Assessment Report 103

Assessment by supplementary environmental report

Department of Defence

HMAS Coonawarra - Dredging and Dredged Material Management

August 2023

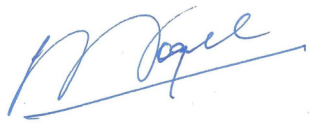
ntepa Northern Territory Environment Protection Authority

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act). It describes the outcomes of the NT EPA's assessment of the HMAS Coonawarra - Dredging and Dredged Material Management proposed action.

The proposed action is to carry out two capital dredging campaigns of approximately 100,000m^3 and 120,000m^3 as part of upgrades to the Royal Australian Navy wharf facilities and basin navigation area at HMAS Coonawarra. Dredged material would be discharged to the marine environment at a location near HMAS Coonawarra, Darwin. The proposed action includes ongoing maintenance dredging at HMAS Coonawarra in the order of 10,000m^3 to 15,000m^3 every 5 to 7 years. The NT EPA's method for assessment of the proposed action is by supplementary environmental report.

The assessment report documents potential environmental impacts and risks identified during the environmental impact assessment process, focusing on those that could be significant, and the measures and recommended conditions required to address potentially significant impacts.

In accordance with section 65 of the EP Act, the assessment report is for the Northern Territory Minister for Environment to consider when making a decision about whether to approve the action under the EP Act.



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23 August 2023

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Important Disclaimer

Summary

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (EP Act). This assessment report and the draft environmental approval are provided to the Minister for Environment, Climate Change and Water Security (Minister) for consideration in deciding whether to grant an environmental approval for the HMAS Coonawarra Dredging and Dredged Material Management (proposed action).

The proposed action is located at HMAS Coonawarra at Larrakeyah on the eastern shore of Darwin Harbour, about 2 km northwest of the Darwin central business district. The Australian Government Department of Defence (proponent) proposes two capital dredging campaigns to provide all-tide navigation access of the existing HMAS Coonawarra Fremantle Wharf basin and a proposed future Eastern Wharf facility for new, deeper draft Australian naval vessels. Dredging for the proposed new Eastern Wharf facility would be undertaken at least two to three years following dredging for the Fremantle Wharf. Maintenance dredging is expected to be required once every five to seven years after capital dredging works are complete.

Dredged material removed using a cutter suction dredge (soft surface sediment) would be discharged via a pipe to the marine environment, approximately 300 m southwest of the existing western breakwater, at a depth of about 5 m and over a period of 1-2 months. Dredged material removed via backhoe dredge (hard unweathered rock) over a period of about one month would be transported to settlement ponds within Darwin Port East Arm Wharf area for land-based disposal.

The proposed action would be undertaken within Commonwealth land which is not subject to Northern Territory (NT) law under section 52(2) of the Australian Constitution. The proposed action was referred to the NT EPA under the EP Act due to the potential for significant environmental impact beyond Commonwealth land, within the limits of the Territory.

The NT EPA assessed the proposed action by supplementary environmental report in accordance with the EP Act. The environmental impact assessment examined the potential for significant direct, indirect and cumulative environmental impacts on the environment.

The NT EPA identified and examined potential significant impacts on three key environmental factors:

1. Marine environmental quality
2. Marine ecosystems
3. Culture and heritage.

To address potential significant impacts of the proposed action on the key environmental factors, the NT EPA has recommended conditions for the Minister to consider in deciding whether to grant or refuse environmental approval for the proposed action. The proponent and statutory decision-makers were consulted on the draft environmental approval as required by regulation 160 of Environment Protection Regulations 2020.

The NT EPA's assessment concludes that the proposed action can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted, subject to the conditions in the draft environmental approval (Appendix 1).

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1. Introduction

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) in accordance with section 64 of the *Environment Protection Act 2019* (NT) (EP Act). It provides an evaluation of the potential significant environmental impacts of the HMAS Coonawarra Dredging and Dredged Material Management (proposed action).

The proponent is the Australian Government Department of Defence. The NT EPA carried out an environmental impact assessment by supplementary environmental report (SER) in accordance with the EP Act and Environment Protection Regulations 2020 (EP Regulations).

On completion of its assessment, the NT EPA provides this assessment report (including the draft Environmental Approval at Appendix 1) to the Minister for Environment (Minister) for consideration in deciding whether to grant environmental approval to the proponent.

1.1. Purpose

The purpose of this assessment report is:

- to assess whether the proposed action is likely to meet the environmental objectives
- to assess the potential significant environmental impacts of the proposed action
- to make recommendations for avoiding, mitigating and managing those impacts
- to advise the Minister as to the environmental acceptability of the proposed action.

The assessment report must assess the potential environmental impacts and risks of the proposed action and whether there are any significant residual impacts remaining after all reasonable measures to avoid and then mitigate and manage the risks have been taken.

2. Proposed action

2.1. Overview

The Australian Government Department of Defence (proponent) proposes to undertake dredging and dredged material disposal at HMAS Coonawarra on land parcel 5556 within the Port of Darwin, approximately 2km northwest of the Darwin central business district (**Figure 1**).

There are three key stages of the proposed action:

- Stage 1 - Capital dredging volume of 101,000 m^3 within the existing Fremantle Wharf basin scheduled to be completed over a period of 2-3 months in 2023 (**Figure 2**)
- Stage 2 - Capital dredging volume of 116,000 m^3 for a proposed future eastern wharf facility scheduled for completion within 2-3 years after Stage 1 dredging (**Figure 2**)
- Stage 3 - Maintenance dredging volume of 10,000 - 15,000 m^3 every 5-7 years after capital dredging is complete.

The key stages of the proposed action are summarised in **Table 1**. A detailed description of the proposed action is provided in section 3 of the referral report[1].

[1] available at HMAS Coonawarra - Dredging and Dredged Material Management | NTEPA

Table 1 Proposed action stages and characteristics

Phase	Stage 1 Capital	Stage 2 Capital	Stage 3 Maintenance
Purpose	Deepen existing Fremantle basin	Excavation for new eastern wharf facility	Ongoing maintenance for navigational access
Timing	2023	2 to 3 years after Stage 1 dredging	Ongoing every 5 to 7 years as required
Dredge volume	101,000 m^3	116,000 m^3	10,000 - 15,000 m^3
Duration	Daylight hours, 6 days per week, 2 to 3 months	1 to 3 months	As required

Following dredging for the new eastern wharf facility, the area will be developed for future land uses. Potential impacts associated with future development would be assessed and regulated separately to this proposed action and are therefore not considered by this assessment report. It is expected however that any future activities would need to comply and align with the overarching naval base environmental management plans.

2.2. Local context

The Larrakeyah Base is a working naval and army base established in 1932 comprising Larrakeyah Barracks and HMAS Coonawarra. HMAS Coonawarra is the main support base and homeport for navy vessels. The Base supports frequent visits of non-homeported ships conducting operations and training activities to the north of Australia. Wharf facilities at HMAS Coonawarra were originally developed in the early 1980s for smaller navy vessels, and extended in the period 2007-2008 when larger boats were introduced into service. HMAS Coonawarra does not have sufficient berth space for proposed new homeported navy vessels.

The proposed action is within HMAS Coonawarra which covers an area of about 12 ha on the south side of the base on the eastern shore of Darwin Harbour. The Larrakeyah peninsula is a flat plateau with steep cliffs and a rocky foreshore. The existing HMAS Coonawarra harbour basin is bound to the north and west by a land-backed rock revetment wall, and to the east and south by rock armoured breakwaters. The harbour entrance and navigation channel are located to the south-east. Dredging at HMAS Coonawarra has been undertaken regularly since 1980 to develop and maintain the harbour basin area.

The Darwin Harbour region is the Northern Territory's most densely populated area and supports the Territory's largest concentration of commerce and industry. Darwin Harbour is a working harbour with ongoing development and is recognised as playing an important role in the economy of the Territory. Darwin Harbour has significant environmental, cultural, social and economic values that require protection. The main marine uses of Darwin Harbour in the vicinity of the proposed action include commercial shipping, recreational boating, fishing and scuba diving, and military activities.

Darwin Harbour is a tropical harbour fringed by extensive mangroves, mudflats, reefs and seagrasses and is home to animal life such as dolphins, dugong, sea turtles, shorebirds and a large variety of fish. The harbour is a tropical macro-tidal estuary with semi-diurnal tides which reach a maximum of about eight metres, producing strong tidal movements which transport sediment within and across the harbour boundaries.

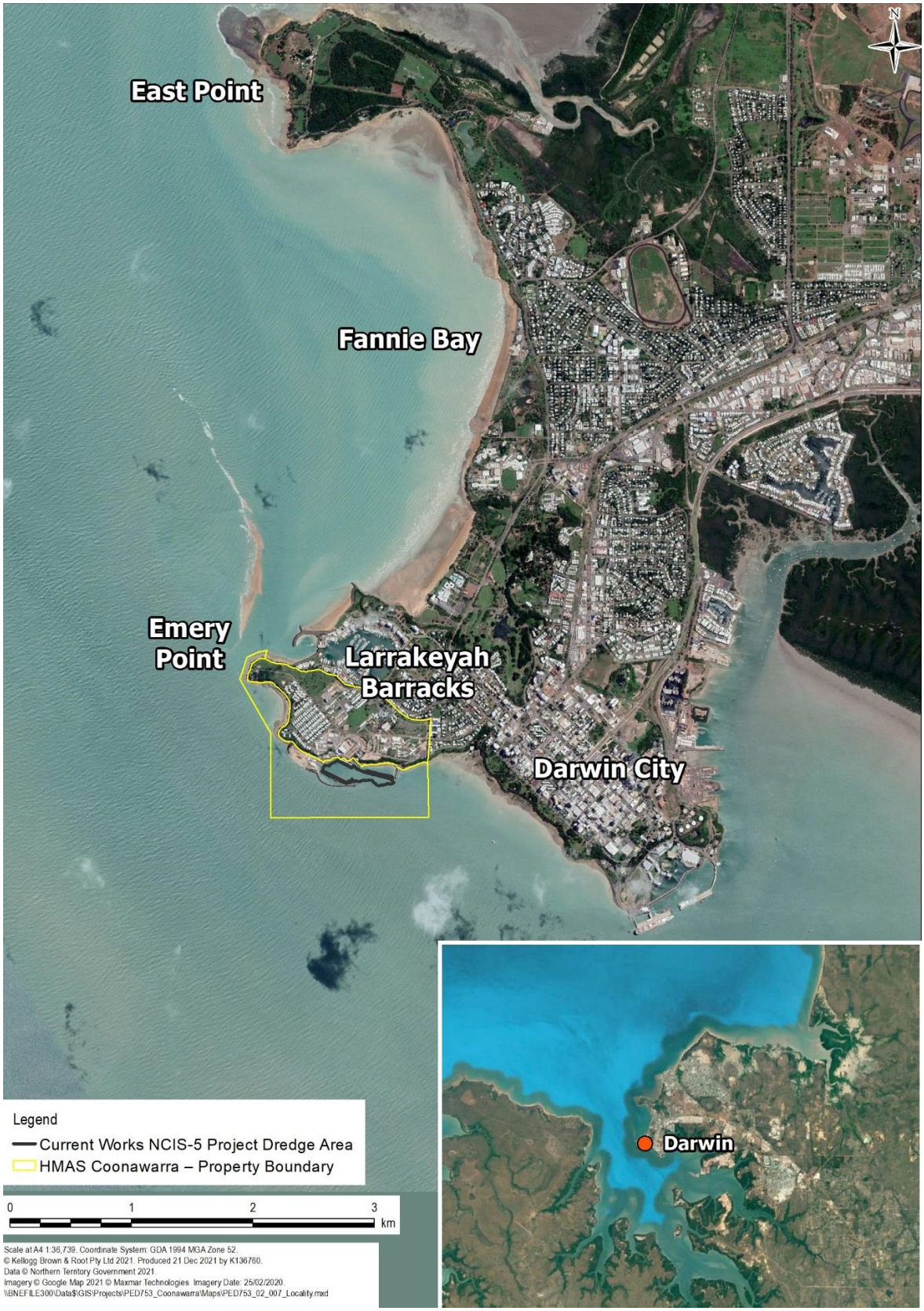

Figure 1 Proposed action location

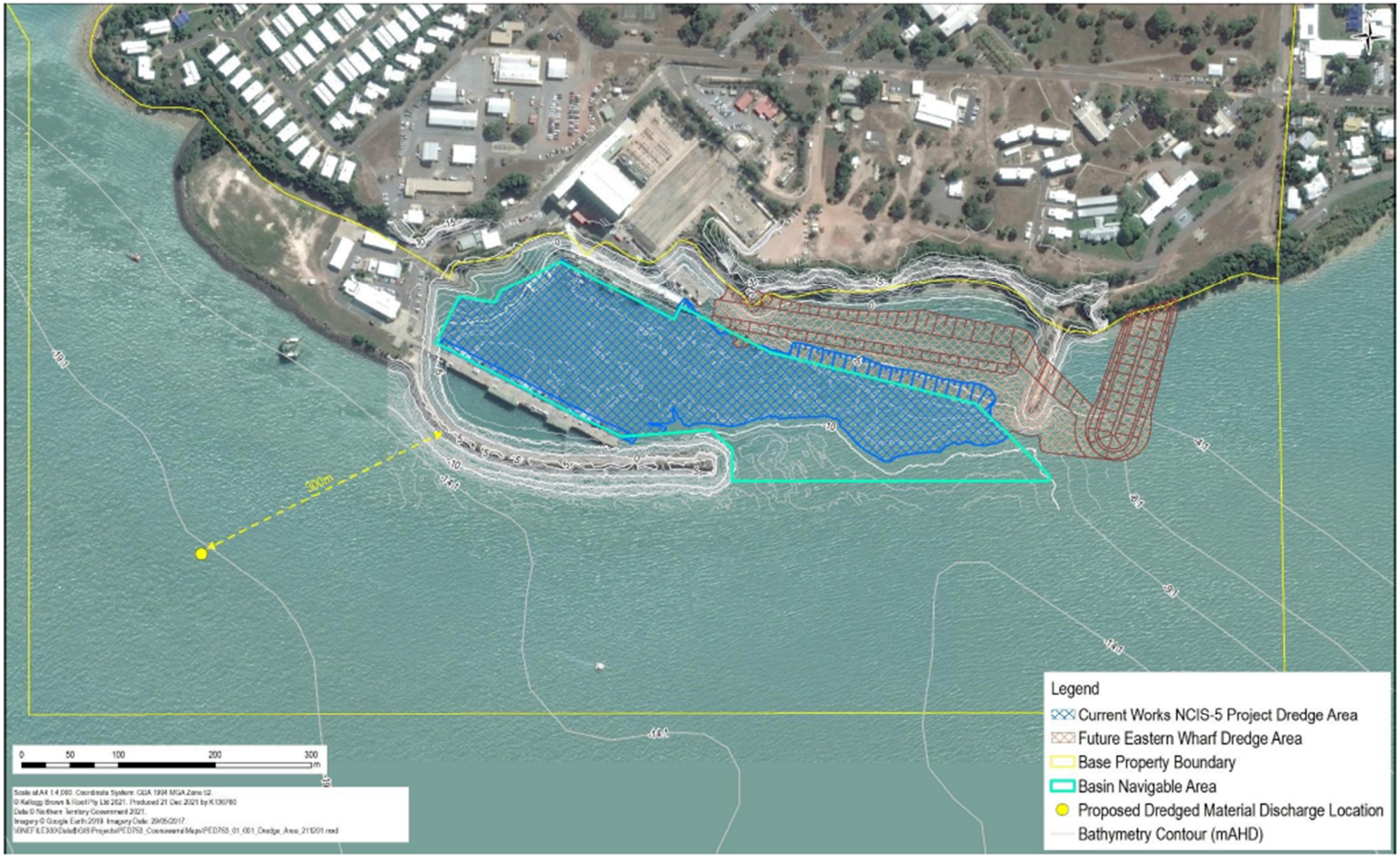

Figure 2 Proposed dredge area

3. Strategic context

The proponent needs to respond to the increasing size of navy vessels to support its operational activities. The proposed action is within the scope of the Navy Capability Infrastructure Sub-program to upgrade and construct facilities and infrastructure across Australia to support new navy capabilities and the introduction of larger navy vessels.

The proponent's primary role is to defend Australia and its national interests, promote security and stability, and support the Australian community as directed by the Australian Government. The strategic justification for the proposed action is established in the Australian Government's 2020 Lead the Way: Defence Transformation Strategy and the Defence Strategic Review 2023.

The proposed action is consistent with NT Government strategies and policy including the Northern Territory Defence and National Security Strategy 2018 and NT Infrastructure Strategy.

3.1. Proposed action benefits and alternatives

The referral indicates that the proposed action is critical to the introduction of the new Arafura Class Offshore Patrol Vessel (ACOPV), with the proposed dredging allowing the new vessels to access and navigate the basin area. The referral also indicates that there is the need for additional berthing facilities and that an Eastern Wharf development is likely to be required in the future to provide additional basin capacity and the ability to homeport an increased number of larger vessels.

Consideration was given to potential alternative options to the proposed action, as was a "no action" option. The most feasible option for dredging to allow HMAS Coonawarra to accommodate ACOPVs and continue its required operations was found to be the dredging method and material management as proposed in the referral and SER.

4. Statutory context

The proposed action requires assessment by the NT EPA under the EP Act. The NT Minister for Environment, Climate Change and Water Security is the approval authority.

The proposed action would be undertaken within Commonwealth land which is not subject to Northern Territory (NT) law under section 52(2) of the Australian Constitution. The proposed action was referred to the NT EPA under the EP Act due to the potential for significant environmental impact beyond Commonwealth land, within the limits of the Territory.

If an environmental approval under the EP Act is granted, it will prevail over other NT statutory authorisations that the proponent is required to obtain. It is the responsibility of the proponent to obtain all relevant statutory authorisations.

4.1. Mandatory matters for consideration

In preparing this assessment report, the NT EPA considered the referral information, the SER, and submissions received on the referral information and the SER, in accordance with regulation 157 of the EP Regulations:

In carrying out its assessment, the NT EPA took into account the purpose of the environmental impact assessment process under section 42 of the EP Act including consideration of:

- the objects (EP Act, section 3)
- the principles of ecologically sustainable development (EP Act, Part 2 Division 1)

- the environmental decision-making hierarchy (EP Act section 26)
- the waste management hierarchy (EP Act section 27)
- ecosystem-based management
- impacts of a changing climate.

Refer to section 8 of this report for further detail about matters that the NT EPA has taken into account during its assessment.

5. Consultation

The NT EPA invited public and government authority comment on the proponent's referral information during the consultation period from 13 April to 16 May, 2022. Submissions from seven government authorities were received. No public submissions were received.

The NT EPA considered the accepted referral information and submissions received, and on 12 July 2022 decided that the proposed action would require an assessment by SER under the EP Act.

The NT EPA invited public and government authority comment on the proponent's SER during the consultation period from 2 May to 5 June, 2023. Submissions from two government authorities were received. No public submissions were made.

In preparing this assessment report, matters raised in the submissions were considered in relation to the potential significant environmental impacts of the proposed action. The issues raised in submissions are discussed in section 6.

The NT EPA consulted with the proponent and the Development Consent Authority on the draft environmental approval in line with EP Regulation 160. One submission was received from the proponent and this was considered by the NT EPA in finalising its advice and recommendation to the Minister.

The proponent conducted its own consultation in relation to the proposed action as detailed in section 4.6 of the referral report, and delivered presentations about the referral and the SER to NT government authorities in May 2022 and May 2023.

The consultation process has been appropriate and reasonable steps have been taken to inform and consult with the community and stakeholders about the potential impacts and benefits of the proposed action. Relevant significant environmental issues identified from this process were taken into account by the NT EPA during its assessment of the proposed action.

6. Assessment of key environmental factors

6.1. Overview

The NT EPA identified that the proposed action has the potential to have a significant impact on environmental values associated with three key environmental factors[2] (**Table 2**).

[2] NT EPA Environmental factors and objectives

Table 2 Key environmental factors

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
SEA	Marine ecosystems	Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
	Marine environmental quality	Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.
PEOPLE	Culture and heritage	Protect culture and heritage.

The NT EPA considered other environmental factors during its environmental impact assessment; however, the impact on those factors was not considered to be significant.

6.2. Marine ecosystems and marine environmental quality

6.2.1. Environmental values

The proposed action has the potential to impact a range of marine environmental values including water quality values, sensitive receptors such as benthic communities and protected marine megafauna in Darwin Harbour. This section evaluates the potential impacts associated with the potential changes to marine water quality and the mitigation and management measures proposed in the SER.

The proposed action is located at the HMAS Coonawarra navy base on the eastern shore of Darwin Harbour, a naturally turbid deep water Port. The Elizabeth, Blackmore and Darwin River catchments, and the minor catchments of West Arm and Woods Inlet, discharge to Darwin Harbour. During wet season storm events, these and other smaller river systems deliver sediments, dissolved metals and nutrients to Darwin Harbour and its nearshore waters.

In addition to freshwater flows, the turbidity and levels of total suspended solids (TSS) within Darwin Harbour are directly influenced by tides and wind, which generate tidal currents that mobilise and transport sediments in the water column as well as stirring up sediments from the seabed. Water quality within the harbour is also heavily influenced by extreme weather events such as cyclones and flooding, which typically increase the occurrence of nutrients and contaminants, and increase the temperature, salinity and pH of the water.

Despite significant changes to Darwin coastal areas as a result of urban, industrial and port development, Darwin Harbour supports a broad range of significant marine ecological values and functions and is recognised a site of conservation significance for the Territory. Particularly notable marine ecological values supported by Darwin Harbour include:

- a wide diversity of marine habitat types including intertidal beaches, mangrove forests, salt marshes, intertidal shoals, subtidal soft sediment habitats, rocky reefs and coral reefs
- local seagrass meadows at Casuarina Coastal Reserve, Mindil Beach, Fannie Bay and West Arm
- well-developed hard coral communities of significant biodiversity value at Channel Island, Wickham Point, Weed Reef and South Shell Island
- habitats for a range of fish and shellfish species of direct economic significance
- significant feeding areas for marine turtles, dugongs and dolphins, which are listed as threatened or migratory under Commonwealth and/or Territory legislation
- habitat for a range of other threatened or otherwise listed marine megafauna species, including whales and sharks protected under Commonwealth and/or Territory legislation.

Marine water quality is an important environmental asset in Darwin Harbour and its surrounds due to the presence of a number of ecological receptors that are sensitive to variations in water quality conditions. Catchment land use, wastewater discharge, coastal industry, shipping and related activities over recent years have resulted in elevated levels of nutrients and other contaminants in some places, particularly from wastewater discharge into creek estuaries. However, past water quality monitoring programs undertaken in Darwin Harbour have found the overall water quality in Darwin Harbour is very good to excellent.

Marine sediments in Darwin Harbour, particularly in the vicinity of port infrastructure and shipping channels, have a history of regular disturbance from dredging and dredged material management activities. Naturally high suspended sediment occurs at times in Darwin Harbour, varying widely with tides, season and location.

In the vicinity of the proposed action, low percent cover (typically <10%) sponge dominated filter feeder benthic communities and some soft corals occur within the predicted zones of impact and influence. The proponent's benthic surveys found that the diversity and spatial extent of soft corals was limited, which is consistent with previous studies which have shown that Darwin Harbour has a relatively low diversity of sea whips and other soft corals, with their poor representation attributed to natural influences such as turbidity, sedimentation, light availability, wave and flow exposure and steepness of reef that control the abundance of soft corals.

Filter feeder communities, such as those within the proponent's survey area, are widespread and well represented within the harbour, occurring in areas where hard substrate is available and coral dominated communities are not established. These habitats can occur at any depth in the lower intertidal and subtidal areas and are typically patchy by nature, often forming a transition zone between hard substrates and the subtidal mud-dominated substrates.

No seagrass communities were identified by the proponent within the predicted zone of impact or zone of influence, and no live seagrass/seagrass remnants or root systems were observed within Fannie Bay during the January 2023 benthic habitat survey. However, Fannie Bay has historically been known to support low density seagrass communities, with previous studies indicating that Halophila beds in Fannie Bay are ephemeral, with peak seagrass coverage more likely to be present in June and July before a decline moving into the tropical monsoon season.

Although the proponent's survey found that there is currently no evidence of seagrass occurring within the survey area, the SER noted the ephemeral nature of seagrass and results of previous field surveys where seagrass was present and acknowledged that there is the potential for seagrass to occur within this area. A submission from DEPWS on the SER provided detail on the locations in Fannie Bay and adjacent to East Point where seagrass and corals are known or likely to occur.

Approach for identifying potential impacts to environmental values

The proponent undertook a benthic habitat survey in January 2023, and considered available data from previous dredging campaigns to identify impacts to sensitive receptors that would potentially be affected by dredging activity. The survey did not account for seasonal variation of seagrass distribution, however this would be addressed through the proponent's proposed updates to the Dredging Management Plan (DMP).

A limited baseline water quality monitoring program was undertaken by the proponent for the SER in early 2023. The assessment analysed water quality conditions at a number of locations within and surrounding the proposed action to both understand the current condition of marine water quality within the Harbour and to determine how the proposed action could potentially change marine water quality during dredging.

The baseline water quality data collected by the proponent was used to develop Water Quality Objectives (WQOs) and turbidity trigger levels for the proposed action. These will be used to monitor when and how the proposed action is influencing marine water quality and to determine appropriate management and/or mitigation strategies in response.

Baseline water quality monitoring data was also used by the proponent to undertake modelling of the proposed action's potential impacts during capital dredging works and dredge material disposal. Hydrodynamic and suspended sediment transport modelling was undertaken to quantify the extent, magnitude and dispersion of predicted sediment plumes that would be generated during dredging and disposal. Modelling was undertaken for dry season (**Figure 3**) and wet season (**Figure 4**) scenarios.

The proponent adopted an impact zonation approach, including zone of high impact, zone of low to moderate impact and zone of influence, to predict and map the extent of sediment plume impacts on sensitive receptors. The SER predicted that the initial dredging works would result in a large zone of influence and relatively small zone of low to moderate impact. Based on the figures in the SER, the zone of high impact would occur only within a small area immediately adjacent to the dredge and disposal locations, while a larger zone of low to moderate impact would extend towards the northwest and southeast. The zone of influence would extend beyond the dredge area for about 9 km to the north and about 5 km to the south.

Sediment sampling and analysis was carried out in accordance with the National Assessment Guidelines for Dredging (NAGD) to determine the physical and chemical characteristics of the sediment within the dredge area and to confirm suitability for the proposed dredging and marine disposal. Sediment samples were analysed for a range of parameters including metals, total recoverable hydrocarbons (TRH), total petroleum hydrocarbons (TPH), benzene, toluene, ethyl benzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs) and phenols, organochlorine (OC) and organophosphorus (OP) pesticides, tributyltin (TBT), acid sulphate soils (ASS), total organic carbon and nutrients, and per- and poly-fluoroalkyl substances (PFAS).

Traces of TBT were detected in eight of the 34 samples analysed across the dredge area, with two samples, collected at locations SD005 and SD013, showing normalised TBT (as Sn) concentrations above the NAGD screening level of 0.009 mg/kg. However, laboratory analysis results, and assessment against the criteria in the NAGD confirmed that all dredge material is considered suitable for unconfined sea disposal.

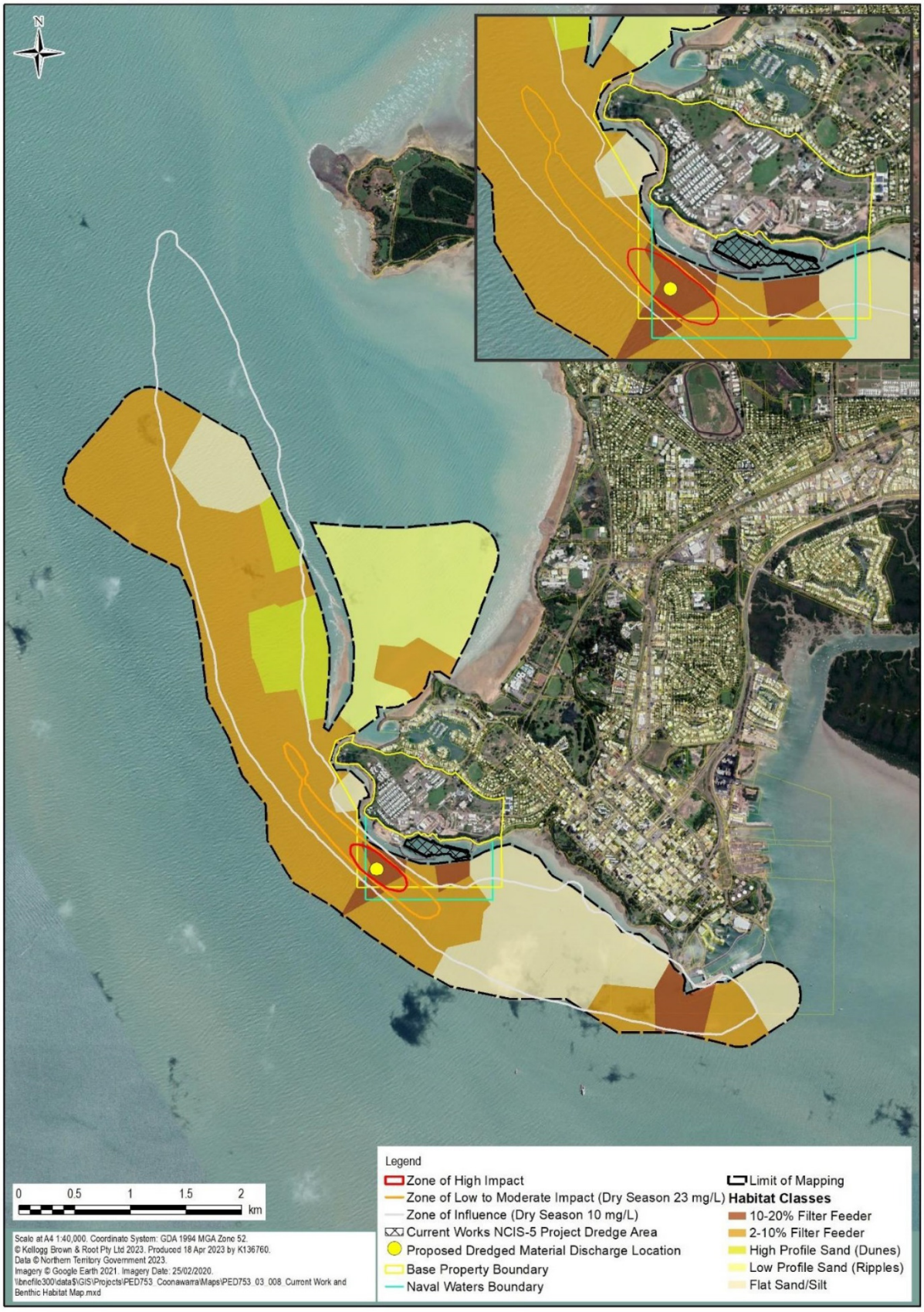

Figure 3 Benthic habitats within the 90th percentile suspended sediment concentration zones of impact and influence (includes 3 mg/L background – dry season)

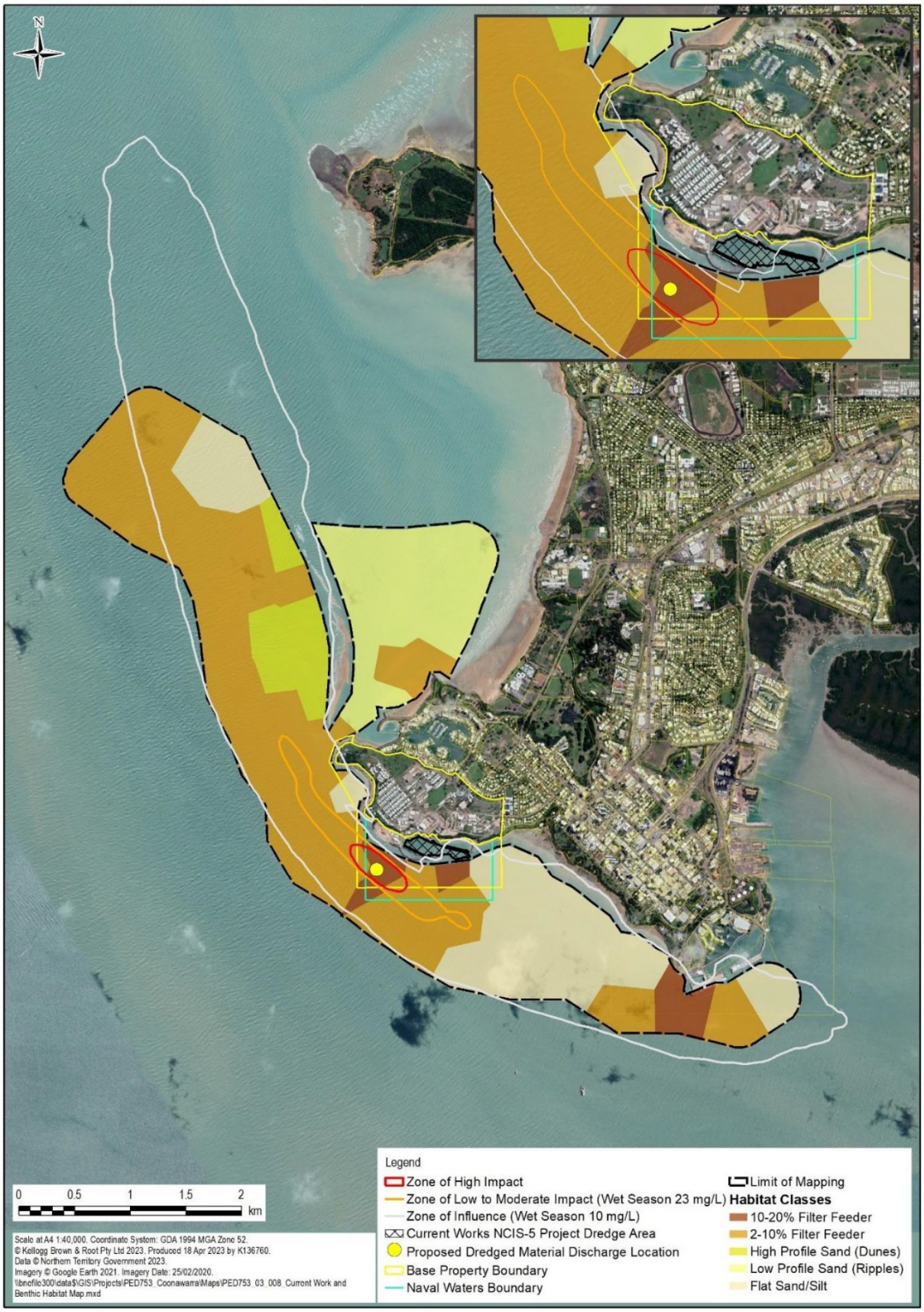

Figure 4 Benthic habitats within the 90th percentile suspended sediment concentration zones of impact and influence (includes 5 mg/L background – wet season)

6.2.2. Consultation

The submissions on the referral information raised the following key issues in relation to marine ecosystems and marine environmental quality:

- a recommendation that dredging is undertaken during the wet season where practicable, as it has relatively less impact on environmental windows and life cycle stages of sensitive receptors
- concern about the timing, accuracy and reliability of the January 2023 benthic habitat survey due to naturally turbid conditions and limited ability to identify benthic biota
- the highly variable spatial and temporal distribution and cover of macroalgae and seagrass between seasons and potential for presence within the predicted zones of influence and impact
- the adequacy of the proponent's survey for coral communities in the vicinity of East Point Fish Reserve and Bullocky Point
- the need for improved understanding of baseline conditions to inform management and mitigation actions that would be implemented during dredging
- recommendations to establish TSS characteristics and the relationships between TSS and turbidity (nephelometric turbidity units) and photosynthetically active radiation (PAR) to manage dredging impacts
- concern about the design of the proponent's monitoring program, recommendations for telemetered monitoring of light availability as PAR, turbidity and depth/pressure, and the lack of an adaptive management approach to manage dredging impacts
- the location of proposed additional monitoring sites at Bennett Shoal and Cullen Bay sites to determine impacts to sponge/filter feeder and seagrass habitats
- concern about the proponent's methods for delineation of the predicted zones of influence and impact, application of proposed trigger values, and consideration of sensitive environmental windows.

The NT EPA considered the submissions and the responses provided by the proponent in its assessment of the proposed action.

6.2.3. Factor assessment and recommended regulation

In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor objectives, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings, recommendations, and recommended conditions of approval are presented in Table 3.

Table 3 Assessment for Marine ecosystems and Marine environmental quality, and recommended conditions

Potentially significant impact	Avoidance and mitigation of impacts	Residual impact to environmental value	Assessment findings	Recommended conditions and regulation by other statutory decision-makers
Marine ecosystems and marine environmental quality Benthic communities have the potential to be impacted through: • direct dredging impacts (habitat removal or alteration) • indirect dredging impacts due to increased turbidity, suspended sediment, deposited sediment and reduced light availability • cumulative impacts of dredging over time and/or in combination with other actions.	The proponent undertook the following actions: • survey and mapping of benthic communities in the zone of influence • applied the environmental decision-making hierarchy to determine the location for dredged material disposal • categorised the predicted impact area into zones of impact (high and low to moderate impacts) and influence, utilising site specific baseline data • prepared a DMP for implementation, drawing upon scientific literature and site-specific data: NCIS-5 HMAS Coonawarra Draft Dredging and Disposal Management Plan (PED752-005-TD-EV-0004	Direct irreversible impacts to the structure, composition and distribution of benthic communities within the areas directly affected by dredging. In the vicinity of the dredged material discharge location and adjacent zones of impact and influence, minor, temporary impacts to benthic habitat within the zones of influence are expected.	The NT EPA's assessment found: • the proposed action would result in a permanent loss of benthic communities, comprising low density (<10%) sponge dominated filter feeders with some soft corals, in the zone of high impact. • the benthic communities within the dredge area have been previously disturbed and represent a relatively small proportion of similar habitats in Darwin Harbour. • the 2023 benthic survey conducted by the proponent did not account for temporal/seasonal variation in the distribution of sensitive receptors near Fannie Bay and East Point, therefore additional monitoring is proposed in line with the DMP. • benthic communities within the zone of influence and zone of low to moderate impact would likely be	Regulated through recommended conditions: • **Condition 1: Limitations and extent -** limit the extent of dredging and disposal of dredged material. • **Condition 2:** Implementation of the action to achieve environmental objectives including no material environmental harm benthic habitats and communities. • **Condition 3: Marine ecosystems and marine environmental quality** o update and implement DMP o monitor water quality prior to and during dredging o re-evaluate turbidity triggers prior to dredging and apply during dredging.

Potentially significant impact	Avoidance and mitigation of impacts	Residual impact to environmental value	Assessment findings	Recommended conditions and regulation by other statutory decision-makers
	Rev. 3 dated 26 April 2023) (DMP). The DMP includes : • triggers and management actions to protect sensitive receptors • a reactive water quality monitoring program to ensure water quality is maintained below levels at which adverse effects on sensitive receptors may occur • use of monitoring data from initial capital dredging to inform the refinement of modelled predictions and triggers for future dredging campaigns.		protected from significant impact through implementation of the proposed triggers and management response actions. • water quality monitoring is required to detect impacts and verify modelled predictions • data collected during the initial capital dredging campaign is required to inform management actions during future campaigns • monitoring data would also contribute to the detection of cumulative impacts and thereby improve understanding and management of Darwin Harbour, ideally applied through a harbour-wide dredging strategy (see section 8) • if subject to the recommended conditions in Appendix 1, the impacts are considered to be insignificant.	**Condition 7 – Environmental performance reporting** Upon completion of capital and maintenance dredging, the proponent must report to the Minister detailing the environmental performance of the action and the compliance status of the DMP.
Marine megafauna Protected marine megafauna individuals such as dugongs, turtles and dolphins have the potential to be impacted through:	The proponent proposed the following measures to avoid and/or mitigate impacts: • marine megafauna observation in the zones of impact and influence to avoid vessel strikes • apply observation (<100 m) and response (<50 m)	• Potential impacts on marine fauna from vessel strikes, and entrainment. • Temporary changes in	The NT EPA's assessment found: • local marine megafauna may experience direct effects within the dredge area, however this would be managed through the proposed marine megafauna observation procedures	Regulated through recommended conditions: • **Condition 2:** Implementation of the action to achieve environmental objectives including minimising risks to marine megafauna

Potentially significant impact	Avoidance and mitigation of impacts	Residual impact to environmental value	Assessment findings	Recommended conditions and regulation by other statutory decision-makers
• injury or death due to direct impact, collision or entrainment during dredging activity • artificial light and underwater noise related to dredging activity.	approach distances from vessels during dredging • temporarily ceasing dredging if response trigger activated • scheduling work activities during day light hours and adhering to lighting design principals outlined in the National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds 2020, in order to minimise impacts from artificial lights.	marine fauna behaviour from noise emissions and light attenuation • Marine megafauna impacts would be managed such that no significant residual impacts are expected.	• Fannie Bay to the north of the proposed action, has previously been a known site for seagrass to occur, although none was identified during the proponent's surveys, there is potential for seagrass to be present within, or adjacent to, the zone of influence • implementation of a comprehensive monitoring and action plan will minimise the impacts on marine megafauna • the environmental outcome is likely to be consistent with the NT EPA's objective for marine ecosystems, subject to implementation of the marine megafauna observation procedure in the DMP.	• **Condition 3: Marine ecosystems and marine environmental quality** o implement DMP incorporating marine megafauna observation procedures o apply observation and response triggers during dredging.

6.2.4. Conclusion against the NT EPA objective

Implementation of the DMP prior to, during and after dredging in accordance with the recommended conditions will ensure that significant impacts from dredging are avoided.

With the implementation of the proponent's proposed management measures, commitments, recommendations, and conditions for avoidance, monitoring, and mitigation of impacts identified in the draft environmental approval (Appendix 1), the NT EPA considers that the proposed action can be conducted in such a manner that its objectives for marine ecosystems and marine environmental quality are likely to be met.

6.3. Culture and heritage

6.3.1. Environmental values

The proposed action has the potential to impact a declared heritage place known as the WWII Degaussing Range within the restricted waters of the Larrakeyah Naval Base, about 300 m to the southeast of the proposed dredge area (**Figure 5**).

6.3.2. Consultation

The submissions on the referral information raised the following key issues in relation to culture and heritage:

- there is a declared heritage place known as the WWII Degaussing Range within the restricted waters of the Larrakeyah Naval Base located approximately 300 m southeast from the edge of the proposed dredge area (Figure 5); while it is unlikely to be impacted by the proposed action, it is worth noting its position in relation to the future eastern wharf capital dredging campaign
- the dredge area and discharge location are at least 450 m from the nearest sacred site (Kulndal; site 5073-2) protected under the *Northern Territory Aboriginal Sacred Sites Act 1989* (Sacred Sites Act).

6.3.3. Factor assessment and recommended regulation

The NT EPA considers that potential significant impacts to cultural heritage can be appropriately avoided through statutory provisions under the *Heritage Act 2011* (NT) and *Underwater Cultural Heritage Act 2018* (Cth). In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor and objective, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings, recommendations, and conditions of approval are presented below in **Table 4**.

Figure 5 Location of declared heritage place WWII Degaussing Range adjacent to the proposed action

Table 4 Assessment for Culture and heritage and recommended conditions

Potentially significant impact	Avoidance and mitigation of impacts	Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Damage to: • declared heritage place under the *Heritage Act 2011* (WWII Degaussing Range) • sacred site (Kulndal site 5073-2) protected under the Sacred Sites Act.	The proposed action is not anticipated to cause significant impact to sites that are protected under the Heritage Act or Sacred Sites Act.	Potential impacts to culture and heritage would be avoided so that there is no residual impact.	The environmental outcome is likely to be consistent with the NT EPA's objective for this factor, subject to limitations on the approved extent of the proposed action.	Regulation through recommended conditions: • **Condition 1: Limitations and extent** Condition to limit the extent of dredging and disposal of dredged material.

6.3.4. Conclusion against the NT EPA objective

With the implementation of the proponent's proposed management measures, commitments, recommendations, the conditions for avoidance, monitoring, and mitigation of impacts identified in the draft environmental approval (Appendix 1), and regulation under the *Heritage Act 2011*, the NT EPA considers that the proposed action can be conducted in such a manner that its objective for culture and heritage is likely to be met.

7. Whole of environment considerations

The NT EPA assessed the impacts of the proposed action against the key environmental factors and environmental values individually in the key factor assessments above. Given the links between marine ecosystems, marine environmental quality, and culture and heritage, the NT EPA also considered connections and interactions between them to inform a holistic view of impacts to the whole of environment.

There is a high level of interaction and connectivity between the environmental factors of marine ecosystems and marine environmental quality. Avoiding and minimising any significant turbidity effects from dredging, and therefore maintaining the quality of marine waters is also important for the protection of marine ecosystems which rely on good water quality. The NT EPA considers that by limiting the extent of dredging, and implementation of the DMP, the proponent would avoid significant environmental impacts to marine ecosystems and marine environmental quality.

There is a direct link between underwater cultural heritage and the physical or biological aspects of the environment. Areas of cultural importance including a heritage place and a sacred site objects may be affected through impacts to marine environmental quality. The NT EPA considers that the proposed mitigation and management measures and recommended conditions for impacts to marine ecosystems and marine environmental quality will mean any interrelated impacts to culture and heritage will likely be consistent with the NT EPA environmental factor objectives.

When the separate environmental factors and values potentially affected by the proposed action were considered together in a holistic assessment, the NT EPA considered that the impacts from the proposed action would not alter the NT EPA's views about consistency with the NT EPA's factor objectives as assessed in section 6.

8. Other advice

The NT EPA provides the following advice for consideration by the proponent and the Minister.

8.1. Cumulative impacts

Darwin Harbour and its surrounding catchment are recognised as significant and valuable assets for Territorians, due to the unique environmental, social and cultural values of the region. The residual impacts from this proposal, combined with potential impacts from other capital and maintenance dredging projects proposed in Darwin Harbour in the near future, may result in significant cumulative impacts to the values of Darwin Harbour if not managed carefully.

As the cumulative impacts of development in Darwin Harbour cannot be attributed to a single proposal, it is critical that a strategic, harbour-wide approach is developed and implemented. The NT Government's proposed harbour-wide dredging strategy, comprising a long-term monitoring program supported by a management and decision-making framework, is appropriate for effective long term management of cumulative impacts on the values of Darwin Harbour.

The NT EPA strongly supports such an approach and it is its expectation that the relevant Government agencies will finalise and implement the strategy as soon as possible so as to inform future NT EPA assessments of dredging campaigns in Darwin Harbour.

9. Matters taken into account during the assessment

Matters taken into account during the assessment	Consideration
Objects of the EP Act	
To protect the environment of the Territory	The proponent's referral information, SER and this assessment report, including the NT EPA's recommended conditions for an environmental approval, provide detail about how the environment of the Territory would be protected from potentially significant environmental impacts that could occur as a result of implementation of the proposed action.
To promote ecologically sustainable development so that the wellbeing of the people of the Territory is maintained or improved without adverse impact on the environment of the Territory	Consideration of the principles of ecologically sustainable development in relation to the proposed action is addressed below.
To recognise the role of environmental impact assessment and environmental approval in promoting the protection and management of the environment of the Territory	The NT EPA recognises the importance of environmental impact assessment and approval processes in the protection and management of the environment of the Territory. The NT EPA has assessed the potential environmental impacts of the proposed action to inform an environmental approval decision by the Minister that, in the NT EPA's view, promotes protection and management of the Territory. The proponent's commitment to implement the DMP, reinforced through recommended conditions for an environmental approval, promotes protection.
To provide for broad community involvement during the process of environmental impact assessment and environmental approval	The referral information indicates that the proponent undertook some community consultation during preparation of the referral information, and that feedback was considered in development of the proposed action. The NT EPA's public consultation undertaken during its assessment of the proposed action provides for community involvement during the environmental impact assessment process. Submissions received in relation to the proposed action have been taken into account in the NT EPA's assessment and the preparation of the recommended conditions for an environmental approval.
To recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes.	The NT EPA recognises the role of Aboriginal people as stewards of their country and the importance of participation by Aboriginal people and communities in environmental decision-making. The public consultation process provided an opportunity for interested persons

Matters taken into account during the assessment	Consideration
	to make a submission in relation to the proposed action. The proponent consulted with the Aboriginal Areas Protection Authority (AAPA) and the Heritage Branch of the Department of Territory Families, Housing and Communities, in relation to Aboriginal sacred sites and cultural heritage.
Principles of ecologically sustainable development	
Decision-making principle 1. Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations. 2. Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.	The NT EPA has considered the decision-making principle in its assessment and has had particular regard to this principle in its assessment of terrestrial ecosystems. The NT EPA notes the interconnectedness between environmental factors and recognises that the mitigation measures to avoid and minimise impacts on the factors listed above may also reduce the significance of impacts on other environmental factors. The NT EPA has recommended conditions for environment protection outcomes to be achieved through design, construction, and ongoing management. The NT EPA considers that its environmental impact assessment and recommended conditions have identified and mitigated environmental impacts. The community has been provided the opportunity for involvement in the environmental impact assessment process during public consultation on the proposed action and the submissions received have been taken into account in the preparation of this report and the recommended conditions to inform the Minister's decision on environmental approval.
Precautionary principle 1. If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. 2. Decision-making should be guided by: (a) careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and (b) an assessment of the risk-weighted consequences of various options.	This principle was considered by the NT EPA when assessing the impacts of the proposed action on the key environmental factors. The proponent has identified measures to avoid or minimise impacts on the environment. The NT EPA has considered these measures during its assessment, and has recommended conditions for environment protection. From its assessment of this proposed action the NT EPA has concluded that the environmental values will be protected provided its recommended conditions, and the proponent's commitments, are implemented. The proposed action may result in some irreversible impacts to marine ecosystems within the dredging area footprint due to the removal of habitat, however those residual impacts are not considered to be significant.

Matters taken into account during the assessment	Consideration
Principle of evidence-based decision-making Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.	The NT EPA has considered the available evidence during the course of its assessment of the proposed action, and this scientific evidence provides the foundation for its decision making and recommended conditions. In its assessment of the proposed action, where the NT EPA considered that further evidence is required to inform the management of potentially significant impacts to marine ecosystems, marine environmental quality, and culture and heritage, the NT EPA has recommended conditions requiring the proponent to limit the extent of dredging and manage dredging impacts through implementation of the DMP.
Principle of intergenerational and intragenerational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.	It is important to protect marine ecosystem and marine environmental values for the benefit of future generations. The NT EPA considers that the recommended conditions for an environmental approval would provide an appropriate degree of protection for these values. The NT EPA has considered the principle of intergenerational equity and intragenerational equity in its assessment. From the assessment of this proposed action the NT EPA has concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.
Principle of sustainable use Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.	The NT EPA has considered the importance of sustainable development and use of resources and this principle during the environmental impact assessment process. The NT EPA considers that this principle is closely linked to the principles of intergeneration and intragenerational equity, and conservation of biological diversity and ecological integrity.
Principle of conservation of biological diversity and ecological integrity Biological diversity and ecological integrity should be conserved and maintained.	This principle was considered when assessing the impacts of the proposed action on the environmental values, particularly in relation to marine ecosystems. The assessment of these impacts is provided in this report. Biological diversity and ecological integrity are likely to be conserved due to the avoidance, minimisation and mitigation measures that will be implemented by the proponent and the conditions recommended by the NT EPA.
Principle of improved valuation, pricing and incentive mechanisms	This principle was considered by the NT EPA when assessing the impacts of the proposed action. The NT EPA notes that the proponent

Matters taken into account during the assessment	Consideration
1. Environmental factors should be included in the valuation of assets and services. 2. Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement. 3. Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes. 4. Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems.	would bear the costs relating to the avoidance and management of potential dredging impacts.
Environmental decision-making hierarchy	
1. In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must apply the following hierarchy of approaches in order of priority: (a) ensure that actions are designed to avoid adverse impacts on the environment; (b) identify management options to mitigate adverse impacts on the environment to the greatest extent practicable; (c) if appropriate, provide for environmental offsets in accordance with this Act for residual adverse impacts on the environment that cannot be avoided or mitigated.	The extent to which the proponent has applied the environmental decision-making hierarchy in its design of the proposed action and the proposed measures to avoid and then mitigate significant impacts has been considered. Where the NT EPA was not satisfied that this hierarchy had been applied, it has recommended conditions requiring that the proponent take reasonable measures to avoid and/or mitigate impacts. The NT EPA has had regard to this hierarchy during the assessment of the proposed action and did not identify any significant residual impacts that would require offsetting.
2. In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must ensure that the potential for actions to enhance or restore environmental quality is identified and provided for to the extent practicable.	The proposed action is located in an area where prior dredging has taken place regularly over the past four decades. The proponent has committed to implement a DMP to manage impacts. Areas within the zone of low to moderate impact and zone of influence that would be temporarily impacted by dredging are expected to recover over time which may restore marine environmental quality in those areas to some extent.

Matters taken into account during the assessment	Consideration
Waste management hierarchy	
1. In designing, implementing and managing an action, all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment. 2. For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority: (a) avoidance of the production of waste; (b) minimisation of the production of waste; (c) re-use of waste; (d) recycling of waste; (e) recovery of energy and other resources from waste; (f) treatment of waste to reduce potentially adverse impacts; (g) disposal of waste in an environmentally sound manner.	The referral and SER considered options for management of dredged material in line with the waste management hierarchy. The strategy for management of dredged material includes some potential reuse of dredged material where it is shown to have suitable characteristics for this purpose. The referral and SER also commit to disposing of waste generated by the proposed action at an appropriately licensed management facility.
Ecosystem-based management	
Management that recognises all interactions in an ecosystem, including ecological and human interactions.	The NT EPA considered the importance of ecosystem-based management for achieving both sustainable development and biodiversity protection goals. With consideration of the link between marine ecosystems, marine environmental quality, and culture and heritage, the NT EPA also considered the connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment. The NT EPA formed the view that the impacts from this proposed action can be managed to be consistent with the NT EPA's environmental factors and objectives.
The impacts of a changing climate	
The effects of a changing climate on the proposal and resilience of the proposal to a changing climate	The effects of a changing climate on the proposed action are not anticipated to significantly impact the proposed action. The effects of a changing climate are potentially relevant to long term maintenance dredging campaigns. However, the NT EPA considered that potential impacts would not be significant and specific conditions did not need to be recommended.

10. Conclusion and recommendation

The NT EPA has considered the HMAS Coonawarra - Dredging and Dredged Material Management proposed action by the Australian Government Department of Defence. The NT EPA's assessment of the proposed action identified potentially significant environmental impacts associated with the key environmental factors.

The NT EPA considers that the proposed action can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted subject to the conditions recommended in Appendix 1.

Appendix 1 – Draft Environmental Approval

ntepa Northern Territory Environment Protection Authority

Draft Environmental Approval

PURSUANT TO SECTION *69* OF THE *ENVIRONMENT PROTECTION ACT 2019*

Approval number	EP2022/015-001
Approval holder	Secretary of the Department of Defence
Australian business number (ABN)	68 706 814 312
Registered business address	Russell Offices Department of Defence Canberra ACT 2600
Contact	Project Director - West Directorate Capital Facilities and Infrastructure Branch Infrastructure Division / Security and Estate Group BP26-1-C035 Brindabella Business Park PO Box 7925 Canberra BC ACT 2610
Proposed action	HMAS Coonawarra - Dredging and Dredged Material Management

Proposed action description

The proposed action is to carry out two capital dredging campaigns as part of upgrades to the Royal Australian Navy wharf facilities and basin navigation area at HMAS Coonawarra Larrakeyah, Darwin, including:

- 101,000 m^3 for the Current Works NCIS-5 Project Dredge Area (comprising 85,000 m^3 made up of 79,000 m^3 soft clay material and 6,000 m^3 of rock material, with an additional 16,000 m^3 of mixed clay and rock material; and
- 116,000 m^3 for the Future Eastern Wharf Dredge Area (comprising 66,000 m^3 soft clay material and 50,000 m^3 of rock material.

Dredged soft clay material removed by cutter suction dredge would be discharged to Darwin Harbour at a location approximately 300 m southwest of the dredge areas. Dredged rock material removed by backhoe dredge would be transported on barges to the East Arm Wharf ponds for land-based disposal.

The proposed action includes ongoing maintenance dredging up to 15,000 m^3 at HMAS Coonawarra every 5 to 7 years.

Advisory notes

i. Approval is granted under section 69 of the *Environment Protection Act 2019* for the action to be undertaken in the manner described, including with implementation of the environmental management measures, commitments and safeguards documented in the Referral Information (including the Referral Report and Appendices) and Supplementary Environmental Report (SER) (including the SER and Appendices). If there is an

inconsistency between the Referral Information or the SER, and this environmental approval, the requirements of this environmental approval prevail.

ii. Submission of all notices, reports, documents or other correspondence required as a condition of this approval, including notification to the CEO or Minister, must be provided in electronic form by emailing environmentalregulation@nt.gov.au

Address of proposed action	Lots 5556 and 5239, Town of Darwin, NT
NT EPA Assessment Report number	103
Person authorised to make decision	Hon Lauren Jane Moss MLA, Minister for Environment, Climate Change and Water Security
Signature	NOT FOR SIGNING
Date of decision	NOT FOR APPROVING

Recommended Environmental approval conditions

Marine environmental quality and marine ecosystems

1 Limitations and extent

1-1 When implementing the action, the approval holder must ensure the action does not exceed the limitations and extent in Table 1.

Table 1 Limitations and extent

Action element	Figure	Limitation or maximum extent
Dredging	Figure 2	• Capital dredging of no more than 101,000 m^3 of material from the **Current Works NCIS-5 Project Dredge Area**; • Capital dredging of no more than 116,000 m^3 of material from the **Future Eastern Wharf Dredge Area**; and • Maintenance dredging of no more than 15,000 m^3 for any single maintenance **dredging activity**.
Dredged material disposal	Figure 2	Dredged material may only be: • discharged to receiving waters via a pipeline from the cutter suction dredge to the discharge location*; or • loaded onto a barge by the backhoe dredge and transferred to land for onshore containment and disposal in the East Arm Wharf ponds.

*Note: *Dredge pipe outlet position may vary within a 50 m radius of the discharge location shown at Figure 2.*

2 Environmental objectives

2-1 The approval holder must ensure the implementation of the action achieves the following environmental objectives:

(1) no **material environmental harm** to the environmental values and declared **beneficial uses** of water in Darwin Harbour beyond the zone of high impact, including but not limited to ecosystem health, cultural, aesthetic, recreational, aquaculture;

(2) no **material environmental harm** to **benthic habitats and communities** beyond the zone of high impact**;** and

(3) risks of physical injury, mortality, behavioural changes and health impacts on marine megafauna are minimised.

2-2 The approval holder must undertake monitoring in the zones of impact and influence during and following the cessation of **dredging activity** that is capable of

demonstrating whether the environmental objectives in condition 2-1(1) and 2-1(2) have been met.

3 Dredging Management Plan

3-1 At least 10 business days prior to commencement of **dredging activity**, the approval holder must submit to the **Minister** a revised version of the document NCIS-5 HMAS Coonawarra Draft Dredging and Disposal Management Plan PED752-005-TD-EV-0004 Rev. 3 26 April 2023 (Dredging Management Plan (**DMP**)) to meet the requirements specified in condition 3-2.

3-2 The revised **DMP** required by condition 3-1 must incorporate an updated receiving environment monitoring program associated with sediment plumes generated by **dredging activity** that includes:

(1) a requirement for **dredging activity** to achieve the environmental objectives required by condition 2-1;

(2) clearly stated objectives, methods and outcomes including a conceptual model that defines stressors and potential impacts on sensitive receptors in the receiving environment and identifies the links between predicted response and the monitoring indicators to be monitored;

(3) details of monitoring locations and water quality indicators pertinent to the sensitive receptor types and locations, designed to:

(a) assess the baseline condition of receiving waters spatially within the modelled zone of influence using accurate and reliable monitoring approaches sufficient to describe temporal variation and reliably detect impacts;

(b) confirm locally-relevant trigger values for turbidity (**NTU**)

(c) provide continuous logging (with on-line near real-time monitoring capability at WQ1) for turbidity (Table 3);

(d) provide periodic monitoring of **TSS**, nutrients, pH, conductivity, metals and metalloids at monitoring sites (Table 3);

(e) assess monitoring results based on site-specific baseline data with **reference site**-based checking, quality assurance methods and reporting of results;

(4) details of measures to avoid dredging-related impacts to sensitive receptors during any critical windows of environmental sensitivity (such as known coral spawning and seagrass flowering windows);

(5) a requirement to validate the adopted 1:1 **TSS:NTU** relationship using site-specific monitoring data collected during **dredging activity** within the **Current Works NCIS-5 Project Dredge Area**, to confirm the suitability of turbidity **trigger values** (Table 2);

(6) a requirement for sediment plume prediction validation monitoring to be undertaken periodically throughout the duration of **dredging activity** to

allow comparisons between the predicted and actual spatial extent and characteristics of plumes generated by the **dredging activity**;

(7) procedures for determining whether any exceedance of management **trigger values** is attributable to the action;

(8) a trigger action response plan incorporating a tiered adaptive monitoring and management (including a feedback loop) to manage **dredging activity** to achieve the environmental objectives required by condition 2-1;

(9) contingency measures to be implemented where **trigger values** are reached or exceeded or the sediment plume does not behave as predicted by modelling;

(10) include monitoring and management measures to achieve the environmental objective required by condition 2-1(3) including but not limited to:

(a) measures to avoid direct impacts of vessel strikes and entrainment of marine megafauna, such as imposing speed limits on vessels and specifying safe distance for marine megafauna encounters during **dredging activity**;

(b) defined observation and exclusion zones, along with protocols for marine megafauna observation, and keeping a record of sightings and locations in the vessels' daily log book;

(c) trained marine megafauna observers to be present during **dredging activity**;

(d) procedures for reporting any incidents related to marine megafauna injury or mortality to the relevant regulators; and

(11) provide measures to prevent the introduction of marine pests.

4 Revising the Dredging Management Plan

4-1 The approval holder:

(1) must revise the **DMP** as required by condition 3-1;

(2) must revise the **DMP** as and when directed by the **Minister**; and

(3) may revise the **DMP** for its own purposes.

4-2 For any revised **DMP**, the approval holder must provide a copy to the **Minister** at least 10 business days prior to any amendment(s) being implemented, accompanied by:

(1) a tabulated summary of the amendment(s) with document references;

(2) reasons for the amendment(s); and

(3) an assessment of environmental risks and potential impacts associated with the amendment(s).

4-3 Prior to the commencement of capital **dredging activity** within the **Future Eastern Wharf Dredge Area**, provide a written review and endorsement from an

independent qualified person stating that the revised **DMP** appropriately identifies and mitigates any environmental risk and complies with the conditions of this approval.

4-4 The approval holder must implement the action to comply with the latest revision of the **DMP** provided in accordance with condition 4-2.

5 Commencement of action

5-1 This approval expires 5 years after the date on which it is granted, unless **dredging activity** has commenced on or before that date.

5-2 The approval holder must provide notification in writing to the **Minister,** at least 5 business days prior to the commencement of **dredging activity**.

6 Change of contact details

6-1 The approval holder must notify the **Minister** in writing of any change of its name, physical address or postal address for the serving of notices or other correspondence within 10 business days of such change.

7 Environmental performance and compliance reporting

7-1 The approval holder must:

(1) within 12 months after the completion of **dredging activity** carried out for any capital dredging under this approval, prepare a report to address conditions 7-2(1) to 7-2(8); and

(2) submit each report to the **CEO** within 30 days of its completion.

7-2 The reports required by condition 7-1(1) must:

(1) provide all monitoring data and reportable incidents required by the conditions of this approval;

(2) provide an analysis and interpretation of monitoring data to demonstrate whether compliance with the requirements of condition 2-1 has been achieved;

(3) describe the approaches used to validate the sediment plume modelling outputs;

(4) provide a comparison between the actual and predicted:

(a) water quality changes in turbidity levels and **TSS** concentrations from **dredging activity**; and

(b) spatial extent of sediment plumes generated by **dredging activity.**

(5) describe measurements of sediment and hydrodynamic information obtained under representative conditions;

(6) include an assessment of the effectiveness of monitoring, management and contingency measures implemented to comply with the requirements of condition 2-1;

(7) identify all non-compliances and describe corrective and preventative actions taken;

(8) include a written review and endorsement by an **independent qualified person.**

8 Provision of environmental data

8-1 All environmental monitoring data required to be collected or obtained under this environmental approval must be retained by the approval holder for a period of not less than 10 years commencing from the date that the data is collected or obtained.

8-2 The approval holder must, as and when directed by the **Minister**, provide any environmental data (including sampling design, sampling methodologies, empirical data and derived information products such as maps) relevant to the assessment of the action and implementation of this environmental approval, to the **Minister** in the form and manner and at the intervals specified in the direction.

Definitions

The terms used in this approval have the same meaning as the terms defined in the *Environment Protection Act 2019* and Environment Protection Regulations 2020.

Term	Definition
baseline data	The environmental monitoring data, including chemical, physical and biological data collected (from studies undertaken) prior to commencement of **dredging activity**, that is used to characterise baseline conditions.
beneficial uses	Has the same meaning as in section 4 of the *Water Act 1992*.
benthic habitats and communities	The areas of seafloor that support functional ecological communities (e.g. high relief reef, platform reef, sand, silt and the depth they occur). The communities may include light dependent taxa (e.g. algae, seagrass, corals, some sponges, mangroves) or animals that obtain their energy by consuming live or dead organisms (e.g. ascidians, sponges, soft corals).
CEO	Has the same meaning as in section 4 of the *Environment Protection Act 2019*.
continuous logging	Requires ongoing data collection to be undertaken during **dredging activity**. Where specified in a condition of this approval, monitoring must be telemetered to ensure near real time availability of data).
Current Works NCIS-5 Project Dredge Area	The Current Works NCIS-5 Project Dredge Area as shown at Figure 2 of this approval.
DMP	Dredging Management Plan, which includes management and disposal of dredged material.
dredging activity	Dredging works carried out under this approval including: • dredging; • loading of barges or similar vessels with dredged material; • movement of barges or similar vessels from the dredge footprint to a barge unloading facility; • removal of dredged material from barges or similar vessels into trucks or similar infrastructure for transport to the East Arm Wharf ponds.
EP Act	*Environment Protection Act 2019*.
Future Eastern Wharf Dredge Area	The Future Eastern Wharf Dredge Area as shown at Figure 2 of this approval.

independent qualified person	A qualified person as defined under section 4 of the **EP Act**; and who also meets the following requirements: a) was not involved in the preparation of the approval holder's **referral**; b) is independent of the personnel involved in the design and implementation of the action; and c) has obtained written approval from the **CEO**, on the advice of the Executive Director, of the NT Department of Environment, Parks and Water Security Flora and Fauna Division to be the qualified person to satisfy the **independent qualified person** reporting requirements under this approval.
material environmental harm	Has the same meaning as in section 8 of the *Environment Protection Act 2019*.
Minister	The Minister responsible for administering the *Environment Protection Act 2019*.
NT EPA	Northern Territory Environment Protection Authority.
NTU	Nephelometric turbidity units
reference site	A monitoring site located beyond the anticipated zone of influence of the modelled sediment plume (Figure 3).Monitoring at this site is intended to assist in determining if elevated sediment concentrations which may be detected at sensitive receptors are associated with the **dredging activity** or other mechanisms within the harbour unrelated to **dredging activity**.
referral	The approval holder's **referral** to the **NT EPA** under section 48 of the **EP Act**: NCIS-5 - HMAS Coonawarra Dredging and Dredged Material Management - Referral Report and Appendices, dated 21 March 2022.
SER	The approval holder's Supplementary Environmental Report submitted to the NT EPA under regulation 119 of the Environment Protection Regulations 2020: NCIS-5 - HMAS Coonawarra Dredging and Dredged Material Management Supplementary Environmental Report and Appendices, dated 26 April 2023.
trigger value(s)	The values of monitored environmental parameters that indicate when response actions are required to prevent impact.
TSS	Total suspended solids. In relation to a water sample, the measure of the particles mixed in the water sample.

Location and extent of action

Spatial data depicting information provided in Figures 1 to 3 are held by the Department of Environment, Parks and Water Security as follows:

- NTEPA2021/0174-016 - 14 Consultation on SER – Spatial Files - Department of Defence - HMAS Coonawarra - Dredging and Dredged Material Management.

Figure 1 Location of action

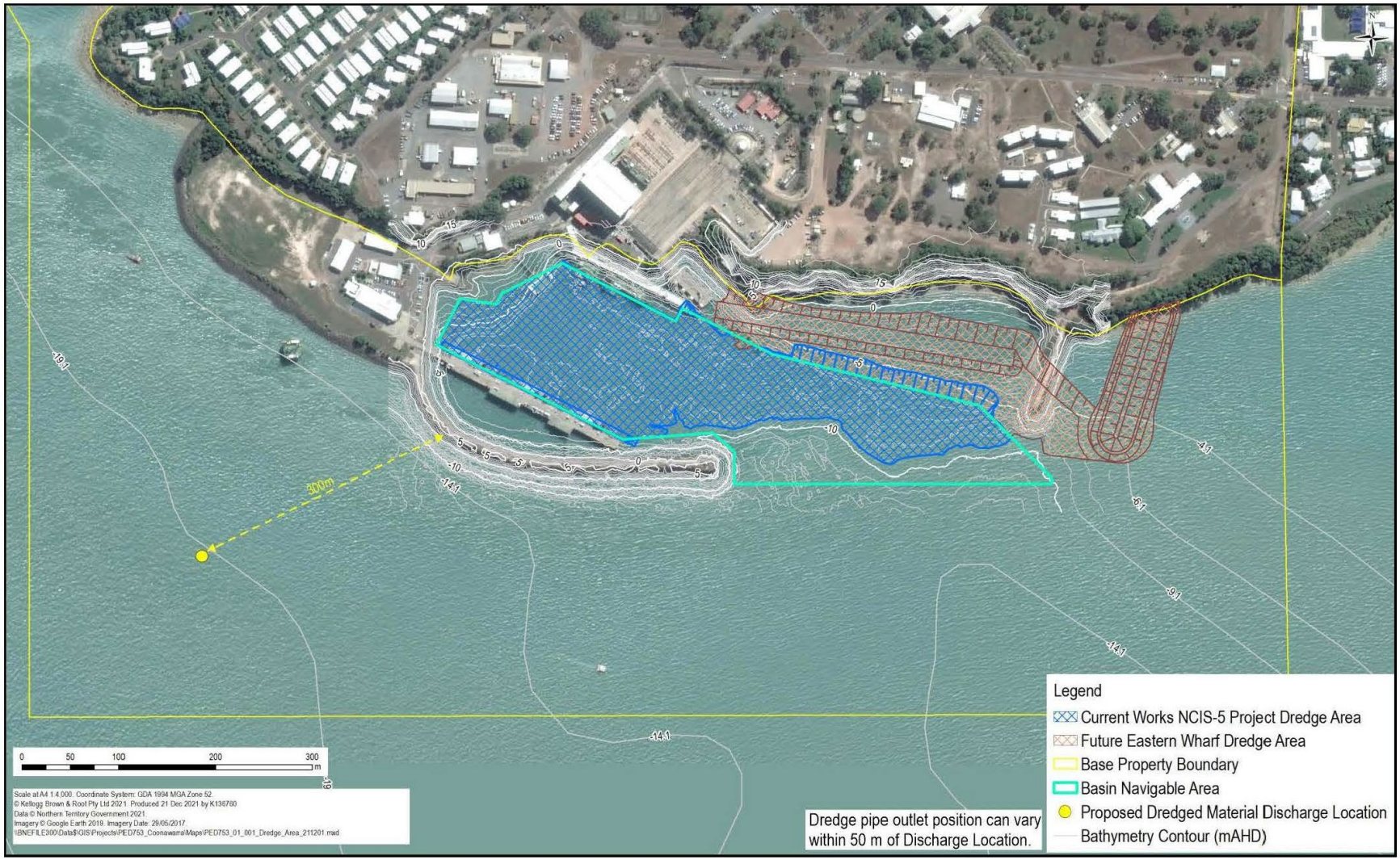

Figure 2 Dredge areas and dredged material discharge location

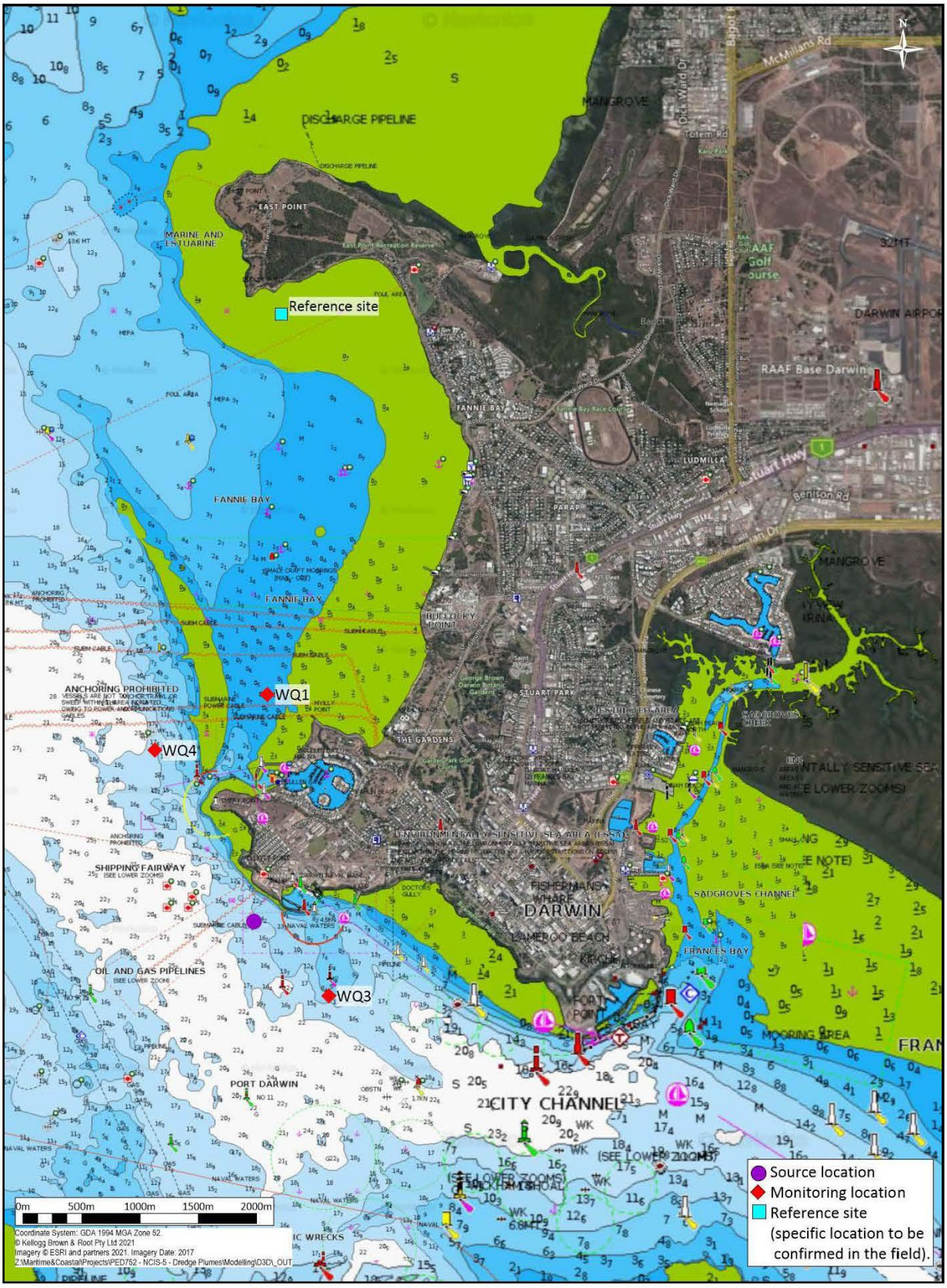

Figure 3 Monitoring locations during dredging

Table 2 Draft trigger values for zones and turbidity and time limits for monitoring site WQ1 (Figure 3)

Monitoring site^	Season	Draft trigger values >intensity value and >duration or >frequency		
		Intensity	Duration	Frequency
WQ1 Fannie Bay*	Wet and dry season	30 **NTU** (6-hourly average)	12 hours	12 hours
Zone of low to moderate impact*		70≥23 **NTU** (90th%ile)	N/A	N/A
Zone of influence*		10≤23 **NTU** (90th%ile)	N/A	N/A

Notes:
**Only applicable where volume to be dredged is more than 20,000m^3.*
 # Draft trigger values to be confirmed and published in the revised DMP required by condition 3-1.
^ WQ1 trigger values are reactive. Zone triggers are informative only.

Table 3 Monitoring requirements

Monitoring location name	Monitoring points (GDA94 decimal degrees)		Quality characteristic	Timing	Minimum monitoring frequency
	Latitude	Longitude			
• WQ1* • Reference site • WQ3 • WQ4	TBA	TBA	Turbidity (**NTU**) Water depth/pressure • pH • Conductivity • Dissolved oxygen • Total suspended solids (**TSS**) • Nutrients • Metals and metalloids	During **dredging activity**	At the frequency specified in the revised Dredge Management Plan required by condition 3-1

*Note: * Continuous data logging (at least every 15 minutes) with online or near real-time monitoring capability to be provided at WQ1.*

Appendix 2 – Environmental impact assessment timeline

Date	Assessment stages
4 April 2022	Referral accepted
13 April to 16 May, 2022	Referral consultation submission period
12 July 2022	NT EPA decided environmental impact assessment required by the supplementary environmental report (SER) method
14 October 2022	NT EPA directed the proponent to provide additional information in the SER
2 May to 5 June, 2023	SER consultation submission period
21 July to 11 August, 2023	Consultation with proponent and statutory decision-maker on draft environmental approval
23 August 2023	Statutory timeframe for the NT EPA's assessment report to be provided to the Minister for Environment, Climate Change and Water Security
30 business days after receiving the NT EPA's assessment report	Minister's decision on environmental approval due (If the Minister does not make a decision within 30 business days after receiving the assessment report the Minister is taken to have accepted the NT EPA's recommendation for approval).