Bermagui Harbour Dredging

Addendum REF submissions report

Transport for NSW | May 2022

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Prepared by NGH Pty Ltd and Transport for NSW

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Signed:	
Dated:	

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Draft 1.0	18/05/2022	Kyle Mercer	Zeina Jokadar
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Executive summary

The Proposal

Transport for NSW (TfNSW) propose to modify the Review of Environmental Factors (REF) for the *Bermagui Boat Harbour and Entrance Channel Sediment Investigation* prepared by Advisian (2016), and subsequent Addendum REF March 2020 by reassessing the final destination of dredged marine sediments of the Bermagui Harbour and Entrance Dredging Project.

Key features of the proposed modification (the Proposal) would include:

- Leaving the stockpile of 12,000m^2 of Virgin Excavated Natural Materials (VENM) material removed from Horseshoe Bay Beach in-situ, rather than relocating to Moorhead Beach as suggested in the Project REF.
- Material dredged from inner harbour areas of the Bermagui Boat Harbour (Area 3, 4 and 5) and placed at the stockpile site to be tested and classified for reuse or waste.
- Managing the stockpile for long-term storage of the dredge material according to the *Stockpile Site Management Guidelines 2015*.
- Material dredged from Areas 2 and 6 would be placed offshore of Moorhead Beach in/behind the surf zone.

Clean dredge spoil from these areas will be hydraulically placed in the surf zone off Moorhead Beach. Whilst non VENM spoil would be disposed at a licensed landfill.

Display of the Addendum Review of Environmental Factors

Transport prepared the Addendum Review of Environmental Factors 2 (AREF2) to assess the potential environmental impacts of the proposed works. AREF 2 was publicly displayed for 30 days Friday 4 March-Monday 4 April 2022.

AREF 2 was available in hard copy at Bermagui Library and at Maritime Head Office in Rozelle. It was available for electronic viewing and download from the TfNSW project web page. Two information sessions were held to allow the public to drop in and discuss the Proposal directly with the project team at the Bermagui Community Centre on the 24th and 26th of March.

AREF 2 was placed on Transport's project website and made available for download. The display locations and website link were advertised in local newspaper/radio, on Facebook, and via media release. A Community Update detailing the consultation was letterbox-dropped throughout Bermagui as well as directly emailed to key stakeholders.

Summary of issues and responses

Public display of the AREF2 and the supporting consultation resulted in a total of seven submissions, of which all were from the general community.

Of the seven submissions, one respondent offered general support for the Proposal, four respondents offered no position however made comments or suggestions regarding the Proposal, and one respondent objected to any proposed dredging of the Harbour.

The main issues raised and responses to those issues are summarised below.

Implications of the Proposal on the state of Moorhead beach

Sub-issue a: Changing beach dynamics at Moorhead Beach

Sub-issue a response: TfNSW have commissioned Manly Hydraulics Laboratory (MHL) to prepare a detailed sand placement monitoring program that will occur concurrently with the dredging work. The

monitoring of the site will begin prior to the contracted works beginning on site, continue throughout the works and monitored for a time period following the works. MHL's monitoring will identify and address potential sediment dispersion pathways from the placement site at Moorhead Beach. A commitment has been made to ensure the existing dynamics of Moorhead Beach and the Bermagui River will not be significantly altered as a result of the works.

Sub-issue b: Screening dredged sand

Sub-issue b response: Sand to be transported to Moorhead beach would be screen to 10 millimeters (mm). This sediment size is considered appropriate for deposition at Moorhead Beach as the size would be similar to the existing sand at the beach. Sediments greater than 10 mm taken from dredge Areas 6 and 2 would be diverted to the stockpile.

Sub-issue c: Aquatic biodiversity

Sub-issue c response: The disposal area at Moorhead beach was assessed on page 69 of the Project REF. It was determined that the subtidal area where disposal is proposed to occur consists of sand, and no permanent seagrass or sensitive habitat is present.

Sub-issue d: Human health implications

Sub-issue d: response: A sediment quality investigation was undertaken for the Project REF (WorleyParsons, 2015). The study which is summarised in Section 6.1 AREF 2 concluded that sediments from Areas 1 and 6 are suitable for onshore disposal. The summary notes that Area 3,4, and 5 sediments are not suited for offshore disposal and are not being considered in this response to submissions as they will not be further excavated under the program of works.

Sediment in Area 2 are also suitable for offshore disposal at Moorhead beach. It is noted that table 6-1 of AREF 2 did not include a column that summarised the sediment quality results that were undertaken (WorleyParsons, 2015). A revision of this work has clarified that sediments at Area 2 and Area 6 are suitable for offshore disposal.

Remediation of Horseshoe Beach

Issue: Suggests that Horseshoe Beach should be remediated prior to any further dredging

Response: This is an out-of-scope item, these concerns are not addressed in this submissions report. The clean-up of Horseshoe Beach will be subject to a separate assessment. It should be noted however that about 12,000m^3 of dredged marine sands placed on the beach have been relocated by truck to the designated stockpile area west of the harbour.

Implications of Dredging on the size of vessel entering the harbour

Issue: Suggests dredging should be limited to dredge Areas 1-5 but Area 6 in the river should not be dredged as it will encourage bigger boats to use the river

Response: The dredging of Area 6 would occur up to a depth of -1.5m Lowest Astronomical Tide (LATm), which would not be deep enough for larger vessels to access the river (no larger than a small trailer boat able to access the river via the boat ramp on the western side of the Wallaga Lake Road bridge). Therefore, it is not expected that the Proposal would encourage larger boats to utilise the river.

New mitigation measure included to reflect this clarification.

Dredge disposal options

Sub-issue a: Suggests dredged sand deposit location is at a popular swimming spot and a more appropriate area would be further 'up' the Moorhead Beach

Sub-issue a response: The offshore disposal area at Moorhead Beach has been studied in the Project REF and is approved for works in consideration of environmental impacts. Disposal further up the beach would result in impacts to Moorhead Beach associated with extension of the dredge pipe. In its assessed form the pipe can be laid over the sea wall and has a minimal impact on surrounding areas.

Mitigations will be in place to ensure that disposal offshore at Moorhead Beach does not affect the recreational quality of the popular swimming spot, primarily these include grain size screening and the option to dispose offshore rather than onshore. As described above the site has been studied and is considered a low impact option in comparison to alternate beach disposal options.

A detailed sediment transport monitoring program will be undertaken by MHL. The sediment transport monitoring program mitigation measure has been updated to include a specification that the beach renourishment should not significantly alter the existing bathymetry.

Sub-issue b*:* Suggests that Beares Beach would be a more appropriate disposal area for beach nourishment as the beach has a steep drop off

Sub-issue b response*:* Beares Beach has not been considered as a disposal option due to its location over 1km away from the dredging area and is not considered a beach in need of renourishment. As such, disposal at Beares Beach would not be feasible due to the cost and emissions of transporting the excavated sand. Consequently, Beares Beach has not been studied for its suitability as a disposal site.

Sub-issue c: Suggests that AREF 2 option 3 ‘disposal at a licensed waste facility’ is the best option for waste disposal

Sub-issue c response: Similarly, to the Beares Beach option above, there would be large costs associated with landfill disposal. Considering there have been concerns raised in three submissions regarding the cost of the Proposal to the taxpayer, this option is not considered viable for all sediment, in comparison to disposal at Moorhead Beach.

Subject to testing some sediments will be disposed at a licensed landfill if they are not considered suitable for offshore disposal.

Ineffectiveness of consultation and cost concerns

Sub-issue a: Suggests that consultation has been ineffective to date

Sub-issue a response: Consultation was carried out in accordance with the State Environmental Planning Policy (Infrastructure) 2007 (now the State Environmental Planning Policy (Transport and Infrastructure) 2021. Section 4 of the Project REF, Section 5 of AREF 1 and Section 5 of AREF 2 outlines the stakeholders who were consulted with and their responses. The Project REF however did not consider community consultation, which has been addressed through the public display of the current Addendum REF 2 and this submissions report.

Addendums 1 and 2 were prepared as a result of concerns within the community.

Sub-issue b*:* Suggests that cost of any future remediation to the tax payer is a concern

Sub-issue b response*:* The dredging proposed in AREF 2 has provided sufficient additional mitigations to ensure that dredge spoil is appropriately managed to avoid unforeseen cleanup jobs such as the transport of spoil from Horseshoe Beach to the current stockpile. Areas dredged under AREF 2 will be either disposed at landfill, if they do not qualify as clean excavated material (also known as Virgin Excavated Natural Materials (VENM)) or stockpiled if they are not suitable for beach disposal i.e., the grain size does not suit beach disposal but are otherwise not contaminated.

Changes to the Proposal

There are three key changes from AREF 2 proposed as a result of this submissions report.

Change 1 Screening of sediments to 10mm

The grain size of dredged sediments was raised as a concern in the exhibition period and is covered in Section 2.2 of this report. TfNSW officers confirmed during consultation sessions that sediments to be transported to Morehead Beach would be screened to 10mm. Sediments greater than 10 mm taken from dredge Areas 6 and 2 would be diverted to the stockpile.

Change 2 Area 6 dredge depth to 1.5LATm

Submission 3 noted that dredging of Area 6 could encourage larger boats to use the river channel. Clarification is provided in Section 2.4, that the dredge depth of -1.5LATm would not be deep enough for large vessel access.

Change 3 Clarification of sediment transport monitoring

Submissions 1, 2, 3, 4 and 6 noted concerns about the planned sediment disposal site at Moorhead beach and also dredging along the Bermagui River. TfNSW have commissioned MHL to prepare a detailed sand placement monitoring program that will occur concurrently with the dredging work. Wording in Section 4.2 has been updated to clarify that this monitoring will ensure the dynamics of Moorhead Beach and the Bermagui River will not be significantly altered as a result of the works.

Next steps

Transport for NSW as the determining authority will consider the information in the REF and this submissions report and make a decision whether or not to proceed with the Proposal.

Transport for NSW will inform the community and stakeholders of this decision and where a decision is made to proceed will continue to consult with the community and stakeholders prior to and during the construction phase.

Contents

Tables

Appendices

Terms and acronyms used in this REF

Term/Acronym	Description
Addendum REF 1 or AREF 1	Bermagui Boat Harbour, Bermagui River and Entrance Channel Dredging Addendum REF (Blue-sky Planning, 2020)
Addendum REF 2 or AREF 2	Bermagui Harbour Dredging Addendum review of environmental factors (NGH Pty Ltd , 2021)
AHD	Australian Height Datum
ASS	Acid Sulphate Soils
CEMP	Construction environmental management plan
DPI	Department of Primary Industries
EIA	Environmental impact assessment
EPA	NSW Environmental Protection Agency
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
FM Act	*Fisheries Management Act 1994* (NSW)
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LAT	Lowest Astronomical Tide
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
MHL	Many Hydraulics Laboratory
PASS	Potential Acid Sulphate Soils
POEO Reg	Protection of the Environment Operations (Waste) Regulation 2014
Project REF	*Bermagui Boat Harbour and Entrance Channel Sediment Investigation* prepared by Advisian (2016)
The Proposal	All proposed changes to the Project REF that are contained within the scope of AREF 2
REF	Review of Environmental Factors

Term/Acronym	Description
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
TfNSW	Transport for New South Wales
VENM	Virgin Excavated Natural Materials

1. Introduction and background

1.1 Proposal background

The Bermagui Boat Harbour provides berthing for a number of commercial fishing vessels supplying the Bermagui Fisherman's Co-operative, many recreational motor and sailing boats, Marine Rescue NSW and also provides marine servicing and slipway facilities for the local area. The Entrance Channel provides the only access into the Bermagui River and out into the ocean.

The most recent prior dredging campaign had been undertaken in 2003. This historical work was performed using a small cutter section dredge and two locations within the Boat Harbour plus the Entrance Channel were dredged to - 4.5m Australian Height Datum (AHD). Materials from within the harbour were pumped to a bunded disposal site immediately west of the slipway. Clean sands from the Entrance Channel were used for renourishment of Moorhead Beach.

In 2016, Department of Primary Industries (DPI)-Lands commissioned the original Review of Environmental Factors (REF) investigation works for the Proposal, with the aim to assess the likely potential environment impacts of the proposed dredging and associated spoil disposal activities, and to consider the appropriate level of environmental assessment of the Proposal (Advisian, 2016). Subsequent to this, but prior to dredging activities commencing, the Project REF Addendum 1 was prepared in response to further consultation with Bega Valley Shire Council regarding the dredging strategy and disposal options.

1.1.1 Bermagui Boat Harbour and Entrance Channel Sediment Investigation: Review of Environmental Factors and Sediment Options Report (Advisian, 2016)

The scope of works at the time considered by Advisian in their assessment included dredging parts of the Bermagui Boat Harbour and Entrance Channel to - 4.5 m AHD as required to maintain safe navigation of commercial and recreational vessels travelling through the Bermagui Entrance Channel into the Bermagui River and Boat Harbour. This included assessment of the following activities:

- Dredging and relocation of clean marine sands from the Entrance Channel to be disposed of at one of two identified beach disposal sites (Moorhead Beach or River Beach) in close proximity to the dredge location.
- Dredging and relocation of marine sediments from the Boat Harbour to a land-based disposal site west of the Bermagui Slipway, which is also in close proximity to the dredge location.
- Installation/removal of dredge pipelines, dewatering bunds and temporary works.

The objectives of these activities were informed by targeted consultation with key stakeholders conducted in the first half of 2016.

In order to re-establish safe Entrance Channel access and navigation, an estimated 12,000m^3 of marine sands would need to be removed. An additional 5,000m^3 of material would need to be extracted from the Boat Harbour. This equated to removing a total of 17,000m^3 of marine material through dredging activities.

A number of dredging options were considered at the time. These included:

1. Doing nothing (i.e., not dredging);
2. Considering alternative dredging options based on the location of seagrass meadows, the specific dredging needs identified through consultation and the practicality and impact of difference dredging equipment; and,
3. Considering alternative disposal options, including
   a. **Moorhead beach**
   b. **River beach**
   c. **Vacant land immediately west of the Bermagui slipway**

d. Eastern end of Horseshoe Bay (requested for consideration by Bega Valley Shire Council), and
e. Offshore disposal (at sea).

Advisian (2016) recommended in the Project REF that the majority of dredged material from the Entrance Channel should be placed on the eastern end of Moorhead Beach (option a) by pipeline. Some material could also be used to:

- Renourish River Beach (avoiding seagrass areas) or;
- Remediate any existing borrow pits from the vacant land immediately west of the harbour, or;
- Temporarily stockpile on adjacent land for use by Council to renourish other nearby beaches (e.g., Horseshoe Bay Beach).

Furthermore, it was recommended that the material removed from the Boat Harbour should be delivered to vacant Crown land on the western side of the Harbour subject to further material testing and consultation with the NSW Environmental Protection Authority (EPA) (Advisian, 2016).

1.1.2 Bermagui Boat Harbour, Bermagui River and Entrance Channel Dredging Addendum REF 1 (Blue-sky Planning , 2020)

Following consultation with BVSC and further sediment sampling, DPE – Crown Lands (formerly DPI - Lands) revised the scope of dredging works and hence commissioned the first addendum to the Project REF (AREF 1). Prepared by Blue-sky Planning (2020), the scope of works assessed for the amendment were:

- Expanding the dredge footprint to include approximately 6,000m^3 of clean marine sand from the Wallaga Lake Road Bridge to the Entrance Channel to address stakeholder consultation issues.
- **Disposal of clean marine sand to Horseshoe Bay Beach via a pipeline through Dickinson Park (Lot 7063 DP 1118744), which is a Council managed Crown Reserve, and to Moorhead Beach via submerged pipeline.**
- Dredging and relocation of marine sediments from the Boat Harbour to a land-based disposal site west of the Bermagui Slipway via an overland pipeline and testing of marine sediments from the boat harbour using a compartmentalised testing regime to minimise the amount of marine sediment being disposed of to landfill.
- The preparation of a sediment sampling and analysis plan for waste classification for areas not previously sampled and for boat harbour sediments in relation to disposal options.

The new total dredge volume was expected to be a maximum of 27,000m^3. Approximately 12,300m^3 would be placed on Horseshoe Bay Beach, 8,000m^3 on Moorhead Beach and the remainder dredged from the harbour and placed on the Crown land stockpile site west of the boat harbour (consistent with the Project REF).

The material dredged from Areas 1 and 6 were initially placed on Horseshoe Bay Beach as proposed and assessed in the Project REF Addendum 1 (AREF 1). **However, this disposal option generated concerns from the community**. In response, approximately 12,000m^3 of dredged marine sands placed on the beach have been relocated by truck to the designated stockpile area west of the harbour.

1.1.3 Bermagui Harbour Dredging Addendum REF 2 (NGH Pty Ltd)

TfNSW, who now coordinate and manage the maritime functions of DPE-Crown Land through the Maritime Infrastructure Delivery Office, propose to now leave the relocated 12,000m^2 of Virgin Excavated Natural Materials (VENM) within the stockpile area *in situ*.

This differs from the Project REF, which noted that the material would be hydraulically placed on Moorhead Beach (Advisian, 2016). Rather, the material will remain on the stockpile for an indefinite amount of time. As such, a stockpile management plan will need to be produced to manage issues that arise from the long-term storage of the material. An acid sulfate soils management plan would also need to be prepared.

The remaining dredging works in Area 6 (refer Figure 1-2) will continue as stated in the Project REF, meaning the dredge spoil will be hydraulically placed offshore of Moorhead Beach. It was noted that the harbour was dredged in 2003, and the sand was placed on Moorhead Beach.

Considering the change to the original scope of works, Addendum REF2 was required to re-assess the environment impacts of the Dredging Project Proposal and fulfil the requirements outlined in Division 5.1 of the EP&A Act and Section 5.5 of the EP&A Act. It pertains in particular to the following amended scope of works:

- Leaving the stockpile of 12,000m^3 of VENM removed from Horseshoe Bay Beach in-situ, instead of the relocation to Moorhead Beach as suggested in the Project REF.
- Placing dredge material from Area 3, 4 and 5 at the stockpile site to be tested and classified for reuse or waste.
- Managing the stockpile for long-term storage of the dredge material according to the *Stockpile Site Management Guidelines* (TfNSW, 2015).
- Placing material dredged from Areas 2 and 6 offshore of Moorhead Beach in/behind the surf zone.

1.2 The Proposal

Transport for NSW (TfNSW) propose to modify the Project REF for the *Bermagui Boat Harbour and Entrance Channel Sediment Investigation* prepared by Advisian (2016), and subsequent AREF 1 March 2020. By reassessing the final destination of dredged marine sediments of the Bermagui Harbour and Entrance Dredging Project.

Key features of the proposed modification (the Proposal AREF 2) would include:

- Leaving the stockpile of 12,000m^2 of VENM material removed from Horseshoe Bay Beach in-situ, rather than relocating to Moorhead Beach as suggested in the Project REF.
- Placing material dredged from inner harbour areas of the Bermagui Boat Harbour (Area 3, 4 and 5) at the stockpile site to be tested and classified for reuse or waste.
- Managing the stockpile for long-term storage of the dredge material according to the *Stockpile Site Management Guidelines 2015*.
- Placing material dredged from Areas 2 and 6 offshore of Moorhead Beach in/behind the surf zone.

The proposed modifications detailed in the AREF 2 would be undertaken concurrent with dredging works in Areas 6 and 2. These areas will be dredged in accordance with the provisions of the Project REF and AREF 1. Clean dredge spoil from these areas will be hydraulically placed in the surf zone off Moorhead Beach. Whilst non VENM spoil would be disposed at a licensed landfill.

The location of the stockpile site is shown in Figure 1-1. No change to the location is proposed. The works area, including dredging areas, is provided in Figure 1-2.

A more detailed description of the Proposal is found in the Section 1.1 and Section 3 of the AREF 2 prepared by NGH for Transport (NSW Bermagui Harbour Dredging Addendum review of environmental factors (NGH Pty Ltd , 2021)).

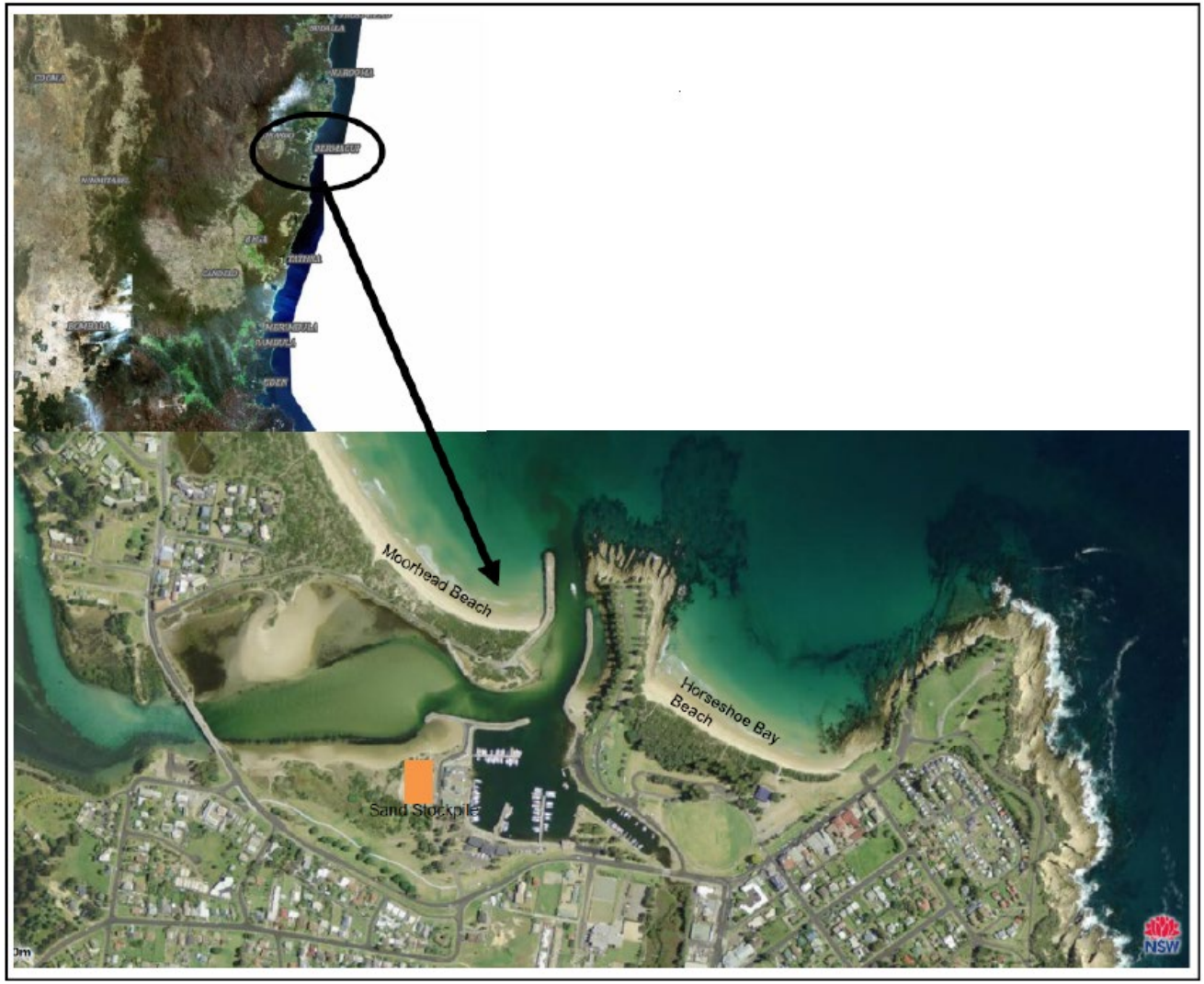
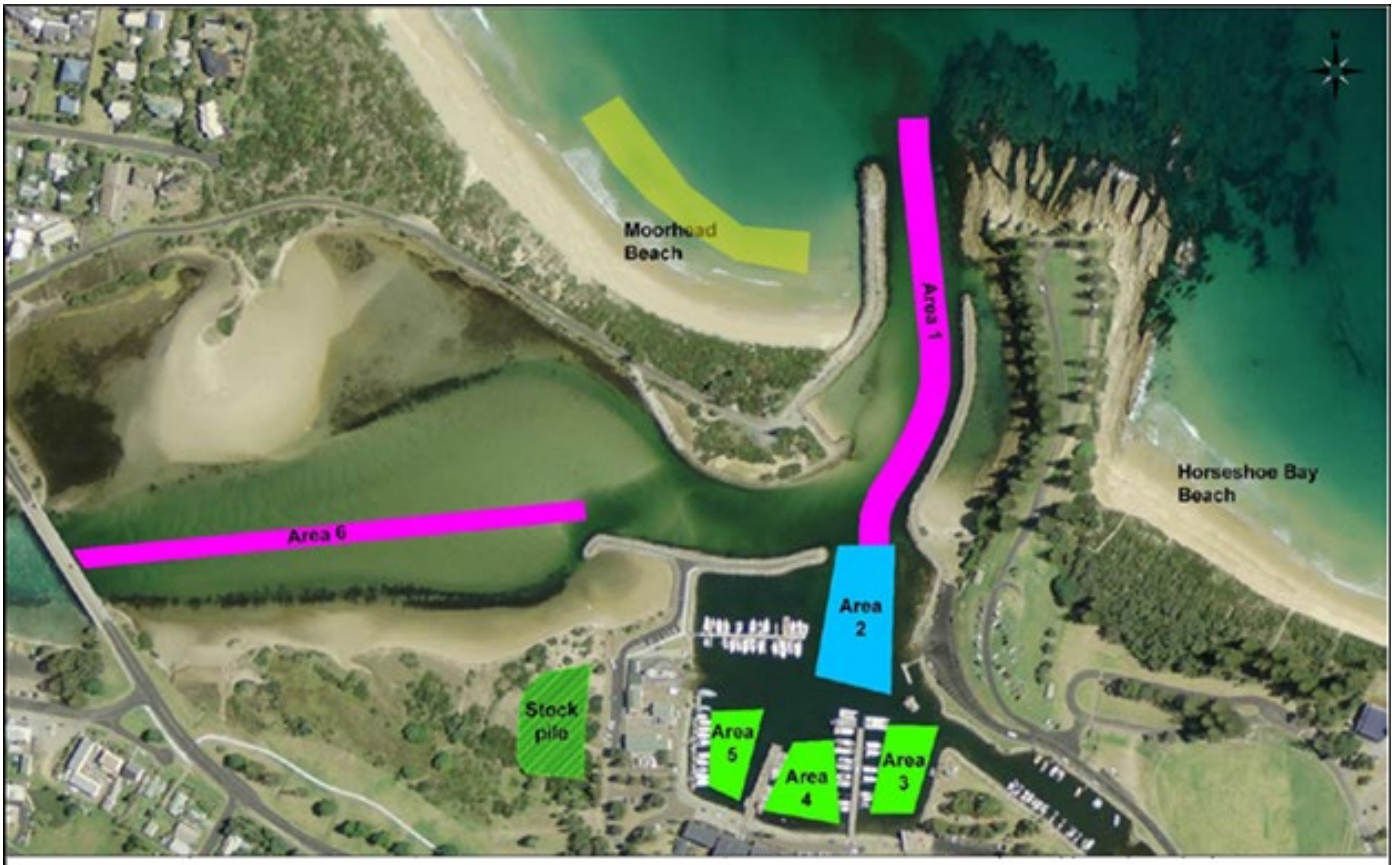


Figure 1-1: Location of the proposed modification



Notes

- Approximately 6,000m3 of dredged sand (from Areas 1 & 6) which was placed on Horsehore Bay Beach was removed from the beach and trucked to the Stockpile.
- This addendum REF will include long-term storage of the VENM materials (previously on Horseshoe Bay Beach) on the stockpile
- Only approximately half of Area 6 has been completed.
- Areas 2, 3, 4 & 5 were not dredged under the previous works
- Once the stockpile has been adjusted the area will be setup with the dewatering equipment ready for the Harbour dredging works
- The remaining works on Area 6 will be hydraulically placed in the Moorhead Beach Surf Zone
- Area 2 will also be hydraulically placed in the Moorhead Beach Surf Zone

Figure 1-2: The proposed modification

1.3 AREF 2 display

Transport prepared the AREF 2 to assess the potential environmental impacts of the proposed works. AREF 2 was publicly displayed for 30 days Friday 4 March-Monday 4 April 2022.

AREF 2 was available in hard copy at Bermagui Library and at Maritime Head Office in Rozelle. It was available for electronic viewing and download from the TfNSW project web page. Two information sessions were held to allow the public to drop in and discuss the project directly with the project team at the Bermagui Community Centre as detailed in Table 1-1.

AREF 2 was placed on Transport's project website and made available for download. The display locations and website link were advertised in local newspaper/radio, on Facebook, and via media release. A Community Update detailing the consultation was letterbox-dropped throughout Bermagui as well as directly emailed to key stakeholders.

Table 1-1: Display locations

Location	Address	
Bermagui Community Centre (Main Hall)	9 Bunga Street, Bermagui	Thursday 24 March 7-9pm
		Saturday 26 March 2-4pm

1.4 Purpose of the report

This submissions report relates to AREF 2 prepared for the Proposal and should be read in conjunction with that document.

This submissions report summarises the issues raised and provides responses to each issue (Chapter 2) and any modifications or changes to the Proposal and any additional environmental management measures as a result of further design development or in response to submissions.

Five revisions have been made to the environmental management measures as described in the AREF 2. The three key changes are described in Section 3. The remaining two revisions to the mitigation measures are:

1. Clarification that the Sediment Sampling and Analysis Plan (SSAP) has been prepared and approved.
2. Removal of the measure to install a silt curtain in the Harbour dredge area. This decision has been made by the project manager due to the small size of the harbour making the curtain installation unfeasible.

2. Response to issues

Transport for NSW received seven submissions, accepted up until 31 March 2022. Table 2-1 lists the respondents and each respondent's allocated submission number. The table also indicates where the issues from each submission have been addressed in Chapter 3 of this report.

Table 2-1: Respondents

Respondent	Submission No.	Section number where issues are addressed
Individual	1	Section 2.2 and Section 2.3
Individual	2	Section 2.2 and Section 2.3
Individual	3	Section 2.4 and Section 2.5
Individual	4	Section 2.2, Section 2.3, Section 2.5 and Section 2.6
Individual	5	Section 2.3, Section 2.5 and Section 2.6
Individual	6	Section 2.2 , Section 2.3 and Section 2.6
Individual	7	Section 2.3, Section 2.5

2.1 Overview of issues raised

All seven submissions were from individuals (i.e., no government agency submissions). Each submission has been examined to understand the various issues raised. Each issue has been extracted and collated, with corresponding responses provided. Where similar issues have been raised by different submissions, only one response has been provided. The issues raised and Transport for NSW's response to these issues forms the basis of this chapter.

Of the seven submissions, one respondent offered general support for the Proposal with some comments raised, four respondents offered no position however made comments or suggestions regarding the Proposal, one respondent objected to any proposed dredging of the Harbour.

The main issues raised by the public can be divided into five categories:

1. Implications of the Proposal on the state of Moorhead beach
2. Remediation of Horseshoe Beach
3. Implications of dredging on the size of vessels entering the harbour
4. Dredge disposal alternatives
5. Ineffectiveness of community consultation and cost concerns

These issues are described in more detail in Section 2.2, Section 2.3, Section 2.4, Section 2.5 and Section 2.6

2.2 Issue 1 Implications of the Proposal on the state of Moorhead beach

Submission number(s)

Submissions 1, 2, 3, 4 and 6

Issue description

a. Suggests no offshore bar exists off Moorhead Beach and that 'beach nourishment' may change the dynamics of the beach
b. Suggests sand should be screened, so large sediment particles are not spread out like they were at Horseshoe Beach
c. Suggests the disposal of new material at Moorhead beach does not take into account aquatic biodiversity impacts
d. Suggests that dumping of contaminated sand and rubble could have human health impacts for Moorhead beach users

Response

Response to sub issue a. changing beach dynamics at Moorhead Beach

It is noted in Section 6.1.2 of the 2021 addendum REF that while studies indicate that the influence on longshore drift on the movement sediment from Moorhead Beach to the Entrance Channel is moderated by the Bermagui River mouth training walls (BMT WBM, 2015), sediment does still deposit and accumulate in the Entrance Channel under prevailing tidal conditions. Further detailed understanding of the processes of sediment transport and accumulation is required to:

- Predict likely movement of any deposited material;
- Identify if it will remain in the beach compartment;
- Determine the potential for the material to circulate back into the Entrance Channel; and,
- Inform preferred deposition locations to maximised beneficial re-use.

As such, TfNSW have commissioned Manly Hydraulics Laboratory (MHL) to prepare a detailed sand placement monitoring program that will occur concurrently with the dredging work (refer to sediment monitoring safeguard in safeguard No. S1 Table 4-1. The monitoring of the site will begin prior to the contracted works beginning on site, continue throughout the works and monitored for a time period following the works. MHL monitoring will identify and address potential sediment pathways from the placement site at Moorhead Beach.

MHL's monitoring program will follow the steps below to ensure that sand placed offshore at Moorhead beach is appropriate and placed in a way that will not negatively impact the existing bathymetry:

1. Literature survey and desktop study to obtain an understanding of the area's coastal processes in order to agree with TfNSW the dimensions and location of the potential disposal site. MHL will provide a brief summary of the relevant coastal processes based on the outcomes of their review
2. Pre-nourishment drone and bathymetric surveys of intended disposal/target sites to establish baseline data, including immediately adjacent to the subaerial beach at the proposed disposal site
3. A sand testing/evaluation/monitoring program for the prosed dredge material
4. Post-nourishment bathymetric and drone surveys of the disposal area
5. A post beach nourishment summary report
6. Optional: Ongoing monitoring and reporting. Monthly for three months after last nourishment
7. Optional: Preparation and comparison of existing and predicted (post-placement) beach profiles at the selected disposal site on Moorhead Beach. This assessment would facilitate advice to the client on the most suitable location and placement method.

Response to sub issue b. screening dredged sand

Safeguard S-1 of AREF 2 (refer to Table 7-1 of AREF 2) includes a provision for deposited sediment offshore at Moorhead Beach and reads as follows.

- *Sediment sampling:*
  - *Sedimental sampling shall be conducted on Moorhead beach to determine grain size, and therefore the appropriateness of the VENM sediments for beach re-nourishment (sand used for nourishment shall be similar grain size or slightly coarser).*

TfNSW has since determined that sand to be transported to Moorhead beach would be screened to 10 mm. This sediment size is considered appropriate for deposition at Moorhead Beach as the size would be similar to the existing sand at the beach. Sediments greater than 10 mm taken from dredge Areas 6 and 2 would be diverted to the stockpile. The safeguard above has been altered accordingly in Section 4.2.

Response to sub issue c. aquatic biodiversity

The submission relating to issue c suggests that the decision to place dredged sands 50m off Moorhead beach as shown in Figure 1-2 does not consider the implications to underwater ecology.

The subtidal area of Moorhead beach was assessed on page 69 of the Project REF. It was determined that the subtidal area where disposal is proposed to occur consists of sand, and no permanent seagrass or sensitive habitat is present. It was noted that a patch of drift algae (*Ecklonia rediata)* was observed, which is not a threatened species. Mitigation B-1 will be referenced to ensure no threatened seagrass areas are impacted by the sand deposition.

No changes to the design are proposed.

Response to sub issue d human health implications

The suggestion was made that placing dredged sediment that is contaminated and could lead to human health impacts for users of Moorhead beach.

A sediment quality investigation (WorleyParsons, 2015) was undertaken. The study which is summarised in Section 6.1 AREF 2 concluded that sediments from Areas 1 and 6 are suitable for onshore disposal. The summary notes that Area 3,4, and 5 sediments are not suited for offshore disposal and are not being considered in this response to submissions as they will not be further excavated under the program of works.

Sediment in Area 2 are also suitable for offshore disposal at Moorhead beach. It is noted that table 6-1 of AREF 2 did not include a column that summarised the sediment quality results that were undertaken (WorleyParsons, 2015). The results of the WorleyParsons sediment study are included in Table 2-2 below. The conclusion of sediment suitability for offshore disposal is summarised as follows:

“There were two guideline exceedances in the sediment study for foreign materials and ANC (a precursor for Acid sulphate soils), that do not exclude the sediment from being suitable for offshore disposal.

Foreign material exceedance

The only foreign materials recorded at the exceedance site were stones. These are not considered foreign materials under the NSW EPA Order. Screening of sediment to 10mm as proposed will ensure that large stones are not deposited at Moorhead beach.

Potential Acid Sulphate soils

Net acidity, including the acid neutralising capacity (ANC) of the sediment, exceeded at BH2. ASS impacts are only expected if sediments are exposed to oxygen (WorleyParsons, 2015)*. The sediments are proposed to be pumped through enclosed pipes from Area 2 to Moorhead Beach, and as such the sediments will not be exposed to oxygen.*

No changes to the design are proposed.

Table 2-2 Amended sediment quality investigation results for Area 2 sediments (amended from table 6-1 of AREF2)

Contaminant/Physio-chemical property	Boat Harbour (Area 2) BH1, BH2, BH3)) (WorleyParsons, 2015)
Particle size	+75 µm to +19.0 mm.
Foreign material	The 10% foreign materials in sediments NSW EPA guidelines were exceeded at BH1. These consisted only of stone, which are not regarded as foreign materials under the NSW EPA order (WorleyParsons, 2015)
Acid sulfate soils (ASS)	No physical evidence of AASS were observed. Dark grey / black fine organic sediments were observed in the top 300 mm of the majority of cores indicating the potential presence of PASS. Net acidity, including the acid neutralising capacity (ANC) of the sediment, exceeded at BH2. ASS impacts are only expected if sediments are exposed to oxygen (WorleyParsons, 2015).
Metals/Metalloids	Individual concentrations, means and 95% UCLs of all metals and metalloids in the Entrance Channel and Boat Harbour were below the respective NAGD screening levels and NSW EPA ENM levels.
Tributyltin (TBT)	TBT concentrations were not exceeded within Area 2 sediments. The highest TBT concentration in Area 2 was recorded at 2.6 µgSn/kg. This is below both the NAGD screening level of 9 µgSn/kg and ANZECC (2000) sediment quality guidelines value for non-normalised TBT of 5 µgSn/kg.
Elutriates testing for TBT	The average TBT result for elutriates testing in the harbour was 2.8 ngSn/L which is below the ANZECC 95% protection trigger value of 6 ngSn/L.
Organochloride Pesticides	Individual concentrations, means and 95% UCLs of OCs in the Entrance Channel and Boat Harbour were below the respective NAGD screening levels.

Contaminant/Physio-chemical property	Boat Harbour (Area 2) BH1, BH2, BH3)) (WorleyParsons, 2015)
PCBs	Individual concentrations, means and 95% UCLs of OCs in the Entrance Channel and Boat Harbour were below the respective NAGD screening levels.
Hydrocarbons	Individual concentrations, means and 95% UCLs of hydrocarbons in the Entrance Channel and Boat Harbour were below the respective NAGD screening levels and NSW EPA ENM levels for all recorded hydrocarbons.
Conclusions	Sediments in Area 3 are suitable for offshore (underwater) disposal. There were two guideline exceedances in the sediment study for foreign materials and ANC (a precursor for Acid sulphate soils), that do not exclude the sediment from being suitable for offshore disposal. **Foreign material exceedance** The only foreign materials recorded at the exceedance site were stones. These are not considered foreign materials under the NSW EPA Order. Screening of sediment to 10mm as proposed will ensure that large stones are not deposited at Moorhead beach. **Potential Acid Sulphate soils** Net acidity, including the acid neutralising capacity (ANC) of the sediment, exceeded at BH2. ASS impacts are only expected if sediments are exposed to oxygen (WorleyParsons, 2015). The sediments are proposed to be pumped through enclosed pipes from Area 2 to Moorhead Beach, and as such the sediments will not be exposed to oxygen.

2.3 Issue 2, Remediation of Horseshoe Beach

Submission number(s)

Submissions 1, 2, 4, 5, 6 and 7

Issue description

a. Suggests that Horseshoe Beach should be remediated prior to any further dredging

Response

This is an out-of-scope item, these concerns are not addressed in this submissions report. The clean up of Horseshoe Beach will be subject to a separate assessment. It should be noted however that about 12,000m^3 of dredged marine sands placed on the beach have been relocated by truck to the designated stockpile area west of the harbour.

2.4 Issue 3, Implications of Dredging on the size of vessel entering the harbour

Submission number(s)

Submission 3

Issue description

a. Suggests dredging should be limited to dredge Areas 1-5 but Area 6 in the river should not be dredged as it will encourage bigger boats to use the river

Response

Dredging proposed in the Bermagui River (Area 6 of Figure 1-2) was not originally scheduled for dredging under the Project REF.

Following the Project REF works the original stakeholders of the Project REF indicated a need for dredging up to the Wallaga Lake Road bridge. This was considered in Chapter 3 (Justification) of the 2020 addendum 1 REF (NSW DPIE, 2020). The justification is detailed as follows:

*"During the consultation for the original REF stakeholders expressed a need for the dredging footprint to extend further west to address infilling in the Bermagui Harbour as far as the Wallaga Lake Road bridge, to access the boat ramp on the southern side of the bridge. As a result of that consultation, Crown Lands (**now managed by TfNSW**) has sourced funding to extend the dredging campaign west along the channel into the harbour within the Bermagui River in line with stakeholder requests. Undertaking the additional dredging concurrently with the original works will minimise disruption time and result in funding efficiencies."*

The dredging of Area 6 would occur up to a depth of -1.5m Lowest Astronomical Tide (LATm), which would not be deep enough for larger vessels to access the river (no larger than a small trailer boat able to access the river via the boat ramp on the western side of the Wallaga Lake Road bridge). Therefore, it is not expected that the Proposal would encourage larger boats to utilise the river.

The condition of dredging of Area 6 up to -1.5LATm has been included in the updated summary of safeguards in measure S1 (refer to Table 4-1)

2.5 Issue 4, Dredge disposal alternatives

Submission number(s)

Submissions 3, 4, 5 and 7

Issue description

a. Suggests dredged sand deposit location is at a popular swimming spot and a more appropriate area would be further 'up' the Moorhead Beach
b. Suggests that Beares Beach would be a more appropriate disposal area for beach nourishment as the beach has a steep drop off
c. Suggests that AREF 2 option 3 'disposal at a licensed waste facility' is the best option for waste disposal

Response

Response to sub issue a. dredge disposal further up Moorhead Beach

One respondent identified that the area offshore of Moorhead Beach proposed for dredge material placement is a popular swimming spot for locals. It is suggested that it may be more appropriate to choose a new location further 'up' (northwest) the beach where swimming is less popular.

The offshore disposal area at Moorhead Beach indicated in Figure 1-2 was selected in the Project REF (see page 69) as the dredging pipeline could be placed over the seawall and avoid the coastal dune. The area has also been subject to a biodiversity study (see Section 2.2) that determined the site is suitable for dredge disposal with mitigation measures. The problem with disposal further up to beach as suggested by the respondent is that the pipeline would need to be extended and laid along the beach, this could disturb the coastal dune habitat and would require further biodiversity studies especially in relation to shorebird nesting sites. Likewise, the aquatic disposal site would require further study to ensure no threatened species are present.

Mitigations will be in place to ensure that disposal offshore at Moorhead Beach does not affect the recreational quality of the popular swimming spot, primarily these include grain size screening and the option to dispose offshore rather than onshore. As described above the site has been studied and is considered a low impact option in comparison to alternate beach disposal options.

A detailed sediment transport monitoring program will be undertaken by MHL. The sediment transport monitoring program **mitigation measure has been updated to include a specification that the beach renourishment should not significantly alter the existing bathymetry.**

Response to sub issue b. Disposal at Beares Beach

Beares Beach has not been considered as a disposal option due to its location over 1km away from the dredging area and is not considered a beach in need of renourishment. As such, disposal at Beares Beach would not be feasible due to the cost and emissions of transporting the excavated sand. Consequently, Beares Beach has not been studied for its suitability as a disposal site.

No changes to the design are proposed.

Response to sub issue c. Landfill option

Similarly, to the Beares Beach option above, there would be large costs associated with landfill disposal. Considering there have been concerns raised in three submissions regarding the cost of the Proposal to the taxpayer, this option is not considered viable for all sediment, in comparison to disposal at Moorhead Beach.

Some sediments will be disposed at a licensed landfill if they are not considered suitable for offshore disposal. As included in the mitigation measures in Section 4.2 a SSAP would be prepared prior to commencement of the works. Areas where contamination is identified will be disposed of at a licenced landfill.

2.6 Issue 5, Ineffectiveness of consultation and cost concerns

Submission number(s)

Submissions 4, 5 and 6

Issue description

a. Suggests that consultation has been ineffective to date
b. Suggests that cost of any future remediation to the taxpayer is a concern

Response

Response to sub issue a. Consultation ineffectiveness

Consultation was carried out in accordance with the State Environmental Planning Policy (Infrastructure) 2007 (now the State Environmental Planning Policy (Transport and Infrastructure) 2021. Section 4 of the Project REF, Section 5 of AREF 1 and Section 5 of AREF 2 outlines the stakeholders who were consulted with and their responses. The Project REF however did not consider community consultation, which has been addressed through the public display of the current Addendum REF and this submissions report.

Addendums 1 and 2 were prepared as a result of concerns within the community.

Response to sub issue b. costs of the dredging process

The costs of the dredging process are justified in the Project REF and are considered acceptable as the works aim to maintain safe navigation for commercial and recreational vessels. The dredging was undertaken considering these concerns from key stakeholders below:

- NSW DPI (Fisheries) – Huskinsson office
- NSW Marine Parks Authority – Bateman's Bay Marine Park
- NSW DPI – Lands (South Coast Area)
- NSW Environment Protection Authority (EPA) – South-East Region
- Roads and Maritime Services (Maritime) - Port Kembla
- Bega Valley Shire Council (BVSC)
- National Parks and Wildlife Service (NPWS) – Merimbula Office
- Marine Rescue NSW – Bermagui
- Bermagui Dune Care
- Local Aboriginal Land Council (LALC) – Bega & Merrimans Offices
- Bermagui Marine Services & Slipway
- Bermagui Fisherman's Co-op (representing Commercial Fishermen)
- Bermagui Big Game Anglers Club (representing Recreational Fisherman)

It is noted that the planning process has come into question due to the handling of dredge sediments at Horseshoe Beach, this issue will be avoided with the mitigation measures of AREF 2. The dredging program is not unprecedented with similar dredging works being undertaken in 2003. The costs of not dredging the allocated areas may include damage to commercial and publicly owned vessels (e.g., Marine Rescue), and could also limit the effectiveness of marine based industry if the harbour is too hazardous to access.

The dredging proposed in AREF 2 has provided sufficient additional mitigations to ensure that dredge spoil is appropriately managed an avoid unforeseen cleanup jobs such as the transport of spoil from Horseshoe Beach to the current stockpile. Areas dredged under AREF 2 will be either disposed at landfill, if they do not qualify as clean excavated material (also known as Virgin Excavated Natural Materials (VENM)) or stockpiled if they are not suitable for beach disposal i.e the grain size does not suit beach disposal but are otherwise not contaminated.

While there will be costs associated with dredging these are considered unavoidable, which nearby disposal the most cost-effective option. Disposal at Moorhead beach will only require pipelines to be laid out, this avoids additional costs associated with trucking sediments to alternative disposal site such as waste treatment sites.

3. Changes to the Proposal

There are three key changes from AREF 2 proposed as a result of this submissions report.

1. Confirmation that sediments will be screen to 10 mm
2. Confirmation that dredge depth in the river would be up to -1.5LATm
3. Strengthening the wording of sediment transport monitoring program mitigation measure to ensure any dredging of the Bermagui River or Moorhead Beach will not be significantly altered from their existing condition

3.1 Change 1 Screening of sediments to 10mm

The grain size of dredged sediments was raised as a concern in the exhibition periods and is covered in Section 2.2 of this report. TfNSW officers confirmed during consultation sessions that sediments to be transported to Moorhead Beach would be screen to 10mm. Sediments greater than 10 mm taken from dredge Areas 6 and 2 would be diverted to the stockpile.

3.2 Change 2 Area 6 dredge depth to 1.5LATm

Submission 3 noted that dredging of Area 6 could encourage larger boats to use the river channel. Clarification is provided in Section 2.4, that the dredge depth of -1.5LATm would not be deep enough for large vessel access.

3.3 Change 3 Clarification of sediment transport monitoring

Submissions 1, 2, 3, 4 and 6 noted concerns about the planned sediment disposal site at Moorhead beach and also dredging along the Bermagui River. TfNSW have commissioned MHL to prepare a detailed sand placement monitoring program that will occur concurrently with the dredging work. Wording in Section 4.2 has been updated to clarify that this monitoring will ensure the dynamics of Moorhead Beach and the Bermagui River will not be significantly altered as a result of the works.

4. Environmental management

AREF 2 for Bermagui Harbour Dredging identified the framework for environmental management, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (section 6 of AREF 2).

After consideration of the issues raised in the public submissions and changes to the Proposal, the safeguard and management measures have been revised (refer to Section 3 and Section 4.2).

Should the Proposal proceed, environmental management will be guided by the framework and measures outlined below.

4.1 Environmental management plans (or system)

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

A Construction Environmental Management Plan (CEMP) will be prepared to describe safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to dredging works starting and must be reviewed and certified by environment staff from the Marine Infrastructure Delivery Office (MIDO), 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), ion and QA Specification G1 – Job Specific Requirements.

4.2 Summary of safeguards and management measures

AREF 2 for Bermagui Harbour Dredging identified a range of environmental outcomes and management measures that would be required to avoid or reduce the environmental impacts.

After consideration of the issues raised in the public submissions, the environmental management measures for the Proposal (refer to Chapter 7 of AREF 2) have been revised.

Five revisions have been made as described in the AREF 2. The three key changes are described in Section 3. The remaining two revisions to the mitigation measures are:

1. Clarification that the Sediment Sampling and Analysis Plan (SSAP) has been prepared and approved.
2. Removal of the measure to install a silt curtain in the Harbour dredge area. This decision has been made by the project manager due to the small size of the harbour making the curtain installation unfeasible.

Should the Proposal proceed, the environmental management measures in Table 4-1 will guide the subsequent phases of the Proposal. Additional and/or modified environmental safeguards and management measures to those presented in AREF 2 have been underlined and deleted measures, or parts of measures, have been struck out.

Table 4-1: Summary of environmental safeguards and management measures

Key:

~~Strikethrough~~ = mitigation text removed

Underline = mitigation text added

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
S - 1	Soils and erosion	• No dredging around areas where high concentrations of TBT were recorded should occur (i.e., around the slipway area). • No dredging should occur in areas where the ANC of PASS is low (i.e., up the eastern channel). If this area requires dredging at a later date, then material from here which is disposed to land should be treated in accordance with an ASS Management Plan (ASSMP) which will include the application of lime for acid neutralisation. • A Sediment Sampling and Analysis Plan (SSAP) ~~would be prepared prior to commencement of the additional works.~~ has been approved by Transport for NSW and ~~would~~ defines the testing regime for dredged sediments from the boat harbour and areas not sampled for the original REF. The SSAP will be implemented prior to commencement of works within any of the additional areas. • Dredged material would be managed dependent on its classification. Disposal of contaminated material would be undertaken at an appropriately licenced landfill in accordance with the relevant guidelines. • Any permanent disposal of Boat Harbour sediment to the land site west of the harbour will require further testing for PASS and TBT. If not, then determined to be ENM then transfer to a licences waste facility will be required. • Erosion and sediment control measures are to be implemented and maintained to: o Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets o Reduce water velocity and capture sediment on site o Minimise the amount of material transported from site to surrounding pavement surfaces o Divert clean water around the site.	Contractor	Construction/ Operation

(in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)).

- Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.
- Erosion and sediment control measures are not to be removed until the works are complete, and areas are stabilised.
- The maintenance of established stockpile sites is to be in accordance with the Roads and Maritime Services Stockpile Site Management Guideline.
- Potential or actual acid sulphate soils are to be managed in accordance with the Roads and Maritime Services Guidelines for the Management of Acid Sulphate Materials 2005.
- No new access tracks to be created for the works.
- VENM sediments will be clearly partitioned from materials dredged from Areas 3,4 and 5.
- Implement further assessment to understand sediment transport between the beach and the Entrance Channel to:
  - Predict likely movement of any deposited material
  - Identify if it will remain in the beach compartment
  - Determine the potential for the material to circulate back into the Entrance Channel
  - Inform preferred deposition locations to maximised beneficial re-use
- Implement a detailed sediment transport monitoring program to address potential sedimental pathways from Moorhead beach to the Bermagui River Entrance Channel. This monitoring plan shall consist of:
  - Pre and post beach renourishment hydrosurveys in conjunction with aerial photogrammetry surveys of the beach <u>to ensure Moorhead Beach and the Bermagui River's bathymetry is not significantly altered by the works</u>
- <u>Dredging of Area 6 would occur up to a depth of -1.5m Lowest Astronomical Tide (LATm).</u>
- Sediment shall be piped to the surf zone north of the break wall (at least 50-100m north) to minimise potential for migrating back into the channel.
- Sediment sampling:
  - ~~*Sedimental sampling shall be conducted on Moorhead beach to determine grain size, and therefore the appropriateness of the VENM sediments for beach re-nourishment (sand*~~

		~~*used for nourishment shall be similar grain size or slightly coarser).*~~ *Sand used for nourishment at Moorhead beach will be screened to ensure sediment sizes are no larger than 10 mm.* • Samples shall be tested from the swash zone to foredune, with the swash zone to berm generally having coarser sand grading finer at foredune		
AQ -1	Air quality	• Ensure that exhaust emissions from all diesel-powered plant and equipment remain within EPA emission standards by fitting appropriate exhaust control measures. • Implement regular maintenance of all diesel-powered plant and machinery used in the project in line with manufacturer's requirements. • Wind fences, or other measures, to minimise the generation of windblow sediment from the stockpile site.	Contractor	Construction/ Operation
W-1	Water quality	~~• To reduce the potential impact of suspended sediments on the marine environment (increased turbidity and re-suspension of potential contaminants) a floating boom and silt curtain should be installed around the immediate dredge area (with consideration to boating traffic and safe navigation) to prevent the spread of finer sediments disturbed during dredging.~~ • Silt curtain should be used when dredging ~~areas of the Boat Harbour which are~~ close to seagrass beds. • At any onshore disposal site(s), sediment bunding should be placed around the area identified for sediment disposal (prior to placement) to prevent intermediate sediment run-off into the waters. • Works should be postponed in the event of heavy or prolonged rainfall to reduce any cumulative effects of increased turbidity on marine habitats including seagrasses • All dredge plant and associated equipment should be maintained and inspected regularly to minimise the risk of oil and fuel leaks. • No refuelling of dredge plant or equipment should be undertaken onsite. • An oil spill response kit should be kept on all boats and barge and be on land at site. In the event of a spill, NSW Maritime and any relevant marine authorities should be notified.	Contractor	Construction/ Operation

		• All other solid waste / litter generated (e.g., food scraps and packaging) during the works should be contained to prevent them entering the waterways. This waste should be disposed of appropriately onshore. • A surface water monitoring plan should be developed to measure water quality performance prior to and during the dredging. An understanding of ambient water quality prior to dredging will be required. Some basic data is presented in this Section, but additional monitoring is recommended. Parameters may include TSS / turbidity, DO, pH and metals. Surface monitoring may include periodic monitoring of water quality near dredging locations or targeted monitoring during high-risk operations to detect issues. May include visual and in-situ (e.g., turbidity) monitoring • Dewatering strategies should be designed for each for each disposal site to prevent remobilisation of potential contaminants and suspended sediment from re-entering the dredged waterway. ANZECC (2000) water quality triggers should be adopted for all discharges (TSS, DO, pH and metals). • For the Entrance Channel a resultant discharge of <50mg/L TSS from dewatering areas should be acceptable • Measures to avoid water quality impacts should be outlined in an environmental management plan developed for the activity.		
B-1	Marine habitat and fauna	• Mitigation measures outlined for minimising impacts on sediment quality and water quality will also minimise impacts on marine flora and fauna and should be adopted. • The River Beach site should not be used as a disposal area due to the presence of important and sensitive marine habitats here (e.g., dense seagrass beds and extensive mudflats used by juvenile fish, marine invertebrates and shorebirds for feeding). • The dredge contractor should be made aware of the location of seagrass beds and other sensitive habitats including areas of rocky intertidal / subtidal near the entrance to the Boat Harbour. The dredge operator should take all necessary precautions to avoid damage to these habitats. Any movement of barges / vessels should be undertaken to limit their impact on seagrass beds. Vessels should limit travel at low tide over seagrass beds to minimise the potential for propeller damage. Anchoring of the dredge barge and any other associated vessels should be kept to a minimum and no anchoring in Seagrass beds should occur unless	Contractor	Construction/ Operation

absolutely necessary. Silt curtains should be placed between the immediate dredge area and seagrass beds / rocky habitats.

- ~~To reduce the spread of suspended sediments and their potential impact on all marine habitats and fauna present in the study area a silt curtain should be erected around the area of operations where it is safe and possible to do so.~~
- Dredging during the late winter / early spring months rather than summer months will help to reduce the impact on seagrass from increased turbidity effects (i.e., light attenuation and smothering). Seagrasses are more vulnerable to light deprivation in summer and start to regenerate following senescence in late spring as waters start to warm.
- Dredging should be limited to periods of calm weather and low rainfall where possible to decrease the potential impact on water quality and the possible cumulative impacts of increased turbidity on seagrass beds.
- The dredge operator shall take all necessary actions to avoid any adverse interactions with marine mammals, turtles and rays including ceasing dredge operations if required. Before commencement of dredging the area should be scanned for the presence of marine fauna. Work should not commence until they have left the dredge area.
- Silt curtains should be monitored / checked regularly to avoid entanglement of marine fauna.
- Silencers on engines and machinery could be used to minimise noise impacts on marine fauna.
- All equipment used should be serviced and well maintained to ensure that they are in proper working condition and reduce the potential for spills of fuels / oils.
- All general waste generated during the activity should be contained of appropriately before removal and disposal offsite to prevent it entering the waterway and being ingested by / entangling marine fauna.
- Due to the presence of marine vegetation in the study area and the potential for harm to this through dredging / disposal of sediments a NSW DPI Part 7 Permit to Harm Marine Vegetation is required for the proposed activity.
- No dredging equipment is to encroach within 20m of any marine vegetation. Seagrass mapping is to be used as a guide to the required buffer area.

B-2	Terrestrial vegetation, habitat and fauna	• All pipeline routes for disposal of sediment should be planned so they do not pass through areas of native vegetation or coastal dunes. There are suitable pipeline routes along either roadways or adjacent grassed areas from both the Entrance Channel and Boat Harbour sites to proposed disposal sites. • Mitigation measures outlined previously for minimising impacts on sediment quality and water quality will also minimise impacts on coastal shorebirds, their habitats and food sources. • ASS risks should be managed through the implementation of an ASSMP. • Bunding should be erected at the disposal sites prior to disposal so that runoff of fine sediment does not occur through coastal vegetation or marine habitats used by shorebirds during the dewatering phase. • Works should be postponed in the event of heavy or prolonged rainfall. • All plant and machinery required for the land-based works should be well maintained and in good working order to prevent spills of fuels and oils into terrestrial areas. • No land-based machinery should operate within areas of coastal vegetation or dunes. No disturbance of dune landforms should occur. • All rubbish associated with the activity should be contained of and disposed of appropriately to prevent pollution of the terrestrial environment and impacts on terrestrial species. • No terrestrial or marine vegetation is to be removed for the pipeline systems used for sediment deposition. • Ensure that machinery used for the works is free of weed material before entering and exiting the works area to avoid the introduction or spread of weed species. • If unexpected threatened species are discovered, works must cease immediately, and the Project Manager contacted for further instruction. • No deposition of sand on any beach is to occur during shorebird nesting season. • If the planned timing for dredging and deposition off Moorhead Beach coincides with the shorebird nesting season (September to March), Consultation should be undertaken with DPIE shorebird officers.	Contractor	Construction/ Operation
H – 1	Aboriginal heritage	• No disturbance of subsurface deposits at the disposal sites should be undertaken by land-based machinery.	Contractor	Construction/ Operation

		• In the unlikely event that a potential archaeological object is identified whilst carrying out works, all activities in the immediate vicinity of the object should cease and a suitably qualified archaeologist should be contacted to confirm the validity of the object. The Contractor must notify the appropriate agency and will need to apply for the appropriate approvals prior to the recommencement of further ground disturbance works. • All persons working on site that are involved in ground disturbing works should be made aware that it is an offence under Section 86 of the National Parks and Wildlife Act 1975 to harm or desecrate an Aboriginal object unless that harm or desecration is the subject of an approved Aboriginal Heritage Impact Permit (AHIP).		
H – 2	Historic heritage	• In the unlikely event that a potential archaeological object is identified whilst carrying out works, all activities in the immediate vicinity of the object should cease and a suitably qualified archaeologist should be contacted to confirm the validity of the object. The Contractor must notify the appropriate agency (Heritage NSW) and will need to apply for the appropriate approvals prior to the recommencement of further ground disturbance works.	Contractor	Construction/ Operation
SE – 1	Socio-economic	• The duration of dredging should be undertaken in as short a time frame as necessary to reduce the impact on scenic and visual amenity in Bermagui Boat Harbour. • Timing of the works, and therefore any restrictions on boating movements and public access along the foreshore, should take into account the peak use periods (including holiday periods and weekends) and aim to minimise interruptions to recreational users. • The community and commercial operators in the area should be made aware of the timing of the proposed works so that they can plan accordingly. This may be done through direct consultation with commercial operators and local businesses, notices in the local newspaper, local shops, community noticeboards and through council. • There are a number of official requirements of NSW Maritime which will help mitigate impacts on recreational and commercial boating arising from the proposed works: ○ *Speed Restrictions* – Short term speed restrictions (4 knot limit) are to be put in place around the dredge area and any equipment during dredging and pumping operations. ○ *No Anchoring Zones* – No anchoring will be allowable anywhere where a pipeline has been sunk for temporary sand pumping activities.	Contractor	Construction/ Operation

		○ Under the *Marine Safety Act* all marine obstructions (e.g., pipelines) must be clearly marked and channel markers erected during dredging operations. Channel markers would then be relocated to their new positions following dredging. • To reduce the potential issues associated with access NSW Maritime requires that Lands provide a Marine Notice in the local papers in advance of the works to notify users of changes to navigation and access during the dredging operations. • The use of silencers on engines and machinery will help to minimise any potential noise impacts. Dredging and disposal should also be undertaken within the hours nominated in the Interim Construction Noise Guidelines • Prior to the commencement of works Bega Valley Shire Council will be consulted in relation to potential disruption to public areas and roads. • All works areas will be restored to their original condition at the completion of works, and all signage, fencing and rubbish removed from the site. • The process and potential benefits of VENM sediment deposition off Moorhead Beach should be clearly communicated to community stakeholders. This should include outlining the ongoing management and monitoring activities that the TfNSW will be undertaking.		
N-1	Noise	• Undertake all dredging works within the specified Hours of Operation. • Optional noise mitigating strategies include enclosing engines with sound absorption material and ensuring properly maintained / functioning mufflers are fitted to plant and equipment. • Guidelines for noise levels which should be referred to by the contractor include: ○ *DEC 2006 – Assessing Vibration: A Technical Guideline. Department of Environment and Conservation. February 2006.* ○ *DECC 2009 – Interim Construction Noise Guidelines. Department of Environment and Climate Change. July 2009.* ○ *DECCW 2001 – NSW Road Noise Policy. Department of Environment, Climate Change and Water. March 2011.* ○ *EPA 2000 – NSW Industrial Noise Policy. Environment Protection Authority. January 2000.* • Plant will not be left running when not in use.	Contractor	Construction/ Operation

		• All plant must be regularly maintained and repaired or replaced if equipment becomes noisy due to age or condition. • The work site must be arranged to minimise the use of movement alarms on vehicles and mobile plant. • All employees and contractors should receive an environmental induction prior to commencement of works. The induction should include but not be limited to: o relevant project specific and standard noise mitigation measures; o permissible hours of work; and location of nearest sensitive receivers.		
T -1	Traffic and transport	• Vessel traffic management and consultation plans will be developed in consultation with TfNSW. • Specific vehicle traffic management measures will be included in a traffic management plan, particularly in relation to the proposed pipeline routes, and Council will be informed at least 21 days prior to works commencing. • Works would be coordinated around the busy holiday period to minimise the traffic disruption to local tourism. • Any works impacting on waterway navigation must seek TfNSW support, 21 days prior to works commencing. A full scope of works including dates is to be provided to *NavigationAdviceNorth@rms.nsw.gov.au*. • Any work vessels or equipment involved in the project must comply with the relevant NSW Marine Legislation (i.e., day shapes, lights, etc.) including the Marine Safety (Domestic Commercial Vessels) National Law Act 2012. All navigation beacons and lights are to remain operational. Any decommissioning or damage is to be reported to TfNSW.	Contractor	Construction/ Operation

4.3 Licensing and approvals

All relevant licenses, permits, notifications and approvals needed for the Bermagui Harbour and Entrance Channel Dredging project and when they need to be obtained are listed in Table 7-2. No new licences or permits are required.

Table 4-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
FM Act 1994	Part 7 Fisheries Management Act 1994 permit application to dredge and / or reclaim from NSW Department Primary Industries (Fisheries).	Pre-construction
FM Act 1994	Part 7 Fisheries Management Act 1994 permit application to harm marine vegetation (seagrasses) from the NSW Department Primary Industries (Fisheries).	Pre-construction
POEO Reg 2014	Special Exemption from EPA under Part 9 of the POEO Regulation 2014 if disposal of Boat Harbour sediment to the area west of the harbour is to occur (to be determined by Lands and Exemption to be prepared by Lands if this option is selected).	Pre-construction

5. References

Advisian. (2016). *Bermagui Boat Harbour and Entrance: Review of Environmental Factors and Sediment Disposal Options Report.* NSW Department of Primary Industries.

Blue-sky Planning . (2020). *Bermagui Boat Harbour, Bermagui River and Entrance Channel Dredging Addendum Review of Envrionmental Factors .* Commisioned by NSW DPI.

BMT WBM. (2015). *Bega Valley Shire Coastal Processes and Hazards Definition Study.* BMT WBM.

NGH Pty Ltd . (2021). *Bermagui Harbour Dredging Addendum review of environmental factors .*

NSW DPIE. (2020, March). *ADDENDUM REVIEW OF ENVIRONMENTAL FACTORS Bermagui Boat Harbour, Bermagui River and Entrance Channel Dredging .* Retrieved from https://roads-waterways.transport.nsw.gov.au/documents/maritime/projects/bermagui-harbour-and-channel-dredging/bermagui-harbour-and-channel-dredging-ref-03-2020.pdf

TfNSW. (2015). *Stockpile Site Management Guidelines.*

WorleyParsons. (2015). *Bermagui Boat Harbour and Entrance Channel Sediment Investigation: Sediment Sampling and Analysis Plan .* Sydney: WorleyParsons & NSW Crown Lands.

Appendix A

Submissions register

Submission number	Submission summary from email and community information session

1	• Disappointed by Info Session turnout
	• Reasonably happy that this round of dredging will be better managed than the last time with the following caveats:
	  ○ Screening size of material is not referred to in short document Bermagui dredging Community Update Transport for NSW February 2022. I was pleased to hear last evening assurance that screening will be to 10mm with escape to 20mm. It is noted that material screened is referred to as “excavated sand”.
	  ○ The proposed area for pumping excavated sand is only 50m offshore and it’s noted the intention is for the pumped material to be “beach nourishment”. However, there is no natural regular bar at Moorhead Beach. Might the dynamics of the beach be changed? Also -
	  ○ The proposed area for dumping “excavated sand” is about 350m in length, but straight in front of the popular swimming end of Moorhead Beach (near the training wall). It may be prudent to consider depositing the material further up the beach (apex of bight onwards)?
	  ○ Main concern over state of Horseshoe Beach. It is not yet fully remediated and some more sustained (*though modest work) would help. Can this be done also?

2	• Critical is the screening of sand to Moorhead Beach is critical so we don’t end up with the situation we now have at Horseshoe Beach Submitter asked more questions, about: • Will sand be automatically pumped to Moorhead Beach? A: Yes • Will anything be done at Horseshoe Beach? • To what degree will sand be screened?
3	• Do not dredge the harbour. Larger boats are too dangerous • Dredge the entrance to the harbour past rock wall but stop at the entrance to river to keep family free zone • Don’t put sand on Moorhead Beach—take it away maybe to Beares Beach Bermagui where there is need for extra sand as there is a massive drop off entering the beach.
4	• State of Horseshoe Beach, not happy with the remediation • Concerned that Consultation has been ineffective • The sand dumped at the stockpile from Horseshoe Bay Beach was not cleaned before it went to the stockpile • Putting new material onto Moorhead Beach does not take into account underwater ecology. This plan needs more explanation as to the expected effects. • Reconsider the Proposal to dump dredged material back into the local environment, and do not support the current proposed approach. • There ought to be a reconsideration of the approach, with a view to progressing Option 3 - permanent removal of dredged material to a licensed facility.
5	• Fix Horseshoe Beach before doing anything else…it’s still not fixed.

Submission number	Submission summary from email and community information session
	• Cart the dredged material away instead of putting it in the natural environment (no dumping at Moorhead Beach) • I agree with the need to dredge, but not with the strategy to dump spoil at Moorhead Beach • Concerned with the cost (to taxpayers) or remedial action to fix past errors.
6	• Fix Horseshoe Beach first…still not properly remediated • While they agree that dredging may have to be done for the safety of boats in our harbour, the submitter is extremely concerned regarding the dumping of 'contaminated sand and rubble'. Large and small boats dump fish carcasses and flush motors, after fishing expeditions into the harbour. To consider dumping this into a place where families swim and young people learn to surf on the sheltered Moorhead beach is criminal. This beach is sometimes the only safe beach protected from strong southerly winds. • Concerned regarding the amount of taxpayer dollars spent in attempts at fixing situations that should have been better thought through
7	• Disappointed to be advised that the Bermagui River dredging process proposes to deposit the waste products off the shoreline of Bermagui. Horseshoe Bay Beach has been detrimentally affected and still not recovered from the 2020 dredging process. The once pristine sand on the beach continues to be littered with stones and debris that were thoughtlessly deposited there. This beach area was beautiful prior to it being used as a convenient dumping site. Now it is not as beautiful despite several remediation attempts. • Bermagui's beaches and seashores should be allowed to remain unpolluted and pristine. Therefore the submitter does not agree with the proposed plan to dump the dredged waste products being allowed to be deposited anywhere on and off Bermagui's seashore.