Crowdy Head Boat Harbour Upgrade

Addendum Review of Environmental Factors

Transport for NSW

March 2025

Crowdy Head Boat Harbour Upgrade

Addendum Review of Environmental Factors

Transport for NSW | March 2025

Complete Planning and Environment

Prepared by Complete Planning and Environment Pty Ltd and Transport for NSW

Document controls

Approval and authorisation

Title	Crowdy Head Boat Harbour Upgrade Addendum Review of Environmental Factors
Accepted on behalf of Transport for NSW by:	Daniel Cini Project Manager - Maritime Infrastructure Delivery Office
Signed:	
Dated:	30.3.25

Executive summary

The proposed modification

Transport for NSW (Transport) proposes to modify the Crowdy Head Boat Harbour Upgrade Project (the Project) to take into account concerns and suggestions raised by the community and stakeholders during the public display and consultation period. The Project Review of Environmental Factors (Project REF) was prepared in June 2022 and placed on public display between 10 June and 15 July 2022. A submissions report addressing the feedback on the Project REF was prepared in February 2024.

Key features of the Project as described within the Project REF include:

- New heavy duty floating pontoons.
- Water and electricity to each berth.
- 18 berths of various sizes.
- One temporary or short-term berth.
- Demolition of Jetty 2.
- Dredging of the harbour.
- Landscaping.

Key features of the Proposed Modification considered within this Addendum REF include:

- A revised deposition location for material dredged from the Crowdy Head Harbour.
- An expanded dredging area between Jetty 2 and the boat ramp channel.
- Installation of two temporary moorings within the harbour during construction.
- Installation of elevated solar lighting on selected pile caps on Jetty 1.

Construction of the Project is expected to commence in the second quarter of 2025 and take approximately 12 months to complete.

Background

Crowdy Head Boat Harbour is located on the Mid North Coast of NSW. It is an important regional harbour for boat users, as it is safe and accessible, with no river mouth or coastal bars to cross.

The original harbour was formed in 1964 with the construction of the breakwater. In 1975 the harbour was then extended, and two mooring jetties were also installed.

In 2010 the western jetty (Jetty 2) was taken out of service, due to its poor condition, and at the time the eastern jetty (Jetty 1) was also assessed as nearing the end of its useful life and in need of either major maintenance or replacement.

In December 2020, the NSW Government announced $2 million of maritime stimulus funding to replace the Crowdy Head Boat Harbour Jetty 1 to improve the on-water berthing infrastructure within the harbour. Transport subsequently developed a proposal to upgrade the harbour and associated infrastructure.

A Project REF was prepared in 2022 to assess the likely environmental impact of the works and placed on public display for comment. As a result of feedback from the community and stakeholders during the display period, Transport decided to modify elements of the proposal to reduce the environmental impacts of the works and provide enhancements that would benefit users of the harbour during construction and operation of the Project.

Need for the Proposed Modification

The coastal harbour at Crowdy Head is situated on a natural harbour that was formed by a rocky reef on the north-eastern side of the headland. Due to the nature and location of the harbour, accumulation of marine sand occurs in the northern section of the harbour directly adjacent to the northern breakwater.

Works to repair Jetty 2 and dredging of the harbour was undertaken in 2010 by the NSW Land and Property Management Authority under the Department of Planning, Industry and Environment (now the Department of Planning, Housing and Infrastructure (DPHI) Coastal Infrastructure Program (2015-2019).

Since 2013, the Crowdy Head Harbour has not been able to sustain heavy boat use, with Jetty 2 closed since 2010. Furthermore, due to surging swells, the harbour has accumulated significant siltation that affects safe clearance depths. Infrastructure and services associated with the Crowdy Head Harbour have an estimated replacement value of about $18.5 million. The original scope of works assessed in the Project REF would have addressed those needs. However, the modified scope of works allows those needs to be met whilst also reducing the potential environmental impacts of the works and better meeting the needs of the community and users of the harbour.

Proposal objectives and development criteria

The objectives and development criteria that apply to the Project include:

- Improved accessibility and safety for vessels using Crowdy Head Boat Harbour.
- Increased safety for users of the harbour by upgrading infrastructure to meet relevant modern design standards and requirements.
- Improved community access and use of the harbour.
- Increased lifespan of the infrastructure in use.

The objectives of the Proposed Modification as outlined within this Addendum REF were developed to address feedback received from community and stakeholder consultation during the Project REF display period. The Proposed Modification also seeks to minimise or eliminate certain environmental impacts associated with the original scope of works as assessed under the Project REF by:

- Providing a viable location for deposition of dredged material.
- Mitigating sand buildup within the harbour and enhance navigational access from the harbour entrance to the boat ramp by the inclusion of an additional dredging area.
- Providing temporary moorings for commercial fishing vessels, a Marine Rescue vessel and vessels seeking emergency shelter during the construction phase of the Project.
- Enhancing visibility at the extremities of the new Jetty 1 through the installation of additional lighting on selected pile caps.

Statutory and planning framework

State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) aims to facilitate the effective delivery of infrastructure across the State. Clause 2.80 of TISEPP permits development for the purpose of wharf or boating facilities, including dredging, to be carried out on any land by or on behalf of a public authority without consent. However, such development may only be carried out on land reserved under the *National Parks and Wildlife Act 1974* (NPW Act) if the development is authorised by or under that Act.

As the proposal is for the purpose of wharf or boating facilities and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and development consent from council is not required. The proposal is not located on land reserved under the NPW Act.

The Environmental Planning and Assessment Regulation 2021 (EP&AR) requires the determining authority when considering the likely impact of an activity on the environment, to take into account the environmental factors specified in the environmental factors guidelines that apply to the activity. Section 171 (2) requires that if there are no environmental factors guidelines in force, the determining authority must take into account certain environmental factors relating to the proposed activity. Section 171 (3) requires a determining authority to prepare a review of environmental factors that demonstrates how the environmental factors specified in the environmental factors guidelines, or the environmental factors specified in subsection (2) if no guidelines are in force, were taken into account when considering the likely impact of an activity. The preparation of the Project REF and this Addendum REF satisfies this requirement.

Section 171 (4) requires the REF to be published on the determining authority's website or the NSW planning portal if—

(a) the activity has a capital investment value of more than $5 million, or

(b) the activity requires an approval or permit as referred to in any of the following provisions before it may be carried out—

(i) *Fisheries Management Act* 1994, sections 144, 201, 205 or 219,

(ii) *Heritage Act 1977*, section 57,

(iii) *National Parks and Wildlife Act* 1974, section 90,

(iv) *Protection of the Environment Operations Act* 1997, sections 47–49 or 122, or

(c) the determining authority considers that it is in the public interest to publish the review.

The activity covered under this Addendum REF has a capital investment value of less than $5 million but requires a permit under the FM Act. As such, Transport will publish this Addendum REF on its public website.

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. The assessment of the impact of the Proposed Modification on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the EPBC Act.

Community and stakeholder consultation

No additional community or stakeholder consultation has been undertaken during the development of the Proposed Modification, as the modifications were developed to address issues raised by the community and stakeholders during the display period for the Project REF. The Addendum REF will be published on the Project website.

Environment impacts

The modifications to the scope and methodology for undertaking the proposed works assessed under this Addendum REF have resulted in an overall reduction in environmental impacts from those that would have been associated with the original scope of works covered by the Project REF. In particular, the Proposed Modification has significantly reduced potential impacts on terrestrial biodiversity and potential traffic impacts. The main environmental impacts of the Proposed Modification would be in relation to marine biodiversity and water quality as outlined below.

Marine biodiversity

Transport proposes to establish a harbour seabed level of -3m in the additional dredge area via dredging of shallow sands, which are typically of -1m or less depth. The proposed additional dredge area design would avoid direct disturbance to seagrass beds and macroalgae stands and provide a minimum buffer of >20 m from closest previously mapped seagrasses. The proposed near shore sand placement area would also avoid marine vegetation and has been designed to maintain a minimum 100 metre distance from nearby subtidal rocky reef habitat. The sand placement would be in close proximity to the surf zone, where sedimentation impacts would be minimal.

Dredging and placement of sands would, however, result in the following impacts on marine habitat:

- Removal of shallow sands from the dredging area that may contain some infauna (marine invertebrates that live on or in the sand). These are expected to consist of common species of polychaetas, gastropods, and crustaceans.
- Smothering of benthic infauna or slow moving epibenthic fauna, which may include various crustaceans, gastropods, polychaetas, bivalves or small fish, from the placement of sand in subtidal areas.
- Mobilisation of sediments and a reduction of water quality (increased turbidity) during dredging and placement works, which may result in reduced available light for macrophyte growth (seagrass and macroalgae) and sedimentation.

The following proposed measures would be implemented to minimise or mitigate these impacts:

- All equipment would be thoroughly cleaned and inspected before mobilisation to site. This would include inspection for any soils and estuarine material, while also ensuring it is in good working order and no hydrocarbon leaks are present.
- Vessels and barges must maintain at least 600 mm clearance to the seabed when within 10 m of any seagrass or macroalgae habitat.
- Vessels and barges must only access the site or shore via the boat ramp or the area immediately to the west of the boat ramp. No shoreline access or works are to occur on the eastern side of the boat ramp.
- Hydrocarbon booms would remain in place around any plant when in operation and spill kits would be available onsite for the duration of the works.

Water Quality

Near shore placement of dredged material has the potential to generate marine turbidity, which would not be experienced as a result of land based placement. Given the material is marine sand (course material with low silt content), it is anticipated that any turbidity impacts would be localised and aquatic plumes would settle quickly within the water column. However, notwithstanding the relatively low risk nature of the material, additional water quality impacts have the potential to occur as a result of the near shore placement methodology. The following proposed measures would be implemented to minimise or mitigate these potential impacts:

- A Sediment and Water Management Sub-Plan (SWMSP) will be prepared as part of the CEMP, or mitigation strategies will be included within the CEMP, to minimise all risks relating to erosion, turbidity and pollution caused by sediments and other materials. The SWMSP or mitigation strategies will describe how these risks will be addressed during construction.
- An Environmental Control Plan (ECP), forming part of the EWMS-CEMP and including water quality control measures, will be implemented during construction to manage potential water quality impacts associated with the Project.

- A Water Quality Monitoring Program (WQMP), will be developed as part of the CEMP and implemented throughout construction. The WQMP will address the relevant requirements of TfNSW G36 and will be prepared in accordance with the TfNSW Guideline for Construction Water Quality Monitoring and EPA publication “Approved Methods for the Sampling and Analysis of Water Pollutants in NSW.”
- Visual monitoring by both the dredge operator and the deposition site supervisor is to be undertaken continuously as part of their normal duties whilst work is occurring. Visual assessment is to complement calibrated meter readings and is to include:
    - Nature, extent and direction of any turbid plume at the dredge site. Any change in plume characteristics should be noted and appropriate measures to reduce excessive turbidity are to be implemented immediately.
    - The nature of the sediments being discharged at the deposition location are to be visually assessed to ensure that excessive fines are not being discharged and that the material is consistent with clean marine sand. Cause for concern could include changes in water colour (i.e. red/brown colouration if coffee rock is being dredged), increased fines content (higher turbidity) or presence of excessive amounts of shell/rock.
- A suitable calibrated water quality meter should be used to measure turbidity in accordance with TfNSW G36 during both dredging and deposition activities.

Justification and conclusion

This Addendum REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by construction of the proposed activity as modified. This has included consideration of impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the EPBC Act.

The Proposed Modification would result in fewer environmental impacts than the proposed scope of works assessed under the Project REF. Specifically, the Proposed Modification would result in reduced construction traffic and transport impacts due to a significant reduction in truck movements, reduced impacts on terrestrial biodiversity, and improved social impacts during construction and operation through the provision of temporary swing moorings within the harbour, improved outcomes for vessel navigation and improved lighting on Jetty 1. On balance, the Proposed Modification is considered justified.

The Proposed Modification would be unlikely to cause a significant impact on the environment. Therefore it is not necessary for an environmental impact statement to be prepared and a Biodiversity Development Assessment Report or Species Impact Statement is not required. The Proposed Modification is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required. The Proposed Modification is also unlikely to have a significant impact on matters of national environmental significance or the environment of Commonwealth land and referral to DCCEEW is not required.

Contents

1 Introduction 1
1.1 Proposed modification overview 1
1.2 Purpose of the report 3

2 Need and options considered 4
2.1 Strategic need for the proposed modification 4
2.2 Proposal objectives and development criteria 4

3 Description of the Proposed Modification 5
3.1 The Proposed modification 5
3.2 Construction activities 9
3.3 Ancillary facilities 11
3.4 Public utility adjustment 12
3.5 Property acquisition 12

4 Statutory planning framework 14
4.1 Environmental Planning and Assessment Act 1979 14
4.2 Other relevant NSW legislation 15
4.3 Commonwealth legislation 19
4.4 Confirmation of statutory position 19

5 Consultation 20
5.1 Consultation strategy 20
5.2 Community outcomes 20
5.3 Ongoing or future consultation 23

6 Environmental assessment 24
6.1 Land surface 24
6.2 Coastal processes 25
6.3 Water quality 26
6.4 Waste management 30
6.5 Noise and vibration 30
6.6 Landscape character and visual impact 31
6.7 Terrestrial biodiversity 32
6.8 Marine biodiversity 32
6.9 Traffic, transport and access 36
6.10 Aboriginal heritage 36
6.11 Non-Aboriginal heritage 37
6.12 Other impacts 38
6.13 Cumulative impacts 38

7 Environmental management 39
7.1 Environmental management plans 39
7.2 Summary of safeguards and management measures 40
7.3 Licensing and approvals 62

8 Justification and conclusion 63
8.1 Justification 63
8.2 Objects of the EP&A Act 63
8.3 Conclusion 66

9 Certification 68

10 References 69

Appendix A Consideration of section 171(2) factors and consideration of matters of National Environmental Significance 72

Appendix B Statutory consultation checklists 78

Appendix C Marine Ecology Assessment 84

Figures

Figure 1-1 Location of the proposed works 2

Figure 3-1: Revised deposition location for dredged material 6

Figure 3-2: Expanded dredging area 7

Figure 3-3: Proposed location of temporary moorings 8

Figure 3-4: Proposed lighting on new Jetty 1 9

Figure 3-5: Location of ancillary facilities 13

Tables

Table 5-1: Summary of issues raised by the community 20

Table 5-2: Issues raised through consultation with government agencies 21

Table 6-1: Additional water quality safeguards and management measures 27

Table 6-2: Additional biodiversity safeguards and management measures 35

Table 7-1: Summary of site specific safeguards 40

Table 7-2: Summary of licensing and approvals required 62

Table 8-1: Consistency of the Project with the objects of the EP&A Act 63

1 Introduction

1.1 Proposed modification overview

Transport for NSW (Transport) proposes to modify the Crowdy Head Boat Harbour Upgrade Project (the Project) to take into account concerns and suggestions raised by the community and stakeholders during the public display and consultation period. The Project Review of Environmental Factors (Project REF) was prepared in June 2022 and placed on public display between 10 June and 15 July 2022. A submissions report addressing the feedback on the Project REF was prepared in February 2024.

Key features of the Project as described within the Project REF include:

- New heavy duty floating pontoons.
- Water and electricity to each berth.
- 18 berths of various sizes.
- One temporary or short-term berth.
- Demolition of Jetty 2.
- Dredging of the harbour.
- Landscaping.

Key features of the Proposed Modification considered within this Addendum REF include:

- A revised deposition location for material dredged from the Crowdy Head Harbour.
- An expanded dredging area between Jetty 2 and the boat ramp channel.
- Installation of two temporary moorings within the harbour during construction.
- Installation of elevated solar lighting on selected pile caps on Jetty 1.

The location of the Proposed Modification is shown in Figure 1-1 and the Proposed Modification is described in detail within Chapter 3.

Figure 1-1 Location of the proposed works (Source: Project REF - GHD)

1.2 Purpose of the report

This Addendum Review of Environmental Factors has been prepared by Complete Planning and Environment Pty Ltd on behalf of Transport for NSW Maritime Infrastructure Delivery Office (MIDO). For the purposes of these works, Transport for NSW is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This Addendum REF is to be read in conjunction with the Project REF and Submissions Report. The purpose of this Addendum REF is to describe the Proposed Modification, to document and assess the likely impacts of the Proposed Modification on the environment, and to detail mitigation and management measures to be implemented.

The description of the proposed work and assessment of associated environmental impacts has been undertaken in context of section 171 of the Environmental Planning and Assessment Regulation 2021, *Guidelines for Division 5.1 assessments* (former Department of Planning and Environment June 2022), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so, the Addendum REF helps to fulfil the requirements of section 5.5 of the EP&A Act including that Transport for NSW examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the Addendum REF would be considered when assessing:

- Whether the Proposed Modification is likely to result in a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report.
- The potential for the Proposed Modification to significantly impact any matter of national environmental significance or Commonwealth land and the need to make a referral to DCCEEW for a decision by the Australian Government's Minister for the Environment and Water on whether assessment and approval is required under the EPBC Act.

2 Need and options considered

2.1 Strategic need for the proposed modification

Chapter 2 of the Project REF addresses the strategic need for the Project, the Project objectives and the options that were considered. The Proposed Modification described and assessed in this Addendum REF is consistent with the strategic need for the Project as described within the Project REF.

The Proposed Modification is needed to address issues raised during the community and stakeholder consultation process for the Project REF. The modified scope of works and works methodology covered by this Addendum REF would enable Transport to still address the strategic need for the Project, whilst also enhancing the benefits to the community associated with the works and reducing the potential environmental impacts of the Project.

2.2 Proposal objectives and development criteria

Section 2.3 of the Project REF identifies the proposal objectives and development criteria that apply to the Project which include:

- Improved accessibility and safety for vessels using Crowdy Head Boat Harbour.
- Increased safety for users of the harbour by upgrading infrastructure to meet relevant modern design standards and requirements.
- Improved community access and use of the harbour.
- Increased lifespan of the infrastructure in use.

The proposal objectives as outlined within the Addendum REF are to address feedback received during community and stakeholder consultation during the Project REF display period and to minimise or eliminate certain environmental impacts associated with the original scope of works as assessed under the Project REF by:

- Providing a viable location for deposition of dredged material.
- Mitigating sand buildup within the harbour and enhance navigational access from the harbour entrance to the boat ramp by the inclusion of an additional dredging area
- Providing temporary moorings for commercial fishing vessels, a Marine Rescue vessel and vessels seeking emergency shelter during the construction phase of the Project.
- Enhancing visibility at the extremities of the new Jetty 1 by the installation of additional lighting on selected pile caps.

3 Description of the Proposed Modification

3.1 The Proposed modification

Transport for NSW proposes to modify the Crowdy Head Boat Harbour Upgrade Project to take into account concerns and suggestions raised by the community and stakeholders during the public display and consultation period. The proposed modifications are shown in **Figure 3-1** to Figure 3-4.

Key features of the Proposed Modification would include:

- A revised deposition location for material dredged from the Crowdy Head Harbour.
- An expanded dredging area between Jetty 2 and the boat ramp channel.
- Installation of two temporary moorings within the harbour during construction.
- Installation of elevated solar lighting on selected pile caps on Jetty 1.

Each of the above key features are described in further detail under the following headings.

3.1.1 Key features of the Proposed Modification

Revised deposition location for material dredged from the Crowdy Head Harbour

The preferred option for placement of dredged material in the Project REF was disposal of dredge spoil by deposition to land to the 'Old Quarry' on the southern side of Crowdy Head. During the REF consultation period, Crown Lands expressed concerns regarding the transport and stockpiling of dredged material to the 'Old Quarry' location.

Near shore placement of dredged material had been one of the options considered when the Project was in the design phase, but was not the preferred option due to the potential for negative impacts upon marine biodiversity. A revised deposition location has been developed and is shown in **Figure 3-1**. A marine ecology study has now been undertaken to determine the likely impacts of near shore placement of dredged material on marine flora and fauna. The findings from this study have been addressed in Section 6.8 of this Addendum REF. The marine ecology study forms Appendix C of this Addendum REF.

Figure 3-1: Revised deposition location for dredged material (Source: Transport)

Expanded dredging area

During the REF consultation period, it was determined that an additional dredging area should be included in the Project to mitigate sand buildup within the harbour and enhance navigational access from the harbour entrance to the public boat ramp. This additional area extends the original dredging scope to include a small section between the soon-to-be-demolished Jetty 2 and the boat ramp approach, which may otherwise pose navigational challenges within the harbour. The Project Team may incorporate this section into the overall Project scope.

The estimated volume of sand to be dredged in this area is an additional 1,500–2,000 m^3. A separate marine ecology study has been prepared to assess the potential impacts of the expanded dredging area on marine lifeforms within the vicinity of the proposed works. The findings from this study have been addressed in Section 6.8 of this Addendum REF. The proposed additional dredging area is shown in Figure 3-2.

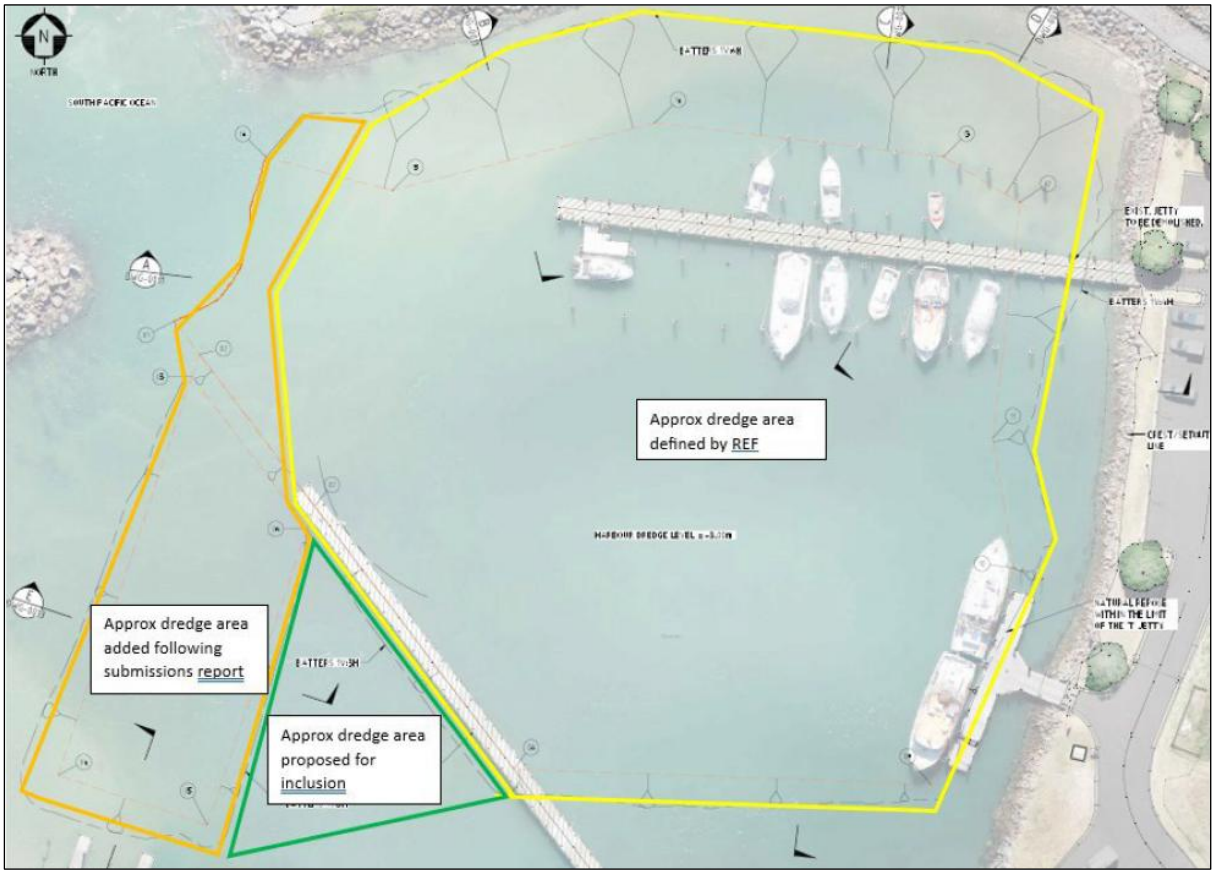

Figure 3-2: Expanded dredging area (Source: Transport)

Installation of temporary moorings

During the construction phase of the Project, access to licensed berthing at Jetty 1 would be temporarily suspended. Alternative berthing arrangements are therefore proposed to potentially accommodate:

- Two commercial fishing vessels.
- A Marine Rescue Vessel.
- Emergency sheltering vessels.

As part of these interim arrangements, two temporary swing moorings would be installed to support various vessels throughout the construction period. The proposed location of the temporary moorings is shown in Figure 3-3.

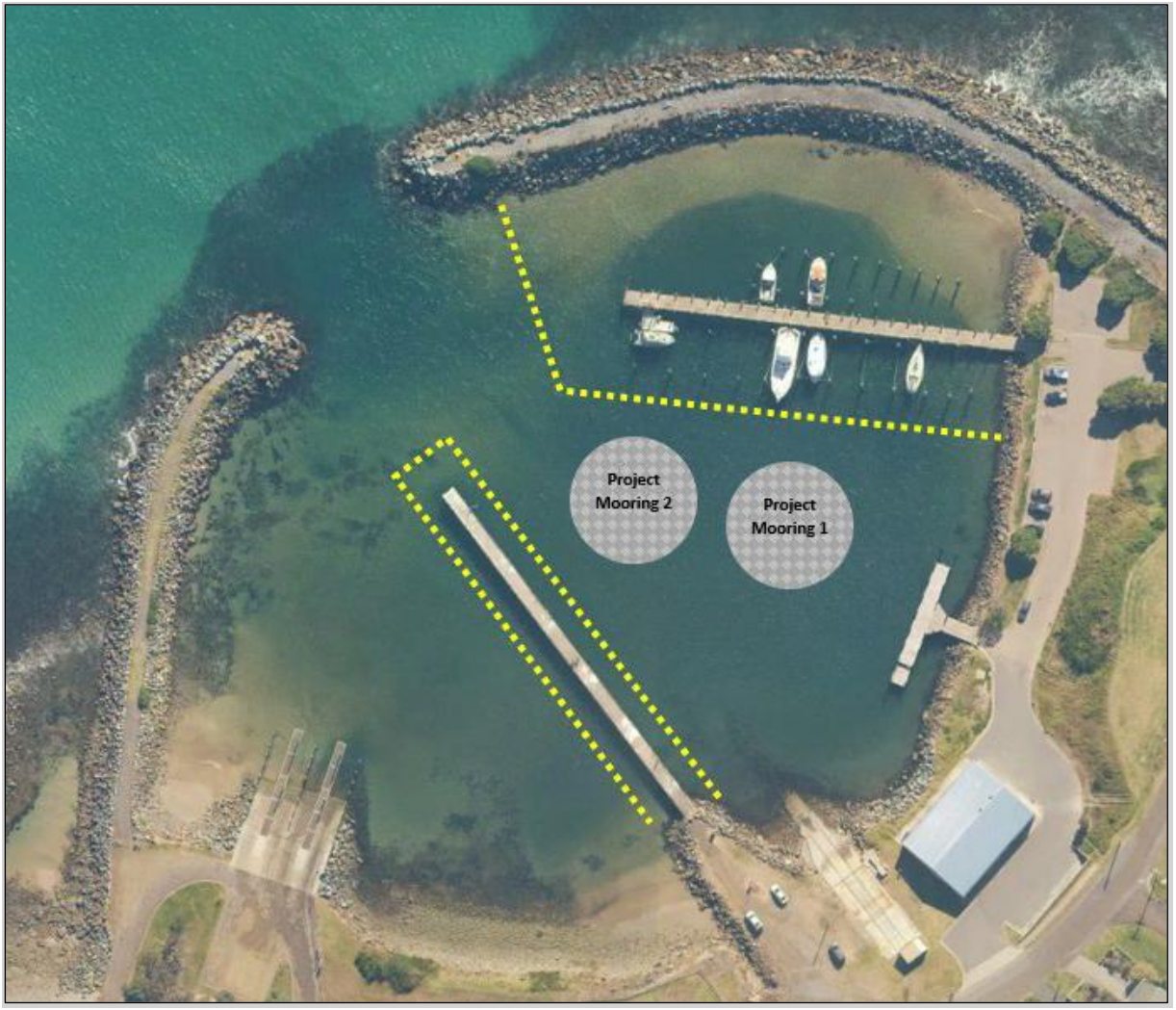

Figure 3-3: Proposed location of temporary moorings (Source: Transport)

Installation of solar lighting on Jetty 1 pile caps

The existing Jetty 1, scheduled for removal, is equipped with six LED streetlight-style fixtures to ensure safe access for vessels. The new Jetty 1 design incorporates ten LED pedestal lights, integrated within service pedestals strategically placed at regular intervals along the floating pontoon structure.

A proposal has been made to enhance visibility at the extremities of the new Jetty 1 by installing low-output solar lights atop selected pile caps, approximately 4-6 meters above the pontoon deck. These lights are intended solely to improve general visibility and are not designed to provide sufficient illumination for safe vessel access or operational lighting. The proposed lighting is shown in Figure 3-4.

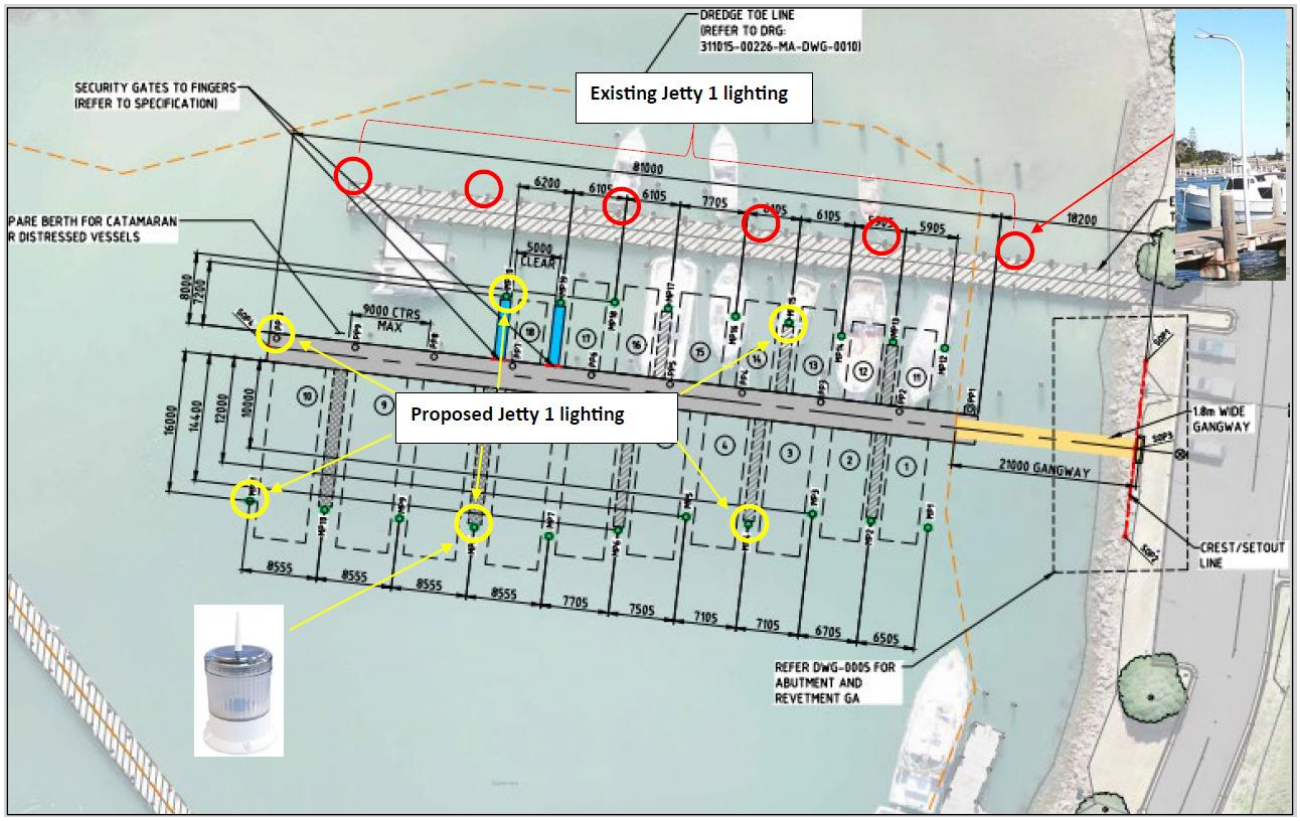

Figure 3-4: Proposed lighting on new Jetty 1 (Source: Transport)

3.2 Construction activities

3.2.1 Work methodology

The following methodology would be undertaken for the works.

Site establishment

Site establishment works would include:

- Establishment of ancillary facilities.
- Installation of exclusion fencing and signage to prevent access by the public to the works site.
- Installation of environmental controls before the mobilisation of the plant and equipment.
- Mobilisation of the barge and workboats. The barge would be transported to the site via truck and launched at the boat ramp. The contractor would liaise with MidCoast Council regarding any requirements for launching.

Jetty 1 and 2 removal

Jetty removal would include:

- Demolition of the existing deck of both jetties using powered hand tools and a hydraulic powered excavator mounted concrete breaker to remove the topping slab.
- Following removal of the deck, the beams and headstocks would be carefully removed using powered hand tools and hydraulic attachments mounted onto the excavator.
- Existing piles would be removed using the barge-mounted excavator.
- Removed jetty sections would be placed on the barge or a service punt and transported to shore.
- Removed sections would be loaded on a truck with a land-based excavator and taken offsite for disposal.

Dredging and placement of sand in sand placement area

The Project is anticipated to involve dredging and sand placement using a cutter suction dredge. The typical cutter-suction dredge utilised for this Project would be shore-launched and requires the establishment of a temporary pipeline between the dredging and placement area. The positioning of the vessel during dredging is typically controlled by winches pulling against cables anchored on each side and/or spuds anchoring the stern of the vessel. The dredged area is gradually expanded as the dredge works from side to side across the cut face. Minor repositioning occurs with the aid of a work boat to move anchors. Apart from such movements, dredging within an area is relatively continuous as sand is constantly pumped to the deposition area.

The implementation of this dredging and sand placement methodology would generally be undertaken as follows:

- The dredge is transported by road to the launch site and typically lifted by crane into the water. This would occur at the public boat ramp within the harbour.
- Lengths of pipe are delivered to the designated laydown area and are assembled on-shore segment-by-segment as the pipe is towed out from the shore by a work boat. Once the required length has been achieved, the pipe is positioned between the intended placement area and the dredge connected. The pump size on the dredge and the corresponding pipe diameter would depend on contractor and equipment availability; however, the pipeline would likely be 150 – 250 mm in diameter.
- The pipeline may consist of both floating sections (with the use of floats) and submerged sections (through navigation channels or high vessel traffic areas). The pipeline route may also cross the existing break wall if preferred by the project team. Pipeline routes would be subject to prevailing conditions and contractor methodology and are to be best configured to minimise the area impacted.
- The pipeline would avoid areas of sensitive marine habitat. The discharge point of the pipe is fixed by anchors and is moved periodically to ensure the even spread of sand within the placement area.
- Pipelines would have appropriate navigational aids and warnings installed where required.
- The main dredge vessel would be serviced by outboard-powered work boat(s), which would undertake functions such as pipeline and anchor handling, crew transfers, hydrographic survey or environmental monitoring.

Post-dredging and placement hydrographic surveys would be undertaken to confirm compliance with the design, verify volumes of sand moved and confirm completion of the contracted works.

At the conclusion of the dredging campaign, all vessels, pipelines and other equipment would be removed from the Project area generally in the reverse fashion to the establishment.

Installation and removal of temporary swing moorings

Temporary swing moorings would be installed within the harbour during construction. The temporary moorings would likely be installed from a work boat or barge and would facilitate securing of vessels as required throughout the construction phase of the Project. The moorings would likely be removed by work boat or barge following the completion of construction activities, when permanent moorings have been reestablished.

Pontoon wharf

Construction of the pontoon wharf would include:

- Following removal of Jetty 1, driving of piles into the sea floor using an excavator mounted torque head. The piles would be screwed into the seabed using a water swivel.
- Piles would then be hammered with an excavator to confirm they are seated correctly.
- Pile caps would be concreted in place and the subframe connection secured.
- Sub-framing would be installed onto the piles. The subframe would be constructed offsite and installed by a crane or excavator.

- Pontoons would be installed on the subframe. The pontoons are to be constructed offsite and lifted into position using a crane sited in the car park.
- The pre-fabricated gangway would be installed with the crane.
- Finishing items, such as power, lighting and water supply, would be installed.

3.2.2 Construction hours and duration

Construction would be undertaken within the standard working hours as defined in the Interim Construction Noise Guideline (ICNG; DECC, 2009). Standard working hours are as follows:

- Monday – Friday: 7:00am to 6:00pm
- Saturday - 8:00am to 1:00pm
- Sunday and public holidays – No work

Construction is expected to commence in the second quarter of 2025 and take about 12 months to complete.

3.2.3 Plant and equipment

The following plant and equipment would likely be used for the proposed works:

- Barge mounted excavator with piling and concrete breaking equipment.
- Workboats to manoeuvre barges.
- Sediment curtains.
- Generators.
- Powered hand tools.
- Bunded refuelling equipment.
- Site security fencing.
- Site storage containers, accommodation and amenities blocks.
- Land-based crane or excavator.
- Dredging equipment.
- Dump trucks.

3.2.4 Traffic management and access

Access to Crowdy Head Harbour is via Harrington Road and Crowdy Head Road off the Pacific Highway (see Figure 1-1). Site access and parking is available within the harbour itself, along Crowdy Head Road, and on Pacific Drive.

3.3 Ancillary facilities

Transport proposes to install the following ancillary facilities:

- Site storage container.
- Security fencing.
- Site toilets.
- Spill kits.
- Fire fighting equipment.
- Emergency assembly point.
- Barge and service punt.

The intended approximate locations of these facilities are shown in Figure 3-5.

3.4 Public utility adjustment

Power, water and sewer, and potentially telecommunications infrastructure is located within the harbour. All utility infrastructure would be physically located prior to any works commencing and the need for protection and/ or relocation confirmed with the asset owner.

3.5 Property acquisition

No property acquisition is required for the proposed works.

Figure 3-5: Location of ancillary facilities (Source: Project REF - GHD)

4 Statutory planning framework

4.1 Environmental Planning and Assessment Act 1979

4.1.1 State Environmental Planning Policies

State Environmental Planning Policy (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 2.80 of TISEPP permits development for the purpose of wharf or boating facilities, including dredging, to be carried out on any land by or on behalf of a public authority without consent. However, such development may only be carried out on land reserved under the *National Parks and Wildlife Act 1974* (NPW Act) if the development is authorised by or under that Act.

As the proposal is for the purpose of wharf or boating facilities and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the EP&A Act. Development consent from council is not required. The proposal is not located on land reserved under the NPW Act.

State Environmental Planning Policy (Planning Systems) 2021

State Environmental Planning Policy (Planning Systems) 2021 (Planning SEPP) repeals State Environmental Planning Policy (State and Regional Development) 2011 and identifies development that is State and regionally significant. The proposal does not meet the definition of State significant infrastructure prior to or as a result of the Proposed Modification.

4.1.2 Local Environmental Plan

Greater Taree Local Environmental Plan 2010

The proposal site is zoned as follows under the Greater Taree Local Environmental Plan 2010 (LEP):

- W3 Working Waterways.
- IN4 Working Waterfront.
- E2 Environmental Conservation.

As the proposal is development permissible without consent under TISEPP, the development control provisions of the LEP do not apply.

4.1.3 Environmental Planning and Assessment Regulation 2021

The *Environmental Planning and Assessment Regulation* 2021 (EP&AR) came into force on 1 March 2022. Section 171 (1) of the EP&AR requires the determining authority when considering the likely impact of an activity on the environment, to take into account the environmental factors specified in the environmental factors guidelines that apply to the activity.

Section 171 (2) requires that if there are no environmental factors guidelines in force, the determining authority must take into account the following environmental factors—

(a) the environmental impact on the community,

(b) the transformation of the locality,

(c) the environmental impact on the ecosystems of the locality,

(d) reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality,

(e) the effects on any locality, place or building that has—

(i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or

(ii) other special value for present or future generations,

(f) the impact on the habitat of protected animals, within the meaning of the *Biodiversity Conservation Act* 2016,

(g) the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air,

(h) long-term effects on the environment,

(i) degradation of the quality of the environment,

(j) risk to the safety of the environment,

(k) reduction in the range of beneficial uses of the environment,

(l) pollution of the environment,

(m) environmental problems associated with the disposal of waste,

(n) increased demands on natural or other resources that are, or are likely to become, in short supply,

(o) the cumulative environmental effect with other existing or likely future activities,

(p) the impact on coastal processes and coastal hazards, including those under projected climate change conditions,

(q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1,

(r) other relevant environmental factors.

Section 171 (3) A determining authority must prepare a review of the environmental factors that demonstrates how the environmental factors specified in the environmental factors guidelines, or the environmental factors specified in subsection (2) if no guidelines are in force, were taken into account when considering the likely impact of an activity.

The preparation of the Project REF and this subsequent Addendum REF satisfies this requirement.

Section 171 (4) The review of environmental factors must be published on the determining authority's website or the NSW planning portal if—

(a) the activity has a capital investment value of more than $5 million, or

(b) the activity requires an approval or permit as referred to in any of the following provisions before it may be carried out—

(i) *Fisheries Management Act* 1994, sections 144, 201, 205 or 219,

(ii) *Heritage Act 1977*, section 57,

(iii) *National Parks and Wildlife Act* 1974, section 90,

(iv) *Protection of the Environment Operations Act* 1997, sections 47–49 or 122, or

(c) the determining authority considers that it is in the public interest to publish the review.

The activity covered under this Addendum REF has a capital investment value of less than $5 million but requires a permit under the FM Act. Transport will publish this Addendum REF on its public website.

4.2 Other relevant NSW legislation

4.2.1 Fisheries Management Act 1994

The objectives of the FM Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. It lists threatened species of fish and marine vegetation, including endangered populations, ecological communities and key threatening processes. One of the objectives of the FM Act is to 'conserve key fish habitats' which includes aquatic habitats that are important to the maintenance of fish populations generally and the

survival and recovery of threatened aquatic species. The FM Act applies to all waters that are within the limit of the State.

Section 220ZZ of the FM Act lists the factors to be considered to determine the impact of an activity on threatened species, populations, ecological communities of fish and marine vegetation. If the proposal is likely to significantly impact on the threatened species, populations or ecological communities, a Species Impact Statement (SIS) is required. The following permits are required in relation to the Project:

- Section 37 Permit for the taking or possession of fish or marine vegetation that would otherwise be unlawful under the FM Act. This permit is required for the relocation works for the White's Seahorse.
- Section 205 Permit will also be required to harm marine animals and vegetation. Harm refers to the gathering, cutting, pulling up, destroying, poisoning digging up, removal, injury to, prevention of light or otherwise any harm to marine vegetation in whole, or part.

This issue is further discussed in Section 6.8. Notification under the FM Act is required for works that constitute dredging and reclamation or harm to marine vegetation. Dredging is proposed and therefore notification will be required.

4.2.2 Biodiversity Conservation Act 2016

The BC Act lists threatened species, populations and ecological communities as well as critical habitat and key threatening processes. Section 7.3 of the BC Act provides the test for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. If a significant impact is considered likely, an SIS or biodiversity development assessment report (BDAR) is required. Impacts to terrestrial biodiversity are addressed in Section 6.7.

4.2.3 Crown Lands Management Act 2016

The *Crown Lands Management Act 2016* (CLM Act) sets out the requirements for leases and licences to be obtained from the Crown land manager for the occupation and use of crown lands.

It is understood that Transport for NSW is the manager of the Crown lands impacted by the proposal. As such, a lease or license under the CLM Act is not required.

4.2.4 Aboriginal Land Rights Act 1983

The *Aboriginal Land Rights Act 1983* (ALR Act) establishes Aboriginal Land Councils (at State and local levels). These bodies have a statutory obligation to protect the culture and heritage of Aboriginal persons in the land council's area and promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area. The process for land claim is defined under the ALR Act.

The proposal is located within the Purfleet/Taree Local Aboriginal Land Council (LALC) area.

The works would directly impact on the following claims made under the ALR Act:

- Claim 36129 by the NSW LALC - under investigation.
- Claim 36156 by the NSW LALC - under investigation.

Given the above, Transport has consulted with the Purfleet/Taree and NSW LALCs during the assessment of the proposal.

4.2.5 Water Management Act 2000

The *Water Management Act* 2000 (WM Act) aims to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future

generations. Approval is required under the WM Act for development within 40 metres of a river, lake, estuary or the coastal waters of the State, including excavation of land or any works that would detrimentally affect the water flowing in a declared waterway.

However, under Clause 41 of the Water Management (General) Regulation 2018, public authorities, such as Transport, are exempt from the requirement to acquire a controlled activity approval. A water access licence (WAL) is required under the WM Act for dewatering of more than three megalitres in one year. Should the Project require dewatering of greater than three megalitres within one year, a WAL would be required.

4.2.6 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) requires the issue of an environment protection licence (EPL) for scheduled activities (being activities listed in Schedule 1 of the Act), the issue of pollution offences, and generally the control of water, air and noise pollution and the management of wastes.

All waste generated from Project works will require classification in accordance with the Waste Classification Guidelines (NSW EPA, November 2014). This waste should be disposed of at a licenced waste facility, or otherwise managed in accordance with an applicable resource recovery order and resource recovery exemption under the Protection of the Environment Operations (Waste) Regulation 2014.

4.2.7 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) aims to prevent the unnecessary or unwarranted destruction of relics and the active protection and conservation of relics of high cultural significance. The NPW Act also provides for the protection of native flora and fauna and the reservation of areas of natural and cultural significance. The Crowdy Bay National Park is approximately 800 metres to the southwest of the harbour and encompasses an area of approximately 7500 hectares of coastal land between Harrington and Camden Haven. It is not anticipated that the Project would directly impact on the park.

Section 86 of the NPW Act lists offences relating to harming or desecrating Aboriginal objects. Under Section 87 of the NPW Act, a permit is required to disturb or move an Aboriginal object. Whilst under Section 90 of the NPW Act, consent is required to destroy, deface or damage an Aboriginal object or Aboriginal place. Aboriginal cultural heritage is discussed further in Section 6.10.

4.2.8 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) is the primary statutory control dealing with non-Aboriginal heritage in NSW. Section 170 of the Heritage Act requires State Government departments to maintain a register of heritage items under their control. No items listed on Transport's or any other State Government department's section 170 registers are located within the area covered by the proposal. No items listed on the NSW State Heritage Register (SHR) are located within the area covered by the proposal.

Section 139 of the Act prohibits disturbance or excavation of any land where it is known or there is reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit issued under section 140 of the Act. No known or potential non-Aboriginal archaeological sites are located on land within the proposal site. If relics are discovered during the works the Transport Unexpected Heritage Items Procedure would be implemented. A search of the NSW State Heritage Inventory on 8 January 2025 revealed no listed items within the area covered by the proposal.

4.2.9 Coastal Management Act 2016

The *Coastal Management Act 2016* (CM Act) aims to manage the coastal environment of NSW in a manner consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of the State. It outlines the management objectives for coastal management areas, provisions for coastal management programs and the manual, and requirements for the establishment and operation of the Coastal Council.

The Project site is mapped as being within a Coastal Environment and Coastal Use area.

The management objectives for the Coastal Environment area are:

(a) to protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes and coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity,

(b) to reduce threats to and improve the resilience of coastal waters, estuaries, coastal lakes and coastal lagoons, including in response to climate change,

(c) to maintain and improve water quality and estuary health,

(d) to support the social and cultural values of coastal waters, estuaries, coastal lakes and coastal lagoons,

(e) to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place,

(f) to maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands and rock platforms.

The management objectives for the Coastal Use area are:

(a) to protect and enhance the scenic, social and cultural values of the coast by ensuring that—

(i) the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast, and

(ii) adverse impacts of development on cultural and built environment heritage are avoided or mitigated, and

(iii) urban design, including water sensitive urban design, is supported and incorporated into development activities, and

(iv) adequate public open space is provided, including for recreational activities and associated infrastructure, and

(v) the use of the surf zone is considered,

(b) to accommodate both urbanised and natural stretches of coastline.

The proposed works are broadly consistent with the above objectives.

4.2.10 Biosecurity Act 2015

The *Biosecurity Act 2015* provides for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.

In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. All private landowners, occupiers, public authorities and Councils are required to control weeds on their land under Schedule 1 of the Act. Any weeds encountered during works would be managed in accordance with the relevant requirements of this Act.

4.2.11 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* aims to establish a process for investigating and (where appropriate) remediating land that the Environment Protection Authority (EPA) considers to be contaminated significantly enough to require regulation under Division 2 of Part 3 of the Act. Land contamination is discussed in Section 6.1.

4.3 Commonwealth legislation

4.3.1 Native Title Act 1993

The *Native Title Act 1993* recognises and protects native title. The Act covers actions affecting native title and the processes for determining whether native title exists and compensation for actions affecting native title. It establishes the Native Title Registrar, the National Native Title Tribunal, the Register of Native Title Claims, the Register of Indigenous Land Use Agreements, and the National Native Title Register. Under the Act, a future act includes proposed public infrastructure on land or waters that affects native title rights or interest.

A search of the National Native Title Tribunal Native Title Vision website on 8 January 2025 showed that there are no Native Title Claims identified within or near the area covered by the proposal.

4.3.2 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. These are considered in Appendix A and chapter 6 of this Addendum REF.

The assessment of the impact of the Proposed Modification on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of Agriculture, Water and Environment under the EPBC Act.

4.4 Confirmation of statutory position

The Proposed Modification is categorised as development for the purpose of wharf or boating facilities, including dredging and is being carried out by or on behalf of a public authority. Under clause 2.80 of ISEPP the Proposed Modification is permissible without consent. The Proposed Modification is not State significant infrastructure or State significant development. The Proposed Modification can be assessed under Division 5.1 of the EP&A Act and clause 171(2) of the EP&A Regulation in the form of this Addendum REF. Transport is the determining authority for this Addendum REF which will fulfil Transport's obligation under section 5.5 of the EP&A Act to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity. Consent from Council is not required. However, the following approvals are required:

- Compliance with applicable Resource Recovery Order and Resource Recovery Exemption under the POEO Act.
- Notification under the FM Act for dredging or reclamation works.
- Permit under the FM Act for harm to marine vegetation.
- Permit under the FM Act for relocation of seahorses.
- Liaison agreement with land claimants as required under the ALR Act.
- A WAL under the WM Act if more than three megalitres per year is dewatered during works.

5 Consultation

5.1 Consultation strategy

The Project REF was placed on display for public comment between 10 June and 15 July 2022. A project specific email address and a free call phone number were established to answer any inquiries and to allow for submitting feedback.

In addition, two community information sessions took place during the public display period to give the community an opportunity to learn more about the project, ask questions and 'have their say'. These information sessions took place on the following dates and locations:

- Wednesday 22 June 2022, between 1pm and 6pm at Crowdy Head Surf Life Saving Club.
- Thursday 23 June 2022, between 1pm and 6pm at Harrington Memorial Hall.

5.2 Community outcomes

A total of 47 submissions were received, of which 44 were from the general community, and 3 were from government agencies. The main issues raised by the community are summarised in Table 5-1 below.

Table 5-1: Summary of issues raised by the community

Group	Issue raised	Response	Where addressed in Submissions Report
General community	Need for fishing platform to replace Jetty 2	Transport has developed a design for a replacement fishing platform and funding options are being considered. An update will be provided to the community once a decision has been made.	Section 2.2
General community	Concerns for the floating pontoon in surging conditions	Transport is aware of the surging conditions within the harbour and the initial concept design did take this into consideration. However, to provide further reassurance, a detailed study was completed using Computational Fluid Dynamic (CFD) modelling.	Section 2.3

Group	Issue raised	Response	Where addressed in Submissions Report
General community	Dredging area to be extended	The proposal included dredging areas of the harbour to provide a safe clearance depth of between 2.6 and 3.0 metres. The dredging area within the harbour excluded some areas due to environmental constraints, contamination and proximity to the slipway. As a result of community feedback, we have increased the dredging area to include the lead up to the boat ramp.	Section 2.4
General community	Community access to Jetty 1	Transport aims to help the boating and wider community safely access, use and navigate our coastal waters. Transport will not exclude public access to Jetty 1 and there is no plan to place a gate on this jetty. The community will be able to access Jetty 1, the same as they currently do.	Section 2.5

Relevant government agencies were provided with the opportunity to make submissions on the Project REF. Issues that were raised as a result of consultation with these agencies are outlined below in Table 5-2.

Table 5-2: Issues raised through consultation with government agencies

Agency	Issue raised	Response
NTS Corp	NTS Corp requested that Transport advise on whether there are any plans to notify in accordance with the Future Acts regime of the *Native Title Act 1993* (Cth).	Transport will notify in accordance with the Future Acts regime of the *Native Title Act 1993* (Cth).
NSW Crown Lands	NSW Crown Lands are supportive of the harbour upgrade but was not sure if the preferred dredged spoil location on the southern headland of Crowdy Head was a viable option due to Native Title implications. They suggested that the dredged material should be placed offshore from	Transport now proposes to dispose of dredged material in a near shore location to avoid Native Title implications. The potential impacts of this change to the proposal are addressed in Section 6.4 and 6.8.

	Crowdy Bay Beach instead.	
DPI Fisheries	Various issues were raised by DPI Fisheries, including: • There is unlikely to be a significant impact on threatened species listed in the REF as White's Seahorse and the Black Rock Cod are unlikely to occur. • Offsetting and a section 205 permit will be required for marine vegetation removal. • Dredging notifications are required. • It is unlikely that White's Seahorse will be present, and no seahorse hotels are required to be fitted to the new structure, however, a pre-construction sweep of the footprint must still occur. • Disposal of dredged material should be limited to the approved area and transported legally. • DPI Fisheries request a copy of the Dredging Environmental Management Plan. • Erosion and sediment controls should be in place for the project and environmental safeguards should prevent the movement of turbid plumes into the adjacent environment.	Transport proposes to take a conservative approach to the potential impacts of the Project on marine fauna and would implement the safeguards and mitigation measures outlined in the Project REF. Transport proposes to offset the impact of the works and obtain a permit under section 205 of the FM Act prior to commencement of works and would notify DPI Fisheries of its intent to undertake dredging. Disposal of dredged material would be limited to the area assessed under this Addendum REF and would be transported legally. A copy of the Dredging Environmental Management Plan would be provided to DPI Fisheries prior to the commencement of construction. Standard Transport construction safeguards in relation to installation of erosion and sediment controls would be implemented during the works, as well as safeguards to prevent the movement of turbid plumes into the adjacent environment. Works would pause and DPI Fisheries would be contacted in the event of a fish kill.

	• Works are to pause and they are to be contacted in the event of a fish kill.	

5.3 Ongoing or future consultation

No further community or stakeholder consultation is proposed for the Project. Transport would implement a Project Communications and Stakeholder Engagement Plan to provide timely and accurate information to wharf users, surrounding sensitive receivers, businesses, stakeholders and the local community of upcoming prior to and during construction of the Project.

6 Environmental assessment

This section of the Addendum REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the Proposed Modification of the Crowdy Head Boat Harbour Upgrade. All aspects of the environment potentially impacted upon by the proposed modification are considered. This includes consideration of the Guidelines for Division 5.1 assessments (DPE 2022) and the factors specified in section 171 of the Environmental Planning and Assessment Regulation 2021. The factors specified in section 171 of the Environmental Planning and Assessment Regulation 2021 are also considered in Appendix B.

Site-specific safeguards and management measures are provided to ameliorate the identified potential impacts.

6.1 Land surface

6.1.1 Methodology

A Phase 1 Preliminary Site Investigation (PSI) was completed for the proposal assessed under the Project REF. The PSI included all areas considered within this Addendum REF, with the exception of the revised near shore placement area. With regard to the near shore placement area, it can be noted that that no excavation is proposed at the site, that the site is within the ocean and no registered contaminated sites occur within this location. The PSI covered:

- Review of geology, soil, hydrology, hydrogeology and topography information for the site.
- Review of the site history including review of historical aerial photographs and any relevant available reports.
- Review of the EPA records under the CLM Act and licences under the POEO Act.
- Assessment and reporting in accordance with the Guidelines for Consultants Reporting on Contaminated Sites (EPA 2020) summarising the results of the desktop review, identification of areas of potential concern, potential chemicals of concern and preparation of a preliminary Conceptual Site Model.

An additional search of the EPA register of contaminated sites was undertaken during the preparation of this Addendum REF. This search did not identify any newly registered sites within the Project locality.

6.1.2 Existing environment

Contamination

No contaminated sites were identified within or adjacent to the proposal area during the preparation of the Project REF and a search of the EPA register of contaminated sites undertaken during the preparation of this Addendum REF did not identify any newly registered sites. The PSI found that the likelihood of chemical contamination within the proposal area was medium to low and this potential is not likely to have changed since the preparation of the Project REF.

Acid sulphate soils

The proposal site and surrounds are mapped as Class 3 and Class 5 acid sulphate soils.

6.1.3 Potential impacts

Contamination

The Project REF found that the proposed works were unlikely to disturb any previously unknown areas of contamination. The revised scope of works covered by this Addendum REF is also unlikely to disturb any previously unknown areas of contamination. Implementation of an

unexpected finds procedures would ensure any potential contamination uncovered is appropriately managed.

Accidental spills from construction plant and improper storage of hazardous materials could lead to soil contamination. Contaminants may also enter and contaminate the harbour if not managed effectively. Potential impacts would be mitigated through the appropriate management of the storage of such materials, and the use of spill kits.

Acid sulphate soils

The Project REF found that the proposed works were unlikely to disturb any acid sulphate soils. The revised scope of works covered by this Addendum REF is also unlikely to disturb any acid sulphate soils.

The proposal would not significantly alter existing land-based infrastructure, and no operational impacts to the land surface are anticipated.

6.1.4 Safeguards and management measures

No additional land surface safeguards or management measures beyond those covered in the Project REF are required as a result of the Proposed Modification, as no substantial change in impacts is anticipated.

6.2 Coastal processes

6.2.1 Methodology

An assessment of the potential impacts of the proposal on coastal processes was undertaken during the preparation of the Project REF. The full report is provided in Appendix D of the Project REF. Dredging and material placement methodology associated with the Proposed Modification was considered within this coastal processes assessment as ‘Option 3’.

6.2.2 Existing environment

The existing coastal processes within the location of the Project (including the location of the Proposed Modification) are described within Appendix D of the Project REF.

6.2.3 Potential impacts

As detailed within the coastal processes assessment included within Appendix D of the Project REF, the harbour has an existing tendency to act as a sediment sink (largely regardless of the levels of maintained dredging). As such, the proposed increased dredging area is unlikely to significantly effect coastal processes when compared to the previously preferred dredging proposal as outlined within the Project REF.

The proposed near shore placement of dredged material, whilst being modest in nature and scale, would have differing potential coastal process impacts to the preferred onshore option identified within the Project REF. Notably, the near shore option assessed within this Addendum REF would incorporate retention of the dredged material within the marine environment as opposed removal and land based placement of this material. Retention of this material within the nearby marine environment more closely aligns with existing dynamic costal processes that exist within the dredging and proposed nearshore placement location, which incorporates the marine based transport of sediment into Crowdy Bay from the south as detailed within Appendix D of the Project REF. Therefore, the revised proposal would reduce coastal process impacts, which had previously been associated with the removal of material from the marine component of the coastal geomorphologic system. It can be noted that both land based and marine based options for the

placement of dredged material were considered within the coastal processes assessment included within Appendix D of the Project REF, and applicable safeguards identified.

6.2.4 Safeguards and management measures

The coastal processes assessment included within Appendix D of the Project REF identified the need to ensure any placement location associated with the proposal is sufficiently offset from existing areas of rock reef type habitat. This mitigation measure has been addressed through Appendix C of this REF, which considers the proposed near shore placement location and confirms its suitability for the placement of dredged material subject to the implementation of safeguards outlined within Appendix C and Table 6-1 of this Addendum REF.

6.3 Water quality

6.3.1 Methodology

A sediment contamination and waste assessment was undertaken during the preparation of the Project REF to assist in determining potential water quality impacts associated with the proposal. The full report is provided in Appendix E of the Project REF.

6.3.2 Existing environment

As detailed within Appendix E of the Project REF, samples were taken at eight locations within the harbour and other than elevated levels of copper and tributylin (TBT) found near the slipway, the remainder of the sediment sampling locations did not contain levels of contaminants of potential concern (CoPC) above the relevant criteria for human health, ecological health or hydrocarbon management limits. Whilst no samples were taken within the additional dredging area covered under this Addendum REF, it is assumed that these findings are applicable to sediment throughout the harbour and that no additional sediment sampling and testing is required.

6.3.3 Potential impacts

Near shore placement of dredged material has the potential to generate marine turbidity, which would not be experienced as a result of land based placement. Given the material is marine sand (course material with low silt content), it is anticipated that any turbidity impacts would be localised and aquatic plumes would settle quickly within the water column. However, notwithstanding the relatively low risk nature of the material, additional water quality impacts have the potential to occur as a result of the near shore placement methodology. Additional safeguards to facilitate the management of potential water quality impacts associated with the Proposed Modification have subsequently been developed and are included within Table 6-1 below.

6.3.4 Safeguards and management measures

The additional water quality safeguards and management measures to be applied to the works as a result of the modification assessed under this Addendum REF are provided in Table 6-2.

Table 6-1: Additional water quality safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
WQ4	Water quality	A Sediment and Water Management Sub-Plan (SWMSP) will be prepared as part of the CEMP, or mitigation strategies will be included within the CEMP, to minimise all risks relating to erosion, turbidity and pollution caused by sediments and other materials. The SWMSP or mitigation strategies will describe how these risks will be addressed during construction.	Contractor	Pre-construction /Construction	Additional safeguard
WQ5	Water quality	An Environmental Control Plan (ECP), forming part of the EWMS-CEMP and including water quality control measures, will be implemented during construction to manage potential water quality impacts associated with the Project.	Contractor	Pre-construction /Construction	Additional safeguard
WQ6	Water quality	A Water Quality Monitoring Program (WQMP), will be developed as part of the CEMP and implemented throughout construction. The WQMP will address the relevant requirements of TfNSW G36 and will be prepared in accordance with the TfNSW Guideline for Construction Water Quality Monitoring and EPA publication “Approved Methods for the Sampling	Contractor	Pre-construction /Construction	Additional safeguard

		and Analysis of Water Pollutants in NSW.”			
WQ7	Water quality	Visual monitoring by both the dredge operator and the deposition site supervisor is to be undertaken continuously as part of their normal duties whilst work is occurring. Visual assessment is to complement calibrated meter readings and is to include: • Nature, extent and direction of any turbid plume at the dredge site. Any change in plume characteristics should be noted and appropriate measures to reduce excessive turbidity are to be implemented immediately. • The nature of the sediments being discharged at the deposition location are to be visually assessed to ensure that excessive fines are not being discharged and that the material is consistent with clean marine sand. Cause for concern could include changes in water colour (i.e. red/brown colouration if coffee rock is being dredged), increased fines content (higher turbidity) or presence of excessive amounts of shell/rock.	Contractor	Construction	Additional safeguard

WQ8	Water quality	A suitable calibrated water quality meter should be used to measure turbidity in accordance with TfNSW G36 during both dredging and deposition activities.	Contractor	Construction	Additional safeguard

6.4 Waste management

6.4.1 Methodology

As detailed above, a sediment contamination and waste assessment was undertaken during the preparation of the Project REF. The full report is provided in Appendix E of the Project REF.

6.4.2 Existing environment

As detailed within the Project REF, a preliminary waste classification has been undertaken. The waste classification is indicative only and additional confirmation sampling would likely be required for offsite disposal to satisfy either state regulatory requirements or landfill acceptance criteria.

The spoil to be dredged for the proposal would likely be classified as General Solid Waste following required treatment for ASS. The exception is the sediments in the vicinity of the slipway, which would likely be classified as Hazardous Waste. These sediments would not be disturbed by proposed works.

6.4.3 Potential impacts

Whilst the proposed disposal location of the dredged sediment from the harbour has changed from on shore to marine based placement, the nature and classification of the material is likely to remain unchanged. As the proposal site and surrounds are mapped as Class 3 and Class 5 acid sulphate soils, the dredged material would require treatment for ASS if it is to be exposed to air. Whilst the risk of generation of sulphuric acid upon exposure of dredged sediments to air is low, due to the proposed dredging and placement methodology, provision should still be made for treatment of ASS should it be required.

6.4.4 Safeguards and management measures

The waste management safeguards and management measures developed for the works assessed under the Project REF remain unchanged and are covered in Table 7-1.

6.5 Noise and vibration

6.5.1 Methodology

Potential noise impacts associated with the Project were assessed within Section 6.4.4 of the Project REF. This Addendum REF has considered potential changes to noise impacts related to the changed scope of works between the preferred project outlined within the Project REF and the Proposed Modification.

6.5.2 Existing environment

As detailed within the Project REF, the nearest sensitive receivers to the proposal are residential and commercial properties on Pacific Drive, about 60 metres southeast of the proposal site (see Figure 6-3). Muir Park is approximately 900 metres south of the proposal. No other sensitive receivers are within proximity of the proposed works.

The existing noise environment is expected to be similar to be a typical suburban environment with a rating background level (RBL) of about 40 dBA (day). As such, the daytime noise management level (NML) would be 50 dBA (RBL + 10 dBA).

6.5.3 Potential impacts

The noise and vibration impacts associated with the Proposed Modification would remain similar in nature to the impacts assessed within the Project REF. This is due to the use of similar construction plant and equipment. However, the deposition of dredged material to the proposed near shore disposal location would result in reduced noise and vibration impacts upon sensitive receivers within the vicinity of the works, due to avoidance of land based processing and transport of dredged material. There would also be a reduction in construction traffic noise associated with the works as there would no longer be any truck movements for bulk disposal of spoil to land.

6.5.4 Safeguards and management measures

The noise and vibration safeguards and management measures developed for the works assessed under the Project REF, as detailed within in Table 7-1, remain suitable and unchanged.

6.6 Landscape character and visual impact

6.6.1 Methodology

Potential impacts to character and visual amenity were considered within Section 6.6.1 of the Project REF. The Proposed Modification was considered in relation to the scope of works as detailed within the Project REF to identify any changes in potential impacts.

6.6.2 Existing environment

As detailed within the Project REF, the proposal site is highly visible and situated immediately north northwest of the small village of Crowdy Head. The surrounding area east, west, and south of the harbour is comprised of residential development including residential flat buildings, multilevel buildings, detached dwellings, and recreational land uses including Muir Park. There are a small number of accommodation providers within the village. Crowdy Head Lighthouse sits on the southwestern corner of the headland and most of the village has a direct line of sight to the harbour.

6.6.3 Potential impacts

There would be positive changes to the visual impact of the Project as a result of the Proposed Modification. This is attributable to trucks not being required for the bulk transfer of dredge spoil to an on-shore placement location, as this material would instead be placed within a near shore location with the use of marine based plant.

Two temporary swing moorings would be installed within the harbour during the construction phase of the Project. This would result in a change in the view of the harbour. However, this would be a minor and short-term change, which is relatively consistent with marine infrastructure currently located within the harbour.

The Proposed Modification would result in a reduced visual impact at the area below the Crowdy Head Cliffs from that that was proposed under the original scope of works covered by the Project REF, as there would now be no disposal of dredged sediment to land.

Additional lighting would be installed in the form of low output-solar lights atop selected pile caps approximately 4-6m above the pontoon deck to delineate the edges of Jetty 1. This lighting would

be solely to improve general visibility for users of the jetty at night, would be restricted to the extremities of the jetty and would only provide sufficient light for visibility. This would result in a negligible increase in the visual impact of the jetty at night.

6.6.4 Safeguards and management measures

No additional landscape character and visual impact safeguards and management measures beyond those developed for the works assessed under the Project REF are required, and some of those original safeguards and management measures no longer apply. The revised safeguards and management measures are covered in Table 7-1.

6.7 Terrestrial biodiversity

6.7.1 Methodology

Potential impacts to terrestrial biodiversity were considered within Section 6.7 of the Project REF. The scope of works within the Project REF were compared to the scope of works associated with the Proposed Modification to determine any changes in potential impacts.

6.7.2 Existing environment

As detailed within the Project REF, the terrestrial environment within the proposal area is highly modified and consists of a landscaped roadside and foreshore park area (Muir Park), with mown grass, planted shrubs and approximately 10 street trees.

6.7.3 Potential impacts

The terrestrial biodiversity assessment undertaken to inform the preparation of the Project REF found that the proposed works would have minimal impacts on terrestrial biodiversity during construction and that no native vegetation or fauna habitat would be removed during the proposed harbour demolition and construction works. The previous assessment found that the proposed disposal of spoil from dredging to land would likely disturb native fauna and smother existing groundcover at the disposal site. Under the revised proposal covered by this Addendum REF there would be no disposal of spoil to land so this impact would no longer occur.

6.7.4 Safeguards and management measures

No additional terrestrial biodiversity safeguards and management measures beyond those developed for the works assessed under the Project REF are required, and some of those original safeguards and management measures no longer apply. The revised safeguards and management measures are covered in Table 7-1.

6.8 Marine biodiversity

6.8.1 Methodology

A marine ecology assessment was undertaken by H20 Consulting Group in December 2024 which covered the proposed additional dredge area within the harbour adjacent to the existing jetty (including areas within 20 m of the proposed additional dredge footprint) and for a near shore sand placement area approximately 200 m northwest of the harbour entrance.

The seabed was inspected using a drop camera with live surface feed and habitat was updated based on recent Nearmap aerial imagery. The survey included collection of field verification points in a customised GIS application to record benthic habitat characteristics including presence of estuarine macrophytes (seagrasses and macroalgae). A habitat map was then prepared using GIS Software.

6.8.2 Existing environment

The additional harbour dredge area covers an area of about 1400 m^2 and is located adjacent to the existing dredging boundary at the boat ramp and the existing jetty. The seabed within the dredge footprint was found during the survey to consist of shallow, unvegetated, clean marine sands, with evidence of shallow shoaling sands in places. Marine vegetation, including seagrasses and macroalgae, was not observed within the additional dredge area boundary. However, a thick layer of green algal wrack was observed in the 30 – 50 cm of water above the sediment, with some settlement on the seabed. This area was characteristic of Type 3 Minimally Sensitive Key Fish Habitat (KFH).

Previous mapping in adjacent habitats by H2O Consulting Group in 2023 identified a mixture of unvegetated, sandy soft sediment to the north, east and west, whilst to the south soft sediment supported seagrass beds and macroalgae. A fringing bed of medium-density Halophila sp. was previously recorded approximately 12 m south of the dredge area, extending approximately 20 m towards the shore before transitioning to a fringing medium-density bed of mixed Zostera sp. and Halophila sp., which extended another approximately 10-12 m towards shore. The seaward edge of this seagrass bed was not observed within the dredge area or 20 m buffer during the most recent survey.

The nearshore sand placement area encompasses an area of approximately 40,000 m^2, with minimum distances from nearby features including 400 m from shore, 200 m from the Harbour entrance and 100 m from rocky reef to the east (seaward). The seabed within the placement footprint was found to consist of unvegetated, shoaling, clean marine sands with some shell rubble and macroalgae wrack. Marine vegetation, including macroalgae, was not observed within the sand placement area. Adjacent habitat within 20 m of the approximate sand placement area boundary consisted of the same habitat features. No subtidal rocky reef was observed in either the sand placement area or the adjacent 20 m buffer. This area was characteristic of Type 3 Minimally Sensitive KFH.

6.8.3 Potential impacts

Transport proposes to establish a harbour seabed level of -3m in the additional dredge area via removal (dredging) of shallow sands, which are typically of -1m or less depth. The proposed additional dredge area design would avoid direct disturbance to seagrass beds and macroalgae stands and provide a minimum buffer of >20 m from closest previously mapped seagrasses. Additionally, the sand placement area also avoids marine vegetation and has been designed to maintain a minimum 100 m distance from nearby subtidal rocky reef habitat with placement in close proximity to the surf zone, where sedimentation impacts would be minimal.

Dredging and placement of sands would, however, result in the following potential impacts on marine habitat:

- Removal of shallow sands from the dredging area that may contain some infauna (marine invertebrates that live on or in the sand). These are expected to consist of common species of polychaetas, gastropods, and crustaceans.
- Smothering of benthic infauna or slow moving epibenthic fauna, which may include various crustaceans, gastropods, polychaetas, bivalves or small fish, from the placement of sand in subtidal areas.
- Mobilisation of sediments and a reduction of water quality (increased turbidity) during dredging and placement works, which may result in reduced available light for macrophyte growth (seagrass and macroalgae) and sedimentation.

- Installation of temporary moorings has the potential to damage areas of seagrass if placed within them. Temporary moorings should only be installed within the footprint of the proposed works covered under the Project REF and this Addendum REF which is outside areas of known seagrass habitat.

6.8.4 Safeguards and management measures

The additional marine biodiversity safeguards and management measures to be applied to the works as a result of the modification assessed under this Addendum REF are provided in Table 6-2.

Table 6-2: Additional marine biodiversity safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
MB11	Seagrasses	Vessels and barges will be required to maintain at least 600 mm clearance to the seabed when within 10 m of any seagrass or macroalgae habitat.	Contractor	Construction	Additional safeguard
MB12	Seagrasses	Temporary moorings will not be established within or immediately adjacent to any areas of seagrass.	Contractor	Construction	Additional safeguard

6.9 Traffic, transport and access

6.9.1 Methodology

Potential impacts to traffic, transport and access were considered within Section 6.9 of the Project REF. The scope of works within the Project REF were compared to the scope of works associated with the Proposed Modification to determine any changes in potential impacts.

6.9.2 Existing environment

As detailed within the Project REF, the road network within the vicinity of the harbour is characterised by residential streets with on and off-street parking.

Crowdy Head Harbour is accessed from Crowdy Head Road and Pacific Drive. Both are local roads managed by MidCoast Council. Crowdy Head Road connects to the Pacific Highway (A1) to the east, with other local roads including Deborah Street, Leopold Street and Stewart Close, within the village to the west.

Crowdy Head Road/ Pacific Drive has one lane in each direction, and a signposted speed of 50 kilometres per hour. There is street lighting along parts of the road around the harbour area.

6.9.3 Potential impacts

The traffic and transport assessment undertaken during preparation of the Project REF found that the majority of traffic and transport impacts associated with construction of the project would come from truck movements required to transport dredged material to the proposed disposal site at Crowdy Head Cliffs. Traffic and transport impacts associated with the Project would be reduced under the Proposed Modification as these truck movements would not occur.

6.9.4 Safeguards and management measures

No additional traffic, transport and access safeguards and management measures beyond those developed for the works assessed under the Project REF are required, and some of those original safeguards and management measures no longer apply. The revised safeguards and management measures are covered in Table 7-1.

6.10 Aboriginal heritage

6.10.1 Methodology

Aboriginal Heritage assessment undertaken in the preparation of the Project REF has been supplemented with an updated Aboriginal Heritage Information Management System (AHIMS) database search and a review of other relevant Aboriginal Heritage resources to determine any change in potential impact between the preferred option for the proposal as detailed within the Project REF and the Proposed Modification.

6.10.2 Existing environment

A search of the AHIMS database undertaken on 8 January 2025 found that there were seven Aboriginal sites and no Aboriginal places recorded within the vicinity of the proposed works, and no

sites or places within the area covered by the Project. The AHIMS search undertaken for the Project REF determined that the nearest listed site, site 30-6-0006, was located over 100 m outside of the project area in Muir Park, and would not have been affected by the scope of works assessed under the Project REF. A Stage 1 Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) assessment was undertaken during the preparation of the Project REF and found that the works proposed under the Project REF were unlikely to harm known Aboriginal objects or places.

The Project is located within the Purfleet/Taree LALC area and the works may impact on the following claims made under the ALR Act:

- Claim 36129 by the NSW LALC - under investigation.
- Claim 36156 by the NSW LALC - under investigation.

6.10.3 Potential impacts

Based on the above, the works proposed under the Project REF and this Addendum REF are unlikely to harm known Aboriginal objects or places.

Should Land Claims ALC36156 and ALC36129 be impacted by the proposed works, Transport would require written approval from the NSW LALC prior to the commencement of works in those areas.

6.10.4 Safeguards and management measures

No additional Aboriginal Heritage safeguards or management measures beyond those developed for the works assessed under the Project REF are required. Aboriginal Heritage safeguards and management measures are covered in Table 7-1.

6.11 Non-Aboriginal heritage

6.11.1 Methodology

Non-Aboriginal Heritage assessment undertaken in the preparation of the Project REF has been supplemented with updated heritage database searches and review of heritage resources to determine any change in potential impacts between the preferred option for the proposal as detailed within the Project REF and the Proposed Modification.

6.11.2 Existing environment

A search of the Heritage NSW State Heritage Inventory (SHI) undertaken on 8 January 2025 found that there were no identified non-Aboriginal heritage sites or items within the vicinity of the proposed works.

6.11.3 Potential impacts

Given no known non-Aboriginal heritage sites exist within the vicinity of the Project, no non-Aboriginal heritage impacts are anticipated.

6.11.4 Safeguards and management measures

No additional non-Aboriginal heritage safeguards and management measures beyond those developed for the works assessed under the Project REF are required. Non-Aboriginal heritage safeguards and management measures are covered in Table 7-1.

6.12 Other impacts

No additional impacts beyond those assessed above and those covered in the ‘other impacts’ section of the Project REF have been identified during the preparation of this Addendum REF.

6.13 Cumulative impacts

No additional cumulative impacts beyond those assessed in the Project REF have been identified during the preparation of this addendum REF.

7 Environmental management

7.1 Environmental management plans

A number of safeguards and management measures have been developed in this Addendum REF as well as the Project REF in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the Project. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the Project.

A Construction Environmental Management Plan (CEMP) would be prepared to describe the safeguards and management measures identified. The CEMP would provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation. The CEMP would be prepared prior to construction of the proposal and must be reviewed and certified by the relevant Transport Environment and Sustainability Officer prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan), QA Specification G40 – Clearing and Grubbing and QA Specification G10 - Traffic Management.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures for the Crowdy Head Boat Harbour Upgrade are summarised in Table 7-1. New updated or additional safeguards and management measures identified in this Addendum REF are included in bold font. Safeguards and management measures proposed to be amended or removed have been marked with strikethrough font.

The revised safeguards and management measures will be incorporated into the CEMP and implemented during construction and operation of the Proposed Modification, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment.

Table 7-1: Summary of site specific safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN 1	General – minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Transport Environment Manager prior to commencement of the activity. As a minimum, the CEMP will address the following: • Any requirements associated with statutory approvals. • Details of how the Project will implement the identified safeguards outlined in the REF. • Issue-specific environmental management plans. • Roles and responsibilities. • Communication requirements. • Induction and training requirements. • Procedures for monitoring and evaluating environmental performance, and for corrective action.	Contractor / Transport Project Manager	Pre-construction / detailed design	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Reporting requirements and record-keeping. The endorsed CEMP will be implemented during the undertaking of the activity.			
GEN 2	General - notification	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / Transport Project Manager	Pre-construction	Standard safeguard
GEN 3	General – Environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings.	Contractor	Pre-construction / detailed design	Standard safeguard
LS1	Erosion and sedimentation	An Erosion and Sediment Control Plan (ESCP) is to be prepared and implemented in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)) to: • Prevent sediment moving off-site and sediment laden water entering any the harbour. • Reduce water velocity and capture sediment on site. • Minimise the amount of material transported from site to surrounding waters and pavement surfaces. • Divert clean water around the site. • Monitor and maintain all controls.	Contractor	Pre-construction Construction	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
LS2	Spills	**Marine and terrestrial** ~~A~~ spill kits ~~is~~ **are** to be available on site and accessible at all times. The spill kit**s** must be appropriately sized for the volume of substances at the work site. **Staff will be toolboxed on the use of spill kits and the need to replace any contents used to clean up spills.**	Contractor	Construction	Additional safeguard
LS3	Contaminated land	Any unexpected finds of contamination are to be managed in accordance with an Unexpected Finds Procedure. If contaminated soils are encountered or suspected, works will cease until appropriate management is implemented and the site is cleared by Transport for NSW.	Contractor	Construction	Additional safeguard
CP1	Safety risk due to extreme events	An Emergency Management Plan (EMP) will be prepared and implemented to include procedures to maintain worker safety and prevent damage to infrastructure, plant and machinery. The EMP will include: • Evacuation procedures. • Protocols for securing and removing water-based and land-based equipment and machinery during evacuation. • Appropriate safe locations for stockpiles and storage areas etc.	Contractor	Construction	Additional safeguard
WQ1	Dredging	A detailed Dredging Management Plan (DMP) would be prepared to outline requirements to control sediments and potential pollutants during dredging activities. The DMP would include the following at a minimum:	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Silt curtain/s are to be installed prior to **works** and around the area of works that may disturb the seabed. Silt curtains are to be installed, monitored and maintained as needed to contain any sediment. • Dredging to take place ~~at low tide only and~~ during stable weather and wave conditions. • Positioning of barges, drilling and pile driving should occur during standard construction hours and calm conditions to prevent excessive scouring and minimise any safety risks. • Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) **is to be undertaken** on a regular basis in accordance with TfNSW G36 to identify any potential spills or deficient erosion and sediment controls. • Vessels (including barges) are only to be used at suitable tides when no less than 600 mm clearance is available between the underside of the vessel and the bed of the waterway. • Prior to entry into the waterway, machinery should be appropriately cleaned, degreased and serviced. • Capture and store any waste drilling fluids for appropriate onshore disposal according to legislative requirements.			

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Ensure that all liquids including fuel and other liquids used on barges during construction are securely contained. • Vessel speeds will be limited to signposted speeds to minimise turbidity being generated from propellor wash.			
WQ2	ASS	Potential or actual acid sulfate soils are to be managed in accordance with the Transport for NSW Guidelines for the Management of Acid Sulphate Materials 2005 and an ASSMP. The ASSMP is to include procedures for testing, material classification, treatment and disposal.	Contractor	Construction	Additional safeguard
WQ3	Water quality	Transport for NSW will continue to provide guidance for harbour users on correct procedures to avoid water quality impacts.	Transport for NSW	Operation	Additional safeguard
WQ4	**Water quality**	**A Sediment and Water Management Sub-Plan (SWMSP) will be prepared as part of the CEMP, or mitigation strategies will be included within the CEMP, to minimise all risks relating to erosion, turbidity and pollution caused by sediments and other materials. The SWMSP or mitigation strategies will describe how these risks will be addressed during construction.**	**Contractor**	**Pre-construction /Construction**	**Additional safeguard**
WQ5	**Water quality**	**An Environmental Control Plan (ECP), forming part of the EWMS-CEMP and including water quality control measures, will be implemented during construction to manage potential water quality impacts associated with the Project.**	**Contractor**	**Pre-construction /Construction**	**Additional safeguard**

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
WQ6	**Water quality**	**A Water Quality Monitoring Program (WQMP), will be developed as part of the CEMP and implemented throughout construction. The WQMP will address the relevant requirements of TfNSW G36 and will be prepared in accordance with the TfNSW Guideline for Construction Water Quality Monitoring and EPA publication "Approved Methods for the Sampling and Analysis of Water Pollutants in NSW."**	**Contractor**	**Pre-construction /Construction**	**Additional safeguard**
WQ7	**Water quality**	**Visual monitoring by both the dredge operator and the deposition site supervisor is to be undertaken continuously as part of their normal duties whilst work is occurring.** **Visual assessment is to complement calibrated meter readings and is to include:** • **Nature, extent and direction of any turbid plume at the dredge site. Any change in plume characteristics should be noted and appropriate measures to reduce excessive turbidity are to be implemented immediately.** • **The nature of the sediments being discharged at the deposition location are to be visually assessed to ensure that excessive fines are not being discharged and that the material is consistent with clean marine sand. Cause for concern**	**Contractor**	**Construction**	**Additional safeguard**

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		could include changes in water colour (i.e. red/brown colouration if coffee rock is being dredged), increased fines content (higher turbidity) or presence of excessive amounts of shell/rock.			
WQ8	**Water quality**	**A suitable calibrated water quality meter should be used to measure turbidity in accordance with TfNSW G36 during both dredging and deposition activities.**	**Contractor**	**Construction**	**Additional safeguard**
W1	Waste	A Waste Management Plan (WMP) will be prepared in accordance with legislative requirements to include measures to minimise waste, outline methods of disposal, reuse and recycling and monitoring, as appropriate. The WMP would include: • Appropriate measures to avoid and minimise waste associated with the proposal should be investigated and implemented where possible. • Waste management, littering and general tidiness will be monitored during routine site inspections. Monitor waste and recycling quantities using Transport for NSW Waste Data Collection Workbook – DMS-FT-436 to support compulsory requirement 4 of the Transport for NSW Sustainable Design Guidelines version 4.0.	Contractor	Pre-construction/Construction	Additional safeguard
W2	Waste	Existing waste bins to be monitored to determine appropriate size/ emptying frequency due to potential patron increase.	Transport for NSW	Operation	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
W3	Resource use	Recycled, durable, and low embodied energy products will be considered to reduce primary resource demand in instances where the materials are cost and performance competitive and comparable in environmental performance (e.g. where quality control specifications allow).	Transport for NSW	Construction	Standard safeguard
W4	Recycling and resource use	Transport will work with both the local Men's Shed and the contractor on the potential for the reuse of the jetty timbers.	Transport for NSW project manager / Contractor	Construction	Additional safeguard
N1	Noise	A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Interim Construction Noise Guideline (ICNG; DECC, 2009) and Construction Noise and Vibration Guideline (CNVG; TfNSW, 2016) and identify: • All potential major noise and vibration generating activities associated with the activity. • Feasible and reasonable standard measures to be implemented. • Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures. • Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.	Contractor	Construction	Standard safeguard
N2	Notification	Advance warning of works and potential disruptions can assist in reducing the impact	Contractor / TfNSW	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		on the community. The notification may consist of using variable message sign, letterbox drop (or equivalent), web site / social media or a combination to distribute information detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of 5 working days prior to the start of works. The approval conditions for projects may also specify requirements for notification to the community about works that may impact on them.			
VA1	Visual amenity	Hoarding or screening will be erected around the construction compound where possible, to reduce visibility.	Contractor	Construction	Additional safeguard
VA2	Visual amenity	The construction area would be left clean and tidy at the end of each working day.	Contractor	Construction	Additional safeguard
~~TB1~~	~~Biodiversity~~	~~The disposal area would be set out prior to any transport of spoil commencing (with flagging tape or temporary fencing etc.). Works would be contained within the delineated area to avoid impacts to adjacent areas.~~	~~Contractor~~	~~Construction~~	~~Additional safeguard~~
MB1	General	A Marine Ecology Management Plan (MEMP) would be prepared to include~~, but not be limited to, the following~~ **management** measures relating to potential direct and indirect impacts **to marine ecology aspects associated with the Project.** Additionally, a section 205 permit will be required to harm marine vegetation. When applying for the permit the Marine Ecology Management Plan	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		and a final offset proposal will also be submitted to DPI Fisheries.			
MB2	Impacts to White's Seahorse	• Visual inspection (via diving) for White's Seahorse on piles and seagrass by suitably qualified marine scientists **would be undertaken** prior to removal of piles and seagrass, with the intent to capture and relocate any individuals found. This will require the development and approval of a Relocation Plan. • If White's Seahorse is identified during the visual inspection, avoid works during the breeding season of the White's Seahorse (September to February).	Contractor	Construction	Additional safeguard
MB3	Water quality	• Dredging will be carried out using a method appropriate to the sediment characteristics within the harbour, with the method reducing environmental impacts as far as reasonably practicable. Use of a cutter suction dredge will result in less environment impact as it is less impactful to the seabed, resulting in less suspended solids. • Disposal of dredged material will be strictly limited to the approved disposal area. • A silt curtain will be used to limit the extent of the turbidity plume generated during dredge activities. Silt curtains to	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		be placed around the works, not around the sensitive areas. • Use tides to assist with entry of deep-draught vessels for dredging to avoid sediment resuspension from propeller wash as far as practicable. Monitoring of turbidity during dredging **will be undertaken** to understand the generation and migration of turbid plumes from the works. Monitoring should be undertaken with reference to trigger levels that are linked to management actions such as adjustment of dredging works (e.g., movement of the dredge position, deployment of silt curtains, ceasing dredging to allow water quality to improve). It is recommended that monitoring comprise daily visual inspections during the active works. Observations should be made on a flood and ebb tide. Where it is evident that the water is becoming turbid as a result of active works, works are to stop and the deployment configuration of silt curtains reconsidered or time allowed for settlement of suspended solids.			
MB4	Water quality	A 'Maintenance Dredging Environmental Management Plan' will be developed that considers the long-term management of spoil in the harbour to include actions that minimise accretion in the harbour, justification for depth and width of dredging proposed, co-ordinates dredging proposed with beach renourishment proposals to make best use of material and establishes spoil disposal arrangements for	Transport for NSW	Operation	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		maintenance dredging that minimises long term impacts. The Plan will also address approvals required, roles and responsibilities, environmental controls, risks and dredging operations proposed.			
MB5	Seagrass removal	Clear delineation of dredge boundaries **will be undertaken** to preserve seagrass outside the footprint. This can be achieved by markers to delineate no-go zones and use of live GPS on dredge plant with reference to digital dredge boundaries.	Contractor	Construction	Additional safeguard
MB6	Noise	• Consideration should be given to the use of bubble curtains during pile driving. • Activities that generate underwater noise (such as piling) should be timed to occur outside of peak migration months to reduce overlap with migratory movements and therefore reduce the potential threat to migratory marine mammals, turtles and migratory marine birds. Piling activities should implement mitigation measures outlined in the Government of South Australia's Underwater Noise Piling Guidelines (DPTI, 2012).	Contractor	Construction	Additional safeguard
MB7	Marine pests	• Where possible, vessels should be locally sourced to complete the proposed works. • Any internationally sourced vessels will empty ballast water in accordance with the latest version of the Australian	Transport for NSW/Contractor	Construction/Operation	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		Ballast Water Management Requirements (DAWE, 2020). • If an invasive marine pest species is identified or suspected, then the contractor will notify the NSW Department of Primary Industries hotline on 1800 675 888 (24 hour line) within 24 hours. Proposal activities will adhere to the National Introduced Marine Pest Information System (NIMPIS) and NSW requirements for invasive marine pest species identification and management.			
MB8	Fauna collision	• Vessels will be operated in accordance with Part 8 of the EPBC Regulation (Interacting with Cetaceans and Whale Watching). The Australian Guidelines for Whale and Dolphin Watching (DoEE, 2017) for seafaring activities will be implemented across the proposal site.	Transport for NSW/Contractor	Construction/Operation	Additional safeguard
MB9	Release of hydrocarbons and chemicals	• Chemicals and hydrocarbons will be packaged, marked, labelled and stowed in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I, II and III regulations. • A Material Safety Data Sheet (MSDS) will be available for all chemicals and hydrocarbons in locations near to where the chemicals/wastes are stored.	Transport for NSW/Contractor	Construction/Operation	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Where required by legislation vessel operators will have an up-to-date Shipboard Oil Pollution Emergency Plan (SOPEP) and Shipboard Marine Pollution Emergency Plan (SMPEP). All shipboard chemical and hydrocarbon spills will be managed in accordance with these plans by trained and competent crew. • Any contaminated material collected will be contained on board for appropriate onshore disposal. • Spill clean-up equipment will be located where chemicals and hydrocarbons are stored and frequently handled (i.e. 'high risk' areas). The quantity of spill recovery materials will be appropriate to the quantity of stored chemicals. • Transfer deck run off discharges to the sea via the scuppers. • Any equipment or machinery with the potential to leak oil will be enclosed in continuous bunding or will have drip trays in place where appropriate. • Following rainfall events, bunded areas on open decks of the vessels will be cleared of rainwater. • All hoses for pumping and transfers will be maintained and checked. • On board oily water disposal will be managed in accordance with the Marine Pollution Regulation 2006.			

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• If vessels are equipped with an oily water filter system, they may discharge oily water after treatment to 15 parts per million (ppm) in an oily water filter system (providing they have a current calibration certificate for the bilge alarm) as required by MARPOL Annex I Regulations (for the prevention of pollution by oil). • Refuelling operations will be a manned operation. In the event the refuelling pipe is ruptured, fuel bunkering will cease. • Refuelling of a vessel will only occur in suitable weather conditions and within the harbour. Dry-break refuelling hose couplings and hose floats can be installed on the refuelling hose assembly.			
MB10	Marine biodiversity impacts	DPI Fisheries and the Environmental Protection Authority are to be notified immediately if any fish kills occur in the.	Transport for NSW environment manager	Construction	Additional safeguard
MB11	**Seagrasses**	**Vessels and barges will be required to maintain at least 600 mm clearance to the seabed when within 10 m of any seagrass or macroalgae habitat.**	**Contractor**	**Construction**	**Additional safeguard**
MB12	**Seagrasses**	**Temporary moorings will not be established within or immediately adjacent to any areas of seagrass.**	**Contractor**	**Construction**	**Additional safeguard**
TT1	Property access	Property access would be maintained during the works.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
TT2	Traffic	A Traffic Control Plan (TCP) will be prepared and implemented in accordance with the 'Traffic control at work sites manual' (RTA, 2010a) and Australian Standard 1742.3 Manual of uniform control devices	Contractor	Construction	Additional safeguard
TT3	Pedestrian access	Safe pedestrian access to the seawall and park area is to be maintained **where practical to do so** with consideration to temporary security fencing and wayfinding being implemented for each construction stage.	Contractor	Construction	Additional safeguard
TT4	Water traffic	A Marine Traffic Control Plan (MTCP) will be prepared and implemented. The MTCP will identify: • Navigational safety requirements for all construction vessels and water-based equipment. • A response plan for implementation including 24-hour contact details, management and communication protocols for enquiries, complaints and emergencies.	Contractor	Construction	Additional safeguard
TT5	Water traffic	Where possible, current vessel movements and public access to the waterway and foreshore area are to be maintained during works. Any disturbance is to be minimised as much as practicable.	Contractor	Construction	Additional safeguard
TT6	Water traffic	Commercial, recreational operators, private services and the community that use the existing wharf will be advised of: • The commencement of construction, well in advance of work starting, including the location of the compound	Transport for NSW	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		site and temporary loss of car parking bays • Any changes to pedestrian routes to safely access the harbour. • The partial harbour closure at least two weeks prior to closure.			
TT7	Water traffic	A navigation exclusion zone will be established during construction to prevent unauthorised vessels entering the area. This zone will be clearly defined to communicate access for other water users.	Contractor	Pre-construction/Construction	Additional safeguard
AH1	Unexpected finds	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport for NSW Aboriginal cultural heritage officer and regional environment manager contacted immediately. Steps in the Transport for NSW Standard Management Procedure: Unexpected Heritage Items must be followed	Contractor	Construction	Standard safeguard
AH2	Agency notifications	Transport will notify in accordance with the Future Acts regime of the *Native Title Act 1993*.	Transport for NSW project manager	Pre-construction	Additional safeguard
HH1	Non-Aboriginal cultural heritage	If unknown or potential heritage object/s are found during construction, work would stop, the area would be protected and advice would be sought from Transport for NSW. Work will only re-commence once advised accordingly.	Contractor	Construction	Standard safeguard
AQ1	Air quality	• Manage work during strong winds or other adverse weather conditions as required. • Cover all loaded trucks and vessels.	Contractor	Construction	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Machinery to be turned off rather than left to idle when not in use. • Maintain all vehicles, including trucks and vessels entering and leaving the site, in accordance with the manufacturers specifications to comply with all relevant legislation. • Maintain the work site in a condition that minimises fugitive emissions such as minor dust. • Install appropriate sediment and erosion controls for any exposed earth or stockpiled waste.			
HR1	Hazards	Refuelling of plant and equipment is to occur in impervious bunded areas located a minimum of 50 metres from drainage lines or waterways	Contractor	Construction	Standard safeguard
HR2	Hazards	Refuelling of plant and equipment and storage of hazardous materials on barges is to occur within a double-bunded area.	Contractor	Construction	Standard safeguard
HR3	Hazards	**Marine and terrestrial** ~~A~~ spill kits ~~is~~ **are** to be available on site and accessible at all times. The spill kit**s** must be appropriately sized for the volume of substances at the work site. **Staff will be toolboxed on the use of spill kits and the need to replace any contents used to clean up spills.**	Contractor	Construction	Standard safeguard
HR4	Hazards	If an incident (e.g. spill) occurs, the Transport for NSW Environmental Incident Classification and Reporting Procedure is to be followed and the Transport for NSW Contract Manager notified as soon as practicable.	Contractor	Construction	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
HR5	Hazards	Emergency contacts will be kept in an easily accessible location on vehicles, vessels, plant and site office. All workers will be advised of these contact details and procedures	Contractor	Construction	Standard safeguard
HR6	Hazards	Spill kits for construction barges must be specific for working within the marine environment.	Contractor	Construction	Standard safeguard
HR7	Hazards	All workers will be advised of the location of the spill kit and trained in its use.	Contractor	Construction	Standard safeguard
HR8	Hazards	Vehicles, vessels and plant must be properly maintained and regularly inspected for fluid leaks.	Contractor	Construction	Standard safeguard
HR9	Hazards	In the event of a maritime spill, the incident emergency plan would be implemented in accordance with Sydney Ports Corporation's response to shipping incidents and emergencies outlined in the 'NSW State Waters Marine Oil and Chemical Spill Contingency Plan' (Maritime, 2012).	Contractor	Construction	Standard safeguard
SE1	Socio-economic	A Communications and Stakeholder Engagement Plan will be prepared to provide timely and accurate information to wharf users, surrounding sensitive receivers, businesses, stakeholders and the local community of: • Construction activities well in advance of construction starting. • Project updates to the progress in construction including the stage construction program. Wharf users will be notified and informed on which	Transport for NSW and Construction Contractor	**Pre-construction/**Construction	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		sections of the wharf will be opened or closed for public use. • Any disruptions to local road traffic. • Contact name and telephone number for enquiries or for making a complaint. A webpage and free-call number will be established for enquiries and will remain active for the duration of construction. All enquiries and complaints will be tracked and acknowledged within 24 hours of being received.			
SE2	Socio-economic	Transport is to update the community on the fee structure for the upgraded harbour prior to completion of the project.	Transport for NSW Project Manager	**Construction**	Additional safeguard
CC1	Climate change and greenhouse gas	The proposal design would consider and reflect, as far as practical, climate change and sea level rise projection.	Transport for NSW	Detailed design	Additional safeguard
CC2	Climate change and greenhouse gas	Recycled materials to be used during design, construction and operation of the proposal wherever possible.	Transport for NSW and Construction Contractor	Detailed design/ construction/ operation	Additional safeguard
CU1	Cumulative construction impacts	Community will be notified prior to the start of the works. Updates on any delays or changes to the construction period will also be communicated. Developers of the Eco Resort will be consulted prior to undertaking the proposal to avoid potential traffic and other issues.	Transport for NSW	Pre-construction**/**Construction	Additional safeguard
DE1	Potential removal of	A pre-construction survey is to be conducted to confirm the location of the seagrass and the	Transport for NSW project manager	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
	seagrass and of habitat for threatened species	design is to be modified to reduce direct and indirect impacts.			
DE2	Increased shading of rocky reef, seagrass and macroalgae	Where shading is required to carry out the works, these works should avoid the start of the growth period.	Transport for NSW project manager	Pre-construction/Construction	Additional safeguard
DE3	Potential aquatic biodiversity impacts	A thorough pre-clearing survey will be conducted to identify if either White's Seahorse or Black Rock Cod are present in the project footprint, particularly in the dredge areas. Individuals will be safely relocated by a qualified ecologist in the event that they are found.	Contractor / Transport for NSW project manager / Ecologist	Pre-construction	Additional safeguard
SS1	Seagrass and habitat disturbance	Vessels and barges must only access the site or shore via the boat ramp or the area immediately to the west of the boat ramp. No shoreline access or works are to occur on the eastern side of the boat ramp.	Contractor	Construction	Additional safeguard
SS2	Macroalgae and seagrass damage	Vessels and barges must maintain at least 600 millimetre clearance to the seabed when within 10 metres of any seagrass or macroalgae habitat.	Contractor	Construction	Additional safeguard
SS3	Potential hydrocarbon spills	Hydrocarbon booms should remain in place around any plant when in operation.	Contractor	Construction	Additional safeguard
SS4	The introduction of marine pests	The inspection of equipment/vessels before use should include cleaning, removal of soils and estuarine material, confirmation the equipment is in working order and	Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
	and contamination	confirmation no hydrocarbon leaks are present.			

7.3 Licensing and approvals

All relevant licenses, permits, notifications and approvals needed for the Crowdy Head Boat Harbour Upgrade and when they need to be obtained are listed in Table 7-2. Additional or changed licenses and approval requirements identified in this Addendum REF are indicated by bold and/or strikethrough font.

Table 7-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
Protection of the Environment Operations (Waste) Regulation 2014	Resource Recovery Order and Resource Recovery Exemption	Prior to start of the activity
Fisheries Management Act 1994 (s199)	Notification to the Minister for Agriculture prior to any dredging or reclamation work.	A minimum of 28 days prior to the start of work.
Fisheries Management Act 1994 (s205)	Permit to harm marine vegetation	Prior to start of the activity
Fisheries Management Act 1994 (s37)	Permit for the relocation of seahorses	Prior to start of the activity
Water Management Act (s91F)	Aquifer interference approval from DPI (Water)	Prior to start of the activity if more than three megalitres of dewatering required
~~Crown Land Management Act 2016 (Division 3.4, 5.5 and 5.6)~~	~~Lease or licence to occupy areas of Crown land.~~ ~~Note: Work on Crown land triggers the requirement for a 24KA notice under the Native Title Act 1993. The notice is to be prepared by the legal team and send to NTSCORP. This is required whether there is a claim on the land or not.~~	~~Prior to start of the activity~~
Aboriginal Land Rights Act 1983	Engagement with the NSW LALC regarding impacts to Claim 36129 and Claim 36156.	Prior to start of the activity

8 Justification and conclusion

8.1 Justification

The Project forms part of the delivery program for MIDO, whose objectives are to plan and deliver maritime infrastructure and dredging services including coastal and boating infrastructure programs. These objectives encompass the former maritime-related functions of DPE and Crown Lands.

Transport has determined that the majority of the core infrastructure at the harbour is in a state of decline, and the harbour is affected by significant siltation. Use of the facility has declined in recent years as the asset condition has deteriorated. There is now little to no commercial activity at the harbour. Dredging of the harbour was last undertaken in 2010.

The proposed upgrade is intended to improve amenity of the maritime and land-side areas of the harbour, address maritime safety and safe use of the facilities, and to renew the lifespan of the infrastructure in use.

A number of options and alternatives have been considered during design development and refined further during the development of the modifications assessed under this Addendum REF. The preferred design and proposed modifications best achieve the objectives outlined in Section 2.2 of the Project REF, when compared to the option of doing nothing and the other options described in Section 2.4 of the Project REF.

Potential environmental and social impacts resulting from construction and operation of the Project have been assessed in Section 6 and minimised through the safeguards and management measures summarised in Section 7.2 of this Addendum REF.

8.2 Objects of the EP&A Act

The consistency of the Project with the objects of the EP&A Act are described within Table 8-1 below.

Table 8-1: Consistency of the Project with the objects of the EP&A Act

Object	Comment
1.3(a) To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	Through the assessment in Section 6, and in the Project REF, it has been identified that the proposal would not have a significant impact on any natural or artificial resources. The proposal will result in community benefits through facilitation of a safe and reliable public wharf in Crowdy Head Harbour.
1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	Ecologically sustainable development is considered in Section 8.2.1.

Object	Comment
1.3(c) To promote the orderly and economic use and development of land.	The proposal facilitates continued and improved use of the harbour.
1.3(d) To promote the delivery and maintenance of affordable housing.	Not relevant to the Project.
1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	The assessment concluded that the proposal would not result in a significant impact on aquatic ecology. No terrestrial vegetation is proposed to be removed as part of the proposal.
1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The proposal would not have any impacts upon any known Aboriginal or non-Aboriginal cultural heritage sites or places.
1.3(g) To promote good design and amenity of the built environment.	The proposal will be in keeping with the existing infrastructure within the harbour to maintain design integrity. The proposal would be integrated within its local area, taking into consideration the nature of the site, local context and the surrounding biodiversity to create a high quality, secure and positive addition to the public domain.
1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to the project.
1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Not relevant to the project.
1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.	This Addendum REF will be made available to the community via publication on the Transport website. Targeted consultation with the community and stakeholders would continue to occur throughout the pre-construction and construction phases of the Project.

8.2.1 Ecologically sustainable development

Ecologically sustainable development (ESD) is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been an integral consideration throughout the development of the Project.

ESD requires the effective integration of economic and environmental considerations in decision-making processes. The four main principles supporting the achievement of ESD are discussed below.

The precautionary principle

The precautionary principle deals with reconciling scientific uncertainty about environmental impacts with certainty in decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

This principle was considered during options development for the works proposed under the Project REF (refer to Section 2 of the Project REF) and considered further during the development of the modification assessed under this Addendum REF. The precautionary principle has guided the assessment of environmental impacts for the Project and Addendum REF and the development of mitigation measures (see Table 7-1).

The precautionary principle has shaped the proposal, modification, assessment and mitigation measures as follows:

- Issues that may cause serious or irreversible environmental damage as a result of the proposed project and where there is scientific uncertainty as to the nature of the damage have been identified.
- Best available technical information, environmental standards and measures have been used to minimise environmental risks.
- Preferred design that minimises vegetation impact, with particular consideration of sensitive areas, was selected.
- Preferred design to avoid or minimise potential damage to known items or areas of cultural significance was selected.
- Preferred design that minimises potential impacts on existing residential properties and other existing land uses, while also taking into consideration potential impacts on proposed future land use was selected.
- Conservative ‘worst case’ scenarios were considered while assessing environmental impact.
- Specialist studies were incorporated to gain a detailed understanding of the existing environment.

Intergenerational equity

Social equity is concerned with the distribution of economic, social and environmental costs and benefits. Inter-generational equity introduces a temporal element with a focus on minimising the distribution of costs to future generations.

Inter-generational equity concerns have shaped the proposal, assessment and mitigation measures as follows:

- The proposal minimises disturbance within sensitive ecological areas to ensure that such areas are conserved for future generations has been selected.
- Water quality and hydrological measures were included into the design to ensure that the impacts on the distribution of flora, fauna and ecological communities within sensitive ecological areas are minimised both for the short and long term.
- Possible compensatory habitat or offsets will be progressed with DPI as required.

- An Aboriginal Cultural Heritage assessment, including consultation with the local Aboriginal Community, was carried out to avoid or minimise the potential for irreparable damage to occur to Aboriginal Cultural Heritage during construction.
- The economic benefits in the form of access, safety and efficiency for surrounding areas for the current and future generation were identified.
- Issues that have potential long-term implications were minimised or avoided, for example consumption of non-renewable resources, waste disposal, greenhouse emissions, removal of vegetation and impacts on water quality, through application of management measures.
- Requirements to minimise the impact of climate change from greenhouse emissions were implemented, for example optimising fuel economy of all construction machinery, and use of recycled materials where feasible.
- Benefits that the proposal provides to current and future generations of local communities and the surrounding region that would maintain or enhance the health, diversity and productivity of the environment were identified.

Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity has shaped the proposal, assessment and mitigation measures as follows:

- Design features that would allow safe movement patterns for native fauna species were incorporated.
- Site selection criteria were established for construction phase facilities that include minimising disturbance.
- The cultural significance of the locality to the local Aboriginal community was considered.
- A biodiversity offset package for unavoidable residual impacts will be implemented where required.

Improved valuation, pricing and incentive mechanisms

The principle of internalising environmental costs into decision making requires consideration of all environmental resources which may be affected by the carrying out of a project, including air, water, land and living things. Valuation of environmental resources has shaped the proposal and mitigation measures by:

- Environmental issues were considered as key matters in the design development process for the proposal.
- The value of the proposal to the community in terms of improved safety was recognised.
- Mitigation measures for the avoidance, reuse, recycling and management of waste during construction and operation are to be implemented.

8.3 Conclusion

This Addendum REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration, where relevant, of conservation agreements and plans of management under the NPW Act, stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the EPBC Act.

A number of potential environmental impacts from the proposed modification have been avoided or reduced during the design development and options assessment. The Proposed

Modification as described in the Addendum REF best meets the project objectives and would result in fewer environmental impacts than the proposed scope of works assessed under the Project REF. The Proposed Modification would result in reduced construction traffic and transport impacts due to a significant reduction in truck movements, reduced impacts on terrestrial biodiversity, and improved social impacts during construction and operation through the provision of temporary swing moorings within the harbour, improved navigation and improved lighting on Jetty 1. On balance the Proposed Modification is considered justified.

Significance of impact under NSW legislation

The Proposed Modification would be unlikely to cause a significant impact on the environment. Therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The Proposed Modification is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation

The Proposed Modification is not likely to have a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Department of Climate Change, Energy, the Environment and Water is not required.

9 Certification

This Addendum Review of Environmental Factors provides a true and fair review of the Proposed Modification in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the Proposed Modification.

Kieran Metcalfe

Director

Complete Planning and Environment Pty Ltd

Date: 5 March 2025

I have examined this Addendum Review of Environmental Factors and accept it on behalf of Transport for NSW.

Nicole Watts

Director - Maritime Infrastructure Delivery Office

Date:

10 References

Survey Findings: Crowdy Head – Marine Habitat Survey, H2O Consulting Group, 10 December 2024

Transport for NSW & GHD 2022 *Crowdy Head Harbour Upgrade Review of Environmental Factors*

Transport for NSW 2024 *Crowdy Head Harbour Upgrade REF Submissions Report*

Terms and acronyms used in this REF

Term/ Acronym	Description
AHIMS	Aboriginal Heritage Information Management System
AS	Australian Standard
Benthic	Relating to, or occurring at the bottom of a body of water
BC Act	*Biodiversity Conservation Act 2016* (NSW).
CEMP	Construction environmental management plan
CFD	Computational Fluid Dynamic
DAFF	Australian Department of Agriculture, Fisheries and Forestry
DoEE	(Former) Department of Environment and Energy
DPE	(Former) Department of Planning and Environment
DPIRD or DPI	Department of Primary Industries and Regional Development
DPTI	Government of South Australia's Underwater Noise Piling Guidelines
DUAP	(Former) Department of Urban Affairs and Planning
ECP	Environmental Control Plan
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
EWMS	Environmental Work Method Statement
FM Act	*Fisheries Management Act 1994* (NSW)
Heritage Act	*Heritage Act 1977* (NSW)
TISEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
Jetty	A structure extending into the harbour as part of a wharf
KFH	Key Fish Habitat
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LGA	Local Government Area
MARPOL	International Convention for the Prevention of Pollution from Ships
MIDO	Maritime Infrastructure Delivery Office
MTCP	Marine Traffic Control Plan

Term/ Acronym	Description
MNES	Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
Piles	Foundations used to support marine structures and offshore platforms
Pontoon	A floating structure serving as a dock
Project site	The area directly impacted by proposed works, including the installation and removal of structures.
PSI	Preliminary Site Investigation
REF	Review of Environmental Factors
Roads and Maritime	NSW Roads and Maritime Services
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SHI	State Heritage Inventory
Soil and Water plan	Soil and Water Management Plan
SWMSP	Sediment and Water Management Sub-Plan
SOPEP	Shipboard Oil Pollution Emergency Plan
SMPEP	Shipboard Marine Pollution Emergency Plan
TSC Act	*Threatened Species Conservation Act 1995 (NSW)* (repealed)
Transport	Transport for NSW
TCP	Traffic Control Plan
TfNSW G36	Crowdy Head Boat Harbour Upgrade Transport for NSW Quality Assurance General Specification 36 – Environmental Protection
TISEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
QA Specifications	Specifications developed by Transport for NSW for use with road work and bridge work contracts let by Transport for NSW.
Wharf	A landing place or pier where ships may tie up and load or unload.
WQMP	Water Quality Monitoring Program

Appendix A Consideration of section 171(2) factors and consideration of matters of National Environmental Significance and Commonwealth land

Section 171(2) Checklist

In addition to the requirements of the *Guidelines for Division 5.1 Assessments* (DPE, 2022) as detailed in the Addendum REF, the following factors, listed in section 171(2) of the Environmental Planning and Assessment Regulation 2021, have also been considered to assess the likely impacts of the Proposed Modification on the natural and built environment.

Factor	Impact
a) Any environmental impact on a community? There would be some disruption to local community during construction from the additional traffic movements and restrictions to part of the wharf, parking and the pedestrian footpath. There would be a minor increase in noise for residential dwellings within the immediate vicinity of the Project site. During operation of the Project similar facilities would be available to the community with the benefit of improved access and utility connections. Potential environmental and community impacts associated with the Proposed Modification are likely to be less than those associated with the scope of works as outlined within the Project REF. This is attributable to dredging operations being marine based and not requiring land based stockpiling, transport and placement of dredged material with an associated reduction in potential traffic and noise impacts.	Minor. These disruptions would be managed by standard safeguard measures and would be short term.
b) Any transformation of a locality? Visual impacts of construction activities are considered to be minor as the works would be temporary and short-term. The proposal has been designed to be as similar to the existing wharf structure as possible and therefore is not expected to result in significant visual impacts to the surrounding area. The removal of the long Jetty 2 would be a permanent visual change. However given the landscape context of the existing harbour, this change is not expected to be significant. Potential visual impacts associated with the Proposed Modification are likely to be less than those associated with the scope of works as outlined within the Project REF. This is attributable to near shore rather than on shore placement of spoil from dredging, which would avoid land based spoil handling and landform modification.	Minor and temporary.
c) Any environmental impact on the ecosystems of the locality? Removal of biofouling communities on piles and jetties would result in both permanent and temporary loss of biodiversity from the proposal footprint. While both existing jetties are to be removed, one will be re-instated. The piles from the jetty not re-instated represents a permanent loss of biodiversity. Removal of piles, seagrass or macroalgae habitat removes potential habitat for the threatened White's Seahorse.	Minor loss of marine habitat.

Factor	Impact
With the implementation of the mitigation measures detailed in the Marine Biodiversity Assessment (Appendix G of the Project REF) and the marine ecological study for the deposition of dredged sand and expanded dredge area (Appendix C of this Addendum REF) there is unlikely to be a significant impact to threatened species listed as likely to occur, including marine turtles, White's Seahorse and the Black Rock Cod.	
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? During construction there would be reduced amenity and recreational activity due to partial harbour closure and physical presence of construction barges and equipment. The proposed works would be staged to allow continued access and use of the harbour, both on-water and land-side, outside nominated construction exclusion zones. Staging would allow a return to service and use of each jetty in sequence so that there is one available for use at all times. Potential aesthetic, recreational, scientific and other environmental quality or value impacts associated with the Proposed Modification are likely to be less than those associated with the scope of works as outlined within the Project REF. This is largely attributable to near shore rather than on shore placement of spoil from dredging, which would avoid land based spoil handling and landform modification, along with reduced potential traffic and noise impacts associated with the modified works methodology.	Minor and temporary.
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The proposal is to replace the existing infrastructure with a similar wharf facility. No significant heritage values will be impacted.	Nil
f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974)?* Removal of piles, seagrass or macroalgae habitat removes potential habitat for the threatened White's Seahorse. A permit will be required under section 205 of the FM Act to harm marine vegetation.	Minor direct loss of marine habitat.
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Potential to impact on White's Seahorse, should they occur. Measures to avoid impacts to the White's Seahorse are provided in the Marine Biodiversity Assessment (Appendix G of the Project REF).	Minor direct loss of marine habitat.
h) Any long-term effects on the environment? There is potential for long-term harm without strict adherence to mitigation controls to minimise the risk and extent of removal of	Nil

Factor	Impact
seagrass and of habitat for threatened species. Mitigation controls are described in Table 7-1.	
i) Any degradation of the quality of the environment? Construction activities, including dredging, has the potential to result in reduced water quality conditions. Proposed mitigation measures and implementation of a silt curtain would minimise sediment dispersal.	Minor and temporary.
j) Any risk to the safety of the environment? The proposed upgrade is intended to improve amenity of the maritime and land-side areas of the harbour, address maritime safety and safe use of the facilities, and to renew the lifespan of the infrastructure in use.	Positive
k) Any reduction in the range of beneficial uses of the environment? The proposal improves the wharf facilities to replace an aging marine asset.	Positive
l) Any pollution of the environment? Table 7-1 describes several mitigation measures that would be implemented to avoid and minimise the potential for pollution of the environment.	Minor
m) Any environmental problems associated with the disposal of waste? All waste removed from the proposal footprint would be managed in accordance with the NSW Waste Classification Guidelines. Results from the Sediment Assessment (Appendix E of the Project REF) indicate that the sediments to be dredged do not pose a risk to human health or the environment. As such, the sediments are suitable for near shore placement, subject to appropriate management and handling measures.	Minor
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The proposal is a small-scale proposal unlikely to result in increased demand or shortage of resources.	Nil
o) Any cumulative environmental effect with other existing or likely future activities? No likely cumulative environmental effects have been identified.	Nil
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? A coastal processes assessment was completed for the proposal as assessed under the Project REF. The findings of the assessment are summarised in Section 6.2 of the Project REF, with the full report provided in Appendix D of the Project REF. No significant changes to coastal processes beyond those assessed during the preparation of the Project REF are anticipated as a result of the Proposed Modification.	Nil

Factor	Impact
q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1. Applicable legislation, plans and strategies have been addressed in Section 2 and Section 4 of this Addendum REF.	Nil
r) Other relevant environmental factors In considering the potential impacts of this proposal all relevant environmental factors have been considered, refer to Section 6 of this Addendum REF.	Nil

Matters of National Environmental Significance and Commonwealth land

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance and impacts on the Commonwealth land are required to be considered to assist in determining whether the Proposed Modification should be referred to the Australian Government Department of Agriculture, Water and the Environment.

Factor	Impact
a) Any impact on a World Heritage property?	Nil
b) Any impact on a National Heritage place?	Nil
c) Any impact on a wetland of international importance?	Nil
d) Any impact on a listed threatened species or communities? With the implementation of mitigation measures listed in the Project REF and in Table 7-1, the proposed works would not impact individuals, populations or habitats of species listed under the EPBC Act such that the population survival will be compromised or result in any significant effect on the population structure and function.	Minor direct loss of marine habitat
e) Any impacts on listed migratory species?	Nil
f) Any impact on a Commonwealth marine area?	Nil
g) Does the proposed modification involve a nuclear action (including uranium mining)?	No
h) Additionally, any impact (direct or indirect) on the environment of Commonwealth land?	Nil

Appendix B Statutory consultation checklists

Transport and Infrastructure SEPP

Certain development types

Development type	Description	Yes/No	If 'yes' consult with	TISEPP
Car Park	Does the project include a car park intended for the use by commuters using regular bus services?	No		Section 2.110
Bus Depots	Does the project propose a bus depot?	No		Section 2.110
Permanent road maintenance depot and associated infrastructure	Does the project propose a permanent road maintenance depot or associated infrastructure such as garages, sheds, tool houses, storage yards, training facilities and workers' amenities?	No		Section 2.110

Development within the Coastal Zone

Issue	Description	Yes/No/ NA	If 'yes' consult with	TISEPP
Development with impacts on certain land within the coastal zone	Is the proposed modification within a coastal vulnerability area and is inconsistent with a certified coastal management program applying to that land?	No		Section 2.14

Note: See interactive map here: https://www.planning.nsw.gov.au/policy-and-legislation/coastal-management. Note the coastal vulnerability area has not yet been mapped.

Note: a certified coastal zone management plan is taken to be a certified coastal management program

Council related infrastructure or services

Issue	Potential impact	Yes/No	If 'yes' consult with	TISEPP
Stormwater	Is the work likely to have a *substantial* impact on the	No		Section 2.10

Issue	Potential impact	Yes/No	If 'yes' consult with	TISEPP
	stormwater management services which are provided by council?			
Traffic	Is the work likely to generate traffic to an extent that will *strain* the capacity of the existing road system in a local government area?	No		Section 2.10
Sewerage system	Will the work involve connection to a council owned sewerage system? If so, will this connection have a *substantial* impact on the capacity of any part of the system?	No		Section 2.10
Water usage	Would the work involve connection to a council owned water supply system? If so, would this require the use of a *substantial* volume of water?	No		Section 2.10
Temporary structures	Would the work involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, would this cause more than a *minor* or *inconsequential* disruption to pedestrian or vehicular flow?	No		Section 2.10
Road & footpath excavation	Would the work involve more than *minor* or *inconsequential*	No		Section 2.10

Issue	Potential impact	Yes/No	If 'yes' consult with	TISEPP
	excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?			

Local heritage items

Issue	Potential impact	Yes/No	If 'yes' consult with	TISEPP
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the work? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than *minor* or *inconsequential?*	No		Section 2.11

Flood liable land

Issue	Potential impact	Yes/No	If 'yes' consult with	TISEPP
Flood liable land	Is the work located on flood liable land? If so, would the work change flood patterns to more than a *minor* extent?	No		Section 2.12
Flood liable land	Is the work located on flood liable land? (to any extent). If so, does the work comprise more than minor alterations or additions to, or the demolition of, a building, emergency work or routine maintenance	No		Section 2.13

Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled

Floodplain Development Manual: the management of flood liable land published by the New South Wales Government.

Public authorities other than councils

Issue	Potential impact	Yes/No	If 'yes' consult with	TISEPP
National parks and reserves	Is the work adjacent to a national park or nature reserve, or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act?	No		Section 2.15
National parks and reserves	Is the work on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	No		Section 2.15
Aquatic reserves	Is the work adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*?	No		Section 2.15
Sydney Harbour foreshore	Is the work in the Sydney Harbour Foreshore Area as defined by the *Place Management NSW Act 1998?*	No		Section 2.15
Bush fire prone land	Is the work for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No		Section 2.15
Artificial light	Would the work increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map?	No		Section 2.15

Issue	Potential impact	Yes/No	If 'yes' consult with	TISEPP
	(Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)			
Defence communications buffer land	Is the work on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhardt LEP 2012, Narrandera LEP 2013 and Urana LEP 2011.	No		Section 2.15
Mine subsidence land	Is the work on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*?	No		Section 2.15

Appendix C Marine Ecology Assessment

H2O Consulting Group Pty Ltd
PO Box 3257
Erina NSW 2250
Tel 0414 848 105
info@h2oconsultinggroup.com.au
www.h2oconsultinggroup.com.au

ABN: 98 620 197 382

DECEMBER 10, 2024

Brett Fletcher
Transport For NSW
Maritime Infrastructure Delivery Office (MIDO)
Brett.Fletcher@transport.nsw.gov.au

Survey Findings: Crowdy Head – Marine Habitat Survey

Dear Brett,

We undertook a survey of the seabed adjacent to the Crowdy Head boat ramp on 2nd December 2024 to update mapping works done in 2023. The area surveyed included the additional dredge area in the Harbour adjacent to the existing jetty (including areas within 20 m of the proposed additional dredge footprint) and for a nearshore sand placement area approximately 200 m northwest of the Harbour entrance. Transport for NSW has proposed to establish a Harbour seabed level of -3m in the additional dredge area via removal (dredging) of shallow sands, which are typically of -1m or less depth.

The seabed was inspected using a drop camera with live surface feed and habitat was updated based on recent Nearmap aerial imagery. The survey included collection of field verification points in a customised GIS application to record benthic habitat characteristics including presence of estuarine macrophytes (seagrasses and macroalgae). A habitat map was then prepared using GIS Software.

Findings

Additional Harbour Dredge Area

The additional Harbour Dredge Area encompasses approximately 778 m^2, adjacent to the existing dredging boundary at the boat ramp and the existing jetty. The seabed within the dredge footprint was found to consist of shallow, unvegetated, clean marine sands, with evidence of shallow shoaling sands in places. Marine vegetation, including seagrasses and macroalgae, was not observed within the additional dredge area boundary. However, a thick layer of green algal wrack was observed in the 30 – 50 cm of water above the sediment, with some settlement on the seabed (Plate 1). This area was characteristic of Type 3 Minimally Sensitive KFH.

Previous mapping in adjacent habitats by H2O Consulting Group in 2023 identified a mixture of unvegetated, sandy soft sediment to the north, east and west, whilst to the south soft sediment supported seagrass beds and macroalgae. A fringing bed of medium-density *Halophila* sp. was previously recorded approximately 12 m south of the Dredge Area, extending approximately 20 m towards the shore before transitioning to a fringing medium-density bed of mixed *Zostera* sp. and *Halophila* sp., which extended another approximately 10-12 m towards shore. The seaward edge of this seagrass bed was not observed within the Dredge Area or 20 m buffer during the most recent survey.

Sand Placement Area

The nearshore Sand Placement Area encompasses approximately 40,000 m^2, with minimum distances from nearby features including 400 m from shore, 200 m from the Harbour entrance and 100 m from rocky reef to the east (seaward). The seabed within the placement footprint was found to consist of unvegetated, shoaling, clean marine sands with some shell rubble and macroalgae wrack. Marine vegetation, including macroalgae, was not observed within the Sand Placement Area. Adjacent habitat within 20 m of the approximate Sand Placement Area boundary consisted of the same habitat features. No subtidal rocky reef was observed in either the Placement Area or the adjacent 20 m buffer. This area was characteristic of Type 3 Minimally Sensitive KFH.

Conclusions

The proposed additional Dredge Area design will avoid direct disturbance to seagrass beds and macroalgae stands and will provide a minimum buffer of >20 m from closest previously mapped seagrasses. Additionally, the Sand Placement Area also avoids marine vegetation and has been designed to maintain a minimum 100 m distance from nearby subtidal rocky reef habitat with placement in close proximity to the surf zone, where sedimentation impacts will be at the minimum.

Dredging and placement of sands will, however, result in the following impacts on marine habitat:

- Removal of shallow sands from the dredging area that may contain some infauna (marine invertebrates that live on or in the sand). These are expected to consist of common species of polychaetas, gastropods, and crustaceans.
- Smothering of benthic infauna or slow moving epibenthic fauna, which may include various crustaceans, gastropods, polychaetas, bivalves or small fish, from the placement of sand in subtidal areas.
- Mobilisation of sediments and a reduction of water quality (increased turbidity) during dredging and placement works, which may result in reduced available light for macrophyte growth (seagrass and macroalgae) and sedimentation.

Recommendations

The following actions are recommended to minimise disturbances on aquatic habitat:

- All equipment should be thoroughly cleaned and inspected before mobilisation to site. The inspection should include for any soils and estuarine material, while also ensuring it is in good working order and no hydrocarbon leaks are present.
- Vessels and barges must maintain at least 600 mm clearance to the seabed when within 10 m of any seagrass or macroalgae habitat.
- Vessels and barges must only access the site or shore via the boat ramp or the area immediately to the west of the boat ramp. No shoreline access or works are to occur on the eastern side of the boat ramp.
- Hydrocarbon booms should remain in place around any plant when in operation and a spill kit should be available onsite for the duration of the works.

Please don't hesitate to contact me on 0431 558 965 should you have any further questions.

Warm regards,

Alex Swanson

AQUATIC ECOLOGIST – TEAM LEAD

Figures and Plates

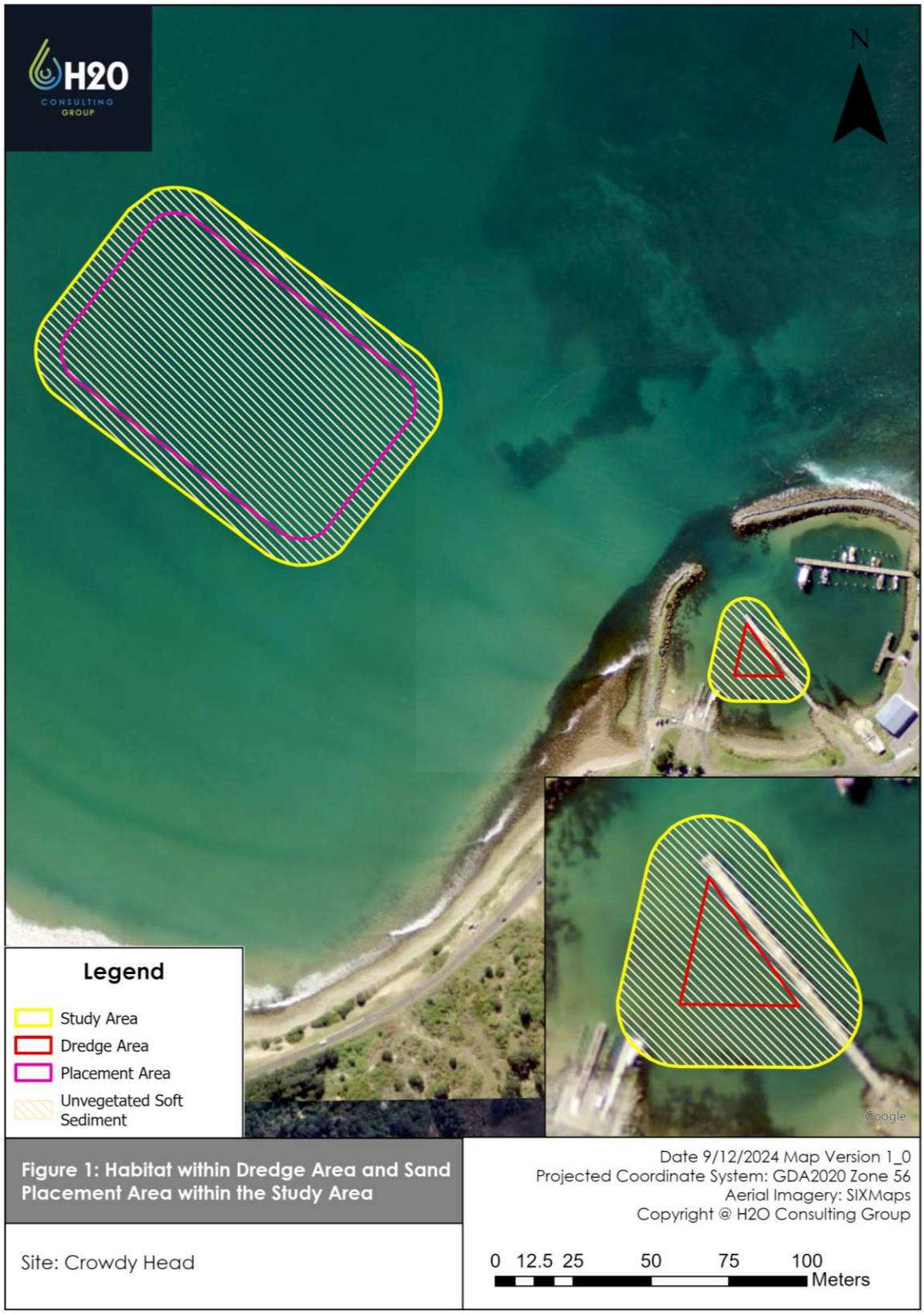

Figure 1: Habitat map of marine vegetation at Crowdy Head boat ramp

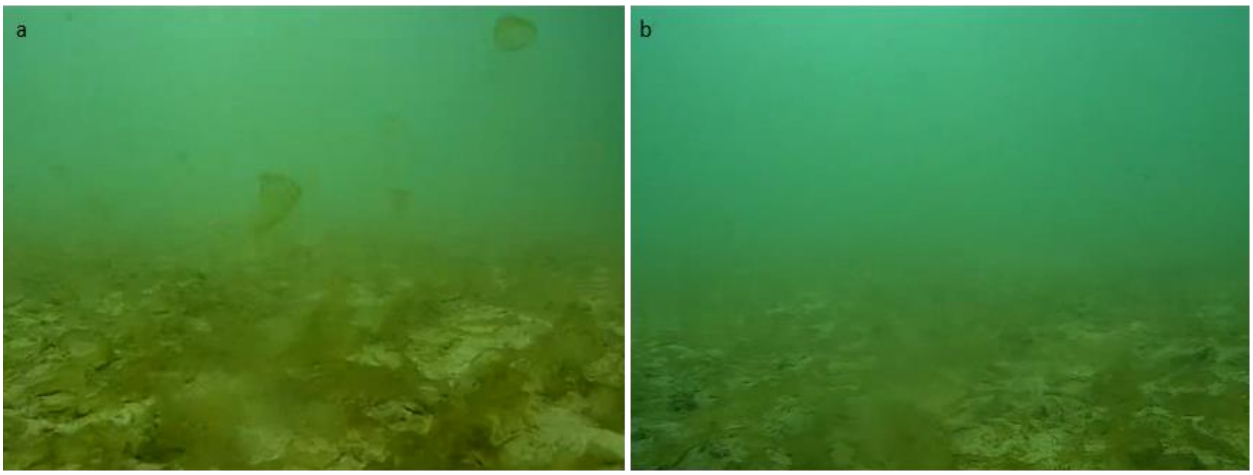

Plate 1: Typical subtidal habitat at Crowdy Head boat ramp, showing (a and b) unvegetated soft sandy sediment with algal wrack.