Northern Territory
Environment Protection Authority

DIRECTION TO PROVIDE ADDITIONAL INFORMATION IN THE SER

This direction is given under regulations 119(2) and 121(2) of the Environment Protection Regulations 2020

Name of proposed action	Mandorah Marine Facilities
Proponent	Department of Infrastructure, Planning and Logistics (DIPL)
NT EPA reference	EP2022/014 Referral accepted 23 March 2022
Description of proposed action	To develop a safe, weather-resistant ferry berthing facility at Mandorah (within Lots 116 and 50, Hundred of Bray), to improve transport connectivity between the Cox Peninsula and Darwin. The proposal area would cover six hectares comprising: • northern and southern rock armoured breakwaters • dredging of an access channel, turning basin and berthing areas (15,000 m^3 of unconsolidated marine sediments, and approximately 70,000 m^3 of rock material) • a new single lane boat ramp and car park modification • floating pontoon, gangway, jetty and rock armoured access causeway, and • a ferry terminal building The proposal also includes: • offshore spoil disposal • maintenance dredging estimated to occur every 5-7 years
Nature of proposed action	Coastal and marine
Method of environmental impact assessment type	Assessment by Supplementary Environmental Report (SER)
Direction	The proponent is directed to: • address all the submissions (received in relation to the referral information) in the SER • provide additional information in the SER as detailed in **Attachment 1**
Submission period for SER	The SER must be submitted to the NT EPA within 12 months of the date of this Direction
Form	The SER must generally conform with the Web Content Accessibility Guidelines (WCAG) 2.0 Level AA and material

NOTICE OF DIRECTION

	relevant to creating accessible documents on the NT Government website
	In particular, the SER must:
	• be provided as:
	  ○ accessible PDF files that do not exceed 20 MB
	  ○ a printed copy to be displayed at the locations listed below
	• be divided into two parts:
	  ○ a main report (with summary available as separate document)
	  ○ appendices to the main report
	• have a navigable table of contents
	• present information in format that is easy to follow
	• use hyperlinks to assist with navigation through the document

Manner	The SER must be:
	• provided electronically to the NT EPA for publishing on the NT EPA webpage public register
	• published electronically on the proponent's webpage and maintained for the duration of the proposal
	• provided in printed hard copy for display at the following locations during the public consultation submission period:
	  ○ NT EPA, Level 1, Arnhemica House, 16 Parap Road, Parap
	  ○ Northern Territory Library, Parliament House, Darwin
	  ○ Environment Centre NT, Unit 3, 98 Woods Street, Darwin
	  ○ Northern Land Council, 45 Mitchell Street, Darwin

Person authorised to give direction	Dr Paul Vogel AM – Chairperson, Northern Territory Environment Protection Authority Delegate of the NT EPA under section 36 of the *Northern Territory Environment Protection Authority Act 2012*
Signature	
Date of direction	13 July 2022

Attachment 1 – Additional information requirements for the Supplementary Environmental Report - Department of Infrastructure, Planning and Logistics (DIPL) - Mandorah Marine Facilities

Environmental Factor	Comment	Additional Information Required
LAND		
Terrestrial environmental quality: Land and soils	A temporary 30,000 m^2 work area for the temporary stockpiling of dredge spoil (rock) is proposed, and the disturbed area will be rehabilitated when the site is no longer required. At most, 70,000 m^3 of rock will be stored at the site, of which approximately 28,000 m^3 will be reused locally for construction of breakwaters. Saline and sediment laden run-off from dredge spoil has the potential to contaminate the soils in the storage area and surrounding environment. The Referral has not assessed the potential impacts from soil salinisation, and how this may influence the rehabilitation of this area.	Provide further information that demonstrates: 1. There is a plan for the rehabilitation and closure of disturbances that includes: • the closure objectives, and • criteria to measure success of rehabilitation.
Terrestrial ecosystems: Species of threatened and significant terrestrial fauna	A temporary 30,000 m^2 work area for the temporary stockpiling of dredge spoil (rock) is proposed. It is noted that the Proponent has not assessed the terrestrial biodiversity and environmental values of this area.	Provide further information that demonstrates: 1. Clearing is consistent with the NT Land Clearing Guidelines. 2. The temporary work area is assessed for its biodiversity and environmental values in accordance with the NT EPA's hierarchies for environmental protection and management (Part 2 of the *Environment Protection Act 2019*). 3. There is ongoing monitoring and inspection/reporting of threatened species to ensure protection of environmental values. 4. Weed control is undertaken. 5. Lighting design for above water infrastructure complies with the National Light Pollution Guidelines[1] 6. The Construction Environmental Management Plan (CEMP) is revised to address the management of these issues.

[1] National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020

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SEA		
Coastal processes	The proposal will result in changes to coastal processes. There will be a modification to the existing open shoreline environment with substantial changes to currents and sediment characteristics and transport. A suite of models has been constructed for impact assessment that includes sediment transport and plume modelling supported by hydrodynamic modelling. There is uncertainty about where direct and indirect impacts are likely to occur, post-construction, as a result of altered coastal processes including accretion to the north of the facility and erosion to the south. There are information gaps regarding management of potential impacts to the beach and shoreline, and their inherent physical, ecological and cultural values. The change to conditions may have a significant impact and consequences for the beach structure and benthic community and ecosystem. To improve confidence in sediment transport and plume modelling, and hydrodynamic model outputs, results, and impact predictions, the models should be calibrated and validated, with clearly stated assumptions. Consider a peer review of the models. <u>Wave modelling</u> The hydrodynamic model and wave model have not been qualitatively or quantitatively assessed and should include robust sensitivity analysis and statistical metrics, such as Root-Mean-Square-Deviation (RSME), and average bias to demonstrate certainty of prediction and overall model performance. Model calibration should be against an appropriately representative dataset encompassing both the wet and dry season as the wind climate and forcing function for wave action in Darwin Harbour differs considerably between the wet and dry season. The combined effect of the wave regime and currents is one of the key parameters for characterising the physical environment and a	As noted by the Flora and Fauna Division of DEPWS, additional information is required to improve confidence in model outputs, results, and impact predictions, and to assess behaviour of suspended and deposited sediments. 1. Evaluate the combined effect of the current and wave regime by modelling maximum bed shear strength (the energy at the seafloor due to bottom currents), orbital velocity (wave energy at the seafloor) and their combined effects on sediment movement, deposition and re-suspension. This is missing from the referral and should be incorporated into the assessment. 2. To ensure that there is a clear understanding of the changes to hydrodynamic and wave conditions, provide a comparison of pre-development and post-development scenarios, and the net change at the appropriate spatial scale and detail for: • Current strength and direction for spring tide incoming and outgoing tides, and wave regime for wet and dry season conditions. • Bed shear stress, orbital velocity and combined effect for wet and dry season conditions. 3. Review the methodology used to determine the sediment budget, and revise inputs so that sediment movement is modelled with a high degree of confidence. Consider the use of sediment tracers coupled with a standard suite of conventional hydrographic survey techniques. 4. In addition to modelling the shoreline sediment transport of coarse sand, also include sediment transport of finer sediments (sandy muds and muds), which are more likely to impact lower intertidal and shallow subtidal environments that support benthic primary producer habitats. 5. Ensure that the models are constructed, calibrated and validated in order to assess sediment behaviour, transport pathways, fate, and deposition with a high degree of confidence. 6. Review and update the Dredge and Spoil Disposal Management Plan (DSDMP). 7. Consider a beach management plan for maintenance and bypass operations. 8. Apply the research and resources developed by WAMSI under the NESP Dredging node: Dredging Science Program – Western Australian Marine Science Institution (wamsi.org.au).

Environmental Factor	Comment	Additional Information Required
	driver for the distribution of sediments and occurrence of benthic communities. <u>Sediment transport model</u> The proponent has developed a non- calibrated and unvalidated sediment transport model with outputs that indicate net sediment transport is in a southerly direction, and estimated to be between 2,000 and 20,000 m^3/year. The modelling also shows that beach nourishment (accretion) will occur to the north of the project and beach erosion will occur to the south and that it will take approximately 11 years for sediment to bypass the development. The Flora and Fauna Division of DEPWS has concerns around the sediment transport model's ability to accurately estimate the volume of sediment transported for wet season and dry season conditions. Revisions to the model are required to improve confidence in predictions, and to better understand and evaluate: • Transport pathways, fate and deposition for both coarse and finer fractions of sediment • Likely consequences of changes to sediment transport characteristics, and • Indirect impacts to environmental and ecosystem values.	9. Apply the NT EPA's hierarchies for environmental protection and management (Part 2 of the *Environment Protection Act 2019*).
Marine environmental quality	There is a high likelihood that changes in turbidity/total suspended solids (TSS) will be significant. This is likely to be through successive, incremental, and combined sources of contamination such as run-off and the release of contaminants as a result of dredging, dredge disposal, and construction activities. Modelling was conducted to assess changes in turbidity/TSS by modelling sediment plume dispersal as a result of the dredging activities. <u>Plume modelling</u> DEPWS has noted the plume modelling was only run for the period that the cutter suction dredge and the backhoe dredge were	Additional information required: 1. Revise the site conceptual model to include all potential contamination sources (e.g. from transport, handling and stockpiling of dredged rock, and construction of breakwaters and pile-driving). 2. Improve the accuracy of the estimates of the amount of sediment deposition that will be derived from dredging induced turbidity (from operating the cutter suction dredge and the backhoe dredge), and ensure this is included in the modelling. 3. Review and revise the models to improve confidence in the evaluation of the proposal's cumulative impacts to marine environmental quality, including ensuring the sediment transport and plume models include source terms for all potential sources of contamination.

Environmental Factor	Comment	Additional Information Required
	working simultaneously. The referral estimated this duration to be about ten days. However, it is noted that the backhoe dredge is required to excavate about 70,000 m^3 at a rate of about 121 m^3/hour, which is equivalent to about 70 backhoe days of dredging, and not the stated ten days. Consequently, the time duration of elevated turbidity will be seven times longer than assumed, which may have a significant impact on the receiving environment and sensitive receptors. It follows that the accuracy of the estimates of the predicted amount of sediment deposition derived from dredging induced turbidity is questioned, and requires clarification. <u>Light availability</u> The light availability at the seafloor (which is a physical environmental parameter that drives a number of ecosystem processes) will be influenced by sediment plumes and has not been discussed in the Referral. To inform the risk assessment for benthic primary producer habitats from elevated suspended sediments, there is need to understand the changes in light intensity and duration at the seafloor. To complete the assessment there is a need to understand the turbidity/TSS and light intensity relationship, which is then coupled with the plume modelling to develop the triggers for mitigation and management actions. <u>Zone of influence, thresholds and triggers</u> Trigger values (above background) have been developed for both wet and dry seasons (Table 7-3 of the Sediment Transport Report) and assigned to the three zones of impact: high (ZoHI), medium (ZoMI) and zone of influence (ZoI), applying the 85, 90, and 95th percentiles respectively. In all three case the TSS concentrations of 11 Mg/L during the dry season and 49 Mg/L in the wet is applied. It is noted that: • the zone of influence should be at the lower end of the percentile range, and not the higher	4. Establish the turbidity/TSS and light intensity relationship, and apply this to develop the appropriate triggers for mitigation and management actions. 5. Review and update the DSDMP, and the CEMP for the Proposal. 6. Apply the NT EPA's hierarchies for environmental protection and management (Part 2 of the *Environment Protection Act 2019*).

Environmental Factor	Comment	Additional Information Required
	• TSS concentrations for each of the impact zones cannot be the same for each percentile classes (as in Table 7-2) • the severity of the impact is solely dependent on TSS values, rather than the combined effect of sediment deposition and TSS values • the derived layer for light availability at the seafloor should be included in the derivation of the impact zones/thresholds. The derivation of the triggers informs and influences the DSDMP, and the CEMP for the Proposal.	
Marine ecosystems	<u>Benthic habitat</u> Benthic primary producer habitats and filter feeder habitats can be impacted by suspended sediment through three primary cause effect pathways: • light reduction • increased suspended sediment concentrations, and • sediment deposition (smothering). It is critical that appropriate triggers discussed above are appropriately developed to minimise risk to these habitats, and it is recommended best practice that the proponent inform the approach using the research and resources developed by WAMSI under the NESP Dredging node: Dredging Science Program – Western Australian Marine Science Institution (wamsi.org.au). As part of the site selection process and risk assessment for the disposal of dredged material into the water column, a benthic survey using video was conducted to verify the modelled benthic habitat data and mapping/presence of sensitive receptors e.g. seagrass, coral, macro algae communities. Additionally, the preferred disposal site is in close proximity to the occurrence of subtidal rocky reefs, which generally are high biodiversity areas. In contrast, the spoil disposal site has been:	Additional information required: 1. Review and revise the modelling of the zones of impact, and the risk assessment for dredge spoil disposal and site selection. 2. Demonstrate that the site selection process is robust, and the potential impacts to marine ecosystems from the disposal of dredge material are acceptable. 3. Provide a seagrass health monitoring program which includes assessing environmental conditions such as light availability at the seafloor, sedimentation rates, wave and current energy. 4. Provide a plan for monitoring dugong movement patterns along the western side of Darwin Harbour. 5. Review and revise the DSDMP and include provisions for management, monitoring, and reporting of seagrass and dugong. 6. Provide an assessment of the potential direct, indirect and cumulative (successive, incremental, and combined) impacts from the existing, ongoing and proposed dredging and dredge disposal activity. 7. Apply the NT EPA's hierarchies for environmental protection and management (Part 2 of the *Environment Protection Act 2019*).

Environmental Factor	Comment	Additional Information Required
	• located outside and adjacent to the benthic survey area, and critically i.e. located outside the area of ground-truthing • located based on modelled data, rather than verified habitat data, and • located in close proximity to subtidal rocky reefs, which generally are high biodiversity areas. <u>Seagrass meadows</u> Seagrass meadows on the western side of Darwin Harbour are not extensive, compared to the eastern side, and are only known to occur in small areas, (e.g. between Weed Reef and Stokes Point, the mouth of Woods Inlet, Mandorah, and some small patches between West Point and Charles Point). However, these meadows may assist dugong movement between Darwin Harbour and Bynoe Harbour and the loss of seagrass habitat within the zone of influence could influence feeding dugong and hinder movement. The potential loss or decline in health of seagrass on the western side of Darwin Harbour could be considered significant. <u>Cumulative impacts</u> There are a number of existing, ongoing and proposed dredging and dredge disposal activities in Darwin Harbour that includes the Mandorah Marine Facilities, with potential significant impacts to the environmental values of Darwin Harbour and the Beagle Gulf.	