PILBARA PORTS AUTHORITY

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

PORT HEDLAND SPOILBANK MARINA

A942382

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Table 1: Version History

VERSION NO.	DATE	PREPARED BY	REVISION DESCRIPTION	ISSUED TO
Rev A	14/02/2019	M Spence/ DoT	Spoilbank Marina Proposal	J Bradford
Rev B	17/02/2019	J Bradford/ DoT	Spoilbank Marina Proposal	EPA
Rev C	06/04/2020	M Spence/ DoT	DWER/DBCA Comments	J Bradford
Rev 0	11/08/2020	M Spence/ DoT	J Bradford	DAWE
Rev 1	30/09/2020	J Bradford/ DoT	Spoilbank Marina Proposal	DAWE
Rev 2	21/01/2021	J Bradford/ DoT	Respond to DAWE comments	DAWE
Rev 3	09/02/2021	M Spence/ DoT	Respond to DAWE comments	DAWE
Rev 4	25/03/2022	A Stanley/ PPA	PPA CEMP	DAWE

DECLARATION OF ACCURACY

I declare that to the best of my knowledge, all the information contained in, or accompanying this document is complete, current, and correct. I am duly authorised to sign this declaration on behalf of the approval holder. I am aware that:

a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.
b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cwth) where the person knows the information or document is false or misleading.
c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed:  Date: 28/3/2022

Full name: Derek Walker
Organisation: Pilbara Ports Authority
EPBC Referral Number: 2019/8520
Name of Action Management Plan this document and declaration refers to: Port Hedland Spoilbank Marina: Construction Environmental Management Plan

1. INTRODUCTION

Pilbara Ports Authority (**PPA**) is committed to the delivery of its services and activities in an environmentally sensitive and responsible manner. This is clearly stated within PPA's Environment and Cultural Heritage Policy. The stewardship of land and waters under PPA management require a range of management plans to ensure effective and consistent delivery of this mandate. This Construction Environmental Management Plan (**CEMP**) demonstrates how PPA addresses environmental management during the construction of the Port Hedland Spoilbank Marina.

2. PROJECT DESCRIPTION

PPA has been nominated as the Developer of the Port Hedland Spoilbank Marina (the **Proposal**), a government initiative initially led by the Department of Transport (**DoT**) in partnership with the Town of Port Hedland (**ToPH**). The Proposal is located on the western side of the spoilbank sand formation, a man-made coastal landform created in the late-1960s and early-1970s as a result of disposing dredge material associated with Port Hedland's inner harbour development.

The Proposal includes development of a marina basin, rock armored breakwaters, a dredged approach channel, boat pens, a boat ramp and landside infrastructure such as carparks, amenities, public open space, lighting, paths and landscaping. The Proposal involves ground disturbance of up to 40 hectares within the Project Area of approximately 77 hectares (Figure 2-1).

The physical and operational elements of the Proposal include:

- Marina basin, berth facilities (up to 80 pens), boat launching area and approach channel;
- Dryland excavation of up to 600,000 m^3 of material, some of this excavated material will be used onsite as fill material to reprofile the site, the remainder will be transported to Dredge Material Management Area (DMMA) C under PPA's approved Surplus Materials Management Plan (Surplus Material Management Plan, Rev 0, JBS&G, 2021) and assessed for suitability for reuse at other locations;
- Capital dredging of up to 190,000 m^3 to a maximum depth of -3.5 m CD (chart datum – maximum depth will be for the development of a silt trap for a small area within the entrance channel deign) plus a horizontal over dredge to meet the ultimate design. The material removed will disposed of at Spoil Ground 'I' under the Commonwealth *Environment Protection (Sea Dumping) Act 1981* as conditioned through SD2021/4009;
- Construction of the marina's breakwaters, revetments and sand trap. Materials for the construction of these structures will be sourced from local and regional quarry operations; and

- Parking facility, amenities (public and pen holders), public open space and upgrading of road infrastructure.

A new access road is also being constructed through Lot 501 to link Morgans Street to Sutherland Street to provide access to the Spoilbank site. Whilst the construction of this new access road is outside the remit of this CEMP, the ongoing use and management of the new road during the construction period of the Proposal, will be managed by this CEMP.

Figure 1: Port Hedland Spoilbank Marina Project Area

3. SCOPE

This CEMP has been prepared to outline how environmental impacts will be managed during construction of the marine and land-based components of the Proposal.

This CEMP provides the overall environmental management framework and specific management sections to address relevant environmental factors and mitigate potential impacts of construction activities. This CEMP has been developed with due consideration and incorporated all of commitments of the DoT's *Port Hedland Spoilbank Marina Proposal - Construction Environmental Management Plan (Rev 3, dated 09/02/2021)* submitted to the State and Commonwealth environmental regulators to support the environmental referrals process. As the Proposal Developer and Principal, PPA has extended the scope of the DoT Construction Environmental Management Plan to cover the management of a broader range of environmental values and to link this CEMP to a range of Management Plans which support the Proposal.

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.

4. REGULATORY APPROVALS

The potential environmental impacts of the Proposal were considered at Commonwealth, State and Local Authority level with each Authority providing guidance on the level of assessment required. This CEMP forms a key documented process and tool for recognising and managing the various conditions and requirements of the environmental approvals. The relationship between the Authorities and this CEMP are presented in Figure 4-1 and detailed in sections 4.1 to 4.3.

4.1 Commonwealth Referrals

DoT referred the Proposal to the Commonwealth's Department of Agriculture Water and the Environment (**DAWE**) under the *Environmental Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) on 22 August 2019. The Proposal was determined to be a 'Controlled Action' by a Delegate of the Commonwealth Minister for the EPBC Act on 21 January 2020 on the basis that it will, or is likely to have, a significant impact on the following Matters of National Environmental Significance (**MNES**):

- Listed threatened species and communities (section 18 and 18A)
    - Flatback turtle (*Natator depressus*) – vulnerable and migratory
    - Green turtle (*Chenonia mydas)* – vulnerable and migratory
    - Green sawfish (*Pristis zijsron*) – vulnerable and migratory
    - Dwarf sawfish (*Pristis clavata*) – vulnerable and migratory

- Listed migratory species (sections 20 & 20A)
    - Narrow sawfish (*Anoxypristis cupidata*) – migratory

The DoT Referral was supported by a number of management plans, these plans including the management actions, have been referenced to in this CEMP.

The proposal was approved by DAWE (EPBC 2019/8520) on 19 February 2021 subject to conditions.

The proponency of the Proposal was formally transferred from DoT to PPA on 18 May 2021 under Section 145B of the EPBC Act.

PPA prepared and submitted a sea dumping permit application with DAWE to load and dispose of at sea, up to 190,000m^3 of capital dredged material derived from the Port Hedland Spoilbank Marina. The sea dumping permit was granted under sections 19 and 21 of the *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act) by DAWE on 29 October 2021 as conditioned through SD2021/4009.

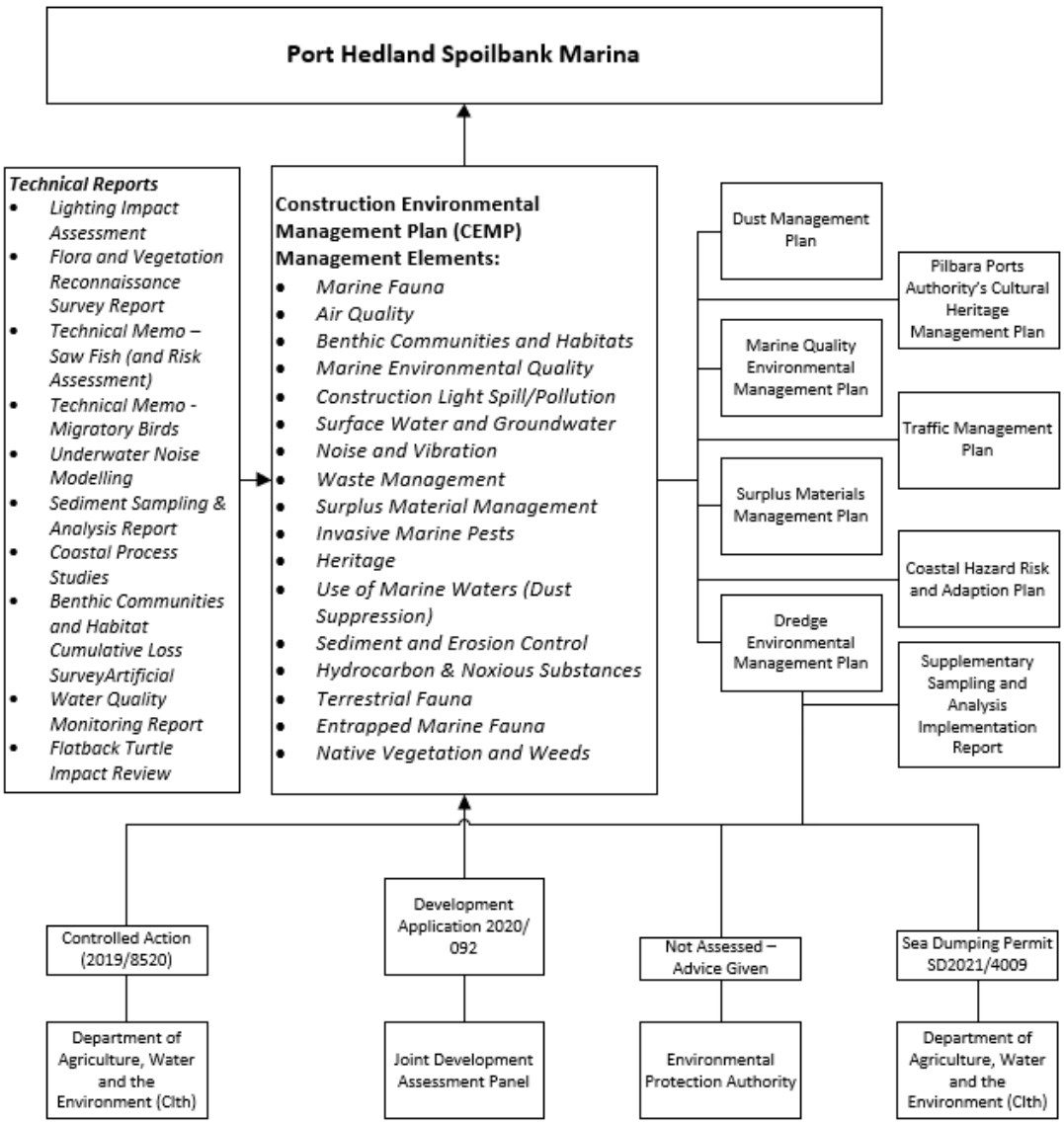

Figure 2: CEMP linkages to Commonwealth, State and Local Authority Approval

4.2 State Assessment

In February 2020, DoT referred the Proposal to the State Environmental Protection Authority (**EPA)** under section 38 of the *Environmental Protection Act 1986 (**EP Act**)*. The DoT referral package considered the potential significant effects of the Proposal and outlined the proposed management for these in a supporting CEMP (**DoT CEMP**)[1]. The EPA returned a decision of "not assessed - advice given", however the EPA identified "Air Quality" as a key factor in considering its findings. In its explanation of decision, the EPA summarised that "…*although the proposal*

[1] Port Hedland Spoilbank Marina Proposal, Construction Environmental Management Plan, Rev B, DoT (February 2019)

raises a number of environmental issues, the EPA is of the view that the Proposal as implemented consistent with referral information, will result in environmental effects that are not so significant to warrant formal assessment under Part IV of the EP Act".

The DoT CEMP was updated to address and incorporate feedback from the EPA's advice and recommendations regarding environmental issues, as well as comments received during the public comment period.

PPA has adopted the content of the DoT CEMP and updated the management and mitigation measures to incorporate PPA's standard processes and practices to more accurately present the full suite of environmental values and controls expected to be delivered under the Proposal. In some cases, specific reference has been made to supporting Management Plans which should be reviewed and considered when implementing this CEMP.

The CEMP will support the Regional Joint Development Assessment Panel conditions of the Proposal as issued by the ToPH (refer section 4.3)

4.3 Joint Development Assessment Panel Role

The proposal was considered by the Western Australian Development Assessment Panel through a Joint Development Assessment Panel (**JDAP**) in accordance with the provisions of the ToPH Town Planning Scheme No. 5 as was approved with conditions as set out in the Determination Notice issued on 1 October 2020.

5. RATIONALE AND APPROACH

5.1 Local Setting

The Spoilbank is a man-made coastal landform created in the late 1960s and early 1970s as a result of disposing of material associated with dredging activities within the Port Hedland Inner Harbour and Goldsworthy shipping channel. Over time, the Spoilbank has become a popular recreational area for recreational fishers, picnickers and four-wheel drivers. The Spoilbank is defined as Crown Land under the management control of the ToPH, with PPA Port Limits extending to the high-water mark.

The Spoilbank comprises approximately 76.3 hectares (**ha**) of the largely undeveloped reclaimed land extending from directly adjacent to Sutherland Street on the southern boundary to approximately 575 metres (m) north. The western site boundary is approximately opposite where Howe Street meets the end of Sutherland Street, and the eastern site boundary is approximately 55 m to the east of where Acton Street meets the southern side of Sutherland Street.

The Spoilbank has remained largely undeveloped except for an area along the Sutherland Street frontage, where the Port Hedland Yacht Club (**Yacht Club**) and a number of ancillary buildings have been developed. A small lagoon has been created in front of the Yacht Club, which is only accessible to the ocean at higher

tides. An unsealed public access road was constructed to provide access to the northern end of the Spoilbank, where several picnic structures have been constructed by the ToPH.

The Port Hedland region has historically been the subject of numerous large-scale infrastructure developments, including extensive and periodic capital and maintenance dredging campaigns. Due to these developments the environment has been extensively surveyed and is well-understood. The findings of these investigations are outlined in Appendix 3 – Survey and Study Findings.

5.2 Key Environmental Considerations

In considering the potential environmental impact of the Proposal, DoT identified the key sensitive receptors requiring specific management actions to mitigate the impacts. Of primary concern was the potential impact on the nesting and inter-nesting population of flatback turtles at Cemetery Beach, approximately two kilometres (**km**) east of the Spoilbank. The flatback turtle is considered a MNES and is protected under the EPBC Act and the State's *Biodiversity Conservation Act 2016* (**BC Act**).

DoT identified the key impact pathways for this flatback turtle population to be from construction and operational light spill / pollution, vessel strikes and dredging equipment entrainment, water quality changes and underwater noise. The mitigation measures noted in the DoT CEMP (and supporting Management Plans), provide a mechanism to avoid impacts entirely or minimise the impact to an acceptable level. The impact predictions are supported by technical experts as reported in Appendix 2.

The EPBC Act Protected Matters Search Tool (**PMST**) report (5 km buffer radius) identified several threatened and migratory marine fauna species that may frequent the area, including the humpback whale, blue whale, southern right whale, great white shark, whale shark, as well as dwarf, narrow and green sawfish.

The green sawfish has been historically recorded in inshore marine waters and inhabits muddy bottom habitats and estuaries (Thorburn et al, 2007). The green sawfish is the most commonly distributed species of sawfish in Western Australian waters, occurring in areas with a muddy substrate and frequently found in shallow water. It commonly inhabits marine inshore waters, estuaries and lagoons. Most sawfish move into marine waters during or after the wet season and re-enter estuarine or fresher waters to breed (Morgan et al, 2011).

In addition to marine fauna, the original assessment by DoT identified fugitive dust emissions generated during construction activities to be a key environmental issue for the Proposal. To manage fugitive dust emissions, a detailed Dust Management Plan was developed by PPA and provided by DoT to Commonwealth, State and Local Authorities to inform the Proposal's management measures, monitoring requirements and reporting protocols.

5.3 Management Plan Approach

DoT completed a range of site-specific environmental studies to support environmental referrals for the Proposal. These studies, in conjunction with the advice and recommendations from commonwealth, state and local authorities, have informed and guided the preparation of a range of Management Plans to support implementation of the Proposal. Subsequently, PPA also prepared a suite of issue-specific environmental management plans in response to the conditions of environmental approvals issued by regulatory authorities for the Proposal.

The combined suite of Management Plans which directly support this CEMP (as noted in Figure 4-1) are presented below and should be reviewed in parallel with the CEMP as required.

- ***Dredge Environmental Management Plan (DEMP)*** (*O2Marine*, 2021) which includes dredge plume modelling (including spatially delineated Zones of Impact), ecological impact assessment (including benthic cumulative loss predictions). The DEMP is informed by management-based provisions that clearly define management objectives, supported by appropriate monitoring programs that include management targets, management actions, adaptive management and reporting protocols. These monitoring programs include the *'Marine Water Quality Monitoring Program'*, *'Return Water Quality Monitoring Program'* and the *'Marine Fauna Observations Program'*.

- ***The Construction Dust Management Plan (DMP)*** (ETA, 2021) commits the Contractor to ensure a number of environmental objectives detailed within the DMP are met. The DMP provides for a site risk assessment that directs the required management measures and monitoring required to ensure fugitive dust emissions generated during construction can be minimised to as low as practicable.

- ***Marine Environmental Quality Plan (MEQP)*** *(O2Marine)* commits to manage marine environmental quality impacts from operation of the Proposal, and provide a framework to monitor, characterise and report on long-term trends in marine water and sediment quality within and immediately adjacent to the Proposal. The MEQP will form part of the Operational Environmental Management Plan (**OEMP**) for the Proposal once the construction phase has been completed.

- ***Surplus Materials Management Plan (SMMP)*** (JBS&G, 2020) provides a structured approach to the removal and relocation of surplus material from the Proposal to PPA's Dredged Material Management Area C (DMMA-C) for ex-situ sampling and analysis prior to determining the material's final use. The SMMP considers key aspects associated with the contaminant status of the material including the management of acid sulphate soils, its

reuse under the *Waste Avoidance and Resource Recovery Act 2007* and detailed management actions to minimise environmental impact.

- ***Traffic Management Plan (TMP)*** *(PPA, 2020)* sets out the procedures for the safe movement of and interactions between vehicles, mobile plant and pedestrians in the workplace and minimise the impact of traffic movements on the local community during the construction of the Proposal.

- ***Cultural Heritage Management Plan (CHMP)*** (PPA, 2020) outlines how Aboriginal and historical heritage (including maritime heritage), is considered in all activities undertake by PPA (and its contractors) during the construction phase of the Proposal. The CHMP presents a tiered approach, which focuses on the principles of *Avoidance*, *Mitigation* and *Management*. The CHMP also presents several procedures/management actions to address cultural heritage matters. A Heritage Survey was also completed for the Proposal with no specific matters of concern identified. The CHMP provides the mechanism for effective engagement with the Aboriginal community and statutory regulators to ensure all works remain compliant with heritage legislation.

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 and related Management Plans (as above).

5.4 Stakeholder Consultation

Significant engagement with the Port Hedland community has occurred over many years as plans for the Proposal have evolved. In line with the recent commitment to the project, an engagement process has been initiated to inform the formulation of the Masterplan, as follows:

- Stakeholder Interviews (August 2019);
- Vision and Design Workshop (12 September 2019);
- Kariyarra Workshop (4 & 5 September 2019);
- Kariyarra Design Workshop (30 September 2019);
- Online Survey (13-22 September 2019);
- Public Advertising of Masterplan (2-11 November 2019); and
- Public Open Day (2 November 2019).

The outcomes of the community engagement process are presented within the 'Port Hedland Marina and Waterfront, Community and Stakeholder Engagement Outcomes Report (November 2019).

6. ROLES AND RESPONSIBILITIES

The overarching responsibility for the implementation of this CEMP lies with PPA as the Developer and Principal for the construction phase. This CEMP has been prepared for use by all site Contractors during the construction phase. An OEMP will be developed by the site operator prior to the commencement of site operations following Practical Completion and the transfer of the site to the responsible Authority.

Key roles within the CEMP include:

- Principal
- Superintendent
- Contractors
- Regulatory/Approval Authorities

The roles and responsibilities of organisations or individuals in relation to the environmental protection measures during construction are described in Table 6-1. These responsibilities do not replace any other regulatory responsibilities of parties in relation to a change in land use or development work for the Proposal.

Table 2: Environmental Protection Roles and Responsibilities

STAKEHOLDER	ROLES AND RESPONSIBILITIES
PPA as the Principal and roles appointed by the Principal such as the Site Superintendent	The Principal is the party with ultimate responsibility of the Site during the Construction Phase. This may include but not be limited to the following: • Promoting and maintaining environmental management by aiming to prevent environmental impacts caused by working practices • Monitoring compliance with environmental legislation, regulation, standards and codes • Allocation of financial resources to adequately meet environmental management needs • Provision of competent person(s) to investigate environmental incidents and accidents and initiate corrective (preventative) actions • Provision of adequate resources for effective environmental management • Notification to the Contractor(s) of potential environmental issues • Assessing and reviewing Contractors' abilities to comply with environmental management requirements • Confirmation of Contractor(s) adherence to the CEMP requirements • Ensuring adequate instruction and training is provided for all employees. • Inform the Contractor(s) of the Heritage values identified for the Proposal • Ensure adequate monitoring of the Contractor(s) with regard to implementation of the CEMP during construction.

STAKEHOLDER	ROLES AND RESPONSIBILITIES
	• External reporting to the appropriate authority in the event of an environmental incident or adverse environmental impact taking place during the development of the Proposal.
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: • 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. • Undergoing training and induction to effectively fulfil its environmental management role and responsibilities • Ensuring employees are inducted in CEMP and follow environmental management procedures. • Promoting environmental management and encouraging the involvement of all personnel in cooperating and being involved with toolbox meetings • Ensuring that all management actions outlined in the CEMP are carried out. • Undertaking inspections and completing relevant checklists. • Reporting of all environmental hazards and incidents and ensuring appropriate records are created and investigations undertaken. • Notification of the Superintendent in the event of non-compliance or failure to meet environmental targets and all environmental incidents outlined in this CEMP. • Ensuring environmental management issues are resolved as soon as is practicable. • Ensuring that all employees receive relevant training. • Recording of all activities relating to soil excavation including the location and nature of the excavation and material tracking (as required). • Ensuring that plant and equipment complies with Regulations, Codes of Practice or Standards and that documentation is available on request. • Ensure that a register/ log is kept for all inductees to the site (i.e. employees / subcontractors).
Regulatory Authorities: • Town of Port Hedland (ToPH) • Department of Water and Environmental Regulation (DWER) • Department of Agriculture, Water and the Environment (DAWE)	• The issuance of approvals and conditions to which the project must comply, management and report. • In the event of a failure to comply with the CEMP, the DWER has powers to require further management of any environmental issues and / or additional assessments if deemed necessary. • Setting conditions associated with the management of MNES as issued to the Proponent under the EPBC Act.

7. TRAINING, AWARENESS AND COMPETENCY

Site induction training shall be carried out prior to the commencement of any staff on the project. All site staff including contractor's staff shall undergo site induction training during mobilisation to the project. The induction process shall make staff aware of the following:

- Potential environmental impacts on the site.
- The procedures set out in this CEMP.
- Their role and responsibility in the implementation and monitoring of the CEMP for the duration of the Proposal (construction phase).
- A list of people and/or organisations to be contacted in the event of an environmental incident.

Further training shall be provided to staff throughout the construction phase of the Proposal 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 could 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; and
- Environmental bulletins

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

8. ENVIRONMENT AND HERITAGE RISK MANAGEMENT

8.1 Key Environmental Factors and Objectives

The EPA provides guidance on identifying the relevant Environmental ***Factors*** and ***Objectives*** in its *Statement of Environmental Principles, Factors and Objectives (April 2020*). This Statement has been used by DoT and PPA to guide the development of the CEMP using the broad ***Themes*** of Sea, Land, Water, Air and People as outlined in Table 2. In consideration of potential environmental impact pathways associated with the proposed construction activities, subsequent project specific Environmental Protection Outcomes (**EPOs**) and Management Targets (**MTs**) were derived for each of these Factors and are outlined in Appendix 1. These are further developed and presented in the Environmental Monitoring and Management Plans (**EMMP**) detailed in Section 8.2. The structure is broadly consistent with that detailed in the EPA's *Statement of Environmental Principles, Factors and Objectives (April 2020*).

The Proposal has also been determined as a Controlled Action under the EPBC Act based on the potential for significant impact on MNES as detailed below. Therefore, clear environmental outcomes have also been embedded in the Themes, Factors and Objectives set out in Table 8-1 and Appendix 1, to achieve the following outcomes:

- Listed Threatened Species and Communities:
  - Environmental Outcome: Significant residual impacts do not occur from the proposed action and therefore the biological diversity and ecological integrity of Listed Threatened Species and Communities will be maintained.
- Listed Migratory Species:
  - Environmental Outcome: Significant residual impacts will not occur from the proposed action and therefore the biological diversity and ecological integrity of Listed Migratory Species will be maintained.

Table 3: Environmental Factors and Objective linked to construction of the Spoilbank Marina (the Proposal).

THEME	FACTOR	OBJECTIVE
Sea	**Benthic Communities and Habitat** #	To protect benthic communities and habitats so that biological diversity and ecological integrity is maintained.
	Coastal Processes	To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected.
	Marine Environmental Quality #	To maintain the quality of water, sediment and biota so that environmental values are protected.
	Marine Fauna#	To protect marine fauna so that biological diversity and ecological integrity are maintained.
Land	**Terrestrial Environmental Quality**	Maintain the quality of land and soils so that environmental values are protected
Water	**Inland Waters**	At maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected
Air	**Air Quality**#	At maintain air quality and minimise emissions so that environmental values are protected
People	**Social surroundings**	To protect social surroundings from significant harm.

THEME	FACTOR	OBJECTIVE
	Human Health	To protect human health from significant harm.
	Heritage[##]	To ensure that historical and cultural associations are not adversely affected.

[#] *Key Environmental Factors identified as part of the DoT referral of the Proposal to the EPA to be considered in the construction phase*

[##] *Included to ensure the cultural heritage values of the site are acknowledged and considered in the construction phase*

8.2 Environmental Monitoring and Management Plans

For each environment (and heritage) risk area identified below, an EMMP has been prepared to clearly demonstrate how PPA intends on managing identified risk. The structure used to present the EMMPs is presented below with the individual EMMPs presented in Tables 8-2-1 to 8-2-16

- ***Objective(s)*** - What is intended to be achieved (refer Table 8-1).
- ***Management Strategy*** - What management strategy(ies), 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 liked actions to address the Objective.
- ***Responsibility*** – Defines to responsible person/agency for delivering on the EMMP.
- ***Timing*** - The time period when the controls need to be implemented.
- ***Performance Indicator***- The metrics for recording the outcomes.
- ***Monitoring*** – The metric(s) to be used in checking performance of the EMMP.
- ***Reporting*** - The way in which the compliance with the management actions and outcomes are reported.
- ***Corrective Action*** - Actions to be undertake if the management action is not met.

The EMMPs have been divided into two Tiers of application. Those which directly relate and respond to conditions associated with regulatory approvals (Tier 1) and those which, whilst comply with the relevant legislation and regulations which would apply to any civil construction activities of this scale (Tier 2).

Tier 1 EMMP's include:

- Marine Fauna (Table 4)
- Air Quality (Table 5)
- Benthic Communities and Habitats (Table 6)
- Marine Environmental Quality (Table 7)
- Construction Light Spill / Pollution (Table 8)
- Surface and Groundwater (including dewatering activities) (Table 9)
- Noise and Vibration (Table 10)
- Waste Management (Table 11)
- Surplus Material Management (including Acid Sulphate Soils) (Table 12)
- Invasive Marine Pests (Table 13)

Tier 2 EMMPs detail the required management strategies to ensure appropriate management and mitigation of environmental impacts associated with typical tasks, activities or processes associated with civil construction works. These EMMPs should be considered as a minimum required to address:

- Heritage Management (Table 14)
- Use of Marine Waters for Dust Suppression (Table 15)
- Sediment and Erosion Control (Table 16)
- Hydrocarbons and Noxious Substances (Table 17)
- Terrestrial Fauna (Table 18)
- Stranded Marine Species (Table 19)
- Native Vegetation and Weeds (Table 20)

8.2.1 Marine Fauna

The impact to marine fauna through vessel strikes and dredging activity, including (but not limited to) turtle and sawfish, was identified during the risk assessment as a potential risk during dredging and piling works. Further impact to turtle populations resulting from light spill and overall increases to the light footprint were also identified as a key risk. These issues have been conditioned within the EPBC Act approval and require monitoring and management strategies to adequately address this risk. Key management strategies associated with marine fauna management are detailed in Table 8-2-1.

Table 4: Environmental Monitoring and Management Plan for Marine Fauna

MARINE FAUNA			
Objective(s)	To protect marine fauna so that biological diversity and ecological integrity are maintained. 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	Reducing potential impact to marine fauna is managed primarily through the Dredging Environmental Management Plan (DEMP) 'Section 6.3 Marine Fauna' and limiting light emission in an easterly direction towards Cemetery Beach during night-time hours.		
		Responsibility	**Timing**
Control(s)	**Pre-construction Phase** • Site contractor(s) to undertake environmental induction for all site staff, providing information on marine reptiles (including the Flatback and Green Turtles), cetaceans and fish species (including the Green, Dwarf and Narrow sawfish) awareness and associated management and monitoring protocols. • Appoint a suitably trained marine fauna observer (MFO) tasked with monitoring for marine fauna to avoid and minimise impacts relating to piling (underwater noise impacts) and dredging activities. • Educate construction site contractor(s) that the MFO has the responsibility and powers of suspending dredging and piling activities based on the below monitoring protocols and procedures. **Construction Phase** • Suitably trained marine fauna observer (MFO) on duty during all targeted noise generating activities.	Contractor	Throughout project

MARINE FAUNA			
	• Site contractor(s) to undertake all specified monitoring protocols and procedures. • No start-up of marine noise generating piling activities if marine fauna are observed inside the exclusion zones as per defined protocols. Implement marine fauna monitoring and management as outlined in DEMP Section 6.3.and detailed in Appendix B.3		
Performance Indicator(s)	No incidences of marine fauna injury or death as a result of dredging and piling operations or vessel strike. No disturbance to turtle nesting as a result of marine or terrestrial construction works.	Contractor	Throughout project
Monitoring	Marine fauna observations outlined in DEMP Section 6.3 shall be undertaken for the duration of dredging and/or marine piling activities.	Contractor	Throughout project
Reporting	Contractor to immediately report any environmental incidents or non-conformance to the PPA Superintendent (without delay). A log detailing marine turtle and marine mammal sightings and activities will be maintained on all dredging and piling vessels. If an incident occurs, contractor to submit an incident management system (IMS) report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor Contractor PPA	Without Delay
Corrective Action(s)	Assess marine fauna incident and modify management where necessary.	Contractor	Throughout project

8.2.2 Air Quality

Dust generation from the construction of the Proposal has the potential to impact on human health and the environment if not managed and mitigated appropriately. The West End of Port Hedland township is recognised as a sensitive receptor for the purposes of industry dust management. The short-term construction activities associated with the Proposal could add to the total dust load within the airshed. The Dust Management Plan (ETA 2020) provides a phased approach to the management of dust, both as part of design and construction phase. The Dust Management Plan sets triggers and threshold values at boundary sites which will require the Contractor(s) to adopt specific management responses. To assist in the management of dust, PPA operates a real-time dust monitoring network to monitor dust levels from the site. Access to this network by the Contractor(s) will be by an online portal with automated email and or SMS messaging and alerts. High level controls and performance outcomes from the Dust Management Plan (**DMP**) (ETA 2020) are presented in Table 8.2.2, however the DMP must be read in parallel with this CEMP and takes precedent in the event of any conflict.

Table 5: Environmental Monitoring and Management Plan for Air Quality

AIR QUALITY			
Objective(s)	To minimise the impacts of dust on adjacent areas and the community.		
Management Strategy	Dust issues managed principally by emission controls at source, and administrative controls during works as outlined in the Construction Dust Management Plan (Construction DMP).		
		Responsibility	**Timing**
Control(s)	Implement the dust source control measures detailed in Table 1-2 of the Construction DMP, for construction activities, including but not limited to: • Earthworks • Material Handling and Movement • Vehicle movements, and • Site access and egress Implement the dust management program as outlined in Section 2 of the Construction DMP, including but not limited to: • The adoption of the Initial Trigger Values set out in Table 2-5 & 2-6 of the DMP • The adoption of the Initial Threshold Values set out in Table 2-7 of the DMP, and • The Response Actions as set out in Table 2-8 to table 2-10 of the DMP.	Contractor	Throughout project
Performance Indicator(s)	Initial trigger values are set out in Table 2-5 & 2-6 of the Construction DMP.	PPA	Throughout project

AIR QUALITY			
	Initial threshold values are set out in Table 2-7 of the Construction DMP and listed below: • > 70ug/m^3 24-hour average at southern boundary monitor with winds from the wind arc toward the southern boundary (SB-SE 270-70 degrees, SB-SW 278 to 85) for >50% of the 24-hour period, and at the exclusion of background concentrations not associated with construction. • > 4g/m^2/28-days increase above established background concentration along southern boundary Dust Deposition Gauges (DDGs).		
Monitoring	Three near real-time continuous dust monitors (nephelometers) measuring dust (as PM_{10}) on a 10-minute average basis, with wind speed and wind direction sensors. The Contractor will receive scheduled email notifications at 6am, 12pm and 3pm with the cumulative average pm10 and the percentage of time winds from the wind arc (SB-SE 270-70 degrees, SB-SW 278 to 85) are towards the southern boundary. Ten DDGs will be deployed across site to measure total deposited dust. These DDGs are designed to collect a composite sample over a 28-day period. Locations of dust monitors and gauges shown in figure 2-3 of the DMP. Daily inspection of works sites to be conducted by the Contractor, including: • visual check for dust crossing the site boundaries • visual check of high potential dust areas, such as haul roads, stockpiles and operational areas.	PPA Contractor	Throughout project Throughout project
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Implement the Response Actions as set out in Table 2-8 & Table 2-9 of the DMP in response to any of the trigger values (DMP Table 2-5 & 2-6) being reached. Investigate cause of excessive dust	Contractor	Throughout project

AIR QUALITY			
	Implement additional controls immediately (e.g. water carts) Implement corrective actions prior to the recommencement of site works Implement administrative controls if required, such as rescheduling of dust generating activities to more favourable weather conditions. The effectiveness of the Construction DMP will be subject to PPA internal review. The review will consider the following: • Is the implementation of the initial Trigger-Action-Response framework achieving the Threshold criteria specified in Table 2-7? • Are the complaints received, registered and validated against monitoring data, an indication that changes are required to the initial Trigger-Action-Response framework? • Are the monitors in the most effective locations for future construction plans? Using these performance indicators, PPA will undertake periodic (quarterly) review of the site dust management procedures and will adjust Trigger values and action responses as necessary	PPA PPA	Quarterly Quarterly

8.2.3 Benthic Communities and Habitats

Three broad Benthic Community Habitat (**BCH**) classes were identified during field surveys of the waters within the Proposal Development Envelope and surrounding marine environment; Bare Sand (90.4 % - 6413.7 ha); Mixed assemblage (8.3% - 587.9 ha); and Mixed assemblage with seagrass (1.3% - 90 ha). The potential environmental impacts to the three identified broad BCH classes have been identified as: (a) direct removal within the dredge and breakwater footprint; (b) turbidity and reduction in available light due to suspended sediments released into the water column during dredging, and (c) discharge of dredge return water. These issues have been addressed in the DEMP with key management strategies detailed in Table 8-2-3.

Table 6: Environmental Monitoring and Management Plan for Benthic Communities and Habitats (BCH)

BENTHIC COMMUNITIES AND HABITATS			
Objective(s)	To protect BCH so that biological diversity and ecological integrity are maintained.		
Management Strategy	Outlined in Dredging Environmental Management Plan (DEMP) Section 6.1, Benthic Communities and Habitats, Table 7.		
		Responsibility	**Timing**
Control(s)	Implement the management actions as outlined in DEMP Section 6.1, Benthic Communities and Habitats, Table 7.	Contractor	Throughout project
Performance Indicator(s)	No irreversible loss, or serious damage to BCH outside of the Zone of High Impact (ZoHI)[1]. No irreversible loss of BCH outside of the Worst Case ZoHI No reduction in the BCH outside of the Worst-Case Zone of Moderate Impact (ZoMI)[2] within the Zone of Influence (ZoI)[3] Maintain a 'Moderate Level of Ecological Protection' at point of dredge return water discharge Environmental protection outcomes, management targets and trigger levels for protection of BCH are defined in the DEMP Appendix B.1.3 Table 17.	Contractor	Throughout project
Monitoring	Implement Marine Water Quality Monitoring Program and Return Water Quality Monitoring Program, as outlined in DEMP Appendix B.1 and Appendix B.2 (respectively) for the duration of dredging and/or marine activities.	PPA	Throughout project

BENTHIC COMMUNITIES AND HABITATS			
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	In consultation with PPA Environment and Heritage representative, assess Marine Water Quality Monitoring Program and Return Water Quality Monitoring Program incidents and implement corrective actions where necessary.	PPA/Contractor	Throughout project

[1] ZoHI. Zone of High Impact *(irreversible loss to BCH) – as outlined in the DEMP*

[2] ZOMI. Zone of Moderate Impact *(recoverable impact to BCH) – as outlined in the DEMP*

[3] ZOI. Zone of Influence *(potential change of environmental quality but no impact on BCH) – as outlined in the DEMP*

8.2.4 Marine Environmental Quality

The Proposal has the potential to impact on marine environmental quality if not managed and mitigated appropriately, through the disturbance of contaminants in sediments and changes to the physico-chemical properties of the water column as a result of dredging, sea dumping and return water discharge, as well as the release of hydrocarbons from a vessel spill and or bunkering operations. These issues have been addressed in the DEMP with key management strategies detailed in Table 8-2-4.

Table 7: Environmental Monitoring and Management Plan for Marine Environmental Quality

MARINE ENVIRONMENTAL QUALITY			
Objective(s)	To maintain the quality of water, sediment and biota so that environmental values are protected.		
Management Strategy	Outlined in Dredging Environmental Management Plan (DEMP), Section 6.2 Marine Environmental Quality, Table 8.		
		Responsibility	**Timing**
Control(s)	Implement the management actions as outlined in DEMP Section 6.2, Marine Environmental Quality, Table 8.	Contractor	Throughout project
Performance Indicator(s)	Maintain water quality to meet a High Level of Ecological Protection criteria at the point of discharge. Impact management targets for return water monitoring are outlined in the DEMP Appendix B.2.5 Table 18	Contractor	Throughout project
Monitoring	Marine Water Quality Monitoring Program outlined in DEMP Appendix B.1. Return Water Quality Monitoring Program outlined in DEMP Appendix B.2 shall be undertaken for the duration of dredging and/or marine piling activities.	Contractor	Throughout project
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay

MARINE ENVIRONMENTAL QUALITY			
Corrective Action(s)	In consultation with PPA Environment and Heritage representative, assess Marine Water Quality Monitoring Program and Return Water Quality Monitoring Program incidents and modify management where necessary.	PPA/Contractor	Throughout project

8.2.5 Construction Light Spill/Pollution

Construction light spill pollution has the potential to create a new point source of light in the horizon and requires consideration and management to prevent potential risk to turtle populations nesting at Cemetery Beach, approximately 2 km to the east of the Proposal. The potential impact during the construction phase can be appropriately managed through the use of directional lighting, limiting working hours to daylight hours and ensuring where lighting is required, appropriate measures are put in place to limit light spill in the direction of Cemetery Beach. Key management strategies associated with construction phase light spill management are detailed in Table 8.2.5.

Table 8: Environmental Monitoring and Management Plan for Construction Light Spill/Pollution

CONSTRUCTION LIGHT SPILL / POLLUTION			
Objective(s)	To protect marine fauna so that biological diversity and ecological integrity are maintained. 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 'Listed Migratory Species' will be maintained.		
Management Strategy	Light spill / pollution managed principally by limiting light emission in an easterly direction towards Cemetery Beach during night-time hours.		
		Responsibility	**Timing**
Control(s)	The direction and intensity of artificial light point sources are managed to avoid and/or reduce light emissions occurring in an easterly direction towards Cemetery Beach. All non-essential construction lighting will be turned off at night-time. Inspection of the construction area at the end of each day to identify potential sources of problematic point source (e.g. task lighting, arena lighting and vehicles). Lighting selected and managed in accordance with relevant State and Commonwealth guidelines, with a specific focus on the following core principles: • Keep it OFF (keep light off the beach and lights off when not needed) • Keep it LOW (mount lights low down with lowest intensity for the job) • Keep it SHIELDED (stop all light escaping upwards and outwards), and • Keep it LONG (use long wavelength lights). Further management measures include:	Contractor	Daily, at dusk prior to the lock-up of the site.

CONSTRUCTION LIGHT SPILL / POLLUTION			
	• Shielding the east facing side (i.e. side facing towards the Cemetery Beach nesting area) of the pole mounted lights to further reduce line of sight visibility to hatchlings within the Cemetery Beach nesting area. • Minimise pole mounted lights required to safely light the main access road and parking and when unavoidable, use low intensity amber LED lights. • Using lighting controls and / or motion sensors where possible during turtle nesting and hatching season (1st November to 31st March) to keep areas dark when not in use and only providing light when active use of an area is required. • Contractor(s) to ensure works are only carried out between 7.00 am and 7.00 pm on any day that is not a Sunday or a public holiday, unless an exemption has been issued.		
Performance Indicator(s)	No construction light emitted in an easterly direction towards Cemetery Beach during night time hours. No complaints regarding light emissions from the construction site.	Contractor	Daily, at dusk prior to the lock-up of the site.
Monitoring	Monitoring and inspections should occur, along the eastern boundary of the site, to ensure controls are implemented prior to leaving site.	Contractor	Daily, at dusk prior to the lock-up of the site.
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Turn off all non-essential construction light sources. Review site lighting setup and modify, if required, to reduce light emissions.	Contractor	Daily, at dusk prior to the lock-up of the site.

8.2.6 Surface Water and Groundwater (including dewatering activities)

Surface and ground water quality can potentially be impacted by a number of processes including Hazardous materials and fuels (i.e. hydrocarbons) that have the potential to leak or spill on-site and enter surface and ground water, and ultimately enter the marine environments. Management for these impact pathways will be a focus of this section and are outlined in Table 8-2-6.

Table 9: Environmental Monitoring and Management Plan for Surface Water and Groundwater

SURFACE WATER AND GROUNDWATER			
Objective(s)	To maintain the quality of surface and ground water, sediment and biota so that the environmental values are protected. To maintain the quality of land and soils so that environmental values are protected. No adverse impacts on surface or groundwater quality resulting from handling Potential Acid Sulphate Soils (PASS). No adverse impacts on land or soils quality resulting from sediment/soil contamination, including PASS.		
Management Strategy	Surface water and groundwater quality is managed principally by avoiding spills, managing discharge water and implementing erosion and sediment control techniques.		
		Responsibility	**Timing**
Control(s)	Implement the Return Water Quality Monitoring Program for return water as outlined in DEMP Appendix B.2 Implement the Sediment and Erosion Control plan as outlined in Section 8.2.13. of this CEMP. Implement the Hydrocarbons and Noxious Substances control plan as outlined in Section 8-2-14. of this CEMP. Contractor to ensure all staff (including sub-contractors) undertake environmental induction, including information on requirement for site water management actions. Implement actions to avoid spills of liquids/chemicals into surface and groundwater, and if a spill occurs within the site, emergency spill procedures will be implemented to control and remediate the spill in consultation with PPA's Superintendent Representative	Contractor	Pre-construction Phase Construction Phase

SURFACE WATER AND GROUNDWATER			
	Spill kits (marine and terrestrial) are to be located on site, maintained by the Contractor and personnel trained in their use. The required resources of spill kits will be informed by a construction environmental risk assessment led by the Contractor (and updated throughout construction), which will consider the range of probable hydrocarbon / chemical spill risks for marine and terrestrial works, and the response capability required for these scenarios. At the commencement of the settlement period, the reclamation area will be stabilised, for instance with hydro-mulch, jute matting or geotextile, to minimise mobilisation of the material in the reclamation area through overland flows.		
Performance Indicator(s)	Impact management targets for return water monitoring are outlined in the DEMP Appendix B.2 Table 18 No adverse impacts surface or groundwater quality resulting from handling Potential Acid Sulphate Soils (PASS). No adverse impacts on land or soils quality resulting from sediment/soil contamination, including PASS	Contractor	
Monitoring	Return Water Quality Monitoring Program outlined in DEMP Appendix B.2 shall be undertaken for all return water discharge. Pre-start daily inspections to be undertaken of all site vehicles to check for fluid leaks. Monitoring for hydrocarbon spills (with response actions) should be carried out in accordance with the DEMP. Monitoring for PASS in accordance with DEMP and SMMP.	Contractor	On-going during construction.
Reporting	Contractor to immediately report any non-conformance to a representative of PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay

SURFACE WATER AND GROUNDWATER			
Corrective Action(s)	Assess surface water and groundwater incidents and modify management where necessary. All PASS and affected water to be treated by contractor onsite.	Contractor	

8.2.7 Noise and Vibration

Noise and vibration from the Proposal has the potential, if not managed and mitigated appropriately, to impact on sensitive receptors within the ToPH (construction, public, commercial, and residential areas). The key monitoring and management strategies associated with noise and vibration are presented in Table 8-2-7.

Table 10: Environmental Monitoring and Management Plan for Noise and Vibrations

NOISE AND VIBRATIONS			
Objective(s)	Manage emissions (including air and noise) so they do not adversely affect environmental values or the health, welfare and amenity of people and land uses. Construction activities undertaken in accordance with AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites. Construction activities undertaken in accordance with *Environmental Protection (Noise) Regulations 1997*		
Management Strategy	Noise to be managed primarily through administrative and equipment / plant / machinery controls.		
		Responsibility	**Timing**
Control(s)	Contractor to ensure all staff (including sub-contractors) undertake environmental induction, including information on requirement noise management actions. Contractor(s) required to develop a Noise Management Plan to manage potential noise impacts. The Noise Management Plan should be submitted to the Town of Port Hedland at least seven days before the work starts with the plan being approved by the Town prior to the commencement of construction activities. All equipment, machines and vehicles on site during construction to be the quietest reasonably available consistent with operational requirements, and to be routinely maintained to ensure effectiveness of noise suppression systems and equipment. All “warm-up” of equipment by employees and site contractor(s) arriving early to the construction site not to be carried out outside of approved construction hours. Site contractor(s) to ensure works are only carried out between 7.00 am and 7.00 pm on any day that is not a Sunday or a public holiday, unless an exemption has been issued.	Contractor	Pre-construction Phase Construction Phase

NOISE AND VIBRATIONS			
	Pre-start checks and maintenance schedules to ensure equipment performance is as required. Noise-dampening equipment to be used on equipment with excessive noise generating characteristics; Construction activities in accordance with AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites		
Performance Indicator(s)	No complaints from adjacent residential, commercial premises and/or community.	Contractor	On-going during construction.
Monitoring	Daily inspection of works sites to occur. Service logs for equipment/machinery used on site. If required, undertake periodic noise monitor at boundary and sensitive receptor locations	Contractor PPA/ Contractor	On-going during construction. As required
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Investigate any noise-related complaints and register as an environmental incident, triggering review of work processes and a corrective action managed by the site contractor(s) if the complaint is supported and can be resolved. In consultation with PPA's Superintendent Representative, implement corrective measures prior to the recommencement of site works. Reschedule of noise-generating activities to reduce noise impact to sensitive receptors.	Contractor	On-going during construction.

8.2.8 Waste Management

Waste from the Proposal, if not appropriately managed, has the potential to impact the environment by contaminating the soil, air and water. It can also harm fauna through toxic effects, entanglement, suffocation and ingestion. The management actions proposed to minimise potential impacts that waste may have on the environment are detailed in Table 8-2-8.

Table 11: Environmental Monitoring and Management associated with waste management

WASTE MANAGEMENT AND HOUSEKEEPING			
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)	Provide labelled waste bins to accommodate the type, volume and service frequency of anticipated waste streams. All loads arriving or leaving the site will be appropriately secured. Provide information regarding waste management in site specific inductions, including waste separation and importance of securing vehicle loads. Ensure licensed contractors are used to collect controlled wastes 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. Recycling of all recyclable construction metal waste. Records kept of waste leaving site (waste tracking register).	Contractor	On-going during construction.
Monitoring	Daily inspection of work site to occur. Review of waste bins (% full, time to next service). Waste volumes leaving site from waste contractors	Contractor	On-going during construction.

WASTE MANAGEMENT AND HOUSEKEEPING			
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Investigate cause of inappropriate waste disposal Review cause of issue and develop response, such as variation to bin size, service schedule or waste separation awareness. Implement controls	Contractor	Throughout project

8.2.9 Materials Management (Surplus Materials)

The impact to land and marine environments through the inappropriate management of surplus materials excavated or encountered on the site, including suspected contaminated soils or acid sulphate soils (actual or potential) may result in further contamination of the site(s) and adjacent areas. The inappropriate consideration of the contaminant levels within such soils may have an adverse impact on both human health and the environment. PPA has developed a Surplus Material Management Plan (SMMP) (JSB&G, 2020) to specifically address this issue. High level controls and performance outcomes from the SMMP are presented in Table 8-2-9, however the SMMP (JBS&G 2020) must be read in parallel and takes precedent in the event of any conflict.

Table 12: Environmental Monitoring and Management Plan for Surplus Materials

Surplus Materials			
Objective(s)	To minimise the impact to land and marine environments through the loading, transport and receipt of surplus material.		
Management Strategy	Outlined in the SMMP Section 10.		
		Responsibility	**Timing**
Control(s)	Outlined in the management tables of the SMMP Section 10.1 Loading, Section 10.2 Transport, Section 10.3 Temporary Placement.	Contractor	Throughout project
Performance Indicator(s)	Outlined in the management tables of the SMMP Section 10.1 Loading, Section 10.2 Transport, Section 10.3 Temporary Placement.	Contractor	Throughout project
Monitoring	Routine monitoring is outlined in the SMMP Section 10.4 Routine Monitoring. Contractor to maintain a material tracking system as outlined in the SMMP Section 10, table 10.1	Contractor Contractor	Throughout project
Reporting	Contractor to provide monthly environmental progress report as outlined in the SMMP Section 11.3. Contractor to immediately report any non-conformance to PPA's Superintendent Representative (without delay).	Contractor Contractor	Monthly Without Delay

Surplus Materials			
	If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor PPA	
Corrective Action(s)	Outlined in the management tables of the SMMP Section 10.1 Loading, Section 10.2 Transport, Section 10.3 Temporary Placement.	Contractor	Throughout project

8.2.10 Introduced Marine Pests

The Proposal will require mobilisation of non-trading commercial vessels and associated immersible equipment to support marine construction activities. The 'biofouling' (i.e. the accumulation of microorganisms, plants, algae and animals) on submerged surfaces of such vessels is considered an important vector for 'bio-invasions', with the potential (if unmanaged) for establishment of an introduced marine pests (**IMP**) within the local marine environment. The key monitoring and management strategies associated with IMP are presented in Table 8-2-10.

Table 13: Environmental Monitoring and Management Plan Invasive Marine Pests

INVASIVE MARINE PESTS			
Objective(s)	Ensure that all non-trading commercial vessels mobilising to the Port of Port Hedland for the purposes of the Proposal, implement appropriate vessel biofouling management, thereby mitigating the transfer of IMP to the Port to as low as reasonably practicable (ALARP). To protect marine fauna so that biological diversity and ecological integrity are maintained. 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 associated with the Proposal are best practice as demonstrated through the Department of Primary Industries and Regional Development (DPIRD) "Vessel Check" Portal (Low Risk status), and therefore sufficient to mitigate the transfer of IMP to the Port Hedland marine environment to as low as reasonably practicable (ALARP).		
		Responsibility	**Timing**
Controls	All non-trading commercial vessels to be used in the construction phase of the proposal are required to generate a Vessel Check Risk Assessment report from the DPIRD Vessel Check Portal within 14 calendar days of the vessel's mobilisation (for the Proposal) from any port within State waters or other location within interstate or international waters, which demonstrates that the indicative risk of the vessel is Low. A non-trading commercial vessel that has an indicative risk score of High or Medium will not be permitted entry to the Port of Port Hedland All construction vessels shall comply with Commonwealth Department of Agriculture and Water Resources – Australian Ballast Water Management Requirements, the National Biofouling Management Guidelines for commercial vessels.	Contractor	Prior to mobilising to Port Hedland from another port, interstate or overseas.

INVASIVE MARINE PESTS			
	Implement PPAs Port of Port Hedland Introduced Marine Species Risk Assessment and DPIRD's biosecurity procedures and protocols, including Vessel Check 2.0.		
Performance Indicator(s)	All non-trading commercial vessels assessed as Low Risk on by DPIRD Vessel-Check program.	Contractor	Throughout project
Monitoring	All Vessel-Check Reports to be provide to PPA's Superintendent Representative prior to the vessel entry into the Port of port Hedland.	Contractor	Throughout project
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Where an introduced marine pest is identified or potentially identified on the non-trading vessel / immersible equipment, this will be reported immediately with PPA and Department of Fisheries.	Contractor	Throughout project

8.2.11 Heritage Management

Heritage surveys were conducted within the Project Area of the Spoilbank Marina by the traditional owners of the Marapikurrinya (Kariyarra) estate, who advised that there were no Aboriginal heritage sites within the Project Area. PPA has developed a Cultural Heritage Management Plan (CHMP) to specifically address monitoring and management strategies associated with cultural heritage sites within the surrounding area of the Spoilbank, which also covers unexpected finds. High level controls and performance outcomes from the CHMP are presented in Table 8-2-11, however the CHMP must be read in parallel and takes precedent in the event of any conflict.

Table 14: Environmental Monitoring and Management Heritage Management

HERITAGE MANAGMENT			
Objective(s)	To minimise the impacts of development, operation and maintenance of the Project on the heritage values in the Project area.		
Management Strategy	PPA's Cultural Heritage Management Plan (CHMP) is the overarching strategy to ensure heritage impacts are minimised and impacts outside of the approved disturbance area are avoided.		
		Responsibility	**Timing**
Control(s)	Implement the protocols as set out in PPA's Cultural Heritage Management Plan (CHMP) in consultation with PPA Heritage Specialist and other relevant stakeholders as directed. In the event of the discovery of suspected cultural heritage material implement the required actions outlined in the CHMP page 47. In the event of the discovery of suspected human skeletal material implement the required actions outlined in the CHMP page 49.	Contractor Contractor Contractor	Throughout Project
Performance Indicator(s)	No disturbance of heritage values outside of the approved disturbance area. No complaints or allegations of unauthorised disturbance of heritage values.	Contractor	Throughout Project
Monitoring	Monitoring in areas where first ground disturbance works have been identified as having the potential to encounter subsurface cultural heritage material.	PPA	Throughout Project
Reporting	Contractor to immediately report any non-conformance PPA's Superintendent Representative (without delay).	Contractor	Without Delay

HERITAGE MANAGMENT			
	If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor PPA	
Corrective Action(s)	Cease works in the impact area immediately. Implement measures outlined in CHMP. Review and modify procedures/CHMP if necessary.	Contractor	Throughout Project

8.2.12 Use of Marine Waters for Dust Suppression

The use of marine water for dust suppression can save significant amounts of potable water but needs to be carefully managed to avoid adverse impacts on adjacent areas. The key monitoring and management strategies associated with the use of marine waters for dust suppression are presented in Table 8-2-12.

Table 15: Environmental Monitoring and Management associated with the use of marine waters for dust suppression

USE OF MARINE WATER FOR DUST SUPRESSION			
Objective(s)	To ensure the use of marine waters for dust suppression does not impact adjacent areas		
Management Strategy	Minimise the potential for adverse impacts associated with the use of marine waters for compaction works and dust suppression. To minimise the use of potable water during the construction phase of the Proposal through the use of marine waters for select activities.		
		Responsibility	**Timing**
Control(s)	Waters applied sufficient to address dust suppression only, and excessive runoff waters not created. Wherever possible, all site drainage to run internal to the site and allowed to infiltrate, and/or have the longest internal flow path possible. Filling of the header tank (site storage) to be triggered by float mechanism in tank, indicating low and high level. Operator to maintain watch during filling operation to ensure water cart not over-filled.	Contractor	Throughout Project
Performance Indicator(s)	No evidence of salinity-related impacts to adjacent areas.	Contractor	Throughout project
Monitoring	Daily inspection of work sites to occur, including: visual check for application of dust suppression water, visual check of water cart fill point.	Contractor	Throughout project
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent Representative (without delay).	Contractor Contractor	Without Delay

USE OF MARINE WATER FOR DUST SUPRESSION			
	If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	PPA	
Corrective Action(s)	Investigate cause of excessive dust control waters Implement controls as required (e.g. diversions) Implement administrative controls if required, such as rescheduling of dust generating activities to more favourable weather conditions.	Contractor	Throughout project

8.2.13 Sediment and Erosion Control

Erosion and sediment from construction sites has the potential to degrade freshwater water and marine environments. The key monitoring and management strategies associated with sediment and erosion control are presented in Table 8-2-13.

Table 16: Environmental Monitoring and Management associated with sediment and erosion control

SEDIMENT AND EROSION CONTROL			
Objective(s)	To ensure that the effects of erosion and sedimentation on the environment and biological communities are minimised. Minimise soil disturbance, degradation and erosion.		
Management Strategy	Ensure that direct impacts (land disturbance) are limited to the works area, and that secondary impacts do not impact adjacent areas. Store dredge material as per SMMP.		
		Responsibility	**Timing**
Control(s)	Disturbance area will be minimised and clearly demarcated. Works will only be conducted within the works zone. Vehicle movements will be restricted to the defined roads/tracks. Where possible, work areas will be designed to ensure stormwater runoff drains into the site. Where runoff from the site is required, it will be via the longest flow path possible to ensure maximise sediment retention. Flows to undisturbed areas will be prioritised. Where required, sediment controls will be put in place. These will include, but not be limited to, rock check dams, sediment basins, sediment fences and silt socks. Sediment controls will be reviewed during site inspections and/or after significant rainfall (more than 10mm in 24hrs resulting in site runoff). For dredge material sediment and erosion control implement the management strategies as outlined in SMMP Section 10.3.2 and 10.3.5.	Contractor	Throughout Project

SEDIMENT AND EROSION CONTROL			
Performance Indicator(s)	No evidence of significant sediment deposition outside the works area. No evidence of significant rilling, gullies or other instances of run-off erosion.	Contractor	Throughout Project
Monitoring	Daily site inspections of work site to occur. Weekly logging of sediment control structures (location and condition). Sediment controls will be reviewed during site inspections and/or after significant rainfall (more than 10mm in 24hrs resulting in site runoff). Review will include removal of accumulated sediments as required.	Contractor	Throughout Project
Reporting	Contractor to immediately report any non-conformance to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Investigate cause of sediment control failure Review flow path and determine most appropriate controls are in place, additional controls which can be place in-stream and/or changes that can be made to flow path Review similar controls on-site (even though these may not have failed) for similarities	Contractor	Throughout Project

8.2.14 Hydrocarbons and Noxious Substances

Hydrocarbons and other noxious substances have the potential to leak or spill on-site contaminating the land, surface water and ground water, and ultimately enter the marine environments. Management for these impact pathways will be a focus of this section. Key management strategies associated with the management of hydrocarbons and noxious substances are detailed in Table 8-2-14.

Table 17: Environmental Monitoring and Management associated with oil and other noxious substances

OIL AND OTHER NOXIOUS SUBSTANCES			
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. Refuelling of vehicles/equipment will be undertaken on land (not over water), unless the task is not possible. 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. A copy of the current hydrocarbon SDS will be kept at an appropriate location on site. Drip trays shall be placed under mechanical stationary equipment such as gensets if such equipment is not internally bunded. Onsite spill response training will be carried out on a periodic basis. All deficiencies identified through training and testing of the procedures will be documented and rectified immediately. All equipment will be regularly serviced to reduce emissions and reduce the chance of oil leaks on site and in marine environments. Appropriate controls in place to contain	Contractor	Throughout Project

OIL AND OTHER NOXIOUS SUBSTANCES			
	hydrocarbon leaks should they occur whilst servicing. Controls may include use of drip trays when changing oil and transporting waste oils in bunded containers. Only qualified personnel are to carry out services on plant, equipment and vessels. A prescribed Isolation procedure must be followed prior to work on any plant or equipment. Training / awareness to be included in site induction (including all staff, contractors, subbies etc.). Appropriate volume and type of spill response materials will be available at each work site. Spill 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. All spills reported and investigated as required.		
Performance Indicator(s)	Minor spills (<10L) to land contained, controlled and all contamination removed / cleaned-up within 24 hours. No spills to marine waters. Reporting to PPA within timeframes specified below. No contamination of soil or surface / ground waters. 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. Statistics reported to PPA in weekly meetings and monthly reports.	Contractor	Throughout Project
Reporting	All marine spills (regardless of volume) to be reported to the PPA communications tower (Port Hedland) immediately (VHF 12 or 16, (08) 9173 9030, 24 hour emergency mobile 0438 303 708).	Contractor	Without Delay

OIL AND OTHER NOXIOUS SUBSTANCES			
	All marine pollution incidents shall be reported to the DoT Maritime Environmental Emergency Response (MEER) duty officer (24 hours) on (08) 9480 9924 and followed by an online Pollution Report Form (POLREP), which is available at: http://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-PollutionReport.pdf Contractor to immediately report any non-conformance to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor Contractor Contractor PPA	
Corrective Action(s)	Stop work immediately, contain spill (if safe). Investigate cause of spill and assess. Implement improvements as required. Investigate and assess adequacy of response – implement improvements as required. Implement corrective measures prior to the recommencement of site works.	Contractor	Throughout Project

8.2.15 Terrestrial Fauna

Terrestrial fauna includes vertebrate (birds, mammals including bats, reptiles, amphibians, and freshwater fish) and invertebrate (arachnids, crustaceans, insects, molluscs and worms) groups. The Port Hedland area is known to support a number of conservation significant species of migratory shorebirds, many of which are known to occur on or in close proximity to the Spoilbank Marina project site. Other groups of conservation significant species of terrestrial fauna are not known to occur on the Spoilbank Marina project site but may be present in the local area. The monitoring and management strategies associated with terrestrial fauna management is presented in Table 8-2-15

Table 18: Environmental Monitoring and Management associated with terrestrial fauna management

TERRESTRIAL FAUNA			
Objective(s)	To minimise the impact to fauna To prevent the spread of introduced species		
Management Strategy	Ensure impacts to fauna are minimised and impacts outside the disturbance zone are avoided.		
		Responsibility	**Timing**
Control(s)	Provide site specific information on fauna within the Environmental Induction Include identification sheets in prominent locations for priority species potentially found in the area (olive python, Pilbara Leaf-nosed bat and Northern Quoll). Include identification of feral species in prominent locations. Include toolbox talks for site specific fauna information during project to ensure currency of information. Ensure no activities outside the works zone through clear delineation of the works area, and communication in site inductions Ensure traffic is restricted to established tracks and roads, and speed limits observed. Where excavations are created which may entrap fauna, suitable escape measures are put in place, and excavation are checked for fauna before backfilling.	Contractor	Throughout Project

TERRESTRIAL FAUNA			
	Contact wildlife carer groups/vet for injured fauna. Domestic animals prohibited on-site. Ensure appropriate waste management (lidded bins), including food scraps, to reduce potential for feral species to become established on-site.		
Performance Indicator(s)	No disturbance outside the disturbance zone. No injury or death of any fauna caused by vehicles or excavations. No injury or death of protected fauna. No domestic animals on-site.	Contractor	Throughout Project
Monitoring	Daily inspection of work site to occur.	Contractor	Throughout Project
Reporting	Contractor to immediately report any sightings and incidents to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Investigate cause of incident. Review opportunities/constraints for further minimisation of potential incidents given work procedure parameters. Implement corrective measures prior to the recommencement of site works.	Contractor	Throughout Project

8.2.16 Stranded Marine Species

During construction stage 2A of the Spoilbank Marina a temporary bund wall will be built across the opening of the existing yacht club basin, disconnecting it from the ocean. As a result, some marine species may be trapped within the yacht club basin. The monitoring and management strategies associated with stranded marine species management is presented in Table 8-2-16.

Table 19: Environmental Monitoring and Management associated with stranded marine species management

STRANDED MARINE SPECIES			
Objective(s)	To minimise the impact to stranded marine species. To relocate all stranded marine species to the ocean as safely as possible.		
Management Strategy	Ensure impacts to stranded marine species are minimised.		
		Responsibility	**Timing**
Control(s)	Undertake stranded marine species removal using only permitted means. Under the direction of the Department of Primary Industries and Regional Development (DPIRD). All species being caught are to be moved and released alive to avoid breaching bag and size limits. Include toolbox talks for the management of stranded marine species.	PPA	Throughout Project
Performance Indicator(s)	No injury or death of any marine fauna caused by vehicles or excavations No injury or death of protected marine species/ fauna.	Contractor	Throughout Project
Monitoring	Daily inspection of Spoilbank yacht club basin water body during excavation for stranded marine species.	Contractor	Throughout Project
Reporting	Notify DPIRD 24 hours before stranded marine life removal of the dates, start and finish times, activities and staff who will be involved. After completion of all activities, provide a report to DPIRD of the fish/marine species that have been moved including the numbers of each species and any deaths.	PPA PPA	24 hours before works After completion

STRANDED MARINE SPECIES			
	Contractor to immediately report any incidents to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Investigate cause of incident. Review opportunities/constraints for further minimisation of potential incidents given work procedure parameters. Implement corrective measures prior to the recommencement of site works.	Contractor	Throughout Project

8.2.17 Native Vegetation and Weeds

The Proposal has been granted three Native Vegetation Clearing Permits under section 51E of the EP Act. This includes Native Vegetation Clearing Permit CPS 8909/1 which covers up to 25 hectares of the Project Area, Native Vegetation Clearing Permit CPS 9074/1 which is granted to build a public access road from Sutherland Street to the Spoilbank reserve and CPS 9264/1 which covers an area in the southwest corner of the project area. Key monitoring and management strategies associated with native vegetation and weeds is presented in Table 8-2-16.

Table 20: Environmental Monitoring and Management Native Vegetation and Weeds Management

NATIVE VEGETATION AND WEEDS			
Objective(s)	To minimise the disturbance to existing flora To minimise the introduction and/or spread of weed species		
Management Strategy	Ensure impacts to native vegetation are minimised, impacts outside the areas approved for clearing under CPS 9264/1, 8909/1 and CPS 9074/1 are avoided and appropriate management is in place to control spread / introduction of weeds.		
		Responsibility	**Timing**
Control(s)	Provide site specific information on flora within the Environmental Induction. Ensure that any native vegetation clearing occurs within the limits of an approved area under the PPA whole of Port native vegetation clearing permit. Ensure no activities outside the works zone through clear delineation of the works area, and communication in site inductions Ensure traffic is restricted to established tracks and roads, and speed limits observed. Ensure effective sediment and erosion control to reduce potential impacts to non-disturbance zone. Ensure all plant and equipment coming to site has been cleaned for site access (weeds and seeds). No fires on-site.	Contractor	Throughout Project

NATIVE VEGETATION AND WEEDS			
Performance Indicator(s)	No disturbance of vegetation communities outside the disturbance zone No introduction of weed species	Contractor	Throughout Project
Monitoring	Daily inspection of work site and boundary to occur.	Contractor	Throughout Project
Reporting	Contractor to immediately report any incidents to PPA's Superintendent Representative (without delay). If an incident occurs, contractor to submit an IMS report before the end of the shift where practicable, as outlined in the incident reporting procedures in Section 9 of this CEMP. PPA to report to external stakeholders as per section 9.1 of this CEMP.	Contractor Contractor PPA	Without Delay
Corrective Action(s)	Investigate cause of incident Implement corrective measures prior to the recommencement of site works Review opportunities/constraints for further minimisation of potential incidents given work procedure parameters.	Contractor	Throughout Project

9. INCIDENT REPORTING

9.1 Reporting

All environmental incidents as a result of the activity/ies specific to this CEMP and its associated works must be managed in accordance with PPA's Incident Management Procedure. This includes submission of an online report via PPA's online incident management system (IMS) as soon as practicable and immediately reporting to the Superintendent (without delay).

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 PPA Vessel Traffic Services (VTS) and DoT (refer section.9.1.1);
- Release / spill of contaminants (regardless of volume) that leave 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 this CEMP, or any other development or environmental approval obtained in relation to activities associated with the EMMPs (refer section 8.2; and
- Unexpected finds (refer section 9.4).

9.1.1 Reporting to Department of Transport (DoT)

All marine pollution incidents shall be reported to the DoT Maritime Environmental Emergency Response (MEER) duty officer (24 hours) on (08) 9480 9924 and followed by an online Pollution Report Form (POLREP), which is available at:

http://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-PollutionReport.pdf.

Refer to Marine Pollution Contingency Plan Port of Port Hedland and Port of Dampier Vessel Traffic Services Centre (VTSC) Emergency Response Checklist No. 8 for more information on marine pollution reporting.

9.1.2 Reporting to Town of Port Hedland

PPA to report to the Town of Port Hedland within three days of any complaint received in relation to the Proposal, detailing the nature of the complaint and a detailed description of how the complaint was resolved. PPA to also notify the Town of Port Hedland of any breaches that may impact on surrounding sensitive receptors within 24 hours of the incident.

In the event of any unscheduled activities that may impact air quality for surrounding sensitive receptors, PPA is to notify the Town of Port Hedland in advance to the proposed works.

9.2 Emergency Response

All emergencies shall be reported to PPA's Vessel Traffic Services Centre (VTSC) (refer to Table 9-2-1) by the most expedient means and where appropriate the relevant emergency services organisation (000).

Table 21: Emergency Response Contact Details

EMERGENCY RESPONSE CONTACT DETAILS	
Emergency Services (fire, police, ambulance)	000
Port Hedland VTSC – 24 hours	
Landline	(08) 9173 9030
Mobile	0438 303 708 0427 842 740
VHF Radio	CH12 / CH16
Maritime Environmental Emergency Response (MEER)	(08) 9480 9924

9.2.1 Cyclone preparedness

Contractors are responsible for ensuring that they have cyclone contingency plans and procedures in place. A copy of such plans should be provided to the PPA and updated as necessary prior to 1 October each year. Contractors should nominate a contact person within their plans to liaise with the PPA in the event of a cyclone. PPA will provide whole of Port notifications via the PPA Cyclone distribution list which will be updated prior to 1 November each year.

9.3 Public Complaint Resolution

PPA welcomes feedback from its wide range of stakeholders and has a process to ensure this feedback is captured and responded to in a timely manner. The below information is for individuals who wish to make a formal complaint to PPA regarding a matter of concern.

A complaint must be submitted in writing by an identifiable author via the following methods:

1. An online form available via the PPA website. The online form details what information the complaint must provide.

2. Via email to the spoilbank.marina@pilbaraports.com.au address.

3. By standard post marked attention of General Manager Corporate Affairs and Governance at Locked Bag 4, Cloisters Square PO, Perth WA 6850.

Upon submission of an online Complaint, the Complainant will receive an automatically generated notification stating PPA's intention to respond to the Complaint as soon as practicable following an internal investigation into the matter. A Complaint received by standard post will be acknowledged by the recipient.

Every reasonable effort will be made to investigate all circumstances and information surrounding a Complaint. The level of investigation will be commensurate with the risk, seriousness, frequency of occurrence and severity of the complaint.

The outcome will be communicated in writing to the complainant and copies provided to any PPA personnel involved and the General Manager Corporate Affairs and Governance as soon as practicable following the internal investigation.

PPA's External Complaint Procedure is applicable to written complaints received by PPA whereby the content matter is under the control of the PPA.

9.4 Unexpected Findings Protocol

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

1. Stop/prevent any activity in the area.
2. Place signage and barricade area – make area safe. Do not touch or disturb the item/material.
3. Report the Unexpected Occurrence/Finding to the Superintendent.
4. Record the location, visual appearance, odour, and extent, type of accident or material and mode of discovering the material to the Superintendent.
5. 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 the Cultural Heritage Management Plan (CHMP).
6. Establish management actions in compliance with regulatory requirements.
7. Obtain the Superintendent and the approval of the relevant regulator for the proposed management actions.
8. Implement the approval management action plan and seek on-going advice as necessary.

9. Document the findings and compliance with the approved action plan and provide documentation to the Superintendent.
10. Update the CEMP procedures and controls as required.

10. KEY PROJECT CONTACT DETAILS

Key personal associated with the Proposal are detailed in Table 10-1 however, all primary contact should be made directly to the project Superintendent or the Project Superintendent's Representative in the first instance.

Table 22: Key Project Contact Details

PRINCIPAL ROLES	NAME	CONTACT DETAILS
Superintendent	Nick Dawe	Mob: 0427 933 704 Ph: (08) 6217 7145 Nick.Dawe@pilbaraports.com.au
Superintendent Representative	John Freimanis	Mob: 0428 353 552 Ph: (08) 9159 6509 John.Freimanis@pilbaraports.com.au
Dredging and Survey Manager	Richard King	Mob: 0455 616 557 Ph: (08) 9159 6591 Richard.King@pilbaraports.com.au
Dredging Superintendent Representative	Rhett Moss	Mob: 0447 621 833 Ph: (08) 9173 9035 Rhett.Moss@pilbaraports.com.au
Environment Manager	Derek Walker	Mob: 0447 488 056 Ph: (08) 9173 9112 Environment.porthedland@pilbaraports.com.au
Environment Advisor Spoilbank Marina	Andrew Stanley	Mob: 0447 079 273 Ph: (08) 9173 9121 Environment.porthedland@pilbaraports.com.au
Health & Safety Manager	Todd Brewer	Mob: 0428 323 505 Ph: (08) 9173 9106 Todd.Brewer@pilbaraports.com.au

11. AUDITS AND INSPECTIONS

All environmental inspections shall be performed daily and documented by the Contractor or designated staff.

The person undertaking the daily inspections shall initial the inspection sheet after checking off each environmental aspect. In the event that any non-conforming environmental issues are observed they should be noted on the inspection sheet and brought to the attention of the Principal. Cross reference can be made to attached sheets or documents for major incidents.

Additional environmental inspections shall be conducted when:

- High risk jobs are proposed

- High volume fuel transfer
- Dewatering of sediments
- When the job requirements change.
- When new plant or equipment arrive on site.

The environmental inspections may be used to assess the need for additional on-site management of process, change of equipment and/or procedure changes for work instructions requirements.

12. REVIEW

This CEMP will be reviewed annually by the Environment and Heritage Manager (Port Hedland). This will ensure that the CEMP remains current and in line with the required regulatory requirements and PPA practices. A more frequent review may be required if these is an agreed change of scope in delivering the Proposal

13. PROCESS OWNER

The Environment and Heritage Manager (Port Hedland) has overall responsibility for this CEMP.

1. APPENDIX 1 – ENVIRONMENTAL PROTECTION OUTCOMES (EPOS) AND MANAGEMENT TARGETS (MTS)

ENVIRONMENTAL FACTOR	EPA OBJECTIVE	POTENTIAL ENVIRONMENTAL IMPACTS	ENVIRONMENTAL OUTCOMES	MANAGEMENT TARGETS	MANAGEMENT MEASURES
Benthic Communities and Habitats (BCH)	To protect BCH so that biological diversity and ecological integrity are maintained.	Direct impacts on BCH due to removal of substrate within the dredge and breakwater footprint.	No irreversible loss, or serious damage to BCH outside of the Zone of High Impact (ZoHI).	Dredging operations do not occur outside the defined dredge footprint	Outlined in Dredging Environmental Management Plan
		Indirect impacts of benthic communities and habitats due to reduction in available light caused by increase in suspended sediments released into the water column during dredging and discharge of dredge return water	No irreversible loss of BCH outside of the Worst Case ZoHI	No irreversible loss of BCH outside of the Best Case ZoHI	
			No reduction in the BCH outside of the Worst Case ZoMI (within the Zone of Influence (ZoI))	No reduction in the BCH outside of the Best Case ZoMI	
		Turbidity impacts on BCH arising from return water discharge	Maintain a 'Moderate Level of Ecological Protection' (MEPA) at point of dredge return water discharge	High Level of Ecological Protection (HEPA) for water quality at the discharge point	
Coastal Processes	To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected	Unmanaged changes to the coastal landform due to the construction of hard structures in the marine environment.	Maintain coastal process (sand deposition and erosion) and stabilize as required	Maintain the natural cycles of sand deposition and erosion	Outlined in the Coastal Hazard Risk Management and Adaption Plan
	To maintain the quality of water,	Disturbance of contaminants in	Marine environmental quality shall be maintained to a MEPA'	Marine environmental quality during	Risk Management

ENVIRONMENTAL FACTOR	EPA OBJECTIVE	POTENTIAL ENVIRONMENTAL IMPACTS	ENVIRONMENTAL OUTCOMES	MANAGEMENT TARGETS	MANAGEMENT MEASURES
Marine Environmental Quality	sediment and biota so that environmental values are protected.	sediments during dredging and return water discharger has the potential to deteriorate water quality and contaminate marine organisms	during dredging and disposal and return to a HEPA within one month following completion of dredging and return water discharge. A temporary (for the duration of construction indicative MEPA has been defined (Figure 4 of DEMP). This MEPA recognises the predicted short-term decrease in water quality during construction.	dredging and disposal shall be maintained to a HEPA.	Strategies are presented in the DEMP Table 8, Table 11 and Table 12 and Appendix D.
		Changes to the physico-chemical properties of the water column as a result of dredging and return water discharge			
		Hydrocarbon release into the marine environment from a vessel spill and or bunkering operations			
Marine Fauna	To protect marine fauna so that biological diversity and ecological integrity are maintained.	Injury or death of marine fauna as a result of dredge operations.	No reported negative impacts on marine fauna attributable to marine or terrestrial construction works	No incidences of marine fauna injury or death as a result of turbidity impacts	Risk Management Strategies are presented in the DEMP Table 9.
				No incidences of marine fauna injury or death as a result of dredge operations	
		Injury or death of marine fauna due to vessel movement (strike).		No incidences of marine fauna injury or death as a result of vessel strike	

ENVIRONMENTAL FACTOR	EPA OBJECTIVE	POTENTIAL ENVIRONMENTAL IMPACTS	ENVIRONMENTAL OUTCOMES	MANAGEMENT TARGETS	MANAGEMENT MEASURES
		Disturbance to turtle nesting due to marine or terrestrial construction works (noise and light).		No disturbance to turtle nesting as a result of marine or terrestrial construction works	
		Turbidity impacts on marine fauna.		No incidences of marine fauna injury or death as a result of turbidity impacts	
		Introduced Marine Pests translocation from construction vessels.		No introduction and/or spread of invasive marine species	
		Transfer and spread of potential contaminated sediment/soil	No adverse impacts on land or soil quality resulting from sediment/soil contaminants	Reduce impacts from known contaminated sediment/soil in line with NAGD (2009).	Outlined in Surplus Materials Management Plan and Section 8.2.9 of this CEMP
Terrestrial Environmental Quality	Maintain the quality of land and soils so that environmental values are protected	Transfer and spread of potential contaminated sediment/soil, including PASS/ASS.	No adverse impacts on land or soil quality resulting from sediment/soil contaminants	Effective identification and management of contaminated soils, including PASS/ASS	Outlined in Surplus Materials Management Plan and Section 8.2.9 of this CEMP
Inland Waters	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental	Potential leaching associated with inappropriate management of potential or actual acid sulphate soils on the site, the use of marine waters for dust	No adverse impacts on land or soil quality resulting from sediment/soil contaminants	Effective identification and management of contaminated soils, including PASS/ASS	Outlined in the Surplus Materials Management Plan and the Environmental Quality Management Plan

ENVIRONMENTAL FACTOR	EPA OBJECTIVE	POTENTIAL ENVIRONMENTAL IMPACTS	ENVIRONMENTAL OUTCOMES	MANAGEMENT TARGETS	MANAGEMENT MEASURES
	values are protected	suppress and dewatering of the site to allow for excavation of surplus materials.			
Air Quality	To maintain air quality and minimise emissions so that environmental values are protected.	Dust generated by activities associated with the construction phases of the Project has the potential to impact on the amenity of residents.	Minimise the generation of fugitive dust emissions during construction to as low as practicable.	Minimise visible dust plumes generated during construction activities.	Outlined in the Dust Management Plan
Social Surroundings	To protect social surroundings from significant harm	No adverse environment impact (nuisance or harm) due to site construction activities associated with the Project.	Minimise environmental impacting process during the construction phase of the Project	Broad target to minuses environmental harm and nuisance from construction activities.	Outlined in the Construction Environmental Management Plan
Human Health	To protect human health from significant harm.	Dust generated by activities associated with the construction phases of the Project has the potential to impact on the amenity of residents	Minimise the generation of fugitive dust emissions during construction to as low as practicable.	Minimise visible dust plumes generated during construction activities and monitor PM10 dust fraction against thresholds in Dust Management Plan (aligned to the Port Hedland Air Guideline Vale (AGV).	Outlined in the Dust Management Plan
Heritage	To ensure that historical and cultural associations are not adversely affected	Unexpected finds which may has cultural heritage significance	Minimise any impact on heritage values through avoidance, mitigation or management principles	No impact to heritage values	Cultural Heritage Management Plan.

2. APPENDIX 2 – SURVEY AND STUDY FINDINGS

To support DoT initial referral of the Port Hedland Spoilbank Marina, a number of detailed studies resulting in a series of Technical Reports was presented to the relevant Regulatory Authorities. This section provides an overview of the local and regional setting in the context of the Spoilbank Marina development.

Terrestrial flora and vegetation

DoT environmental consultants undertook a flora and vegetation desktop assessment and reconnaissance site survey work in February 2019, in accordance with EPA's guidelines. It was noted that the site is characterised by predominantly bare sediment with areas of sparsely covered patches of colonising coastal shrubs and grasses (dominant species Buffel grass). No Threatened or Priority Ecological Communities were recorded, and no species of conservation significance were found. The vegetation was generally in degraded condition, being dominated by Buffel grass, and was fragmented by many four-wheel-drive tracks (Strategen, 2020).

DoT's consultants concluded that the Spoilbank Reserve is characterised by a low diversity of vascular flora species and high densities of aggressive weeds. The vegetation does not meet criteria for conservation significance, and no Priority Flora species were identified at the site (Strategen, 2020).

Groundwater

Groundwater survey work included a 12-month groundwater monitoring program of the study area in 2015 (RPS, 2015). The program consisted of salinity profiling to determine the presence and location of the saline interface, groundwater quality monitoring and an assessment of groundwater-tidal interactions. The study identified groundwater flow in a northly direction and discharge into the ocean at the coast. However, due to the presence of the spoilbank, a minor north to south aligned groundwater mound developed, acting as a groundwater divide between the east and west boundaries of the site, directing flows towards both sides of the spoilbank.

The Project area experiences a very high tidal range, which at times exceeds six metres (RPS, 2014). Tidal impact on groundwater elevations occur in two main cycles – semi-diurnal cycles between high and low, and neap and spring tides occurring twice every lunar month. Salinity fluctuated during the 12-month period, most likely correlating to the temporal variations of rainfall recharge to the aquifer. Salinity ranged between saline and hypersaline (5000 mg/L and 40,000 mg/L TDS).

Groundwater quality investigations recorded exceedances in total iron and dissolved cadmium, copper, nickel and zinc (RPS, 2014). These recordings were similar throughout the entire monitoring period with no spatial or temporal trend. The Detailed Site Investigation undertaken by RPS in 2014 concluded that metal

concentrations in groundwater are considered reflective of natural conditions in the aquifer given the consistent concentrations across and up-hydraulic gradient of the site, and the fact that no contamination sources were identified.

Surface Water

The Proposed Action is located on a man-made feature with no discernible surface water flows. No surface water or surface expressions of groundwater are present at the site (RPS, 2011).

Sediment Quality

Environmental investigations and survey work was undertaken across the Proposal's development envelope to characterise the physio-chemical composition of the marine sediment (subtidal and intertidal) (Teal et al, 2019). Sampling was undertaken in accordance with the National Assessment Guidelines for Dredging (NAGD, 2009) and the samples were analysed for particle size distribution, total organic carbon, pesticides, metals, organotins, acid sulfate soils, asbestos containing materials and hydrocarbons.

All analytes were below the available ANZG (2018) guideline values, NEPM (2013) Health Investigation Levels (HILS) and NAGD (2009) Screening Levels. At six locations, Aluminium and Iron exceeded locally derived background levels, however these exceedances were considered to be consistent with ambient concentrations in the area.

All samples were screened for acid sulfate soils and selected samples were subject to chromium suite acid sulfate analysis. The chromium reducible sulfur concentration of three samples were above the action criteria of 0.03% sulfur. The locations of two samples (B12 and S29-B) were in the nearshore environment and one (C02) at the start of the navigation channel (Teal et al, 2019). However, consideration of the acid neutralising capacity presented a positive Net Acidity, which indicated sufficient in-situ buffering capacity for any acid generated during handling. The analysis concluded that sediments were considered suitable for onshore disposal.

Marine Fauna

The Port Hedland area is known to support a number of conservation significant marine fauna species, including marine reptiles, cetaceans, fish species and migratory shorebirds. Cemetery Beach, located approximately 2 km east of the development envelope, has been identified as a biologically important area for inter-nesting flatback turtles (Natator depressus). It is understood that Cemetery Beach supports a mid-sized community (approx. 200 – 500 individuals) that nest on the beach between late November and March, with key hatchling periods between January to March (RPS et al, 2020).

The EPBC Act Protected Matters Search Tool (**PMST**) report (5 km buffer radius) identified a number of threatened and migratory marine fauna species that may frequent the area, including the blue whale, southern right whale, humpback whale, great white shark, whale shark, as well as dwarf, narrow and green sawfish.

Green turtles have also been observed within the Port Hedland Harbour and surrounding mangrove creeks (PENV, 2019). Although juvenile and adult turtles utilise habitat within the Port Hedland area for foraging and breeding, regionally significant foraging sites are known to occur beyond the Port Hedland Inner Harbour (RPS et al, 2020).

The green sawfish has been historically recorded in inshore marine waters and inhabits muddy bottom habitats and estuaries (Thorburn et al, 2007). The green sawfish is the most commonly distributed species of sawfish in Western Australian waters, occurring in areas with a muddy substrate and frequently found in shallow water. It commonly inhabits marine inshore waters, estuaries and lagoons. Most sawfish move into marine waters during or after the wet season and re-enter estuarine or fresher waters to breed (Morgan et al, 2011).

A large number of seabird and shorebird species (or species habitat) may occur within the vicinity of the proposed action; this includes species classified as threatened and migratory under the EPBC Act or specially protected under the WA Biodiversity Conservation Act 2016.

Benthic Communities and Habitat

DoT's environmental consultants undertook ground truthing surveys and targeted survey work in 2019 (PHSM Benthic Communities and Habitat Report, O2 Marine) in accordance with Technical Guidance, Protection of Benthic Communities and Habitats (EPA, 2016c).

The Proposal's subtidal BCH assessment mapped three broad BCH classes within the Detailed Mapping Zone and LAU, including:

- Bare Sand
- Mixed assemblage (Corals, Sponges, Macroalgae, and Hydrozoan)
- Mixed assemblage with seagrass (sparse Seagrass, Sponges, Macroalgae, and Hydrozoan)

The benthic cover was found to be generally sparse to low across more than 95 per cent of the study area. Small areas of low to medium-density mixed assemblage habitat were typically found on consolidated or semi-consolidated substrate generally in shallow water and/or in the intertidal zone and mostly along the shoreline. Areas of mixed assemblage with seagrass were found in slightly deeper water (>3 m) generally in areas with coarse sediment substrate. All habitats identified within LAUs are considered to be widespread across the turbid nearshore

environments of the Pilbara region and did not represent conservation significant habitat (Teal et al, 2019b).

In the vicinity of the development envelope mixed assemblage habitat were present on low profile reefs and patches of very sparse ephemeral seagrass on sand were also observed. Sparse seagrass communities were observed in the vicinity of the Project area, and in the coastal LAU to the west. Survey work also observed corals occurring in proximity of the Proposal's development envelope.

3. APPENDIX 3 – ABBREVIATIONS AND ACRONYMS

ACRONYMS/ABBREVIATION	DESCRIPTION
ALARP	As low as reasonably practicable
BC Act	Biodiversity Conservation Act 2016
BCH	Benthic Community Habitat
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
DAWE	Department of Agriculture Water and the Environment
DEMP	Dredge Environmental Management Plan
DMP	Construction Dust Management Plan
DoT	Department of Transport
EMMP	Environmental Monitoring and Management Plans
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	Environmental Protection and Biodiversit y Conservation Act 1999
EPOs	Environmental Protection Outcomes
ha	Hectares
HEPA	High Level of Ecological Protection
IMP	Introduced marine pests
IMS	Incident management system
JDAP	Joint Development Assessment Panel
km	Kilometres
MEER	Maritime Environmental Emergency Response
MEPA	Moderate Level of Ecological Protection
MEQP	Marine Environmental Quality Plan
MNES	Matters of National Environmental Significance
MTs	Management Targets
OEMP	Operational Environmental Management Plan
PASS	Potential Acid Sulphate Soils
PMST	Protected Matters Search Tool
POLREP	Pollution Report Form
PPA	Pilbara Ports Authority
SMMP	Surplus Materials Management Plan
The Proposal	Port Hedland Spoilbank Marina
ToPH	Town of Port Hedland

ACRONYMS/ABBREVIATION	DESCRIPTION
TMP	Traffic Management Plan
VTSC	Vessel Traffic Services Centre
Yacht Club	Port Hedland Yacht Club
ZoHI	Zone of High Impact
ZoI	Zone of Influence
ZoMI	Zone of Moderate Impact

4. APPENDIX 4 - REFERENCES

Management Plans

DOCUMENT TITLE	DATE	VERSION	AUTHOR	DOCUMENT PREPARED FOR
Marine Environmental Quality Plan (Operational)	21/01/2021	Rev 2	Teal Solutions and O2 Marine	Department of Transport
Port Hedland Spoilbank Marina: Dredging Environmental Management Plan	12/11/2021	Rev 8.1 Final	O2 Marine	Pilbara Ports Authority
Port Hedland Spoilbank Marina Construction Dust Management Plan	01/06/2021	Final Version 1	Environmental Technologies & Analytics	Department of Transport in conjunction with Pilbara Ports Authority
Surplus Materials Management Plan	23/02/2021	59723/132783 Rev 0 - Final	JBS&G	Pilbara Ports Authority
Cultural Heritage Management Plan	01/01/2020	Version 4	Pilbara Ports Authority	Pilbara Ports Authority
Traffic Management Plan	23/12/2020	Draft	Pilbara Ports Authority	Pilbara Ports Authority
Coastal Hazard Risk Management and Adoption Plan	15/4/2020	Draft A	Rogers & Associated	Department of Transport

References

Bamford Consulting (2019) Technical Memo – Assessment of Potential Impacts upon Migratory Waterbirds, report prepared for Department of Transport

Bennelongia Environmental Consultants (2011) Port Hedland Migratory Shorebird Survey Report and Impact Assessment, report prepared for BHP Billiton Iron Ore

DEC (2011) Guidelines for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and Other Related Activities, Department of Environment and Conservation, West Australian Government

DoEE (2009) National Assessment Guidelines for Dredging, Commonwealth of Australia

DoEE (2019) Commonwealth's National Light Pollution Guidelines for Wildlife – including Marine Turtles, Seabirds and Migratory Shorebirds, Department of Environment and Energy, Commonwealth Government of Australia

EPA (2010) Environmental Assessment Guideline No. 5 Protecting Marine Turtles from Light Impacts, Environmental Protection Authority, West Australian Government

EPA (2016a) Environmental Factor Guideline – Marine Fauna, Environmental Protection Authority, West Australian Government

EPA (2016b) Environmental Factor Guideline – Marine Environmental Quality, Environmental Protection Authority, West Australian Government

EPA (2016c) Technical Guidance – Protection of Benthic Communities and Habitats, Environmental Protection Authority, West Australian Government

EPA (2018) Statement of Environmental Principles, Factors and Objectives, Environmental Protection Authority, West Australian Government

Morgan D.L., Whitty J.M., Phillips N.M., Thorburn D.C., Chaplin J., & McAuley R. (2011) North-western Australia as a hotspot for endangered elasmobranchs with particular reference to sawfishes and the Northern River Shark, 2011

Morgan D.L, Wueringer B., McDavitt M. (2019) Technical Review – Spoilbank Marina Proposal: Review of Potential Impacts to Green Sawfish, report prepared for Department of Transport.

NEPM (1999) National Environment Protection (Assessment of Site Contamination) Measure 1999 (the ASC NEPM) is made under the National Environment Protection Council Act 1994

Pendoley Environmental Pty Ltd (PENV) (2019) Technical Review – Spoilbank Marina Proposal: Review of Potential Impacts to Flatback Turtles, report prepared for Department of Transport.

RPS (2011) Environmental Constraints Summary Report, Port Hedland Spoilbank Development, Rev 0, report prepared for LandCorp.

RPS (2014a), Marine Fauna Review, Port Hedland Spoilbank Development, Rev 0, April 2014, report prepared for LandCorp.

RPS (2014), Water Quality Report, Rev 0, April 2014, report prepared for LandCorp.

RPS and Pendoley Environmental (2020) Artificial Light Impact Assessment Report, report prepared for the Department of Transport Strategen (2020a) Spoilbank Marina Dust Management Plan, plan prepared for Department of Transport

Strategen (2020b) Flora and Vegetation Botanical Survey Report, report prepared for Department of Transport

Talis (2020) Underwater Noise Modelling Report, report prepared for Department of Transport

Teal Solutions and O2 Marine (2019a) Sediment Sampling and Analysis Implementation Plan, prepared for the Department of Transport

Teal Solutions and O2 Marine (2019b) Spoilbank Marina Proposal Benthic Communities and Habitat Report, prepared for the Department of Transport

Teal Solutions and O2 Marine (2020a) Spoilbank Marina Sawfish Risk Assessment, prepared for the Department of Transport

Teal Solutions and O2 Marine (2020b) Spoilbank Marina Proposal Marine Environmental Quality Plan, prepared for the Department of Transport

Teal Solutions and O2 Marine (2020c) Dredge Environmental Management Plan, prepared for the Department of Transport

Teal Solutions and O2 Marine (2020d) Spoilbank Marina Cumulative Loss Assessment, prepared for the Department of Transport

Thorburn, D.C., Morgan D.L., Rowland A.L., Gill H.S. (2007) Freshwater sawfish Pristis micridin Latham, 1794 (Chondrichthyes: Pristidae) in the Kimberley region of Western Australia.