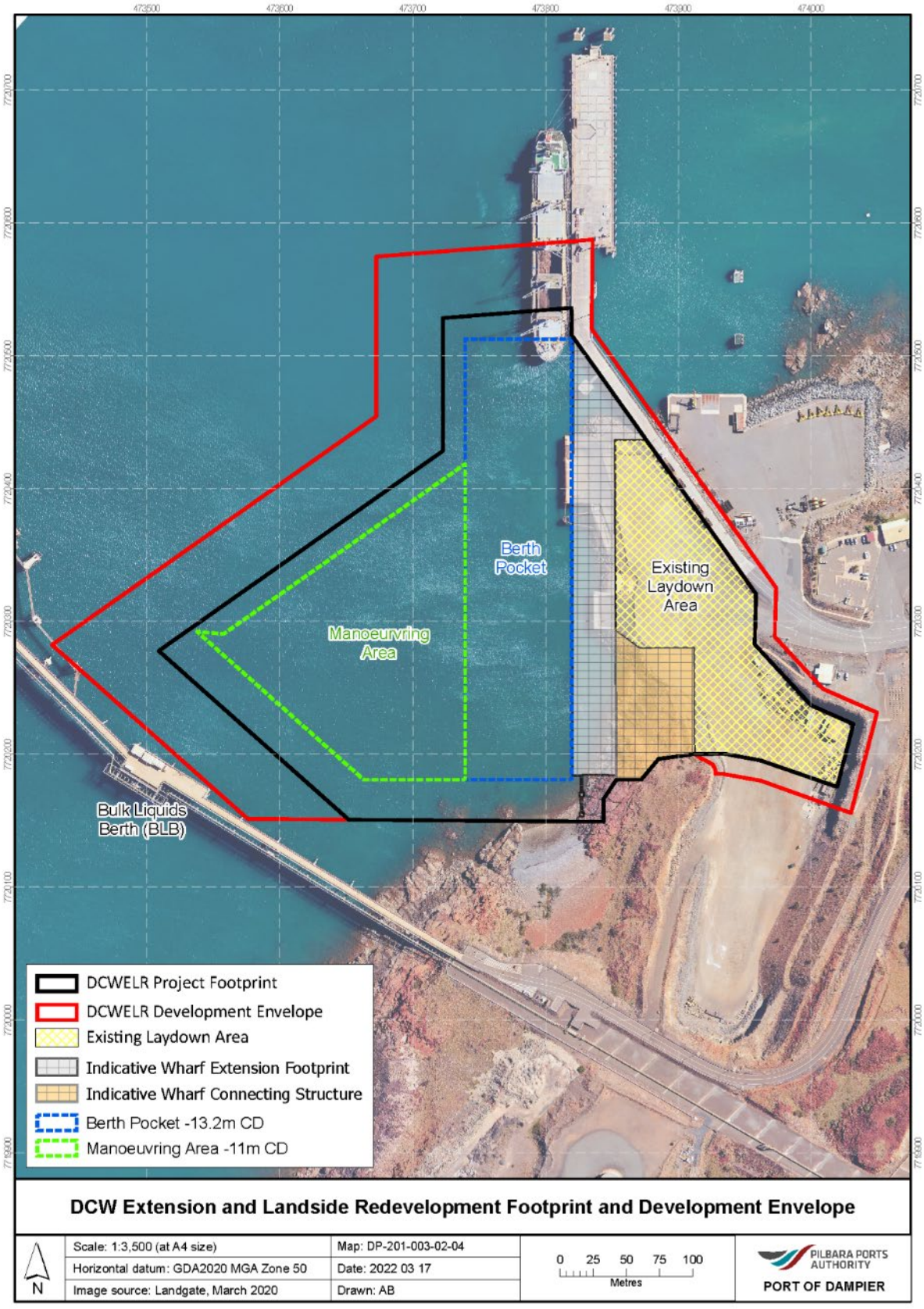


Figure 1 Project Development Envelope and Project Footprint

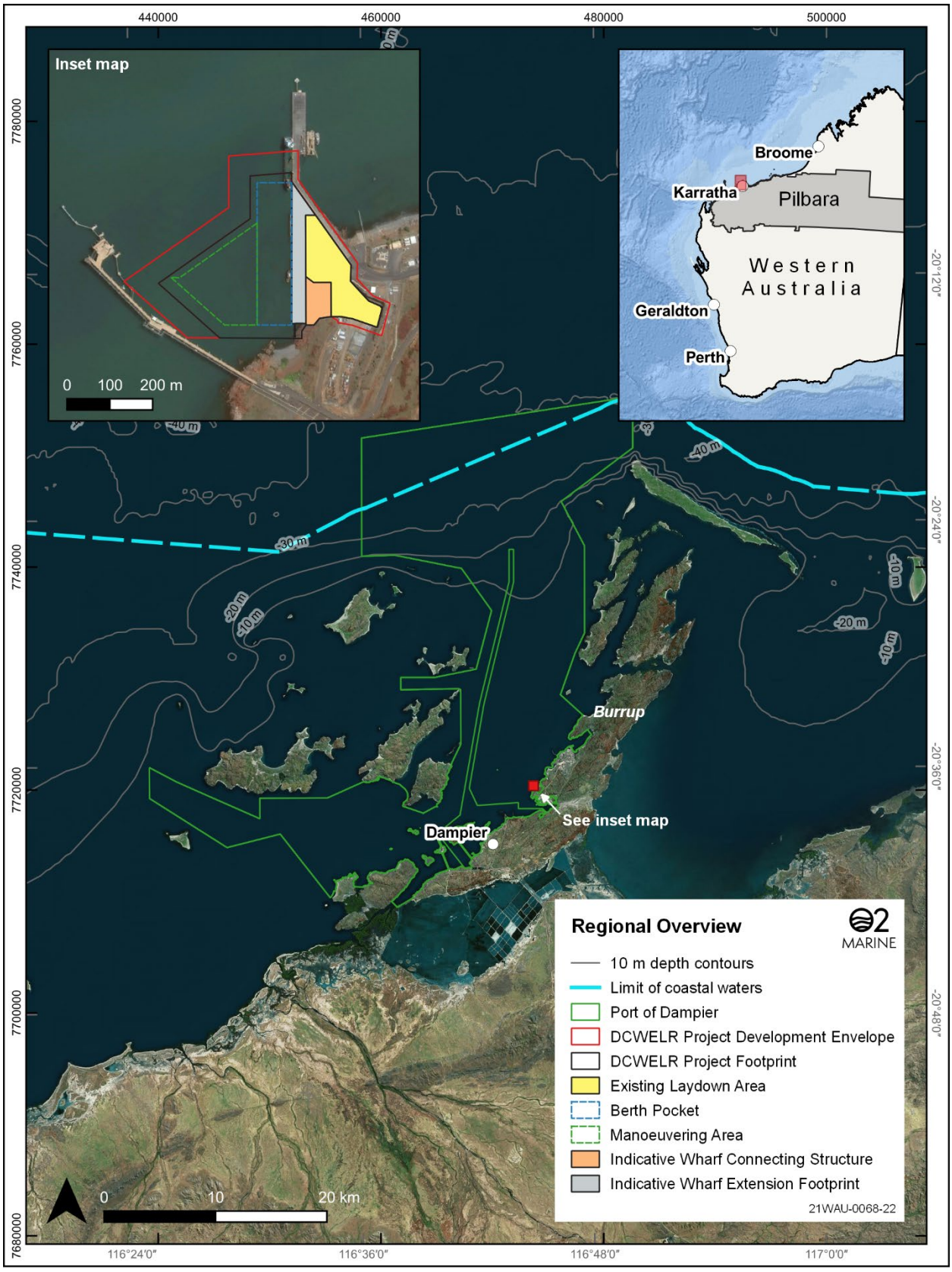


Figure 2 Regional Setting of Project

## 1.2. Purpose of this Plan

This Construction Environmental Management Plan (CEMP) has been prepared to detail how underwater noise impacts to marine fauna from proposed piling and blasting will be managed by PPA during construction of the Project.

The CEMP also provides the overall environmental management framework and specific management measures to mitigate other potential environmental impacts of the construction activities (not including dredging impacts which are addressed in the Project Dredge Environmental Management Plan (DEMP).

The Contractor(s) appointed by PPA will be required to prepare separate CEMP's that are specific to their individual work package(s) but meets (or exceeds) the intent and proposed management measures outlined in this overarching CEMP.

## 1.3. Rationale and Approach

Key marine fauna species that could potentially be impacted by underwater noise generating construction activities were identified for the Project to support targeted EIA and management planning. This approach facilitates the correct proportionality of information to be provided for given species, as it relates to the nature and risk of potentially significant impacts. Further, identified key species are effectively 'umbrella' species – when they are protected, others will be indirectly protected.

Key marine fauna species, likely occurrence and stressors are provided in Table 3.

Table 3 Key conservation significant marine fauna species for this Project.

| Species | Cth EPBC Act Status | | WA BC Act Status | Occurrence |
|---|---|---|---|---|
| | Threatened | Migratory | | |
| Humpback whale *Megaptera novaeangliae* | - | M | CD | Likely to be present in waters surrounding the nearshore and offshore project elements during migration season (particularly southern, including cow/calf pairs). Biologically Important Area overlaps with the Project. |
| Dugong *Dugong dugon* | - | M | OS | Likely to travel through the nearshore area at some time. No seagrass communities recorded. |
| Australian humpback dolphin *Sousa sahulensis* | - | M | P4 | Likely to travel through the nearshore area at some time. Opportunistic foraging is possible. |
| Indo-Pacific bottlenose dolphin *Tursiops aduncus* | - | M | - | Likely to travel through the nearshore area at some time. Opportunistic foraging is possible. |
| Flatback turtle *Natator depressus* | V | M | VU | Nesting on mainland of Dampier Archipelago, but not known at the Project DE. Likely to forage in soft sediments of and transit through local waters of the Project. |

| Species | Cth EPBC Act Status | | WA BC Act Status | Occurrence |
|---|---|---|---|---|
| Green turtle *Chelonia mydas* | V | M | VU | Nesting on mainland of Dampier Archipelago, but not known at the Project DE. Likely to forage at nearby coral reefs and transit through local waters of the Project. |
| Hawksbill turtle *Eretmochelys imbricata* | V | M | VU | Nesting on mainland of Dampier Archipelago, but not known at the Project DE. Likely to forage at nearby coral reefs and transit through local waters of the Project. |
| Loggerhead turtle *Caretta* | E | M | EN | Nesting on mainland of Dampier Archipelago, but not known at the Project DE. Likely to forage at nearby coral reefs and transit through local waters of the Project. |
| Leaf-scaled seasnake *Aipysurus foliosquama* | CE | - | CR | A shallow-water reef specialist that could inhabit complex coral reef / rubble or seagrass areas. |
| Green sawfish *Pristis zijsron* | V | M | VU | It is possible for adult sawfish to occur in nearshore waters proximal to the DE. |
| Dwarf sawfish *Pristis clavata* | V | M | P1 | It is possible for adult sawfish to occur in nearshore waters proximal to the DE. |
| Coastal manta ray *Mobula alfredi* | - | M | - | May travel through the NS or OS area at some time. |

> *EPBC Act* (species listed under the Commonwealth *Environment Protection and Biodiversity* Conservation Act 1999): **C** = Cetacean, **CE** = Critically Endangered, **E** = Endangered, **V** = Vulnerable, **M** = Migratory, **Ma** = Listed Marine, **MM** = Migratory Marine

> *BC Act* (species listed under the Western Australian Biodiversity Conservation Act 2016):

- Threatened Species: **EN** = Endangered, **VU** = Vulnerable, **OS** = Other Specially Protected, **CD** = Conservation Dependent, **CR** = Critically Endangered, **MM** = Migratory Marine
- Priority Species: **P1** = Priority 1, **P4** = Priority 4

# 2. Construction Elements

## 2.1. Scope, sequence and timing of construction elements

The scope, sequence and timing of the construction activities of the Project have not yet been finalised. Under the current proposed schedule, construction activities are planned as follows:

- 18 months construction phase total.
- 9 months dredging/blasting.
- Dredging 24 hrs/day. 14 hours is an estimate of actual dredging time - the remaining 10 hours of the day will be for spoil ground disposal / standdown.
- Piling 24 hrs/day but with mitigation measures.
- Blasting will be undertaken primarily during daylight hours with mitigation measures or within two hours after sunset if specific marine fauna observation requirements are met (as described in Appendix A).

# 3. Project Roles, Responsibilities and Contacts

The overarching responsibility for the implementation of this CEMP lies with PPA as the Proponent. This CEMP has been prepared for use by all relevant Contractors and stakeholders during the construction phase.

All positions across the Project have environmental responsibilities to some extent. These vary in relation to duties in Table 4 but everyone has a base level of Duty of Care to prevent Environmental Impact as described in the *Environmental Protection Act 1986*.

Table 4 CEMP Roles and Responsibilities

| Stakeholder | Roles and Responsibilities |
|---|---|
| PPA as the Principal and roles appointed by the Principal. For the Purpose of this CEMP, PPA as the Principle will be referred to as the PPA representative | The Principal is the party with ultimate responsibility of the Site during the Construction Phase. This will include but not be limited to the following:<br>• Promoting and maintaining environmental management by aiming to prevent environmental impacts caused by working practices<br>• Monitoring compliance with environmental legislation, regulation, standards and codes<br>• Allocation of financial resources to adequately meet environmental management needs<br>• Provision of competent person(s) to investigate environmental incidents and accidents and initiate corrective (preventative) actions<br>• Provision of adequate resources for effective environmental management<br>• Notification to the Contractor(s) of potential environmental issues<br>• Assessing and reviewing Contractors' abilities to comply with environmental management requirements<br>• Confirmation of Contractor(s) adherence to the CEMP requirements<br>• Ensuring adequate instruction and training is provided for all employees.<br>• Inform the Contractor(s) of the Heritage values identified for the Project |

| Stakeholder | Roles and Responsibilities |
|---|---|
| | • Ensure adequate monitoring of the Contractor(s) with regard to implementation of the CEMP during construction.<br>• External reporting to the appropriate authority in the event of an environmental incident or adverse environmental impact taking place during the development of the Project. |
| Contractor(s) | The Contractor(s) is responsible for the day-to-day activities during normal site operations during construction. The Contractor(s), as far as it is reasonably practical, are responsible for:<br>• Developing a Contractor specific CEMP for the scope of works at be completed by the Contractor, which reflects the intent and specific content of this CEMP as it applies at the scope of works at be completed.<br>• Undergoing training and induction to effectively fulfil its environmental management role and responsibilities<br>• Ensuring employees are inducted in CEMP and follow environmental management procedures.<br>• Promoting environmental management and encouraging the involvement of all personnel in cooperating and being involved with toolbox meetings<br>• Ensuring that all management actions outlined in the CEMP are carried out.<br>• Undertaking routine inspections and completing relevant pre-start checklists.<br>• Reporting of all environmental hazards and incidents and ensuring appropriate records are created and investigations undertaken.<br>• Notification of the Superintendent in the event of non-compliance or failure to meet environmental targets and all environmental incidents outlined in this CEMP.<br>• Ensuring environmental management issues are resolved as soon as is practicable.<br>• Ensuring that all employees receive relevant training relating to environmental management and specific CEMP requirement.<br>• Ensuring that plant and equipment complies with Regulations, Codes of Practice or Standards and that documentation is available on request.<br>• Ensure that a register/ log is kept for all inductees to the site (i.e. employees / subcontractors). |

# 4. Training, Awareness and Competency

## 4.1. Site Environment Induction

Site induction training must be carried out for all site-based staff prior to the commencement of construction activities. Any new staff joining the project once construction has commenced will undergo inductions prior to commencing their construction activities. The induction process will make staff aware of the following:

- Awareness of key sensitive receptors
- The procedures set out in this CEMP
- Their role and responsibility in the implementation and monitoring of the CEMP for the duration of the construction phase

- A list of people and/ or organisations to be contacted in the event of an environmental incident

Further training will be provided to staff throughout the construction phase of the Project specifically addressing any high-risk environmental impacts and to convey environmental information as required. The Contractor(s) will be required to demonstrate that environmental issues and the requirements of the CEMP are adequately communicated to the work teams. Examples of methods/ forum which will be used include but are not limited to:

- Site environmental inductions, with assessment
- Project kick-off meetings
- Daily pre-start meetings
- Tool-box meetings
- Incident bulletins
- Environmental bulletins

The Contractor(s) will be required to keep records of the above (as applicable) for review by the principal on request.

# 5. Monitoring and Management

This section details the specific environmental monitoring and management (EMM) actions required to meet the Objective(s) for the Environmental Factor Marine Fauna as well as other potential impacts from construction works. The structure used to present the EMPs is presented below with the specific EMPs presented in Table 6 to Table 9. The framework for EMM tables is provided in Table 5 .

Table 5 Environmental Monitoring and Management framework

| Element | Description |
|---|---|
| **Objective(s)** | What is intended to be achieved. |
| **Management Strategy** | What management strategies, aligned programs of initiatives are to be used to support the objective. |
| **Controls** | The specific actions required to assist in meeting the Objective. These can be single actions or multiple linked actions to address the Objective. |
| **Responsibility** | Defines the responsible person/ agency for delivering the management action. |
| **Timing** | The time period when the management actions need to be implemented. |
| **Performance indicator** | The metrics for recording the compliance against the management action. |
| **Monitoring** | The metrics to be used in checking compliance of the management action. |
| **Reporting** | The way in which compliance with the management actions outcomes are reported. |
| **Corrective action** | Actions to undertake if the management action is not met. |

EMM tables below have been separated into Tier 1, which specifically addresses construction impacts to Marine Fauna (key environmental factor); and Tier 2, which details the required management strategies to ensure appropriate management and mitigation of environmental impacts associated with waste management, hydrocarbon management and introduced marine pests (IMPs).

## 5.1. Marine Fauna

Potential impacts to marine fauna were identified during the Project EIA as a potential risk (Tier 1) during construction works and are detailed below (Table 6).

These issues can be adequately managed through appropriate mitigation and management measures.

Table 6 Environmental Monitoring and Management for Marine Fauna

| MARINE FAUNA | | | |
|---|---|---|---|
| Objective(s) | • To protect marine fauna so that biological diversity and ecological integrity are maintained.<br>• Significant residual impacts do not occur from the Project and therefore the biological diversity and ecological integrity of EPBC Act 'Listed Threatened Species and Ecological Communities' and 'Listed Migratory Species' will be maintained. | | |
| Management Strategy | During construction all reasonably practicable measures will be taken to protect marine fauna by implementing the Underwater Noise Management Procedures (see Appendix A) and management controls within this CEMP. | | |
| | | Responsibility | Timing |
| Control(s) | <u>Pre-construction Phase</u><br>• Contractor(s) must undertake an environmental induction for all site staff, providing information on marine fauna awareness and associated management and monitoring protocols (Appendix A).<br>• Appoint suitably trained marine fauna observers (MFOs) tasked with monitoring for marine fauna to avoid and minimise impacts relating to blasting and piling (noise generating activities).<br>• Educate contractor(s) that the MFO has the responsibility and powers of suspending blasting and piling activities based on the monitoring protocols and procedures (Appendix A). | Contractor | Throughout project |
| | <u>Construction Phase</u><br>• A suitably trained MFO must be on duty at all times during targeted noise generating activities (i.e. piling and blasting)<br>• An additional suitably trained MFO on a dedicated MFO roaming vessel will be used during blasting works to verify no marine fauna in blasting observation zones.<br>• A suitably trained marine fauna observer (MFO) must be on duty on transiting vessels during all targeted noise generating activities (i.e. piling and blasting).<br>• Contractor(s) to undertake all specified monitoring protocols and procedures in relation to piling and blasting activities. (Appendix A). | | |

| | | | |
|---|---|---|---|
| | • Piling and blasting must not occur concurrently or within 24 hours of each other (to minimise cumulative exposure).<br>• Blasting will be undertaken at low tide where practicable and must be undertaken below daily mid-tide (the level or height midway between high- and low-water marks) to reduce exposure ranges and minimise underwater noise impacts.<br>• Air bubble curtain technology must be installed during blasting and piling.<br>• To minimise light pollution impacts to EPBC listed turtles and EPBC listed birds, artificial lighting during the operational phase of the Project must be in accordance with the Commonwealth of Australia National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds (DCCEEW 2023) (Appendix B). | | |
| Performance Indicator(s) | No incidences of marine fauna injury or death as a result of piling and blasting activities. | Contractor | Throughout project |
| Monitoring | Marine fauna observations outlined in Appendix A must be undertaken for the duration of blasting and piling activities. | Contractor | Throughout project |
| Reporting | Contractor to immediately report any environmental incidents or non-conformance to the PPA Representative (without delay).<br><br>A log detailing marine fauna sightings and activities will be maintained on all piling vessels.<br><br>If an incident occurs, contractor to submit an incident report immediately or before the end of the shift, as outlined in the incident reporting procedures in Section 6.1 of this CEMP. | Contractor<br><br>Contractor<br><br>Contractor | Without Delay |
| | Notify the Department of Climate Change, Energy, the Environment and Water (DCCEEW) of any incidents involving the construction activities that result in injury or death to any marine megafauna. | PPA Environment and Heritage Manager (West) | Within 48 hours from the time that the incident occurred. |
| | Completion of detailed incident analysis and implementation of any corrective measures in consultation with DCCEEW. | PPA Environment and Heritage Manager (West) | ASAP after an incident has occurred |
| Corrective Action(s) | Assess marine fauna incident and modify and adapt management where necessary. | Contractor | Throughout project |

## 5.2. Waste Management

Waste during construction works is likely during any construction project and are detailed below (Table 7). These Tier 2 issues were not identified as significant by PPA as they can be adequately managed through appropriate mitigation and management measures.

Table 7 Environmental Monitoring and Management for Waste Management

| Waste management | | | |
|---|---|---|---|
| Objective(s) | Reduce waste volume, maximise recycling, reuse and recovery, prevent any construction waste/litter entering the environment. | | |
| Management Strategy | Minimise environmental impacts through appropriate controls and site inductions of employees and contractors. | | |
| | | Responsibility | Timing |
| Control(s) | • To mitigate the risk of waste and/or hydrocarbon pollution impacting EPBC listed marine fauna and EPBC listed birds: a. All waste must be stored in labelled containers which can accommodate the type, volume, and frequency of use and with covers or lids that close effectively and are used effectively to prevent the escape of waste whether aided by wind, fauna, spillage or other circumstance<br>• All loads arriving or leaving the site will be appropriately secured.<br>• Provide information regarding waste management in site specific inductions, including waste separation and importance of securing vehicle loads.<br>• Ensure licensed contractors are used to collect controlled wastes<br>• Ensure all hazardous materials are appropriately disposed of and records kept. | Contractor | On-going during construction. |
| Performance Indicator(s) | • Hazardous materials all appropriately disposed of and records kept.<br>• Recycling of all recyclable construction metal waste.<br>• Records kept of waste leaving site (waste tracking register) such as waste type, volume, weights and dates. | Contractor | On-going during construction. |
| Monitoring | • Daily inspection of work site to occur. Review of waste bins (% full, time to next service).<br>• Waste volumes leaving site from waste contractors. | Contractor | On-going during construction. |

| | | | |
|---|---|---|---|
| Reporting | • Contractor to immediately report any non-conformance to PPA's Representative (without delay).<br>• If an incident occurs, contractor to submit an incident report immediately or before the end of the shift, as outlined in the incident reporting procedures in Section 6.1 of this `CEMP. | Contractor<br><br>Contractor | Without Delay |
| Corrective Action(s) | • Investigate cause of inappropriate waste disposal<br>• Review cause of issue and develop response, such as variation to bin size, service schedule or waste separation awareness.<br>• Implement controls | Contractor | Throughout project |

## 5.3. Hydrocarbon Management

Hydrocarbon spill is likely during any construction project and are detailed below (Table 8). These Tier 2 issues were not identified as significant to by PPA as they can be adequately managed through appropriate mitigation and management measures.

Table 8 Environmental Monitoring and Management for Hydrocarbon Management

| Hydrocarbon management | | | |
|---|---|---|---|
| **Objective(s)** | To minimise the potential for spills of hydrocarbons and other noxious substances to as low as reasonably practicable. | | |
| **Management Strategy** | Reduce quantity of hydrocarbons stored, implement appropriate controls and provide appropriate training and resources for a spill response. | | |
| | | **Responsibility** | **Timing** |
| **Control(s)** | • All hydrocarbons to be stored in an appropriate bund that is capable of holding 110% of a spill from the largest container, or 10% of total volume of stored liquids, whichever is greater.<br>• Refuelling of vehicles/equipment will be undertaken on land (not over water) using appropriate bunding / drip trays unless the task is not possible. When refuelling of plant / equipment must be undertaken on / over water, a targeted risk assessment will be conducted, and appropriate spill prevention / containment controls implemented.<br>• To reduce the impact of a spill, the lowest volume of hydrocarbons required will be stored in proximity to the marine environment and in the onshore lay down areas.<br>• A copy of the current hydrocarbon Safety Data Sheet (SDS) will be kept at an appropriate location on site.<br>• Drip trays must be placed under mechanical stationary equipment such as gensets if such equipment is not internally bunded.<br>• All equipment will be regularly serviced to reduce emissions and reduce the chance of oil leaks on site and in marine environments. Appropriate controls must be in place to contain hydrocarbon leaks should they occur whilst servicing. Controls may include servicing on sealed areas, use of drip trays when changing oil and transporting waste oils in bunded containers.<br>• Only qualified personnel are to carry out services on plant, equipment and vessels.<br>• A prescribed Isolation procedure must be followed prior to work on any plant or equipment.<br>• Training / awareness on hydrocarbon risks to be included in site induction (including all staff, contractors, subbies etc.). | Contractor | Throughout Project |

| | | | |
|---|---|---|---|
| | • Appropriate volume and type of spill response materials will be available at each work site.<br>• All spills (regardless of volume) will be contained and cleaned-up immediately. Resultant wastes (soils, rags and absorbent material) appropriately stored and disposed of by an appropriately licenced waste contractor as controlled waste.<br>• All spills (regardless of volume) reported and investigated as required. | | |
| Performance Indicator(s) | • Minor spills (<10L) to land contained, controlled and all contamination removed / cleaned-up within 24 hours.<br>• No spills to marine waters.<br>• Reporting to PPA within timeframes specified below.<br>• No contamination of soil or surface / ground waters.<br>• No spills that require an emergency response. | Contractor | Throughout Project |
| Monitoring | • Incident report outlining corrective actions taken and preventative measures to be implemented sent to PPA with 48 hours.<br>• Statistics reported to PPA in weekly meetings and monthly reports. | Contractor | Throughout Project |
| Reporting | • Report any discharge of hydrocarbons to the marine environment (irrespective of quantity / volume) to PPA Vessel Traffic Services *without delay* on 08 9159 6556 or VHF Ch 11 or 16.<br>• All marine pollution events must be reported to the Department of Transport (**DoT**) electronically via "Pollution Report" (**POLREP**) form in accordance with PPAs Port of Dampier Handbook.<br>• A documented report provided to the PPA Representative on the incident, including (as a minimum) details of the incident, the measures taken, the success of those measures in addressing the incident or risk and any additional measures proposed to be taken.<br>All spills to land must be reported to the PPA Representative in accordance with PPAs Incident Management Procedure. | Contractor | Without Delay |
| Corrective Action(s) | • Stop work immediately, contain spill (if safe). Investigate cause of spill and assess.<br>• Implement improvements as required.<br>• Investigate and assess adequacy of response – implement improvements as required.<br>• Implement corrective measures prior to the recommencement of site works. | Contractor | Throughout Project |

## 5.4. Introduced Marine Pests

IMPs may be introduced into the surrounding environment during construction vessel movements and are detailed below (Table 9). These Tier 2 issues were not identified as significant to by PPA as they can be adequately managed through appropriate mitigation and management measures.

Table 9 Environmental Monitoring and Management for Introduced Marine Pests

| Introduced Marine Pests | | | |
|---|---|---|---|
| Objective(s) | • All non-trading commercial vessels mobilising to the Port of Dampier for the purposes of the Project, must implement appropriate vessel biofouling management, thereby mitigating the transfer of IMPs to the Port to As Low As Reasonably Practicable (**ALARP**).<br>• To protect marine fauna so that biological diversity and ecological integrity are maintained.<br>• Significant residual impacts do not occur from the proposed action and therefore the biological diversity and ecological integrity of EPBC Act 'Listed Threatened Species and Ecological Communities' and 'List Migratory Species' will be maintained. | | |
| Management Strategy | Biofouling management practices implemented for all non-trading commercial vessels (i.e. Barges) associated with the Project are best practice as demonstrated through the Department of Primary Industries and Regional Development (DPIRD) "Vessel Check" Portal (Low or Moderate Risk status), and therefore sufficient to mitigate the transfer of IMP to the Port of Dampier marine environment to as low as reasonably practicable (ALARP). | | |
| | | Responsibility | Timing |
| Controls | • WA DPIRD's 'Vessel Check' risk assessment (https://vesselcheck.fish.wa.gov.au) submitted to PPA (including supporting documentation) for all Project construction support vessels (i.e. Barges) that mobilise to the Port of Dampier from interstate or international waters. Risk assessment must indicate that the vessel poses a Low risk (or otherwise excepted by DPIRD) of IMP to Port of Dampier waters. *Note: All domestic commercial vessels mobilising from other Ports within the Pilbara region are considered exempt from this process.*<br>• All vessels will have a ballast water management plan and ballast water exchanges will be in accordance with IMO requirements and the Commonwealth *Biosecurity Act 2015*.<br>• Continue to implement the State Wide Array Surveillance Program (**SWASP**) in collaboration with DPIRD and WA Port Authorities within Western Australia. | Contractor<br><br>Contractor<br><br>PPA | • Prior to mobilising to Port of Dampier from another port, interstate or overseas.<br>• Prior to vessel(s) entering Australian waters<br>• Ongoing |
| Performance Indicator(s) | All Project construction support vessels (Barges) assessed as Low Risk (or otherwise exempt by DPIRD) on DPIRD Vessel-Check program. | Contractor | Throughout project |

| | | | |
|---|---|---|---|
| Monitoring | All Vessel-Check Reports to be provide to PPA's Representative prior to the vessel entry into the Port of Dampier. | Contractor | Throughout project |
| Reporting | Contractor to immediately report any non-conformance to PPA's Representative (without delay). | | Without Delay |
| Corrective Action(s) | Notify the Department of Primary Industries and Regional Development (DPIRD) if the introduction of IMPs is suspected in accordance with existing procedures under the collaborative SWASP. | Contractor | Throughout project |

## 5.5. Management of Change

In the event there is a change in equipment, vessels, machinery, materials used for construction, procedures, processes or roles and responsibilities during the construction phase the following information should be written in a management of change document:

- Reasons for change – Why is it needed and what are beneficial outcomes of the change
- Determine the scope – Who will the change impact, what policies and processes will it impact
- Who is responsible for the change
- How will this change be executed to employees, contractor(s) and other stakeholders

The management of change should be approved by the PPA Representative prior to the execution of the change.

# 6. Reporting

## 6.1. Incident Reporting

All employees or contractors of PPA must immediately report all environmental incidents as a non-conformance (i.e. performance indicators are not met or management actions are not followed (See Section 5) to their site supervisor who will investigate the incident with PPA.

The following examples are reportable incidents:

- Release / spill of contaminants (e.g. fuels / chemicals / sewage) to land
- Release / spill of contaminants (e.g. fuels / chemicals / sewage) of any amount to the marine environment – note this must immediately be reported to PPAs Vessel Traffic Services (VTS) and DoT
- Release / spill of contaminants (regardless of volume) that leaves the construction / work site (e.g. enter a stormwater drain)
- Any environmental complaints received as a result of activities associated with construction
- Non-compliance with the environmental management commitments made under this CEMP, or any other development or environmental approval obtained in relation to activities associated with the EMPs (refer section 5)
- Unexpected finds (refer section 6.2).

The employee must report the incident immediately to the relevant supervisor. In every case the site supervisor will document the incident using the recommended incident reporting within PPAs Incident Management Procedure.

The following points will be recorded in the contractor's environmental incident form:

- Time and date of incident
- Location and description of event
- Incident category
- Involved parties
- Person recording complaint and witness

- Steps to rectify problem
- Steps to ensure incident will not occur again
- Notification to relevant authority
- Due date to rectify incident
- Evidence of incident resolution

Incidents that have the potential to cause localised environmental impacts must be reported to the PPA Representative immediately. Incidents that cause or have the potential to cause environmental impacts external to the Project's Development Envelope must be reported to the PPA Representative immediately. Full copies of the report/ incident investigation must be provided to the PPA Representative in accordance with PPAs Incident Management Procedure.

Recommended corrective and preventative actions must be included in the investigation report. Upon review and approval of the investigation report, recommended actions to correct underlying causes and the contributing factors to prevent the incident from occurring again must be assigned to the appropriate persons. Acceptance of the actions and timeframes must be sought from the action owner or Manager. All actions must be completed within the agreed timeframes and evidence of action completion provided to the PPA environmental representative (Section 5).

## 6.2. Unexpected Findings Protocol

In the event of an unexpected find including cultural heritage items or new material suspected of containing potentially hazardous substances, the following procedures should be implemented:

- Stop/prevent any activity in the area
- Place signage and barricade area – make area safe. Do not touch or disturb the item/material
- Report the Unexpected Occurrence/Finding to PPA
- Record the location, visual appearance, odour, and extent, type of accident or material and mode of discovering the material to PPA
- Obtain assistance from a suitably qualified practitioner in identifying the potential hazard to human health or the environment in accordance with regulatory requirements. For cultural heritage items refer to PPAs Cultural Heritage Management Plan (CHMP)
- Establish management actions in compliance with regulatory requirements
- Obtain the approval from PPA and of the relevant regulator for the proposed management actions
- Implement the approval management action plan and seek on-going advice as necessary
- Document the findings and compliance with the approved action plan and provide documentation to the PPA
- Update the CEMP procedures and controls as required

## 6.3. Emergency Response

All emergencies must be reported to PPA's VTS by the most expedient means and where appropriate the relevant emergency services organisation (000). Note: PPA Security at the Security Gatehouse are also a point of contact for medical emergencies on site. The table below outlines the Project's emergency contacts.

Table 10 Emergency Response Contact Details

| Contact Personnel | Phone number | Location |
|---|---|---|
| Emergency Services (fire, police, ambulance) | 000 | (See below) |
| Karratha Healthcare Campus | (08) 9143 2333 | 62 Balmoral Rd, Karratha WA 6714 |
| Dampier VTS | VHF CH11 / CH16<br>(08) 9159 6556<br>0428 888 800 | Mof Road, Burrup Peninsula, Dampier WA 6713 |
| Police | 131 444 | 8 Hillview Road, Karratha WA 6714 |
| DFES | 13 3337 | Hillview Rd, Karratha WA 6714 |

## 6.4. Document and Record Management

PPA is responsible for ensuring that all necessary documentation relating to quality, safety, health and environmental issues is retained or maintained in either electronic or hard copy format. Currency of legislative documents must be maintained in hard copy and available to all staff on site.

The Contractor must keep a current copy of this CEMP on site at all times. The Contractor must also forward any Pre-Start and Project Meeting Minutes to the PPA for inclusion in the Job File.

Contractors must report monitoring and other data as required by the CEMP and related documents to a PPA environmental representative in a format, due timing and detail as specified by PPA.

# 7. Key Project Contact Details

Key PPA personal associated with the Project are detailed in Table 11.

Table 11 Key PPA contact details

| PPA Personnel | Office | Mobile |
|---|---|---|
| Dampier VTS | (08) 9159 6556 | 0428 888 800 |
| Harbour Master | (08) 9159 6565 | 0427 299 645 |
| Deputy Harbour Master (Operations) | (08) 9159 6508 | 0400 468 725 |
| Deputy Harbour Master (Traffic) | (08) 9159 6546 | 0448 871 085 |
| Health & Safety Advisor | (08) 9159 6503 | 0428 461 232 |
| Security Supervisor | (08) 9159 6520 | 0447 924 896 |
| Duty Landside Operations Supervisor | | 0427 770 859 |
| Security Gatehouse | (08) 9159 6584 | 0407 904 226 |
| Environment and Heritage Manager | (08) 9159 6541 | 0429 071 637 |

# 8. Audits and Inspections

The person undertaking audits or inspections must document and sign after checking off each environmental aspect (where applicable). Further Environmental Inspections must be conducted when the job requirements change.

All non-conformances with the requirements of this plan must be reported to the PPA environmental representative as soon as practicable.

# 9. CEMP Review

This CEMP will be reviewed prior to construction by PPA, this will ensure the CEMP remains current and in line with the required regulatory requirements and PPA practices. An earlier review may be required if there is an agreed change of scope in delivering the Project.

PPA may, at the discretion, authorise amendments to site copy of the CEMP, as may be required during the Project to ensure the practicality and relevancy of the instructions contained herein. Any amendments prepared for inclusion in this CEMP, will be duly signed as authorised by the relevant manager and must comply with statutory requirements. All contractors will be supplied a copy of any revisions that may affect their scope of works.

# 10. References


Australian Antarctic Data Centre (2020). National Whale and Dolphin Sightings and Strandings Database. Occurrence dataset https://doi.org/10.15468/f68ga6 accessed via GBIF.org on 2022-03-25.

Commonwealth of Australia (CoA). (2014). Environmental Management Plan Guidelines. Environmental Management Plan Guidelines 2014.

DCCEEW (2023). National Light Pollution Guidelines for Wildlife, Department of Climate Change, Energy, the Environment and Water, Canberra, May. CC BY 4.0.

Environmental Protection Authority (EPA). (2020). Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans.

O2 Marine 2022d. Dampier Cargo Wharf Extension and Landside Redevelopment Project. Marine Fauna Desktop Assessment Report. Prepared for Pilbara Ports Authority.

O2 Marine 2022e. Dampier Cargo Wharf Extension and Landside Redevelopment Project. Dredge Environmental Management Plan. Prepared for Pilbara Ports Authority.

Pilbara Ports Authority (2020) Port of Dampier Port Handbook.

National Marine Fisheries Service 2018. 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59.

TALIS (2022) Dampier Cargo Wharf Extension and Landside Redevelopment Project: Underwater Noise Assessment. Report prepared for Pilbara Ports Authority.

# Appendix A. Underwater Noise Management Procedures

## Underwater Noise Management Procedures

Underwater noise generated from piling and blasting works during construction will be managed by PPA in accordance with the underwater noise management procedure described below. Target marine fauna for underwater noise management includes whales, dugong, dolphins and turtles.

Suitably trained Marine Fauna Observers (MFOs) will be used during piling and blasting works. An MFO is a suitably trained person responsible for marine fauna observations and associated mitigation measures.

Additionally, suitably trained crew member(s) will be nominated as and will also be responsible for conducting visual observations for both piling and blasting activities in prescribed marine fauna Management Zones.

### Management Zones

Two Management Zones have been set for target marine fauna groups, namely:

- Observation Zones – applies to both Piling and Blasting
- Exclusion Zones – applies to Piling only.

Observation Zones are based on the modelled Temporary Threshold Shift (TTS) onset distance for each fauna group (Table A1 Figure A 1 and Figure A 2 below) but where necessary have been limited to what is realistically manageable based on previous MFO experience on Port construction projects. This is not considered a risk to marine fauna as the underwater noise modelling conservatively assumed 'worst case' construction elements and environmental conditions and therefore provide the 'worst case' predicted impacts (Talis 2022). PPA also are confident that the number of piles and volume of blasting may decrease (but will not increase) when finalising the Project design and construction details.

Exclusion zones apply to piling activities only (Table A1 Figure A 1 below) ) and are based on the Permanent Threshold Shift (PTS) onset distance for each fauna group. To provide further protection and consistent management the exclusion zones have been extended beyond the recommended PTS distances (as shown in Table A1 Figure A 1). Piling must safely stop should an individual move within this distance toward the noise source.

Table A1 Piling and blasting Observation Zones and piling Exclusion Zones distances for each marine fauna group (based on Talis, 2022).

| Marine fauna group | Piling and blasting Observation Zones | Piling Exclusion Zones |
|---|---|---|
| Whales | 2 km | 500 m |
| Dolphins | 1 km | 300 m |
| Dugongs | 1 km | 300 m |
| Turtles | 500 m | 300 m |
| Sharks and rays | 100 m | 100 m |

# Management Protocol and Procedures

## Blasting and Piling - EPBC Listed Marine Fauna

a) Blasting must only occur below daily mid-tide (the level or height midway between high- and low-water marks) to reduce exposure ranges and minimise underwater noise impacts on EPBC listed marine fauna.

b) Observations for EPBC listed marine fauna must be undertaken by a suitably trained crew member in marine fauna observation across the full extent of the piling and blasting observation zones and the piling exclusion zones for a period of at least 30 minutes prior to commencement of soft start procedures and prior to blasting, and during piling and blasting operations.

c) If EPBC listed marine fauna are identified within, or are entering, the corresponding piling and blasting observation zones or the piling exclusion zones during piling or blasting, these activities must cease within two minutes of the sighting or as soon as safely possible. Piling and blasting can and must only recommence once the EPBC listed marine fauna are observed outside the corresponding piling and blasting observation zones and the piling exclusion zones or 30 minutes have passed since the last sighting of EPBC listed marine fauna within these zones.

d) During periods of low visibility, piling and blasting activities may commence or continue, provided no EPBC listed marine fauna has been sighted by the suitably trained marine fauna observer within the corresponding piling and blasting observation zones and the piling exclusion zones during the preceding 24 hours and within two hours leading up to sunset, and observations are undertaken as per point (a) above.

e) Piling and blasting must not occur concurrently or within 24 hours of each other (to minimise cumulative exposure).

## Blasting Procedures

### Pre-start procedure

During blasting in addition to the MFO on land, a suitably trained MFO on a dedicated roaming MFO vessel will be used to verify the blasting observation zones (Table A1 ) are free of marine fauna for 30 mins prior to blasting. Once arriving within the 2 km blasting observation zones, the dedicated roaming MFO vessel will commence continuous observations within the observation zones for 30 minutes and will confirm that the observation zones are free of marine fauna. The MFO must have full view of the observation zones while the roaming vessel navigates through the observation zone to ensure full coverage of the 2 km observation zones. The roaming MFO will be in contact with land based MFO and blasting contractor.

- If marine fauna is not observed within the observation zones within 30 minutes, blasting operations may commence.
- The MFOs (roaming and on land) must confirm: no whales or other marine fauna have been observed within the corresponding observations zones for 30 minutes, or those that have been observed have left the observation zone and the zone has been free for 30 minutes
- 30-minute pre-start procedure required for each blasting event

- Blasting must not recommence until the roaming MFO and land based MFO have confirmed that the marine fauna has exited the corresponding Observation Zone of its own accord or has not been sighted by the MFO for a period of 30 minutes.

### Blasting

During blasting the roaming MFO and land based MFO will continuously monitor the blasting observation zones. If marine fauna is sighted within the corresponding Observation Zone, shut-down procedure must be implemented, and the activity must cease within two minutes of the sighting or as soon as safely possible.

### Shut-down procedures

If target marine fauna are sighted within the corresponding Observation Zone, blasting must cease within 2 minutes or as soon as safely possible. Blasting must not recommence until the roaming MFO and land based MFO have confirmed that the target species has exited the corresponding Observation Zone of its own accord or has not been sighted by MFO for a period of 30 minutes.

### Low visibility

During periods of low visibility (i.e., where a distance out to two kilometers cannot be clearly viewed), including within two hours after sunset or in poor weather conditions such as fog, rain or thick smoke, then blasting may commence provided all the following requirements are met:

- During the preceding 24-hour period there have not been three or more circumstances where marine fauna has been observed which resulted in ceasing of blasting operations
- Within 2 hours leading up to sunset continual observations within the observation zones were undertaken and no target marine fauna were sighted.
- No blasting is undertaken between two hours after sunset and sunrise.

## Piling

### Pre-start procedure

The MFO will perform visual observations within the observation zones set for target marine fauna (Table A1 ) for a period of no less than 30 minutes prior to the commencement of piling activities. Piling must not commence until the MFO has verified that no target marine fauna has been seen within the corresponding Observation Zone during this 30-minute observation period.

If target marine fauna is observed within its corresponding Observation Zone, the commencement of piling activities must be delayed until the target marine fauna has exited its Observation Zone off its own accord, or it has not been seen within its Observation Zone for a period of no less than 30 minutes.

If target marine fauna are not observed within the Observation Zone during the 30-minute observation period, then piling activities may commence in accordance with the procedures specified below.

### Soft-start procedures

Piling activities must commence with Soft-Start procedures. This means gradually increasing the piling impact energy for a period of no less than 15-minutes from the commencement of piling. The Soft-Start procedure may alert marine mammals to the presence of the piling activity and enable animals to move away to distances where injury is unlikely. The MFOs will continually monitor management zones during soft-start procedure.

- If target marine fauna are observed in the corresponding Observation Zone, soft-start procedures will continue and the marine fauna observer will continue to monitor the marine fauna. If target marine fauna are observed in the corresponding Exclusion Zone, soft-start procedures will cease until the observed target marine fauna leaves the corresponding Exclusion Zone or have not been seen for 30 minutes, on competition of the 30 minutes duration and no animal has been observed in the corresponding Exclusion Zone soft-start procedures will recommence

### Shut-down procedures

Where marine fauna is observed within the observation zones (but outside the exclusion zones) during piling activities (including Soft-Start procedures), then following action(s) must be taken:

- If it is evident that the target marine fauna is in distress then piling activities will be suspended within two minutes of the sighting, or as soon as safely possible.
- If target marine fauna is not showing signs of distress and remains within the observation zones (but outside the exclusion zones), piling activities will continue and the MFO will continue to monitor the target marine fauna.

Piling activities that have been suspended must not recommence until the target marine fauna has exited the corresponding Exclusion Zone and Observation Zone of its own accord or has not been seen by the MFO within these zones for a period of 30 minutes.

### Low visibility

During periods of low visibility (i.e., where a distance out to two kilometres cannot be clearly viewed), including night-time or in poor weather conditions such as fog, rain or thick smoke, then piling may commence (with Soft-Start procedures for piling), provided all the following requirements are met:

- During the preceding 24-hour period there have not been three or more circumstances where marine fauna has been observed which resulted in ceasing of piling operations
- Within 2 hours leading up to sunset continual observations within the observation zones were undertaken and no target marine fauna were sighted.

## Marine Fauna Observers

### Training and qualifications

Trained MFOs will be suitably trained crew members with demonstrated training in marine fauna observation and distance estimation.

Evidence of personnel, training certificates will be kept on record which may be used in future audits. Information will include:

- MFO name and contact details
- Details of MFO training

### Shifts

MFO shifts will be set prior to field mobilisation to prevent observer fatigue which can reduce the quality of observations and data recording. From a health and safety perspective, having coordinated shifts will ensure that observers have amenity breaks and reduced weather exposure.

### Platform

MFO observations will be undertaken from a suitable elevated point that provides appropriate vantage of the Management Zones and with 360-degree views around the noise source. This point may need to shift pending the location of the noise source on any given day (i.e. site construction activities).

### Field log

MFOs will record observer effort, fauna observations and mitigation measures. Field logs will include:

- Location, date and start time of observation
- Name, of MFOs involved in the observation
- Start / finish time of blasting or piling activities
- Other target marine fauna observations within 500 m of blasting and piling operations
- Fauna behaviors, in particular any behaviors that could be attributed to blasting and piling activities
- Location, times and reasons when observations were hampered by poor sighting conditions
- Location and time of start-up delays, power downs, or stop work procedures as a result of marine fauna sightings
- Location, time and distance of any fauna sightings including species where possible.

## Air Bubble Curtains

To further minimise underwater noise impacts to marine fauna, air bubble curtain technology must be installed during blasting and piling to absorb and reflect sound energy, creating a barrier that reduces underwater noise transmission outside the air bubble curtain. These curtains provide a barrier against noise attenuation, due to the difference in density between air and water. This would result in a reduction in the distance where Sound Exposure Levels for target marine fauna would be exceeded and will reduce both the Permanent Threshold Shift and Temporary Threshold Shift distances which will reduce the potential impacts to marine fauna.

To achieve the best results in minimising noise attenuation projecting seaward, bubble curtains will be installed on the seabed floor in a semi-circle arc on the sea-ward side of the pile and blasting location. The curtain will be designed will small holes with short distances between the holes as this is known to be the most effective design (greatest reduction in dB).

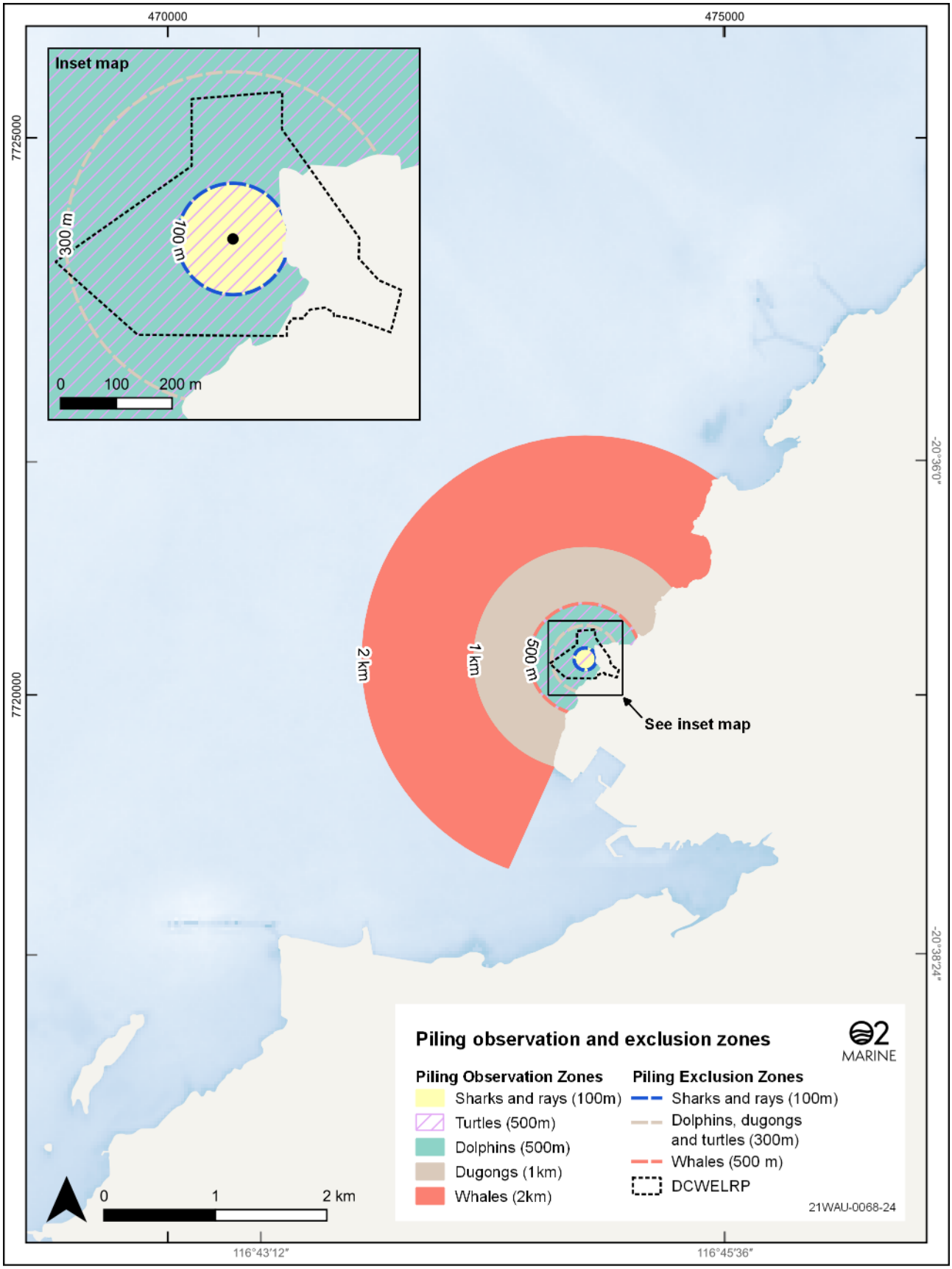


Figure A 1 Piling marine fauna Observation Zones and Exclusion Zones

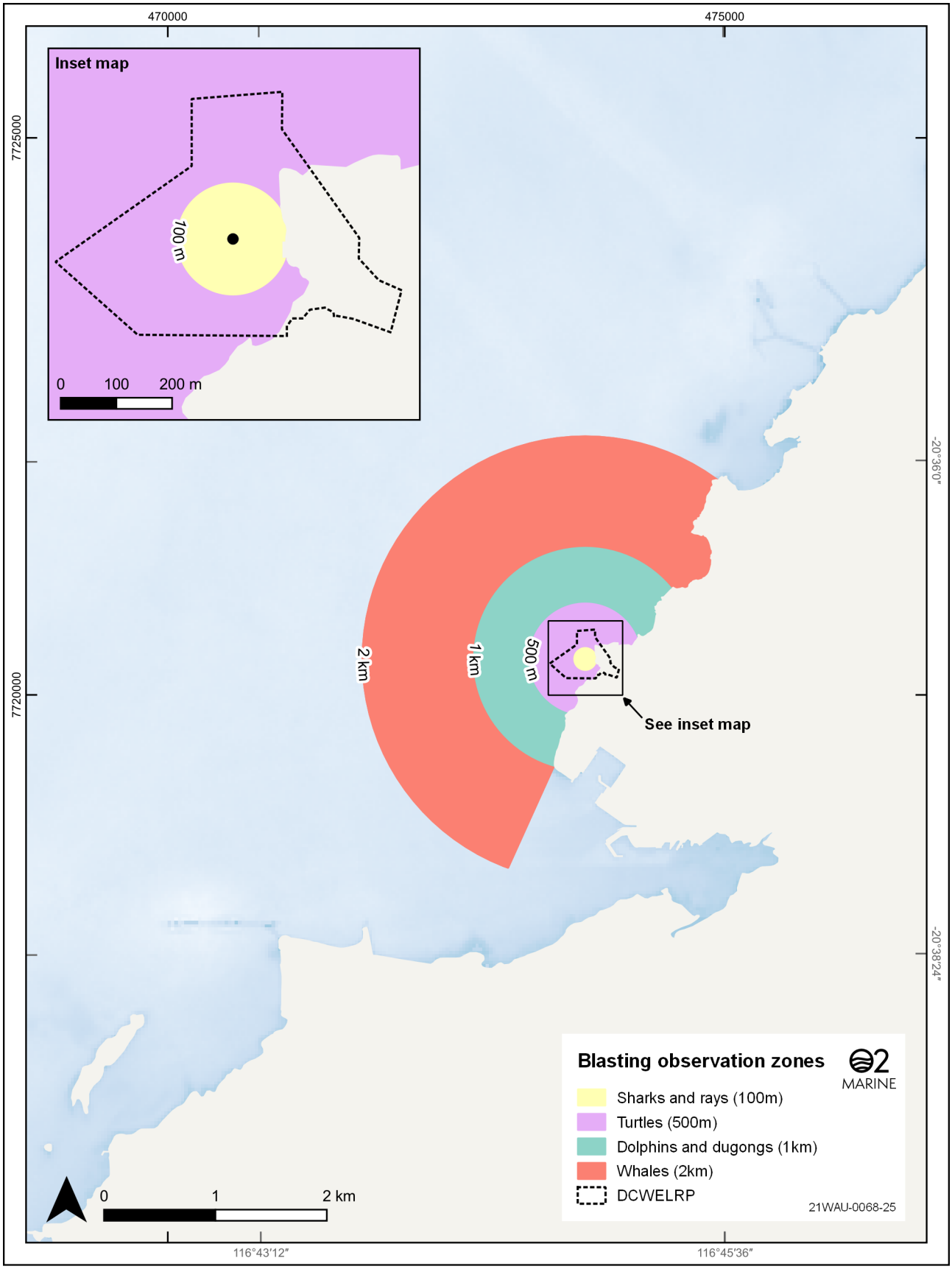


Figure A 2 Blasting marine fauna observation zones

# Appendix B. Artificial Lighting Assessment and Requirements

There are no sensitive shore-based habitats located immediately adjacent to the Project Footprint. The National Light Pollution Guidelines for Wildlife provides a precautionary limit of 20km based on observed effects of skyglow on marine turtle hatchlings. Rosemary island, a significant shore-based habitat for nesting marine turtles is approximately 21.6km away from the Project Footprint. Geographical barriers such as Malus Island and West Lewis Island prevent direct line of site between the proposed Action and Rosemary Island. Although nesting beaches in the Dampier Archipelago could potentially occur on various closer islands to the Project Footprint, such as Angel Island, these are not considered significant shore-based habitat for nesting marine turtles and are not near enough or orientated towards the Project location to be at significant risk from predicted Project construction or operation artificial light emissions.

## Construction lighting

Construction activities will also occur right next to two operational wharf facilities which are managed by PPA. These are the Dampier Bulk Liquids Berth and Dampier Cargo Wharf. Both facilities are required to be operated and lit on 24 hours a day, 7 days a week basis. Both facilities are also visited by ships which are also required to maintain minimum illumination to ensure a safe work environment while operating alongside PPA's wharves. As such, it is unlikely that the illumination from dredging or associated vessels in this area will be discernible from vessels sitting alongside these operational wharf facilities. To mitigate the effects of artificial light on marine turtles, all construction vessels and activities must comply with standards outlines below.

## Construction light control measures

- All lights to be directed downwards using targeted asymmetrical distribution to illuminate only the specific areas of need, while minimising the reflectance
- Ensure mobile light sources are not oriented towards nesting habitat or seaward (where possible) and to keep the height of these to a minimum
- All construction vessels (including dredges) to ensure all lights are directed onto the work deck and immediate work area.

## Operational lighting

Once operational, the Project will be operated on 24 hours a day, 7 days a week basis. As such, all lights are required (under the West Australian Work Health and Safety Act 2020) to be operational and designed to provide a safe working environment. As a minimum, lighting levels for the Project are required to achieve PA1 or PA3 in accordance with Australian Standard 1158 for vehicular traffic (Category V) lighting.

The Project does not include highly polished, shiny, or light-coloured surfaces (other than the concrete deck) which can contribute to sky glow. The Project is situated between two operational wharf facilities managed by PPA which are also required to be operated and illuminated in 24 hours a day, 7 days a week basis.

The Project is located immediately adjacent (to the West) of the Pluto Liquified Natural Gas (LNG) Plant, and (to the North) of Parker Point Iron Ore Terminal, which both represent a significant elevated artificial light source on the western side of Murujuga. Therefore, the operation of an additional (10-15) downward facing pole mounted lights near sea level next to existing wharf facilities and within an existing port / industry context

is not likely to make any significant additional contribution to sky glow or represent a significant risk to protected matters.

## Operational light control measures

The design of the operational lights will be in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW 2023).

As a minimum:

- Wharf lighting levels will have a 50-lux average with a 20-lux minimum
- Lights will be mounted on fixed poles 10 meters high (for those lights facing the wharf), and 20 meters high (for those lights facing the land), 32 meters away from the wharf edge
- Lights will be "marine life friendly" Amber 2200K low glare with minimal light spill and no upward light
- All pole-mounted lights will be directed downwards to illuminate only the specific areas of need. This is also an important requirement in an operational port context as the lights could represent a hazard to safe navigation to the Project and surrounding wharf facilities.