Transport for NSW

Beaches Link and Gore Hill Freeway Connection

9 – Addendum – Treatment and loadout of dredged and excavated material not suitable for offshore disposal

June 2022

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9 Addendum – Treatment and loadout of dredged and excavated material not suitable for offshore disposal

9.1 Introduction and background

This document has been prepared as an addendum to the preferred infrastructure report which was lodged with the Department of Planning and Environment in November 2021.

To address the preferred infrastructure report requirement in relation to further assessment of the treatment and handling of material not suitable for offshore disposal and temporary onshore transfer/handling sites associated with the proposed dredging of Middle Harbour, Transport for NSW considered multiple potential locations for the future loadout facility. The Port of Newcastle construction support site (BL15) was identified in Section 5.3 of the preferred infrastructure report as the most viable option at that stage of the design development for use during construction and was assessed accordingly. However, the preferred infrastructure report acknowledged that the final location of the future loadout facility may be subject to change during further design development.

The assessment undertaken for the Port of Newcastle construction support site (BL15) demonstrated the loadout of dredged and excavated material not suitable for offshore disposal could be carried out within an established port or wharf facility, with negligible impacts on surrounding sensitive receivers and the environment. This was primarily due to the temporary and minor nature and scale of the works proposed, as well as the existing industrial nature of the Port of Newcastle and surrounding land uses which benefit from a large degree of separation from the nearest sensitive receivers, alleviating potential traffic and transport impacts, noise and vibration impacts, and air quality impacts. Other environmental impacts, such as impacts to water quality, were considered minimal and manageable.

Since lodgement of the preferred infrastructure report in November 2021 and after further review, detailed analysis and consideration of feedback received, Transport for NSW confirmed that it will not be progressing with the proposal to transport any materials from the project to the Port of Newcastle construction support site (BL15).

Given the assessment outcomes presented in Section 5 of the preferred infrastructure report however, Transport for NSW has determined that the loadout of dredged and excavated material not suitable for offshore disposal could be carried out within another port or wharf facility comparable with that previously assessed at the Port of Newcastle. The use of a port or wharf facility comparable with that previously assessed at the Port of Newcastle would have similar negligible impacts on surrounding sensitive receivers and the environment that are consistent with the previous assessment outcomes.

Section 5.3 of the preferred infrastructure report identified multiple potential locations considered by Transport for NSW for the future loadout facility. Except for the Port of Newcastle, these locations will continue to be among those considered by Transport for NSW during further design development and construction planning in consultation with a contractor/s, once engaged. Additionally, any other location which could meet the loadout facility selection criteria included in Section 9.5.2 of this addendum to the preferred infrastructure report that is comparable with that previously assessed at the Port of Newcastle may be considered. Prior to determining the future loadout facility location, an

assessment will be carried out to demonstrate that the final loadout facility location can meet the desired performance outcomes and site selection and construction criteria outlined in Section 9.5.2 of this addendum to the preferred infrastructure report.

The project description as described in Chapter 5 of the environmental impact statement remains unchanged by the construction phase refinement to be carried out in accordance with this addendum to the preferred infrastructure report. An alternate location to Port of Newcastle construction support site (BL15) for the future loadout facility would continue to be considered by Transport for NSW in accordance with the process outlined in Section 28.3 of the environmental impact statement.

The approval framework and statutory context outlined within Chapter 2 (Assessment process) and Chapter 3 (Strategic context and project need) of the environmental impact statement respectively remains unchanged by the construction phase refinement to be carried out in accordance with this addendum to the preferred infrastructure report.

9.2 Purpose of this document

The purpose of this addendum to the preferred infrastructure report is to:

- Assess the treatment and handling of contaminated material and any onshore transfer/handling sites associated with the proposed dredging of Middle Harbour as detailed in the Department of Planning and Environment's request for a preferred infrastructure report dated 14 May 2021
- Confirm that Transport for NSW will not be progressing with the proposal to transport any materials from the project to the Port of Newcastle construction support site (BL15)
- Confirm that the construction methodology for works within Middle Harbour remain unchanged
- Identify site selection and construction criteria for a loadout facility to enable a future assessment and confirmation of the final loadout facility location
- Demonstrate that with application of the site selection and construction criteria and desired performance outcomes, the scale and extent of works, and implementation of relevant environmental management measures from Appendix C of the preferred infrastructure report, there would be minimal risk and/or potential environmental and community impacts associated with a future loadout facility
- Identify any corrections and/or clarifications to the submissions report and preferred infrastructure report due to the above.

9.3 Relationship with the submissions report and preferred infrastructure report

This addendum uses the assessment and assessment outcomes outlined in Section 5 of the preferred infrastructure report to set the performance outcomes, site selection and construction criteria the final loadout facility location must meet. As use of the Port of Newcastle construction support site (BL15) will not be progressing, this addendum to the preferred infrastructure report is to be read in lieu of Section 5 of the preferred infrastructure report.

Given the submissions report included specific references the proposed Port of Newcastle construction support site (BL15), clarity has been provided in Table 9-1 on how these references should now be interpreted.

Table 9-2 provides updates to references within the preferred infrastructure report as a result of the above.

Where ‘strike through’ or bold font has been used, this indicates text to be deleted or added, respectively. Where text is both ‘strike through’ and bold, this indicates text that was added to the November 2021 submissions report or preferred infrastructure report, that is now to be deleted.

Table 9-1 Update to references to the Port of Newcastle construction support site (BL15) within the submissions report

Reference	Updated text
Executive summary	
No references to be updated	
Part A Introduction and overview	
Section A1.2.1, pg. A1-2	The project would be located within the North Sydney, Willoughby, Mosman, Northern Beaches and Lane Cove local government areas, connecting Cammeray in the south with Killarney Heights, Frenchs Forest and Balgowlah in the north. Key features of the project are shown in Figure A1-1 and Figure A1-2. ~~The project would also be located within the Newcastle local government area during construction, as following exhibition of the environmental impact statement, Transport for NSW has identified a preferred location for the loadout facility at the Port of Newcastle for sediment from Middle Harbour that is not suitable for offshore disposal (refer to Section 5 (Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infrastructure report for further details).~~
Clarification to Chapter 1 (Introduction), Section 1.3 and Section 1.3 of all technical working papers	The project location description was updated as part of Table A5-13 Clarifications on the environmental impact statement within the response to submissions and would require the following update: "The project would be located within the North Sydney, Willoughby, Mosman~~, and~~ Northern Beaches **and Lane Cove** local government areas, connecting Cammeray in the south with Killarney Heights, Frenchs Forest and Balgowlah in the north... ~~**The project would also be located within the Newcastle local government area during construction**~~".
Part B Response to key stakeholder submissions	
No references to be updated	
Part C Response to community submissions	
Section C7.9.1, pg. C7-30 Fourth paragraph of the 'Middle Harbour cofferdam construction support sites (Bl7 and BL8)' subheading	Some construction activities, including barge transport of marine sediment to the designated offshore disposal site or onshore loadout facility (refer to Section **9**~~5~~ (**Addendum -** Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infrastructure report), may occur outside standard construction hours, as noted in Table 6-21 of the environmental impact statement. This may include works during weekends when recreational use of Middle Harbour is highest. To maintain the safety of the waterway therefore, it would be necessary to maintain exclusion zones around the cofferdams and the dredging site. However as discussed above, construction marine traffic activities will be scheduled to avoid times and locations of high recreational marine traffic, in accordance with revised environmental management measure CTT4 (refer to Table D2-1 of this submissions report).

Reference	Updated text
Section C11.2.3, pg. C11-27	1st paragraph: The potential release of odour during dredging in Middle Harbour is discussed in Section 12.5.4 of the environmental impact statement and Section **9**~~5~~ (**Addendum –** Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infra~~str~~ucture report. 2nd paragraph: About 163,000 cubic metres of soft soil, sediments and rock would need to be removed from Middle Harbour during the dredging activities required for the installation of the immersed tube tunnels and associated transition structures. Dredged and excavated materials suitable for offshore disposal would be transported from Middle Harbour on split hopper barges and disposed of at a designated offshore disposal site (in accordance with legislative requirements). It is expected that about 12,000 cubic metres of sediment from the top 0-1.0 metre of the bed of the harbour may not be suitable for offshore disposal. These materials would be loaded onto hopper barges and transported to a land-based load-out facility, for transport by truck to land disposal at a licensed facility. Since public exhibition of the environmental impact statement, Transport for NSW has prepared a preferred infrastructure report which includes a description of the method for treating contaminated sediments from dredging ~~and the identification of the associated load-out facility. The temporary load-out facility would be located within the Port of Newcastle and would be known as the Port of Newcastle construction support site (BL15), as shown in Figure 5-5 of the preferred infrastructure report~~. **Section 9 of the preferred infrastructure report includes site selection and construction criteria which have been developed to guide the establishment and use of a future loadout facility and ensure potential environmental and community impacts are avoided and/or minimised.** 4th paragraph: Once the dredged material has been treated, the barges would transport the treated material to ~~the~~ **a loadout facility** ~~Port of Newcastle construction support site (BL15),~~ from where it would be loaded into sealed and covered trucks for transport to a suitably licensed waste facility. Material would remain in the barge until loadout into trucks and it is anticipated that stockpiling at the temporary construction support site would not be required.
Section C15.3.2, pg. C15-26 Final paragraph of the ‘Management and treatment of marine sediments from Middle Harbour response’ subheading	It should be noted that the environmental impact statement states that the location of an appropriate loadout facility outside of Middle Harbour for any dredged material not suitable for offshore disposal would be confirmed during further construction planning (refer to Table 28-2 of the environmental impact statement). Since exhibition of the environmental impact statement, Transport for NSW has prepared a preferred infrastructure report and this includes **site selection and construction criteria which have been developed to guide the establishment and use of a future loadout facility and ensure potential environmental and community impacts are avoided and/or minimised** ~~identification of a loadout facility at the Port of Newcastle~~. Please refer to Section **9**~~5~~ (**Addendum –** Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infrastructure report for further information.

Reference	Updated text
Section C23.2.1, pg. C23-4 Final paragraph of the 'Handling, processing, transport and disposal of potential contaminated dredged sediments response' subheading	The environmental impact statement states that the location of a loadout facility for any dredged material not suitable for offshore disposal would be confirmed during further construction planning (refer to Table 28-2 of the environmental impact statement). Since exhibition of the environmental impact statement, Transport for NSW has prepared a preferred infrastructure report and this includes **site selection and construction criteria which have been developed to guide the establishment and use of a future loadout facility and ensure potential environmental and community impacts are avoided and/or minimised** ~~identification of a loadout facility at the Port of Newcastle~~. Please refer to Section **9**~~5~~ (**Addendum –** Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infrastructure report for further information.
Part D Revised environmental management measures	
WQ21	Barges located at ~~Port of Newcastle construction support site (BL15)~~ **the loadout facility for dredged and excavated material not suitable for offshore disposal** will be enclosed within a localised floating silt curtain enclosure to a depth of two to three metres.
Appendix F5 – Updated biodiversity assessment	
Section 1.5, pg. 6 and 7	Construction support sites would include: • Cammeray Golf Course (BL1) • Flat Rock Drive (BL2) • Punch Street (BL3) • Dickson Avenue (BL4) • Barton Road (BL5) • Gore Hill Freeway median (BL6) • Middle Harbour south cofferdam (BL7) • Middle Harbour north cofferdam (BL8) • Spit West Reserve (BL9) • Balgowlah Golf Course (BL10) • Kitchener Street (BL11) • Wakehurst Parkway south (BL12) • Wakehurst Parkway east (BL13)

Reference	Updated text
Section 1.5, pg. 6 and 7 (continued)	• Wakehurst Parkway north (BL14) • ~~Port of Newcastle construction support site (BL15)~~ **a future loadout facility for onshore transfer/handling of dredged and excavated material not suitable for offshore disposal**. Refer to Figure 1-3 for temporary construction support sites nearby the tunnelling and surface works for the project. ~~Refer to Figure 1-4 for the location of the Port of Newcastle construction support site (BL15).~~ A detailed description of construction works for the project is provided in Chapter 6 (Construction work) of the environmental impact statement and should be read in conjunction with the refinements and clarifications provided in Section A4 and A5 of the submissions report. Section **9**~~5~~ (~~Treatment and~~ **Addendum –** Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infrastructure report provides further details on ~~the~~ **a future** loadout facility ~~at the Port of Newcastle for sediment from Middle Harbour that is not suitable for offshore disposal~~ **for dredged and excavated material not suitable for offshore disposal**.
Figure 1-4 Location of Port of Newcastle construction support site (BL15)	Figure to be deleted
Section 2.2.1, pg. 18	In addition, the **future loadout facility** ~~Port of Newcastle construction support site (BL15)~~ would be included in the subject land, according to the definition under the BAM. ~~This site is mapped in Figure 1-4.~~ However, it has generally been excluded from this updated biodiversity assessment as **its location is yet to be confirmed** ~~it is located within an existing industrial land use and provides negligible biodiversity value~~ (refer to Section **9**~~5~~ (**Addendum –** Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infrastructure report). **The future loadout facility would be selected to be** ~~It is~~ absent of PCTs and other native vegetation, and ~~is~~ located ~~on and surrounded~~ **at an existing port or wharf facility comparable with the Port of Newcastle** ~~by hard stand (refer to Plate 1)~~. ~~Assessment of this site **would be** has been carried out by desktop.~~ Direct, prescribed and indirect impacts to biodiversity values covered by the BAM are not anticipated. ~~There is a small area of adjacent open water that would be used for mooring barges. This area is included on the important area shorebird mapping which is considered further in Section 3.7.5.~~

Reference	Updated text
Plate 1 Aerial view of Port of Newcastle construction support site (BL15) showing adjacent hard stand areas and the south channel of the Hunter River (source: Hunter and Central Coast Development Corporation, 2012)	Plate to be deleted
Section 2.10, pg. 71	~~Assessment of the biodiversity values of the Port of Newcastle construction support site (BL15) were limited to desktop only with no field verification carried out.~~
Section 3.7.5, pg. 178	~~The Port of Newcastle construction support site (BL15) is partially located within the Hunter Estuary important area shorebird mapping as shown in Figure 3-10.~~ ~~This important area mapping indicates the approximate boundaries of the Hunter Estuary, parts of which contain known important habitat for the BC Act listed Curlew Sandpiper, Terek Sandpiper and Black-tailed Godwit, and the EPBC Act listed Eastern Curlew, Bar-tailed Godwit and Red Knot.~~ ~~The Port of Newcastle construction support site (BL15) comprises entirely of a constructed hardstand area and open water of the Hunter River. It does not contain any native vegetation, such as mangroves or saltmarsh that would constitute foraging or roosting habitat for these six migratory shorebird species. Additionally, the Hunter River shoreline within the Port of Newcastle construction support site (BL15) consists of an active port used by docking ships, and therefore there is no mud, sand or intertidal areas that may provide habitat for migratory shorebirds. As such, no threatened shorebirds are considered likely to occur on the Port of Newcastle construction support site (BL15).~~ ~~However, the importance of the Hunter River estuary to migratory shorebirds is well known (DEC, 2006). The primary habitat for these species is located within defined areas around Stockton and Kooragang Island. Although the Port of Newcastle construction support site (BL15) does not contain any suitable habitat for these six migratory shorebird species, the Hunter River itself may at times be used as a flight path. The Port of Newcastle construction support site (BL15) is not located between known habitat areas, therefore the surrounding section of the Hunter River is not likely to be commonly traversed by the Curlew Sandpiper, Terek Sandpiper, Black-tailed Godwit, Eastern Curlew, Bar-tailed Godwit or Red Knot~~.
Figure 3-10 Port of Newcastle construction support site (BL15) and important area shorebird mapping	Figure to be deleted

Reference	Updated text
Section 5.4.5.1.3, pg. 240	~~As identified in Section 3.7.5, the Port of Newcastle construction support site (BL15) is partially within the Hunter Estuary important area shorebird mapping. This mapping identifies that the Hunter Estuary is recognised as being an important area for the BC Act listed Curlew Sandpiper, Terek Sandpiper and Black-tailed Godwit, and the EPBC Act listed Eastern Curlew, Bar-tailed Godwit and Red Knot.~~ ~~Under the BAM, the presence of important area mapping within the Port of Newcastle construction support site (BL15) requires that the relevant species are assumed to be present and assessed accordingly for potential impacts. Section 5.2.5 of the BAM describes that a species polygon must be prepared, which includes the entire area mapped on the important habitat map that occurs within the Port of Newcastle construction support site (BL15). The area of the Port of Newcastle construction support site (BL15) within the important area mapping contains a thin sliver of the concrete dock and open water of the Hunter River.~~ ~~As discussed in Section 3.7.5, the Port of Newcastle construction support site (BL15) consists entirely of concrete and a small area of water in the Hunter River where ships are docked, and does not contain any habitat suitable for these six threatened migratory shorebird species. Additionally, there is no habitat adjacent to the Port of Newcastle construction support site (BL15) and the closest known important foraging and roosting sites are located around Stockton and Kooragang Island. Therefore, the proposed activities would not directly impact any habitat for the Curlew Sandpiper, Terek Sandpiper, Black-tailed Godwit, Eastern Curlew, Bar-tailed Godwit or Red Knot. A species polygon for has not be developed and the proposed activity does not require offsetting in accordance with the BAM.~~ ~~Potential impacts to these six species as a result of the proposed activities would be limited to indirect impacts (ie possible disturbance) to any birds traversing the Hunter River adjacent to the Port of Newcastle construction support site (BL15). However, prior to migrating, individuals of these six species, or other non-threatened migratory shorebird species, are most likely to occupy and fly between habitats to the north of the Port of Newcastle construction support site (BL15). Therefore, the Hunter River around the Port of Newcastle construction support site (BL15) is not likely to be an important flight path. Considering the proposed activities are consistent with the current use of the Port of Newcastle construction support site (BL15) and surrounding industry, the potential impact of the proposed activity to the local movement of the Curlew Sandpiper, Terek Sandpiper, Black-tailed Godwit, Eastern Curlew, Bar-tailed Godwit or Red Knot is likely to be negligible~~
~~Annexure D, Section 1.3, pg. 2~~	~~The project would also be located within the Newcastle local government area during construction. During further design development and construction planning in 2021, Transport for NSW identified a preferred location for a loadout facility at the Port of Newcastle for sediment from Middle Harbour that is not suitable for offshore disposal (refer to Section 5 (Treatment and loadout of dredged and excavated material not suitable for offshore disposal) of the preferred infrastructure report for further details). However, given there is no freshwater habitat at this location, further consideration of this facility is not provided in this report.~~

Table 9-2 Update to references to the Port of Newcastle construction support site (BL15) within the preferred infrastructure report

Reference	Updated text
Executive Summary	Treatment and loadout of dredged and excavated material not suitable for offshore disposal. Since exhibition of the environmental impact statement, Transport for NSW has prepared a preferred infrastructure report and this includes **site selection and construction criteria which have been developed to guide the establishment and use of a future loadout facility and ensure potential environmental and community impacts are avoided and/or minimised** ~~identification of a loadout facility at the Port of Newcastle~~. The **future loadout facility** ~~Port of Newcastle construction support site (BL15) would~~ **is** only **anticipated to** be required for a period of around four weeks~~ and is currently proposed to be located within the operational area of the Mayfield Concept Plan, which aligns with the general industrial nature of the area~~. Dredged and excavated materials not suitable for offshore disposal would be treated to make the material spadable (a consistency which allows the material to be spaded or shovelled) within self-propelled barges at Middle Harbour and then the material would be transported from Middle Harbour to ~~the~~ **a future loadout facility** ~~Port of Newcastle construction support site (BL15)~~. The material would be unloaded from the barges directly into trucks at the **future loadout facility** ~~Port of Newcastle construction support site (B15)~~. The loaded trucks would then be covered for transport to a suitably licensed facility. ~~The potential impacts of the proposed loadout facility are expected to include the following:~~ ~~• Traffic and transport - The assessment of existing road traffic data indicates there is sufficient capacity to accommodate the additional traffic generated by the Port of Newcastle construction support site (BL15). The Port of Newcastle construction support site (BL15) is expected to receive about 15 maritime vessels (30 maritime movements) during the four week project dredging program for material not suitable for offshore disposal and this is expected to be within the capacity of the Port of Newcastle, which caters for up to 4000 ships per annum (AECOM, 2010)~~ ~~• Noise and vibration - An additional excavator and barge would be required at the Middle Harbour crossing for a four week period during the dredging and excavation of material not suitable for offshore disposal to make the material spadable within the barge. Subsequently, minor adjustments are required to the assessment presented in the environmental impact statement. The updated assessment has shown that there is an increase in the number of potentially noise affected residential receivers (ie greater than the noise management level) during these works, however these receivers remain either potentially impacted by construction noise levels that may be either moderately intrusive (11 to 20 dB(A) above the noise management level) or clearly audible (10 dB(A) or less above the noise management level).~~ ~~• The proposed Port of Newcastle construction support site (BL15) is located in an area where the noise environment is dominated by industrial, transport and port related operations. The assessment of potential noise impacts predicts that the noise generated at the temporary construction support site would be~~

Reference	Updated text
Executive Summary (continued)	~~substantially lower than the noise limits for the nearby noise generating activities, and would not exceed day time noise limits at nearby receivers. Additional traffic generated from vehicle movement to and from the temporary construction support site would travel on arterial roads via Selwyn Street and Industrial Drive, Mayfield East. It has been assessed that the addition of 90 heavy vehicle movements per day for a period of four weeks is not substantial compared to existing traffic volume and traffic noise. Noise impacts from maritime traffic are also considered unlikely due to the relative low volume of maritime traffic required for the project compared to the existing operations at the Port of Newcastle~~ • ~~Air quality - Modelling results indicate that the maximum predicted odour concentrations would likely remain below the theoretical level of detection (ie 1 OU) at both Middle Harbour and Port of Newcastle construction support site (BL15) and would not impact on any sensitive receivers such as residential properties or Clive Park, Northbridge. Additionally, dust generation is not expected to occur at Middle Harbour or the sealed hardstand temporary construction support site and would not be generated during treatment or transport of dredged material~~ • ~~Hydrodynamics and water quality - Mixing of sediment would take place within the barge by means of an excavator located on an adjacent barge. Both barges would be located within the deep draft silt curtain enclosure at Middle Harbour. The proposed construction activities associated with the Port of Newcastle construction support site (BL15) would not result in any ground disturbance and would not result in an increase in impermeable surfaces or runoff generation. During the transport of material, no overflow would be permitted from transport barges and at Port of Newcastle construction support site (BL15) the material would be transferred into trucks for disposal at a licensed waste facility. It is not anticipated that any discharges of water would be required and potential water quality impacts are considered unlikely. As a precaution, a new environmental management measure WQ21 (refer to of this preferred infrastructure report) will require barges at Port of Newcastle construction Appendix C support site to be surrounded by two to three metre deep silt curtains during loadout activities.~~ ~~Potential impacts as a result of the Port of Newcastle construction support site (BL9) for human health, non-Aboriginal heritage, Aboriginal heritage, flooding, biodiversity, land use and property, socio economics, urban design and visual amenity, hazard and risks, resource use and waste management, sustainability, climate change risk and greenhouse gas and cumulative impacts are considered to be minor.~~ ~~Apart from new environmental management measure WQ21 (refer to Appendix C of this preferred infrastructure report), the environmental management measures presented in Appendix C of this preferred infrastructure report would be sufficient to manage the other impacts identified above.~~ **The current use of the site selection and construction criteria would guide the selection and use of the future loadout facility. Once availability of a location is confirmed, it would be assessed against the criteria. Through the application of the criteria and due to the minor scale and extent of works,**

Reference	Updated text
Executive Summary (continued)	**following the implementation of relevant environmental management measures, there would be minimal risk of environmental and community impacts.** **During the selection of the future loadout facility, Transport for NSW will consult with relevant councils and port authorities on the suitability of potential locations and potential noise, odour, water quality, traffic and amenity impacts. Consultation would be carried out in accordance with the Community communication strategy which would be developed based on Appendix E (Community consultation framework) of the environmental impact statement.** **The potential impacts of the works within Middle Harbour are expected to include the following:** • **Noise and vibration - An additional excavator and barge would be required at the Middle Harbour crossing for a four-week period during the dredging and excavation of material not suitable for offshore disposal to make the material spadable within the barge. Subsequently, minor adjustments are required to the assessment presented in the environmental impact statement. The updated assessment has shown that there is an increase in the number of potentially noise affected residential receivers (ie greater than the noise management level) during these works, however these receivers remain either potentially impacted by construction noise levels that may be either moderately intrusive (11 to 20 dB(A) above the noise management level) or clearly audible (10 dB(A) or less above the noise management level).** • **Air quality - Modelling results indicate that the maximum predicted odour concentrations would likely remain below the theoretical level of detection (ie 1 OU) at Middle Harbour and would not impact on any sensitive receivers such as residential properties or Clive Park, Northbridge. Additionally, dust generation is not expected to occur at Middle Harbour.** • **Hydrodynamics and water quality - Mixing of sediment would take place within the barge by means of an excavator located on an adjacent barge. Both barges would be located within the deep draft silt curtain enclosure at Middle Harbour.** **Potential impacts as a result of the works within Middle Harbour for traffic and transport, human health, non-Aboriginal heritage, Aboriginal heritage, flooding, biodiversity, land use and property, socio economics, urban design and visual amenity, hazard and risks, resource use and waste management, sustainability, climate change risk and greenhouse gas and cumulative impacts are considered to be minor.**

Reference	Updated text
Table 1-1	Provides an assessment of an onshore loadout facility for the treatment and handling of contaminated material associated with the proposed dredging of Middle Harbour described in Table 6-4 of the environmental impact statement. This facility would handle the transfer of all dredged material that is deemed unsuitable for offshore sea disposal. Once material is dredged from Middle Harbour, this material would be loaded directly into self-propelled split hopper barges. where it would be made spadable before being transported to a loadout facility and transferred onto trucks, for disposal at a suitably licensed land-based facility. Since the completion of the environmental impact statement, Transport for NSW **has developed site selection and construction criteria to guide the establishment and use of a future loadout facility and ensure potential environmental and community impacts are avoided and/or minimised** ~~has identified a preferred location for the loadout facility within the Newcastle local government area, at the Port of Newcastle~~.
Section 7, pg. 7-2	Section 5 assesses a proposed loadout facility at the Port of Newcastle (Port of Newcastle construction support site (BL15)) associated with the removal of sediment from the bed of Middle Harbour. **Section 5 of the preferred infrastructure report has now been superseded by Section 9**. Dredged and excavated materials not suitable for offshore disposal would be mixed and treated to make the material spadable (a consistency which allows the material to be spaded or shovelled) within barges at Middle Harbour and then the material would be transported from Middle Harbour to ~~Port of Newcastle construction support site~~ **a future loadout facility**~~(B15)~~. The loadout facility ~~would~~ **is anticipated to** be required for up to four weeks in early 2025. ~~The assessment also includes the feasibility of other locations considered for the loadout facility~~. Mixing of sediment within the barge would be carried out within the deep draft silt curtain enclosure at Middle Harbour, as required by environmental management measure WQ16 (refer to Appendix C of this preferred infrastructure report). ~~As a precaution, once docked at Port of Newcastle construction support site (BL15), the barge would also be surrounded by two to three metre deep silt curtains for the duration of the loadout activity (as required by new environmental management measure WQ21 refer to Appendix C of this preferred infrastructure report).~~ The assessment has determined that ~~all other~~ potential impacts would be managed through the implementation of the environmental management measures presented in Appendix C of this preferred infrastructure report, which would be sufficient to manage the treatment and transport of dredged material not suitable for offshore disposal from Middle Harbour to ~~Port of Newcastle construction support site~~ **a future loadout facility** ~~(BL15)~~.
Appendix C – WQ21	Barges located at ~~Port of Newcastle construction support site (BL15)~~ **the loadout facility for dredged and excavated material not suitable for offshore disposal** will be enclosed within a localised floating silt curtain enclosure to a depth of two to three metres.

9.4 Treatment and loadout of material

This section includes the aspects of the construction methodology previously outlined in Section 5 of the preferred infrastructure report which will remain unchanged notwithstanding the decision by Transport for NSW not to transport material from the project to the Port of Newcastle.

9.4.1 Overview

Removal of sediment from the bed of Middle Harbour would be required as part of cofferdam construction and to form the partial trench for the installation of the immersed tube tunnels at the Middle Harbour crossing, as outlined in Section 6.4.4 of the environmental impact statement.

Marine construction works for the project within Middle Harbour would produce around 163,000 cubic metres of dredged and excavated materials, made up of:

- Estuarine and marine sediments and rock excavated from the two temporary cofferdams in Middle Harbour
- Estuarine and marine sediments and rock dredged for the installation of the immersed tube tunnels within a partial trench.

Some estuarine and marine sediments in Middle Harbour contain elevated concentrations of metallic and non-metallic contaminants (refer to Chapter 16 (Geology, soils and groundwater) of the environmental impact statement). Most of the harbour's sediment contamination result from a combination of historical inputs that remain in the sediments and other ongoing sources of input such as stormwater inflows. The management of dredged and excavated materials during construction of the project would depend on the material's composition.

Sediments from the bed of the harbour requiring excavation and removal during construction, may be disposed of via:

- Offshore disposal – An application for offshore disposal of suitable dredged material will be submitted to the Commonwealth Department of Agriculture, Water and the Environment. The appropriateness of offshore disposal would be assessed in accordance with the National Assessment Guidelines for Dredging (NAGD) (Department of Environment, Water, Heritage and the Arts, 2009). Offshore disposal would only be appropriate for material that meets the requirements outlined in the NAGD

- Landfill disposal – Estuarine and marine sediments unsuitable for offshore disposal and requiring loadout at a suitable onshore facility and disposal to landfill will be assessed in accordance with the Waste Classification Guidelines (NSW EPA, 2014). Testing of the material not suitable for offshore disposal has shown it is not hazardous or toxic waste. Toxicity characteristics for the material have been tested and the material is suitable for disposal at a licensed facility and would be classified as general solid waste (refer to Annexure C of Appendix M (Technical working paper: Contamination)). As tributyltin was detected in the material, land-based disposal of the material would also need to be in accordance with the NSW EPA chemical control order for organotin waste materials.

Of the 163,000 cubic metres of dredged and excavated material that would need to be removed from Middle Harbour during construction, it is expected that around 12,000 cubic metres from the top zero to one metre of the bed of the harbour would not be suitable for

offshore disposal (refer to Table A5-13 of the submissions report). For the dredged and excavated material not suitable for offshore disposal, Section 6.9.4 of the environmental impact statement proposed it would be classified according to the NSW Environment Protection Authority's *Waste Classification Guidelines* (NSW EPA, 2014), barged to a loadout facility outside Middle Harbour for treatment to be made spadable (a consistency which allows the material to be spaded or shovelled) and then loaded onto trucks and disposed of at a suitably licensed waste facility. Transport for NSW committed that the loadout facility would be located outside of Middle Harbour however the environmental impact statement did not identify the location of the loadout facility. The dredging program for material not suitable for offshore disposal would be expected to be around four weeks.

9.4.2 Construction activities in Middle Harbour

As outlined in Chapter 6 (Construction work) of the environmental impact statement, removal of material not suitable for offshore disposal would be required as part of cofferdam construction and to form the partial trench for the installation of the immersed tube tunnels (crossing of Middle Harbour):

- Excavation works within the cofferdams would be carried out in the dry using excavators that would be lowered into the cofferdam. The excavators would use buckets to remove soft sediments, and hydraulic hammers and steel cutter blades where required, to fracture the underlying rock. The sediment and fractured rock would be loaded into bins within the cofferdam, and lifted out by a crane, which would be located on the cofferdam work platform. Any material not suitable for offshore disposal would be barged to the future loadout facility
- Dredging of the bed of the harbour to create a partial trench for the installation of the immersed tube tunnels would be carried out using a backhoe dredge (consists of a hydraulic excavator that is fixed to a pontoon or work barge) with a closed environmental clamshell. A closed environmental clamshell is a closed bucket which is used to minimise the spread of excavated material into the water column. This material would be loaded directly into nearby self-propelled barges (with no overflow allowed). Any material not suitable for offshore disposal would be barged to the future loadout facility.

The dredged and excavated materials not suitable for offshore disposal will be subject to waste classification under the *Waste Classification Guidelines* (NSW EPA, 2014), as noted above. Testing of the material not suitable for offshore disposal has shown it is suitable for disposal at a licensed facility and would be classified as general solid waste (refer to Annexure C of Appendix M (Technical working paper: Contamination)).

The key findings of Annexure C of Appendix M (Technical working paper: Contamination) identified sediment from the top zero to one metre of the bed of the harbour (refer to Table A5-13 of the submissions report) may not be suitable for offshore disposal and would require transportation to an onshore loadout facility. Characterisation of contamination within Middle Harbour is provided in Section 16.3.5 of the environmental impact statement and in Section 4.4.1 of Appendix M (Technical working paper: Contamination). Most of the harbour's contamination results from a combination of historical inputs that remain in the sediments and some current sources such as stormwater inflows. Sediment samples in Middle Harbour were collected as part of the geotechnical investigations carried out for the project. These samples were collected from a range of depths and analysed for a range of contaminant compounds including heavy metals, hydrocarbon compounds (TRH, BTEX and PAH), OCP, PCB, tributyltin (TBT) poly-fluoroalkyl substances (PFAS) and dioxins.

Royal HaskoningDHV carried out further elutriate testing of harbour sediments to determine the suitability of dredged material for offshore disposal (refer to Annexure C of Appendix M (Technical working paper: Contamination). The contaminant levels of material to be dredged were assessed in accordance with the sediment quality guidelines included in the NAGD (Department of Environment, Water, Heritage and the Arts, 2009). Specifically, the contaminants levels were assessed against a screening level. This is the level of a contaminant in the sediment below which toxic effects on organisms are not expected (Department of Environment, Water, Heritage and the Arts, 2009). The top one metre of sediment was identified for onshore disposal. This material would be classified as general solid waste and disposed of at a licensed waste facility due to exceedances of the screening level for copper, lead, mercury, silver and zinc which making the material unsuitable for offshore disposal. This equates to about 12,000 cubic metres of material not suitable for offshore disposal, as detailed in Table 7-1 of Appendix P (Technical working paper: Hydrodynamics and dredge plume modelling).

9.4.3 Treatment of material in Middle Harbour

Dredged and excavated estuarine and marine sediments not suitable for offshore disposal would be transferred to nearby self-propelled barges and made spadable (a consistency which allows the material to be spaded or shovelled). As part of this process, additives such as lime or inorganic polymers would be mixed into the material, fundamentally to reduce moisture content of the materials, but also in the case of lime to assist in mitigating potential odour and to neutralise acid sulfate soils (if present). This process is widely used on marine construction projects where dredged material is disposed of to land and has been applied on recent projects in Sydney Harbour, including Garden Island dredging works completed in 2010 and 2019. Land at Potts Point was used as the treatment and loadout facility for material from Garden Island dredging works in 2010. Land at White Bay was also used as the treatment and loadout facility for material from the Garden Island dredging works in 2019. Examples of material not suitable for offshore disposal being mixed within barges for Garden Island dredging works are shown in Figure 9-1 and Figure 9-2.

Mixing would take place within the barge by means of an excavator located on an adjacent barge within the deep draft silt curtains at Middle Harbour. The dredging and excavation process using a closed environmental clamshell would ensure significant quantities of additional water are not added to the inherent moisture within the soft materials. The addition of lime and/or inorganic polymer is utilised to significantly reduce the inherent moisture content of the soft materials. It is expected that the lime/inorganic polymer required for the treatment process would be delivered on a daily basis and would be stored in pallets at the Spit West Reserve construction support site (BL9). A suitable storage area would be provided as required by environmental management measure HR1 (refer to Appendix C of the preferred infrastructure report).

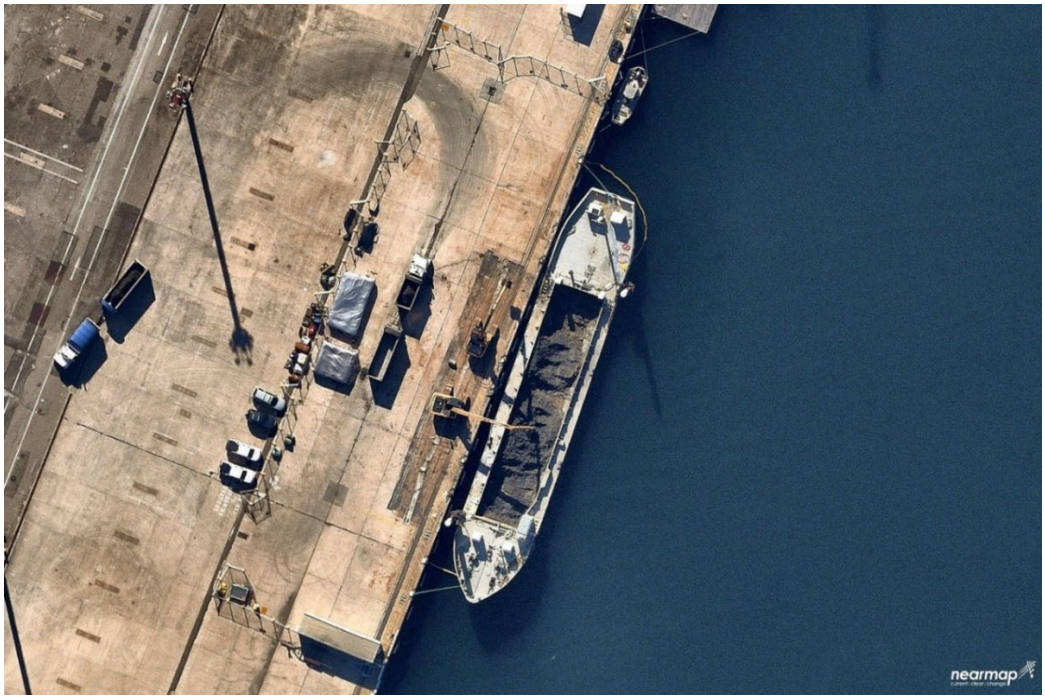


Figure 9-1 Example of material not suitable for offshore disposal being made spadable within a barge at White Bay for the Garden Island dredge works in 2019 (Source: Nearmap)

Figure 9-2 Example of material not suitable for offshore disposal being made spadable within a barge at Potts Point for the Garden Island dredge works in 2010 (Source: Royal HaskoningDHV)

9.4.4 Transport of material to a loadout facility

Barges into and out of Middle Harbour would follow the route for marine construction traffic shown in Map 6 of the Navigation Impact Assessment (refer to Annexure A of Appendix F (Technical working paper: Traffic and transport). It would be a requirement for barges to be fitted with an automatic identification system (AIS). A maximum of one barge per day or two barges every three days over the four week dredging program for material not suitable for offshore disposal would be sent to the loadout facility. Barges would not be fully loaded to ensure sufficient draft is available to safely navigate over the shallow sand bar at the entrance to Middle Harbour and to minimise spillage risk during transport. Transport of dredged and excavated material, would be planned so as to use high tide periods to allow safe travel over this relatively shallow area. Where feasible, barge movements to the loadout facility would be undertaken at night to minimise disruption to maritime traffic in Sydney Harbour and would aim to arrive at the loadout facility in the morning for loadout during the day.

The required weather window for the transit from Middle Harbour to a future loadout facility would depend on whether the barge is non-propelled (towed) or self-propelled, the degree to which the barge is loaded and distance to the loadout facility. For a self-propelled barge of 1800 cubic metres capacity the limiting maximum wave height would be around 4.0 to 4.5 metres (significant wave height 2.25 to 2.5 metres). Final selection of the barge would be the responsibility of the contractor/s. However, this assessment has conservatively assumed self-propelled barges would be used and would transport up to 1200 cubic metres per barge from Middle Harbour to a future loadout facility.

9.4.5 Future loadout facility activities

The final loadout facility activities will be undertaken at an established port or at a wharf facility comparable with that previously proposed at the Port of Newcastle. Key features and activities of a future loadout facility are anticipated to include:

- Office facilities and construction worker amenities with general security requirements, eg fencing or hoarding and lighting as required
- A carpark for up to five light vehicles
- Two excavators for unloading material not suitable for offshore disposal
- Up to 45 heavy vehicles (90 movements per day) would be required with up to eight heavy vehicle movements per hour from the loadout facility.

Material would remain in the barge until it is loaded into trucks. The trucks would then be sealed and covered for transport to a suitably licensed waste facility.

A dewatering area would not be required at the loadout facility, however a vacuum truck would be utilised should residual water need to be removed from the barges prior to or following completion of the loadout facility activities.

The future loadout facility would also be established in accordance with principles followed in the environmental impact statement, including planning the site layout to further minimise environmental and community impacts, eg making use of any temporary buildings to assist in shielding construction noise or establishing internal access roads to avoid the need for heavy vehicle to reverse.

9.4.6 Hours of construction

Consistent with Table 6-21 of the environmental impact statement, excavation and dredging within Middle Harbour would be carried out during standard construction hours (7am to 6pm Monday to Friday, 8am to 1pm Saturday and no construction works on Sundays or public holidays) only, with a four-week dredging program for the material not suitable for offshore disposal being carried out from early 2025. Mixing within the barge to make the material spadable and reduce odours would also be carried out during standard construction hours.

Consistent with Table 6-21 of the environmental impact statement, certain activities may be carried out up to 24 hours per day, seven days per week, and this may include the transport of material between Middle Harbour and the loadout facility. It is noted that weekends within Middle Harbour are typically the busiest period for recreation including recreational boating, and this would be considered during detailed construction planning stages to minimise impacts to recreational activities and residents.

General site activities and material haulage from a future loadout facility would be carried out during standard construction hours (7am to 6pm Monday to Friday, 8am to 1pm Saturday). No haulage is proposed to occur on Sundays or public holidays.

9.5 Environmental impact assessment

A screening assessment was carried out to determine which key environmental issues require detailed environmental impact assessment with regard to any changes in the construction methodology described in Chapter 6 (Construction work) of the environmental impact statement. This included assessment against each of the key issues, as set out in the revised Secretary's environmental assessment requirements issued for the project on 22 April 2020 by the Department of Planning, Industry and Environment.

The screening assessment process involved desktop studies and review of the potential impacts identified regarding the treatment of material in Middle Harbour. The results of the screening assessment are presented in Table 9-3.

Table 9-3 Screening assessment

Potential environmental impact issue	Assessment required
Traffic and transport	Y
Noise and vibration	Y
Air quality	Y
Human health	N
Non-Aboriginal heritage	N
Aboriginal heritage	N
Geology, soils and groundwater	N
Hydrodynamics and water quality	Y
Flooding	N
Biodiversity	N
Land use and property	N
Socio economics	N

Potential environmental impact issue	Assessment required
Urban design and visual amenity	N
Hazard and risks	N
Resource use and waste management	N
Sustainability	N
Climate change risk and greenhouse gas	N
Cumulative impacts	N

Issues where additional potential impacts were identified include traffic and transport, noise and vibration, air quality and hydrodynamics and water quality.

Potential impacts for human health, non-Aboriginal heritage, Aboriginal heritage, geology, soils and groundwater, flooding, biodiversity, land use and property, socio economics, urban design and visual amenity, hazard and risks, resource use and waste management, sustainability, climate change risk and greenhouse gas and cumulative impacts are all considered to be minor.

The environmental management measures presented in Appendix C of the preferred infrastructure report would be sufficient to manage impacts.

9.5.1 Assessment of works within Middle Harbour

This section outlines the aspects of the environmental impact assessment outlined in Section 5 of the preferred infrastructure report which were assessed and will remain unchanged notwithstanding the decision by Transport for NSW not to transport material from the project to the Port of Newcastle.

Traffic and Transport

Maritime traffic

The marine transport and construction vessel routes in Middle Harbour as shown in Figure 6-43 of the environmental impact statement would remain unchanged. Once material is made spadable within the deep draft silt curtains at Middle Harbour, barges would follow the route for offshore sea disposal out of Middle Harbour prior to travelling to the future loadout facility. The additional barge required within Middle Harbour for treatment of material is not expected to impact on the navigational channel between the two cofferdams to be provided by the project as it will sit adjacent rather than in front of or behind the work barge used for dredging.

The required number of maritime vessels for the future loadout facility would be one barge per day or two barges every three days, which is expected to result in about 30 vessel movements over the four week long dredging program. The addition of about 30 maritime vessel movements is unlikely to create a significant addition to maritime traffic between Middle Harbour and the future loadout facility given it will be located within a port or wharf facility comparable with the Port of Newcastle.

Marine works and maritime traffic would be managed through the project marine works and marine traffic management plans which would include requirements for vessel movements and navigational restrictions, as discussed in Table D1-1 of the submissions report. Any potential maritime traffic and transport impacts would be managed through the implementation of environmental management measures (including new and revised environmental management measures) CTT4, CTT16 and CTT17 to CTT20 in Appendix C of the preferred infrastructure report. No new environmental management measures are proposed.

Noise and vibration

Existing environment

An assessment of the noise levels associated with dredging activities within Middle Harbour is provided in Chapter 10 (Construction noise and vibration) of the environmental impact statement. In addition to the excavation and dredging activities within Middle Harbour, material would also now be made spadable within Middle Harbour prior to transportation.

The existing acoustic environment of the construction footprint and surrounds is described in Section 10.5 of the environmental impact statement. The Middle Harbour south (BL7) and Middle Harbour north (BL8) construction support sites would be located at each end of the Middle Harbour crossing and within the harbour at Northbridge to the south and Seaforth to the north. The potential noise generating activities associated with the treatment of dredged and excavated material within Middle Harbour would include:

- An additional excavator
- An additional barge.

An assessment of the potential construction noise associated with the treatment of material within Middle Harbour has been carried out by Renzo Tonin & Associates to determine whether mitigation would be required, and to determine appropriate management controls, as reported in the sections below.

Airborne noise impacts

As a result of the revised methodology to now carry out treatment of material within Middle Harbour as part of the dredging and excavation process, minor adjustments are required to the “Prepare foundations” dredging of a trench for the immersed tube tunnels noise assessment scenario, which is reference MHC_08 in Section 5.7 of Appendix G (Technical working paper: Noise and vibration). This assessment is an update to the assessment presented in Section 5.7 of Appendix G (Technical working paper: Noise and vibration) for the Middle Harbour crossing. The following updates should be read in conjunction with Section 5.7 of Appendix G (Technical working paper: Noise and vibration).

Table 9-4 details the ‘reasonable worst case’ set of operating plant and equipment that could occur during a 15 minute period that has been assessed to determine potential noise impacts. This is as per Section 5.7.1.6 of Appendix G (Technical working paper: Noise and vibration).

The reasonable worst case scenario is conservative because it assumes all equipment expected to be used at a given site would be operating simultaneously, at a worst case intensity, and with a worst case orientation during a 15 minute period and at the closest possible location to an affected sensitive receiver. Where plant items are not operating simultaneously, or for reduced times in a 15 minute period, noise impacts could be lower than predicted.

Table 9-4 Reasonable worst case construction equipment assessed

Site activity	Works ID	Activity/ modelled works	Work hours		Plant item	Reasonable worst case quantity		Individual source/activity sound power level (L_w re. 1pW), $L_{Aeq,15min}$, dB(A)		Vibration intensive plant
			Standard	OOHW		Standard	OOHW	L_{Aeq}	L_{Amax}	
Prepare foundations	MHC_08	Dredge and place gravel foundations	X	-	Backhoe dredge on barge	2	-	110	-	-

The predicted noise levels for the “Prepare foundations” assessment (MHC_08), applicable residential receivers are presented in Table 9-5 Table 5 5 for standard hours construction works (updating Table 5-108 of the Appendix G (Technical working paper: Noise and vibration).

Table 9-5 Predicted construction noise levels during standard hours (residential receivers) – LAeq(15 minute), dB(A) – Middle Harbour crossing

NCA	Noise Management Level (NML)		Predicted noise levels[1, 2] “Prepare foundations“ MHC_08
	Highly noise affected[3]	NML	MHC_08
39.1	75	47	≤ 55
39.2	75	47	≤ 64
40.1	75	47	≤ 51
40.2	75	47	≤ 51
41.1	75	46	≤ 53
42.1	75	52	≤ 67
43.1	75	55	≤ 53
43.2	75	55	≤ 42
44.1	75	60	≤ 49
45.1	75	50	≤ 40
47.2	75	53	≤ 43

Note 1: Construction noise level cells are shaded based upon the predicted worst case noise management level exceedance of the controlling time period as follows: Light blue is ≤ 10 dB(A) above noise management level, Mid blue is 11-20 dB(A) above noise management level, Dark blue is >20 dB(A) above noise management level, and bold text is highly noise affected (>75 dB(A))

Note 2: Predicted noise levels for the stage is based upon the reasonable worst case 15 minute construction works scenario as described in Section 4.2.2 of Appendix G (Technical working paper: Noise and vibration).

Note: 3 : greater than 75 1 dB(A), dB(A) stands for A-weighted decibel, a unit used to measure noise

The number of residential receivers predicted to exceed the noise management levels during the prepare foundations (MHC_08) stage are summarised in Table 9-6(updating Table 5-110 of the Appendix G (Technical working paper: Noise and vibration). Predicted noise levels are intended to be conservative and represent reasonable worst case impacts during the project.

Table 9-6 Number of receiver buildings over the noise management level (all NCAs) – residential receivers – Middle Harbour crossing - Prepare foundations (MHC_08)

Modelled representative activity	Assessment reference	Highly noise affected > 75 dB(A) $L_{Aeq, 15\ minute}$	Day (standard hours) $L_{Aeq, 15\ minute}$		
		Standard	1 - 10 dB(A)	11-20 dB(A)	>20 dB(A)
Prepare foundations	MHC_08	0	102	12	0

There is an increase in the number of potentially noise affected (ie greater than the noise management level) residential receivers during these works, however these receivers remain either potentially impacted by construction noise levels that may be either moderately intrusive (11 to 20 dB(A) above the noise management level) or clearly audible (10 dB(A) or less above the noise management level). Due to the short term nature of the activity over a four week period, there are no proposed changes to the recommended environmental management measures. Any potential construction noise impacts would be managed through the implementation of the construction noise and vibration environmental management measures CNV1 in Appendix C of the preferred infrastructure report.

While for non-residential receivers, the outcome remains the same as currently presented in Table 5-112 of the Appendix G (Technical working paper: Noise and vibration), where there are no non-residential receivers predicted to be noise affected (ie greater than the noise management level) during construction works for the preparation of foundations (MHC_08).

The predicted noise contour for the preparation of foundations (MHC_08) updating the contour presented in Annexure H.1 of the Appendix G (Technical working paper: Noise and vibration), is presented below in Figure 9-3.

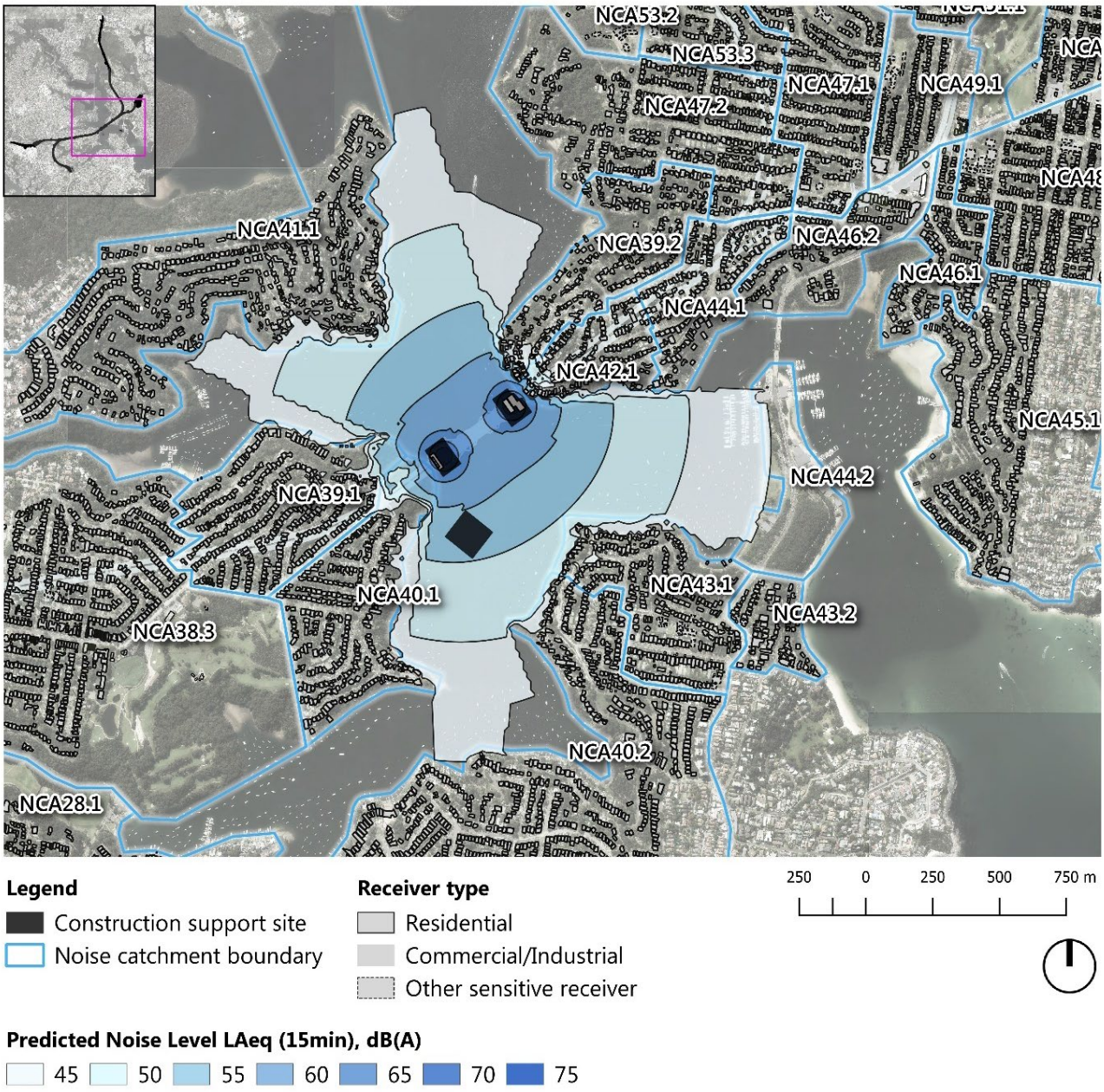


Figure 9-3 Middle Harbour Crossing – Construction noise contour – Standard hours – Prepare foundations (MHC_08)

Air quality

Existing environment

The Sydney region has a humid sub-tropical climate with warm summers and mild winters. Precipitation is typically heaviest in the first half of the year when east coast lows can bring very heavy falls and damaging winds.

The Bureau of Meteorology operates multiple Automatic Weather Stations near the project area, notably at Fort Denison, Terrey Hills and Manly North Head. To get an insight into the climate in the Sydney region, climate statistics from Sydney Observatory Hill have been used. Data from this station indicates that January is the warmest month with an average maximum temperature of 26.0°C. July is the coolest month with an average minimum

temperature of 8.1°C. March through June produces the highest average monthly rainfall, whilst the number of rain days is relatively consistent across all months of the year. Late winter through to early spring are generally drier with the highest prevalence of clear conditions.

Ambient air quality for the project is described in Section 12.4 of the environmental impact statement.

Ambient Air Quality

Despite the additional excavator and barge required for treatment of material within Middle Harbour, impacts would remain consistent with the environmental impact statement (refer to 12.5 of the environmental impact statement). Middle Harbour was considered to have a medium sensitivity to dust settlement effects as there were fewer receivers located near construction works. The potential magnitude of dust emissions was considered to be small. Low risk of dust settlement and ecological impacts as a result of earthworks and construction activities. During the addition of lime and/or inorganic polymer, activities would cease during unfavourable weather conditions as required by revised environmental management measure AQ1 (refer to Appendix C of the preferred infrastructure report).

Assessment of odour impacts

Dredged material has the potential to generate odour once exposed to air or while being processed as detailed in Section 7.2 of Appendix H (Technical working paper: Air quality). The potential impacts to surrounding sensitive receivers would be dependent on the:

- Characteristics of the material
- Amount of material undergoing treatment at any one time
- Treatment, handling and storage method
- Proximity and density of surrounding sensitive receivers.

Odour impacts associated with excavation and dredging activities within Middle Harbour are provided in Chapter 12 (Air quality) of the environmental impact statement. There would be no change to the dredging activities in Middle Harbour, however material would now be made spadable within Middle Harbour. Subsequently an odour assessment has been prepared by ERM to determine the potential for odour impacts at sensitive receivers in the vicinity of the works, and identify any monitoring and management requirements of this new activity in Middle harbour

Assessment criteria

The NSW Environment Protection Authority has developed odour goals and has specified the way in which these should be applied, using dispersion models to assess the likelihood of nuisance impacts arising from odour emissions.

The NSW Approved Methods include ground-level concentration criteria for complex mixtures of odorous air pollutants. These have been refined by the NSW Environment Protection Authority to take account of the population in the affected area. In urban areas (greater than 2000 people) and/or schools and hospitals the odour criteria to be exceeded not more than one per cent of the time is two odour units (2 OU). The odour predictions have therefore compared the maximum (100th percentile) model prediction to this criterion of 2 OU, to ensure a worst case assessment as the works are expected to be limited to a period of four weeks, and these criteria generally apply to operations that continue over a year.

Modelling

Dispersion modelling was carried out to inform a quantitative assessment of the potential odour impacts resulting from dredging activities. This involved various model inputs, including local meteorology and emission rates from potential odour sources. Given the coastal nature and also the terrain in some parts of the model domain, the air dispersion modelling conducted for this assessment is based on an advanced modelling system using The Air Pollution Model (TAPM) and CALMET/CALPUFF.

In order to determine a representative modelling year, an analysis of five years of data from 2016 to 2020 was conducted for the Middle Harbour area from nearby Bureau of Meteorology and NSW Department of Planning, Industry and Environment weather stations. It was identified that the year 2017 compared well with the five-year average across each of the nearby BoM stations (Fort Dension, Terrey Hills and Manly North Head). On this basis 2017 is considered a representative year for modelling.

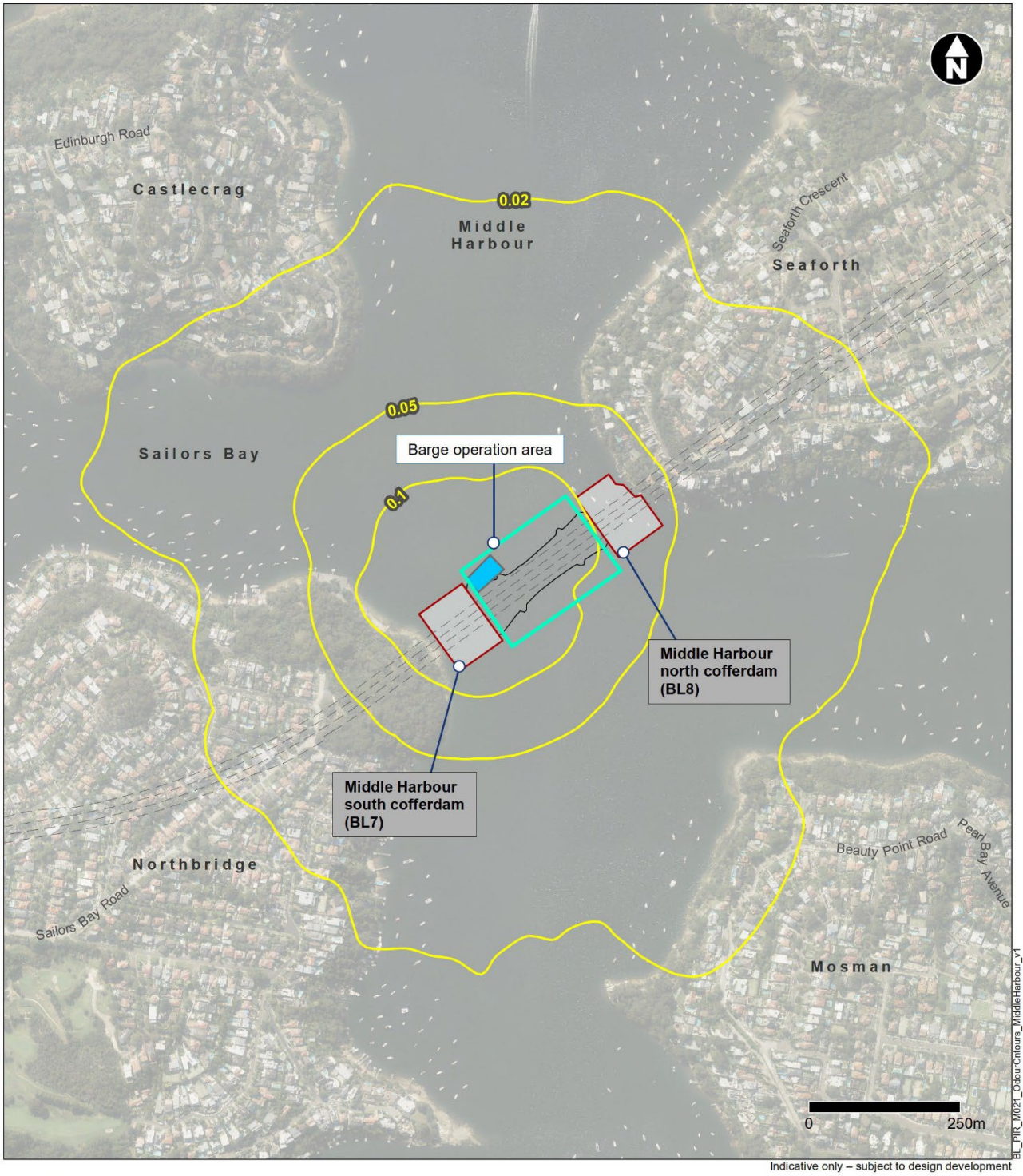
Emissions sources

In order to obtain site-specific odour emission rates, odour samples were taken from dredged material within Sydney Harbour near Birchgrove. Odour samples were taken for freshly extracted and undisturbed sediment, freshly extracted and disturbed sediment and a disturbed sample that was allowed to settle and dry after extraction. This enabled a range of different potential odour emissions. These specific odour emission rates were very low, so the maximum value was used for dispersion modelling. This rate was 0.028 $OU.m^3/m^2/s$.

For the purposes of the assessment, the assumption has been made that the total treatment area would be exposed with odorous material for every day of the year which provides conservatism in the assessment. Additionally, it has been assumed that a maximum area of about 1000 square metres of odorous material would be exposed at any one time to ensure a worst case scenario assessment. At Middle Harbour, this would be on a barge as the material is mixed. Modelling has been conducted for two locations within Middle Harbour one closer to Northbridge and one closer to Seaforth. The mixing of material could be conducted anywhere within the location of the barge operation area as shown on Figure 9-4 and Figure 9-5 but locations closest to receptors have been modelled. The total odour emission rate for the whole area of 1000 square metres, assuming a peak-to-mean ratio of 2.5 would be 70 $OU.m^3/s$.

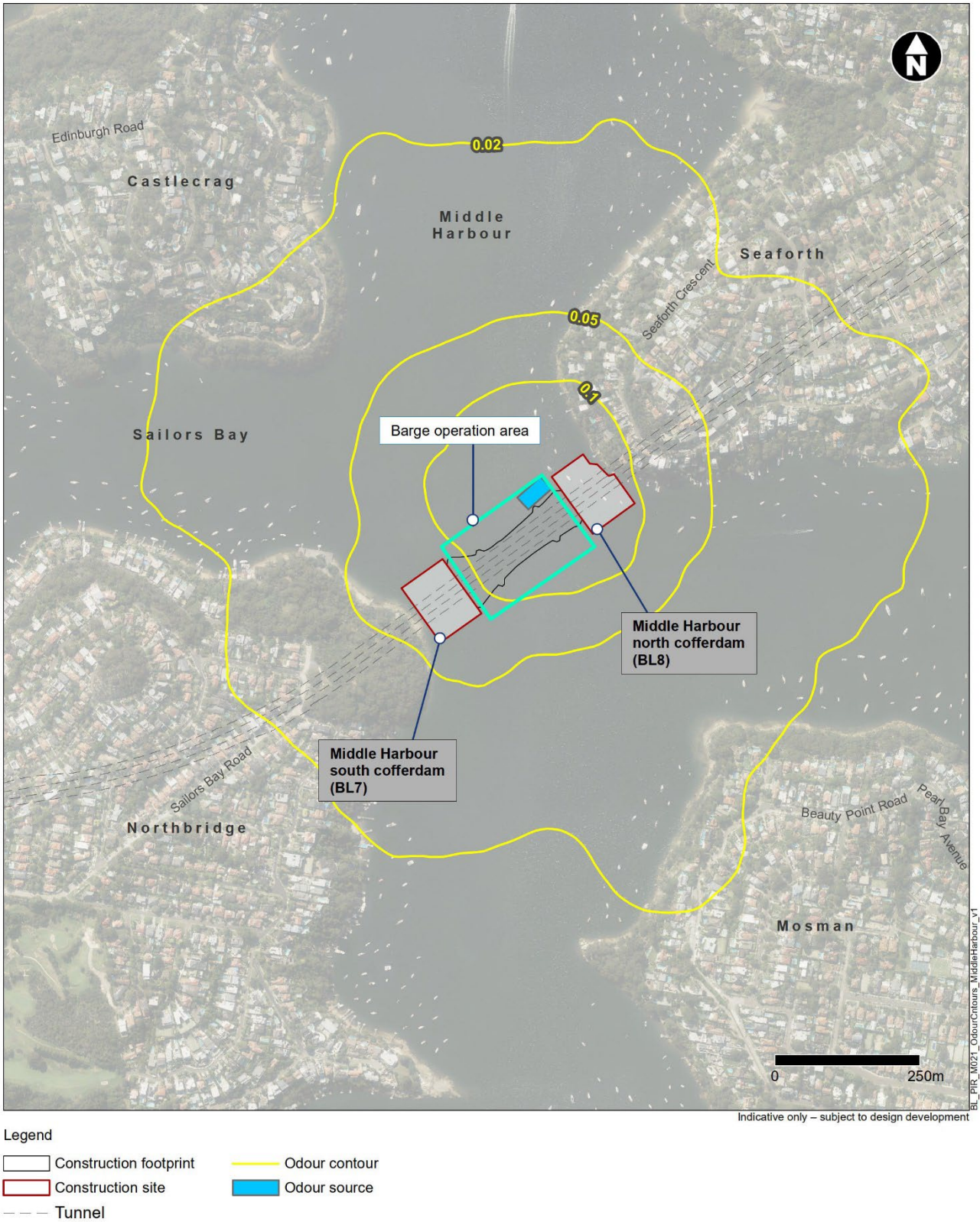
Predicted odour concentration at Middle Harbour

Figure 9-4 and Figure 9-5 present the predicted maximum ground level odour concentration within Middle Harbour near Northbridge and Seaforth, respectively. This assessment has considered the maximum odour concentration due to the short term nature of the operation (expected to be only four weeks in duration). The results presented below indicate that the maximum predicted odour concentrations are likely to remain below the theoretical level of detection (1 OU) and as such likely to be undetectable away from the source, and not at any sensitive receivers such as residential properties or Clive Park.



Note: The theoretical level of detection of odour is 1 odour unit (OU)

Figure 9-4 Predicted maximum ground level odour concentration (OU) near Northbridge in Middle Harbour



Note: The theoretical level of detection of odour is 1 odour unit (OU)

Figure 9-5 Predicted maximum ground level odour concentration (OU) near Seaforth in Middle Harbour

Hydrodynamic and water quality

At Middle Harbour the material would be treated to be made spadable using an excavator within the deep draft silt curtains at Middle Harbour (required by environmental management measure WQ16 refer to Appendix C of the preferred infrastructure report). As per the environmental impact statement, a closed environmental clamshell would be used to minimise the spread of excavated material into the water column. While suspended sediment would be subject to tidal water movement that can affect dispersion, the particles settle back to the bed of the harbour. The potential for dispersion can also be restricted through the use of control measures such as silt curtains. Based on the elutriate test results carried out for the project and the assessed available natural dilution, however, water quality impacts at the dredging site due to contaminants in resuspended sediments entering the dissolved phase would not be expected.

Should material fall back into Middle Harbour while it is being made spadable, impacts are expected to be minor given the elutriate test results carried out for the project and the assessed available natural dilution. The likelihood of this occurring would be minimised as barges would not be completely filled which would allow for space to carry out mixing and ensure barges are able to exit Middle Harbour. Similarly, during the transfer of lime and/or inorganic polymer as part of the mixing process there is the potential for the lime and/or inorganic polymer to be spilt into the harbour. This would be managed through the implementation of revised environmental management measure AQ1 (refer to Appendix C of the preferred infrastructure report) ie during the addition of lime and/or inorganic polymer, activities would cease during unfavourable weather conditions as required. Both activities would also be carried out within the deep draft silt curtains at Middle Harbour (as required by environmental management measure WQ16 (refer to Appendix C of the preferred infrastructure report)).

The storage and use of chemicals, fuels and materials onsite such as those required for mixing at Spit West Reserve construction support site (BL9) will be carried out in accordance with the supplier's instructions, and will comply with applicable legislation, guidelines and Australian Standards, as detailed in environmental management measure HR1 (refer to Appendix C of the preferred infrastructure report).

Other environmental issues

Table 9-7 Other environmental issues potentially impacted

Issue	Potential impact
Human health	The additional activity of mixing of material within Middle Harbour would not change the human health impacts outlining within the environmental impact statement (refer to Chapter 13 (Human health)).
Non-Aboriginal heritage	The additional activity of mixing of material within Middle Harbour would not change the non-Aboriginal heritage impacts outlining within the environmental impact statement (refer to Chapter 14 (Non-Aboriginal heritage)).
Aboriginal heritage	The additional activity of mixing of material within Middle Harbour would not change the Aboriginal heritage impacts outlining within the environmental impact statement (refer to Chapter 15 (Aboriginal heritage)).
Soils, geology and groundwater	Potential impacts from the dispersion of contaminated sediment dredged from Middle Harbour during mixing to occur in Middle Harbour is discussed in the 'Hydrodynamics and water quality' section above.

Issue	Potential impact
Flooding	The additional activity of mixing of material within Middle Harbour would not change the flooding impacts outlining within the environmental impact statement (refer to Chapter 18 (Flooding)).
Biodiversity	Additional activities within in Middle Harbour impacts would be consistent with the environmental impact statement. Marine turtles and marine mammals are susceptible to harm from boat strike which can occur in all subtidal habitats within the project area. On balance, however, the project area would be suboptimal habitat for these species and very few individuals would be likely to occur within the project area during construction. Increased vessel traffic in the project area during construction has the potential to increase the risk of collision between vessels and marine turtles and marine mammals. Given marine turtles and marine mammals regularly breach the surface to breathe, the risk of vessel strike to these species would be managed by having observers monitoring potential encroachment of individuals into the project area. Vessel strike can also be mitigated by slow boat speeds that minimise collisions as required by environmental management measures B25 and B27 (refer to Appendix C of the preferred infrastructure report). Potential impacts from the dispersion of contaminated sediment dredged from Middle Harbour during mixing to occur in Middle Harbour is discussed in the 'Hydrodynamics and water quality' section above. Impacts to biodiversity would be medium to low with placement of silt curtains around sensitive nearshore areas. Contaminated sediment is unlikely to permanently impact seagrass or rocky reef habitats consistent with the findings of the environmental impact statement.
Land use and property	The additional activity of mixing of material within Middle Harbour would not change the land use and property impacts outlining within the environmental impact statement (refer to Chapter 20 (Land use and property)).
Socio economics	Partial restrictions of Middle Harbour with maritime speed restrictions and controlled access would be required as per the environmental impact statement. The additional barge and excavator required for the mixing of sediment would not impact on controlled navigation routes through Middle Harbour. Recreational users, such as boating, sailing, rowing and kayaking would continue to be allowed to travel through the site in a controlled manner ensuring the safety of both the waterway user and the project team. Ongoing consultation and communication with users of Middle Harbour, such as with the local community, Mosman Rowing Club, Northbridge Sailing Club (located in Clive Park), Seaforth Moth Sailing Club (part of the Northbridge Sailing Club), Middle Harbour Yacht Club and users of D'Albora Marinas, The Spit, would assist in managing potential impacts as required by revised environmental management measure CTT16 (refer to Appendix C of the preferred infrastructure report).
Visual amenity and urban design	The additional activity of mixing material would require an additional excavator and barge within Middle Harbour during the completion of dredging works for material not suitable for offshore disposal, increasing the built form visible for surrounding receivers. Given the short term nature of works and as a barge and excavator are already required for dredging works, visual impacts would remain consistent with the environmental impact statement. Any potential impacts would be managed through the implementation of the relevant urban design and visual amenity environmental management measures in Appendix C of the preferred infrastructure report.
Hazard and Risk	No hazardous or dangerous material as classified by the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission, 2020) are proposed to be stored or transferred as part of the works.

Issue	Potential impact
Resource use and waste management	Prior to transport to the future loadout facility, the dredged and excavated materials would be subject to waste classification under the *Waste Classification Guidelines* (NSW EPA, 2014) as required by WM3 (refer to Appendix C of the preferred infrastructure report). Waste would then be disposed of at an appropriately licensed waste facility in accordance with its waste classification as required by environmental management measure WM3 in Appendix C of the preferred infrastructure report.
Sustainability	The additional activity of mixing of material within Middle Harbour would not change the sustainability impacts outlining within the environmental impact statement (refer to Chapter 25 (Sustainability)).
Climate change and greenhouse gas	The additional activity of mixing of material within Middle Harbour would not change the climate change and greenhouse gas impacts outlining within the environmental impact statement (refer to Chapter 26 (Climate change and greenhouse gas)).
Cumulative	The additional activity of mixing of material within Middle Harbour would not change the cumulative impacts outlining within the environmental impact statement (refer to Chapter 27 (Cumulative impacts)).

9.5.2 Site selection and construction criteria for a future loadout facility

Given the assessment outcomes presented in Section 5 of the preferred infrastructure report, the loadout of dredged and excavated material not suitable for offshore disposal could be undertaken within another established port or at a wharf facility comparable with that previously assessed at the Port of Newcastle, with negligible impacts on surrounding sensitive receivers, consistent with the previous assessment outcomes included in the preferred infrastructure report.

While the final location of a loadout facility will be determined during further design development and construction planning, site selection and construction criteria (provided below) have been developed to guide the selection, establishment and use of a future loadout facility and ensure potential environmental and community impacts are avoided and/or minimised. These criteria have been developed based on the assessment and assessment outcomes of Port of Newcastle in Section 5 of the preferred infrastructure report and best environmental management practice.

The future loadout facility to be used for the loadout of dredged and excavated material not suitable for offshore disposal must:

a) Be located within an existing port or wharf facility comparable with that previously assessed at the Port of Newcastle, which is not used for public / private transport ferry services and has ready access to the road network

b) Use existing accesses to the road network from the port or wharf facility comparable with that previously assessed at the Port of Newcastle. Local roads can only be used where they:

   i) Provide direct access from the port or wharf facility to the arterial road network

   ii) Are used as part of existing port or wharf facility operations

c) Not unreasonably impact existing commercial shipping operations or public transport ferry services (includes construction vessel movements to and from the loadout facility)

d) Provide sufficient area for construction workforce parking and other storage of any plant and equipment

e) Be located on a relatively level hardstand area

f) Not be located next to sensitive land use(s) (including where an access road is between the facility and the receiver), unless the landowner and occupier have given written acceptance to the carrying out of the loadout activity in the proposed location

g) Operate during standard construction hours (7am to 6pm Monday to Friday, 8am to 1pm Saturday and no construction works on Sundays or public holidays)

h) Be above the 10% AEP flood level unless a contingency plan to manage flooding is prepared and implemented

i) Not impact Aboriginal archaeological or cultural heritage objects, places or values

j) Not impact non-Aboriginal heritage items, values or conservation areas including maritime heritage

k) Not require clearing of native vegetation (including mangroves) or impact threatened species habitat.

As discussed in Section 9.1, the preferred infrastructure report identified multiple potential locations considered by Transport for NSW for the loadout facility. With the exception of the Port of Newcastle, these locations will continue to be among those considered for the loadout facility. Additionally, any other location which could meet the above loadout facility criteria may be considered during the selection of a final location for the loadout facility. The loadout facility site selection process will be carried out during further design development and construction planning in consultation with a contractor/s, once engaged.

9.5.3 Desired performance outcomes and qualitative assessment

A qualitative assessment of a future loadout facility against the key issues and desired performance outcomes, as set out in the revised Secretary's environmental assessment requirements issued for the project on 22 April 2020, is provided in Table 9-8. The assessment includes consideration of the above loadout facility criteria, general activities that would likely be associated with a future loadout facility based on the previously assessed construction methodology at the Port of Newcastle and desired performance outcomes. The assessment also references the relevant environmental management measures from Appendix C of the preferred infrastructure report which would assist in minimising and managing any potential impact.

Table 9-8 Desired performance outcomes and qualitative assessment of a future loadout facility for Beaches Link

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Traffic and transport	• Network connectivity, safety and efficiency of the transport system near of the project are managed to minimise impacts • The safety of transport system customers is maintained • Impacts on network capacity and the level of service are effectively managed • Works are compatible with existing infrastructure and future transport corridors.	Compliance with loadout facility criteria a), b), d) and g) would minimise potential impacts to the surrounding road network of a future loadout facility. The likely construction traffic volumes for a future loadout facility would be about 45 trucks (90 heavy vehicle movements) and up to 10 associated construction personnel light vehicles (20 movements) each day for about 4 weeks. The addition of around 90 heavy vehicles movements over the entire 7.00am to 6.00pm period (up to eight per hour) is likely to be insignificant compared to existing traffic numbers of the road network surrounding an existing port or wharf facility and be comparable with that previously assessed at the Port of Newcastle. Existing port or wharf facilities are typically located within industrial areas which experience relatively high levels of existing traffic. A future loadout facility would include provision for construction workforce parking which would avoid impacts on any surrounding existing residential or public parking. Compliance with loadout facility criterion c) would minimise potential impacts to maritime traffic. The use of a future loadout facility would likely generate one barge per day or two barges every three days, which is expected to result in about 30 vessel movements over a four week long dredging program. This level of vessel movements is unlikely to affect existing commercial shipping operations or any public transport ferry services surrounding an existing port or wharf facility.	CTT4, CTT6, CTT8, CTT9, CTT13, CTT17

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Noise and vibration – Amenity	• Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity • Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and well-being of the community.	Compliance with loadout facility criteria f) and g) would minimise potential noise and vibration impacts of a future loadout facility. Given the minor scale and extent of establishing and using a future loadout facility, the likely plant and equipment to be used and expected background noise environment associated with an existing port or wharf facility comparable with that previously assessed at the Port of Newcastle, noise levels even during a reasonable worst case construction scenario (ie all equipment expected to be used operating simultaneously), are not expected to be significant and would be effectively managed through implementation of standard noise mitigation and management measures. With the likely construction traffic volumes for a future loadout facility (up to eight per hour over a 7.00am to 6.00pm period) and existing traffic numbers of the road network surrounding an existing port or wharf facility, any potential change in traffic noise levels would likely meet the *Construction Noise and Vibration Guidelines* (Roads and Maritime Services, 2016) and *NSW Road Noise Policy* (DECCW, 2011) requirements. Given the volume of maritime traffic that typically uses existing port or wharf facilities and where they are located, noise impacts from construction vessel movements are considered unlikely due to the relatively small number of barge movements required (one barge per day or two barges every three days) and the short duration of works (four weeks). The establishment and use of a future loadout facility would not require work to be carried outside standard construction hours. Vibration impacts would also not be expected from establishing and using a future loadout facility.	CNV1, CNV2, CNV5, CNV6

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Noise and vibration – Structural	• Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings and items including Aboriginal places and environmental heritage • Increases in noise emissions and vibration affecting environmental heritage as defined in the *Heritage Act 1977* during operation of the project are effectively managed.	Compliance with loadout facility criteria i) and j) would minimise potential noise and vibration impacts of a future loadout facility. Given the minor scale and extent of establishing and using a future loadout facility and the likely plant and equipment to be used, vibration impacts which could adversely impact on the structural integrity of buildings and items including Aboriginal places and environmental heritage are not expected. In addition, a future loadout facility would be located so as not to impact Aboriginal archaeological or cultural heritage objects, places or values, or non-Aboriginal heritage items, values or conservation areas including maritime heritage.	CNV1, CNV2, CNV5
Air quality	• The project is designed, constructed and operated in a manner that minimises air quality impacts (including nuisance dust and odour) to minimise risks to human health and the environment to the greatest extent.	Compliance with loadout facility criteria e) and f) would minimise potential air quality impacts of a future loadout facility. Given the minor scale and extent of establishing and using a future loadout facility and that existing hardstand areas would be used, dust generation would likely be negligible. Similarly, given the plant and equipment proposed and the short program of works there are unlikely to be any observable emission impacts. The proposed methodology discussed in Section 9.4 involves treatment of dredged and excavated estuarine and marine sediments not suitable for offshore disposal within Middle Harbour. As such, there is unlikely to be any potential for odour	AQ1, AQ3, AQ5, AQ6

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Air quality (continued)		impacts from a future loadout facility as additives such as lime assist in mitigating potential odour and to neutralise acid sulfate soils (if present). However, should treatment and handling of the dredged and excavated material be required at a future loadout facility, the previous odour assessment for Port of Newcastle included in Section 5 of the preferred infrastructure report demonstrates that odour impacts would likely remain negligible. The results for the Port of Newcastle assessment showed that the maximum predicted odour concentrations are likely to remain below the theoretical level of detection (1 OU) and as such likely to be undetectable away from the source. The future loadout facility would be situated to comply with environmental management measures AQ5 and AQ6 (refer to Appendix C of the preferred infrastructure report). As such, and with loadout facility criterion f) requiring a future loadout facility not be located next to sensitive land use(s) (including where an access road is between the facility and the receiver), unless the landowner and occupier have given written acceptance to the carrying out of the loadout activity in the proposed location, odour impacts are unlikely even if treatment and handling of the dredged and excavated material is required at a future loadout facility.	

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Health and safety	• The project avoids or minimises any adverse health impacts arising from the project • The project avoids, to the greatest extent possible, risk to public safety.	Compliance with loadout facility criteria e), f) and g) would minimise potential health and safety impacts of a future loadout facility. As discussed above and below, the establishment and use of a future loadout facility is unlikely to result in air quality, noise or other impacts which could cause adverse health impacts to surrounding residences and the community. No hazardous or dangerous material as classified by the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission, 2020) would need to be stored or transferred to a future loadout facility. Testing of the material not suitable for offshore disposal has shown it is not hazardous or toxic waste. Toxicity characteristics for the material have been tested and the material is suitable for disposal at a licensed facility and would be classified as general solid waste (refer Annexure C of Appendix M (Technical working paper: Contamination)).	N/A
Heritage	• The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places.	Compliance with loadout facility criteria i) and j) would minimise potential heritage impacts of a future loadout facility. Given a future loadout facility would be established within existing port or wharf facility comparable with that previously assessed at the Port of Newcastle and take place on a hardstand area with no excavation works, demolition or ground disturbance to be carried out as part of works, any impact to Aboriginal archaeological or cultural heritage of non-Aboriginal heritage items including maritime heritage, is considered unlikely.	NAH12, NAH13, NAH14, AH5, AH6

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Soils	• The environmental values of land, including soils, subsoils and landforms, are protected • Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.	Compliance with loadout facility criterion e) would minimise potential soil related impacts including contamination of a future loadout facility. While an existing port or wharf facility comparable with that previously proposed at the Port of Newcastle may have potential contamination risks, the establishment and use of a future loadout facility would not require any ground disturbance activities that could subsequently potentially cause the mobilisation of contaminants. In addition, the proposed works would not add to contamination within the area as material would remain within the barge until loadout into trucks. It is not anticipated that stockpiling would be required at a future loadout facility. Erosion and sedimentation impacts are not expected or are impacts to acid sulfate soils as the establishment and operation of a future loadout facility would be carried out on hardstand area and are not expected to involve any ground disturbance or earthworks.	SG9, SG13
Water – Hydrology	• Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised • The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable)	Compliance with loadout facility criterion e) would minimise potential hydrology impacts of a future loadout facility. Given the minor scale and extent of establishing and operating a future loadout facility, impacts on surface water and groundwater hydrology are expected to be nil to negligible. While the works would be within and adjacent estuarine and marine waters, the implementation of standard water quality mitigation and management measures as discussed below would ensure any potential impacts are effectively managed.	SG9, SG20, WQ21, HR1

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Water – Hydrology (continued)	are maintained (where values are achieved) or improved and maintained (where values are not achieved) • Sustainable use of water resources.	Water usage requirements for the establishment and operation of a future loadout facility are expected to be minimal.	
Water – Quality	• The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable).	Compliance with loadout facility criterion e) would minimise potential water quality impacts of a future loadout facility. Given the minor scale and extent of establishing and operating a future loadout facility, impacts on freshwater and marine water quality are expected to be nil to negligible. The establishment and operation of a future loadout facility would not require any ground disturbance activities. In addition, the use of a relatively level hardstand area within an existing port or wharf facility comparable with that previously assessed at the Port of Newcastle would also limit disturbance of soils from site runoff. As such, the potential for water quality impacts from erosion and sedimentation is low. During the transport of dredged and excavated material from Middle Harbour to a future loadout facility, no overflow would be permitted from transport barges taking material to the site. Additionally, transport of material would only occur during an appropriate weather window to ensure safe navigation and minimise the likelihood of overtopping.	SG9, SG20, WQ21, HR1

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Water – Quality (continued)		Once the barge arrives at a future loadout facility, the material would be transferred onto trucks for disposal at a suitably licensed waste facility. Load out will take place within two to three metre deep silt curtains located around the barge in accordance with revised environmental management measure WQ21, to minimise impacts on marine water quality. The excavation and dredging process would not add significant quantities of water to the material and the addition of lime and/or inorganic polymer would significantly reduce the moisture content of the material. Accordingly, a dewatering area would not be required at a future loadout facility. However, should residual water need to be removed from the barges prior to or following completion of the loadout activity, a vacuum truck would be used with no discharges of water at site being permitted. With the use of vehicles, plant and equipment in close proximity to marine waters, there is potential for leaks and spills of hydrocarbons to occur which could potentially impact water quality. Appropriately sized spill containment kits will be developed to avoid and manage accidental spillages of fuels, chemicals, and fluids to minimise the risk of water quality impacts, as required by environmental management measure SG20.	
Flooding	• The project minimises adverse impacts on existing flooding characteristics • Construction and operation of the project avoids or minimises the risk of, and adverse impacts	Compliance with loadout facility criterion h) would minimise potential flooding impacts on a future loadout facility. In addition, construction phase environmental management measures related to managing flood impacts on construction sites would further mange any potential risk and/or impact from flooding for a future loadout facility.	F3, F5, F8

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Flooding (continued)	from, infrastructure flooding, flooding hazards, or dam failure.		
Biodiversity	• The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity • Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of project construction and operation.	Compliance with loadout facility criteria a) and k) would minimise potential biodiversity impacts of a future loadout facility. The use of an existing port or wharf facility comparable with that previously assessed at the Port of Newcastle would avoid and/or minimise the potential to impact on any threatened species, populations, or communities. While there is potential for a future loadout facility to be located within mapped migratory shorebirds habitat as detailed in *Threatened migratory shorebird habitat mapping project* (Department of Environment and Conservation, 2006), or include potential roosting habitat for threatened microbats, *Threatened migratory shorebird habitat mapping project* (Department of Environment and Conservation, 2006) would be considered as part of the site selection process and inspections would be carried out in accordance with environmental management measure B14 to confirm presence of any habitat features and ensure they are avoided if identified. No native vegetation (including mangroves) would be impacted during the establishment of a future loadout facility. In addition, transport to a future loadout facility is unlikely to result in impacts to marine mammals. Construction vessel movement speeds would be relatively slow. As such, the risk of injury would be negligible as marine mammals would safely avoid the construction vessels.	B12, B14, B22, B43

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Socio-economic, land use and property	• The project minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities • The project minimises impacts to property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.	Compliance with loadout facility criteria a), b), c), d), f) and g) would minimise potential socio-economic, land use and property impacts of a future loadout facility. Amenity and access and connectivity impacts of a future loadout facility on a surrounding community would likely be negligible (as discussed for key issues associated with traffic and transport, air quality, noise and vibration and place making and urban design) and due to the short term nature of the works. The use of an existing port or wharf facility comparable with that previously assessed at the Port of Newcastle would avoid direct impacts on any social infrastructure. Property acquisition would not be required given the temporary nature of a future loadout facility. The land for the future loadout facility would be temporarily leased in consultation with the landowner for the duration of the use of the construction support site. The site would be rehabilitated in accordance with any landowner requirements after the completion of works. The type of work associated with a future loadout facility would be compatible with an existing port or wharf facility comparable with that previously assessed at the Port of Newcastle and it is unlikely to impact any existing land use activities. Any negotiated lease arrangement for a future loadout facility would consider existing commercial operations associated with the existing port or wharf facility.	LP5, SE3
Place Making and Urban Design	• The project design complements the visual	Compliance with loadout facility criteria a), f) and k) would minimise potential visual amenity and landscape character impacts of a future loadout facility.	V2, V3, V4, V6, V7, V11

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
Place Making and Urban Design (continued)	amenity, character and quality of the surrounding environment • The project contributes to the accessibility and connectivity of communities.	The type of work associated with a future loadout facility would be compatible with an existing port or wharf facility. In addition, works associated with a future loadout facility would be short term and temporary only. As such, with the loadout facility not being located next to sensitive land use(s) (including where an access road is between the facility and the receiver), unless the landowner and occupier have given written acceptance to the carrying out of the loadout activity in the proposed location, it is unlikely that nearby residences or sensitive viewpoints would experience visual impacts.	
Waste	• All wastes generated during the construction and operation of the project are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner that protects environmental values.	Prior to transport to a future loadout facility, the dredged and excavated materials would be subject to waste classification under the *Waste Classification Guidelines* (NSW EPA, 2014). Testing of the material not suitable for offshore disposal has shown it is not hazardous or toxic waste. Toxicity characteristics for the material have been tested and the material is suitable for disposal at a licensed facility and would be classified as general solid waste (refer Annexure C of Appendix M (Technical working paper: Contamination)). As tributyltin was detected in the material, land-based disposal of the material would also need to be in accordance with the NSW EPA chemical control order for organotin waste materials. Waste would be transported from the loadout facility and disposed of at an appropriately licensed waste facility in accordance with its waste classification. Specific facilities and collection contractors for the disposal of waste would be selected and documented in the construction waste management plan.	WM3, WM4

Key issue	Desired Performance Outcome	Assessment	Relevant environmental management measures
		Any waste generated from the establishment, use and decommissioning (if required) of a future loadout facility, will be appropriately transported, stored and handled according to their waste classification and in a manner that prevents pollution of the surrounding environment.	
Sustainability	• The project reduces the NSW Government's operating costs and ensures the effective and efficient use of resources • Conservation of natural resources is maximised.	Establishment and use of the temporary and short-term future loadout facility is not expected to impact on the project's ability to meet its sustainability objects. Project sustainability objectives and targets will be finalised during further design development, informed by the requirements of the project planning approval. A sustainability management plan would be developed for the project.	SU1, SU2
Climate change risk	• The project is designed, constructed and operated to be resilient to the future impacts of climate change.	Due to the limited number of additional marine vessel movements anticipated for a future loadout facility and the small number of heavy vehicle movements required for transportation of material from loadout facility to a licensed waste disposal facility, estimated construction stage emissions presented within the environmental impact statement are likely to remain unchanged.	GHG2
Cumulative impacts	• The project minimises cumulative impacts and maintains communication with nearby projects.	Given the minor and short-term nature (ie four weeks) of the activities at the future loadout facility, cumulative impacts with nearby projects are considered unlikely. Works may be scheduled to avoid conflicts with other port activities and minimise cumulative impacts for surrounding sensitive receivers.	CI1, CI3

9.6 Revised and additional management measures

Environmental management measures related to construction will be included in a construction environmental management plan, as described in Part D of the submissions report. The construction environmental management plan would be prepared prior to construction of the project and would be reviewed and approved by Transport for NSW and the Department of Planning and Environment, prior to the commencement of any on-site work. Transport for NSW would continue to consult with the landowner of the future loadout facility during the preparation of the construction environmental management plan, and the plan would be publicly available once approved. A waste management plan will form part of the construction environmental management plan and include the management of dredged and excavated material that is not suitable for offshore disposal.

The construction environmental management plan would be a working document, subject to ongoing change and updated as necessary, to respond to specific requirements. All handling of material within Middle Harbour and at the future loadout facility would be carried out in accordance with the approved construction environmental management plan and an environment protection licence issued by the NSW Environment Protection Authority.

Environmental management measure WQ21 has been updated to minimise impacts to water quality during load out activities at the future loadout facility:

Ref	Phase	Impact	Environmental management measure	Location
WQ21	Construction	Marine water quality	Barges located at ~~Port of Newcastle construction support site (BL15)~~ **the loadout facility for dredged and excavated material not suitable for offshore disposal** will be enclosed within a localised floating silt curtain enclosure to a depth of two to three metres.	~~Port of Newcastle construction support site (BL15)~~ **Loadout facility for dredged and excavated material not suitable for offshore disposal**

However, the treatment of dredged material within Middle Harbour and other activities associated with the establishment and use of the future load out facility will be managed through the implementation of the environmental management measures described in Appendix C of the preferred infrastructure report.

9.7 Conclusion and next steps

Use of the criteria outlined in Section 9.5.2 would guide the selection of the location of the future loadout facility. Once availability of the location is confirmed, it would be assessed against the criteria, as demonstrated in Table 9-8. During the selection of the future loadout facility Transport for NSW will consult with relevant councils and port authorities on the suitability of potential locations and potential noise, odour, water quality, traffic and amenity impacts. Consultation with the community would also be carried out in accordance with the

Community communication strategy which would be developed based on Appendix E (Community consultation framework).

Through the application of the criteria, due to the minor scale and extent of works and following the implementation of relevant environmental management measure, there would be minimal risk of environmental and community impacts from use of the future loadout facility.

The environmental impact statement, the submissions report, the preferred infrastructure report, additional information in relation to contamination and this addendum to the preferred infrastructure report will be considered by the Department of Planning and Environment during its assessment of the project, in accordance with the approval process under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979*. The Secretary of the Department of Planning and Environment will prepare an environmental assessment report in accordance with Section 5.18 of the *Environmental Planning and Assessment Act 1979*. The Minister for Planning will then decide whether or not to approve the project and identify any conditions of approval which will apply.

If the project is approved by the NSW Government, Transport for NSW will continue to consult with community members, government agencies and other stakeholders during the further design development and construction phases of the project, with a view to further minimising project impacts wherever possible. Should the project be approved, notifications, including letters, emails, and SMS alerts (where appropriate), would be issued to affected receivers to explain construction activities, work hours, and potential impacts from construction activities prior to work occurring. Enquires from and issues raised by the community would be addressed in a timely and transparent manner, in accordance with the Community communication strategy which would be developed based on Appendix E (Community consultation framework), to foster and develop positive and meaningful relationships with stakeholders and the community.