Transport for NSW

Beaches Link and Gore Hill Freeway Connection

Cover note

Information within this report regarding the proposed Port of Newcastle construction support site (BL15) has been superseded by an Addendum to the preferred infrastructure report lodged with the Department of Planning and Environment in June 2022. Please refer to Section 9 – Addendum – Treatment and loadout of dredged and excavated material not suitable for offshore disposal for further information

June 2022

Transport for NSW

Beaches Link and Gore Hill Freeway Connection

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

November 2021

Contents

5 Treatment and loadout of dredged and excavated material not suitable for offshore disposal

5.1 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).

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. Since exhibition of the environmental impact statement the treatment methodology to make the material spadable has been refined and a proposed location of the loadout facility has been identified.

This Section provides further detail and assessment of the treatment of material in Middle Harbour, and the proposed onshore loadout facility, including the establishment and operation of the facility, consideration of alternative locations and consultation. In addition, several stakeholders made submissions regarding the location of the loadout facility as part of the response to submissions to the environmental impact statement for the project. A response to concerns regarding the handling, processing and transport and disposal of potentially contaminated dredged sediment from Middle Harbour is provided in Section C23.2.1 of the submissions report.

5.2 Construction activities in Middle Harbour

As outlined in Chapter 6 (Construction works) 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 proposed 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 proposed 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 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).

5.3 Site selection process

Since exhibition of the environmental impact statement Transport for NSW has considered multiple potential locations for the loadout facility. An assessment of the potential locations considered for the onshore loadout facility is presented in Table 5-1.

Table 5-1 Locations considered for the loadout facility

Location	Feasibility
White Bay, Sydney Harbour	The Western Harbour Tunnel and Beaches Link program of works has been in regular discussion with the Port Authority of NSW for a number of years in relation to the use of White Bay as part of the Western Harbour Tunnel and Warringah Freeway Upgrade project. The Western Harbour Tunnel and Warringah Freeway Upgrade environmental impact statement assessed the use of the White Bay construction support site (WHT3) during construction to support dredging activities for the construction of the immersed tube tunnels for the Sydney Harbour crossing. The Beaches Link and Gore Hill Freeway Connection project team has discussed with the Port Authority of NSW the option of providing an alternate location within White Bay for the project or extending the footprint or alternatively the length of the lease agreement of White Bay construction support site (WHT3) to facilitate use of the site by both projects. In May 2021, the Port Authority of NSW confirmed that due to increased demand for wharfage at White Bay, providing an alternate location within White Bay or extending the footprint or alternatively the length of the lease agreement for White Bay construction support site (WHT3) may not be possible. Transport for NSW will continue discussions with Port Authority of NSW to determine the potential use of White Bay as a loadout facility for the project if capacity allows in future.
Port Kembla/Wollongong Harbour	Use of Port Kembla for the onshore loadout facility was discounted by Transport for NSW due to limited availability of wharfage and the potential for cumulative demand for wharfage due to an upcoming dredging project associated with the approved gas import facility in the inner harbour. Wollongong Harbour was also considered to be an inappropriate location for a loadout facility as it is a base for recreational boating and commercial fishing, it does not have substantial unloading berths, and it is surrounded by a residential/open space setting.
Port Botany, Botany Bay	Due to its commitment to container traffic and subsequently very limited available general wharfage, Port Botany is not considered to be a feasible location for the onshore loadout facility.
Port of Newcastle	Port of Newcastle is considered a potentially appropriate option due to the availability of wharfage as well as the industrial nature of the site and surrounding land use meaning there would be minimal impact to the local community. Several different sites at the Port of Newcastle have been identified and considered by Transport for NSW in consultation with the Port of Newcastle including two separate locations on Kooragang Island (east) and one site at Mayfield North. The previous BHP steelworks site at the Port of

Location	Feasibility
	Newcastle is currently being redeveloped as part of the Mayfield Concept, the history of this area and current approval are outlined in Section 5.6.

Based on the above, Port of Newcastle is considered to be the most viable option at this stage of design development. An overview of the sites identified and considered by Transport for NSW in consultation with the Port of Newcastle is provided in Table 5-2.

Table 5-2: Locations considered for the loadout facility at Port of Newcastle

	Mayfield No. 4 Berth	Kooragang Island
Site description	Mayfield No.4 Berth is shown in Figure 5-1 and is located in Mayfield North within the Port of Newcastle. The berth is located at Lot 44 of DP1191982 and associated with the operational area for the Mayfield Concept Plan (refer to Section 5.6).	The northernmost option on Kooragang Island is located at Lot 20, Lot 21 and Lot 22 of DP234887. The southernmost option on Kooragang Island is located at Lot 15, Lot 16, Lot 17 and Lot 18 of DP234887. Both options on Kooragang Island are shown in Figure 5-1.
Access and egress	Via Selwyn and Industrial Drive (State Road A43)	Via Greenleaf Road and Nelson Bay Road (State Road B63)
Proximity to nearest residential receiver	1.3 kilometres west in Mayfield	600 metres east in Stockton

Figure 5-1 Locations considered for the loadout facility at Port of Newcastle

Transport for NSW has carried out an assessment for a loadout facility to be located at Mayfield No.4 Berth, following selection of this site in consultation with the Port of Newcastle. The loadout facility is referred to as the Port of Newcastle construction support site (BL15) for the remainder of this Section.

While Mayfield No.4 Berth has been identified as the site for the loadout facility, it is acknowledged that the Kooragang Island options share similar characteristics with Mayfield No.4 Berth, including but not limited to an existing industrial land use, adequate separation from residential receivers and ready access to the arterial road network. It is anticipated that potential impacts and the environmental management response described for Mayfield No.4 Berth in Section 5.7 would also apply to the Kooragang Island options, particularly for the traffic and transport, noise and vibration, air quality and hydrodynamics and water quality.

Noting Transport for NSW is continuing discussions with both Port of Newcastle and the Port Authority of NSW, the final location of the loadout facility may be subject to change during further design development in consultation with a contractor/s, once engaged. If an alternate location to that assessed for Port of Newcastle construction support site (BL15) is identified either within Port of Newcastle or on Port Authority of NSW land at White Bay, the proposal for an alternate loadout facility location would be considered by Transport for NSW in accordance with the process outlined in Section 28.3 of the environmental impact statement.

5.4 Consultation

Consultation with the Port of Newcastle has been ongoing since April 2021. This has included the availability of suitable locations for an onshore loadout facility and operation of the Port of Newcastle construction support site (BL15).

Transport for NSW met with the City of Newcastle Council in September 2021 ahead of formal lodgement of this preferred infrastructure report to discuss the Port of Newcastle construction support site (BL15) including potential noise, odour, water quality, traffic and amenity impacts.

Consultation on the project would continue throughout the remainder of the planning assessment process and into the construction period, with a view to further minimising project impacts wherever possible.

5.5 Treatment and loadout of material

5.5.1 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 5-2 and Figure 5-3.

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 this preferred infrastructure report).

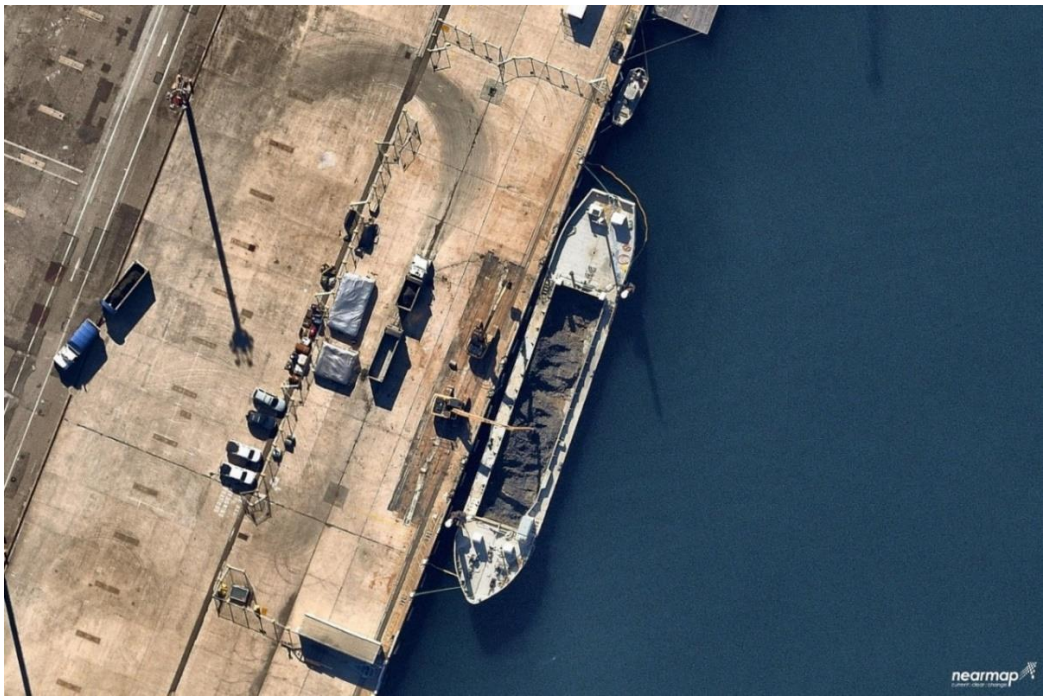


Figure 5-2 Example of material not suitable for offshore disposal being made spadable within a barge at White Bay for the Garden Island dredge works in 2019 (Source: nearmap)

Figure 5-3 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 Haskoning)

5.5.2 Transport of material to Port of Newcastle construction support site (BL15)

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 Port of Newcastle. 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. Barges would take about nine to 12 hours to travel between Middle Harbour and the Port of Newcastle aiming to arrive in the morning for loadout during the day.

The required weather window for the transit from Middle Harbour to the Port of Newcastle would depend on whether the barge is non-propelled (towed) or self-propelled, and the degree to which the barge is loaded. 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 Port of Newcastle.

5.5.3 Loadout facility at Port of Newcastle construction support site (BL15)

The Port of Newcastle construction support site (BL15) at Mayfield No.4 Berth is shown in Figure 5-4 and Figure 5-5 and would be located in Mayfield North within the Port of Newcastle. The berth is located at Lot 44 of DP1191982 and associated with the operational area for the Mayfield Concept Plan (refer to Section 5.6).

The site would include a carpark for up to five light vehicles. Land-based access to the site would be via Selwyn Street and Industrial Drive (State Road A43) and heavy vehicles would enter at the north western end of the site and exit to the south east via Selwyn Street to Industrial Drive.

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. About 45 heavy vehicles (90 movements per day) would be required with up to eight heavy vehicle movements per hour from the Port of Newcastle construction support site (BL15).

A dewatering area would not be required at Port of Newcastle construction support site (BL15), 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 operation.

5.5.4 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 Port of Newcastle. 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 for Port of Newcastle construction support site (BL15) 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.

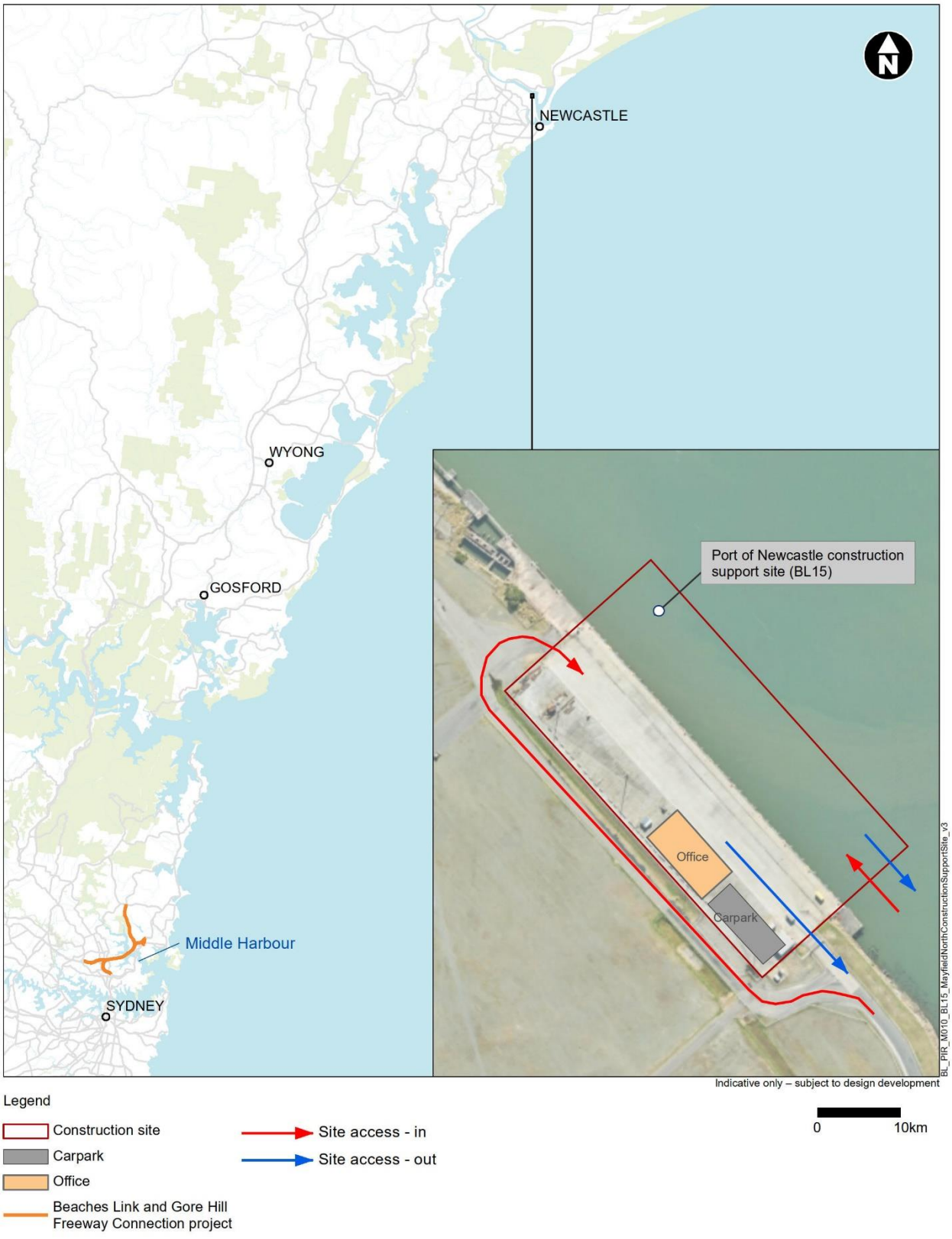
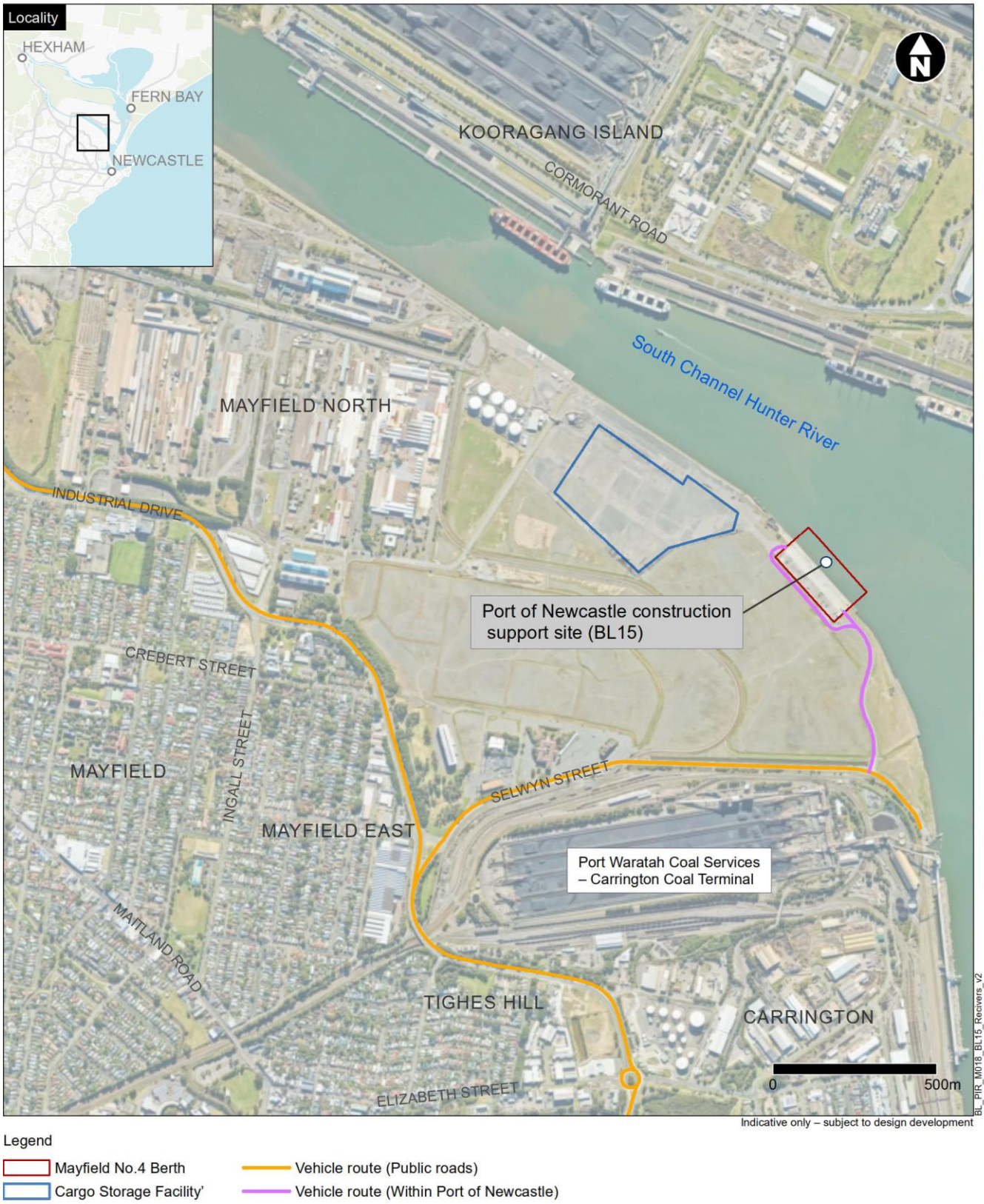


Figure 5-4 Indicative layout of Port of Newcastle construction support site (BL15)



Note: The Cargo Storage Facility is not part of the project area and is an adjacent site part of the Mayfield Concept Plan

Figure 5-5 Locality map of Port of Newcastle construction support site (BL15)

5.6 Mayfield Concept Plan

In 1999, iron and steel making operations at the BHP Steelworks site (known as the Closure Area) ceased and preparation of an environmental impact statement for demolition of the Steelworks, remediation of the Closure Area and development of a multi-purpose terminal commenced (URS, 2000). Development consent was issued by the Minister for Planning in 2001 In accordance with this consent, soil and groundwater remediation activities commenced in 2006.

In 2002, ownership of the Closure Area was transferred from BHP to the NSW State Government. In 2010, the Port of Newcastle took over ownership of a 90-hectare portside portion of the Closure Area. The remainder of the Closure Area is managed by the Hunter and Central Coast Development Corporation.

Mayfield Concept Plan (MP09_0096) (the Mayfield Concept Plan) was approved by the Minister under the Section 75M (now repealed) of the *Environmental Planning and Assessment Act 1979* on 16 July 2012 to enable development of the former BHP Steelworks site (known as the Closure Area or Mayfield Concept Plan area), a 90-hectare portside portion of land on the South Arm of the Hunter River. The proposed Port of Newcastle construction support site (BL15) is located within the Mayfield Concept Plan area at Mayfield No. 4 Berth. The Mayfield Concept Plan area is to be developed progressively in stages to accommodate anticipated future trade needs over a 20-25 year timeframe. The Mayfield Concept Plan identified the use of the site for a range of port related activities that could generally be divided into the following categories:

- Port of Newcastle Operations including office, storage sheds, vehicle and marine equipment, Newcastle Port Corporation dredging vessel, pilot cutters and helipad
- Bulk and General including handling non-hazardous dry bulk products including grain, briquettes, and coke cargoes
- General Purpose uses including handling and storage of cargo containers, heavy machinery, roll on roll off and break bulk cargo. This includes the existing general cargo facility known as Mayfield No.4 Berth approved as part of the 2001 consent
- Container Handling including facilities for the import and distribution of twenty-foot equivalent unit cargo containers
- Bulk Liquid, including storage, blending and distribution of bulk liquids including fuels.

New road and rail infrastructure requirements to service the development of these precincts is also included.

The Mayfield Concept Plan establishes the broad parameters and environmental performance criteria to assess and develop future projects. However, the Mayfield Concept Plan approval does not permit the construction or operation of any project. Future projects within the Mayfield Concept Plan area are subject to separate approval(s) under the *Environmental Planning and Assessment Act 1979*. Approvals related to the development of the Mayfield Concept Plan area include:

- Stolthaven Mayfield Terminal (SSD 7065) a bulk fuel storage and distribution terminal comprising of seven diesel storage tanks and two biodiesel storage tanks, with approval to handle up to 3,500 million litres of fuel annually
- The decommissioning and removal of the gantry and pipe infrastructure of Koppers Carbon Materials and Chemicals Pty Ltd connecting to BHP 6 Berth, this pipeline now connects to Mayfield 7 Berth which is a dedicated bulk liquids berth
- Mayfield Cargo Storage Facility (DA 8137) is an open-air storage for a range of cargo, including breakbulk, project, general and containerised cargoes

- Port of Newcastle Mayfield Services project which includes the commissioning of a new electrical switching substation and development of a multi-purpose deepwater terminal at Mayfield.

As part of the Mayfield Concept Plan, environmental performance objectives and criteria have been developed for the following key environmental issues; transport (road and rail), noise, air quality, hazard and risk, water management and contamination. The environmental performance objectives and criteria are for operation of the port-related developments which would occur at the site. Port of Newcastle would include the environmental performance objectives and criteria in agreements for land leases.

Port of Newcastle construction support site (BL15) would be located within the General Purpose Precinct, an area around 25 hectares fronting Berths 3 and 4, which would be used for handling and storing cargo containers, heavy machinery, break bulk and roll on roll off cargo. Some port-related development has already been conducted at the site. The general cargo handling facility Mayfield No. 4 Berth was approved by the Minister for Planning on 21 November 2009 as a modification to the 2001 consent for the remediation of the BHP steelworks site (DA 293-08-00 MOD 9) prior to the development of the Mayfield Concept Plan. This facility has been constructed and commenced operation in 2010.

The Port of Newcastle currently operates Mayfield No.4 Berth, the proposed location of Port of Newcastle construction support site (BL15), in accordance with Environment Protection Licence (EPL) 13181 for the scheduled activity shipping in bulk. The facility consists of a wharf structure with one berth, mobile cranes for unloading goods, a hardstand area, demountable buildings, and access road.

The establishment and operation of Port of Newcastle construction support site (BL15) would not conflict with the existing and proposed uses of Mayfield No.4 Berth and the Mayfield Concept Plan more broadly. While the establishment and operation of the Port of Newcastle construction support site (BL15) would be in accordance with the relevant environmental management measures detailed in Appendix C of this preferred infrastructure report, any future planning approval issued by the NSW Minister for Planning and Public Spaces, and any conditions of an environment protection licence issued for the project, it is not anticipated that the temporary construction support site would operate in a manner that would be inconsistent with existing environmental performance objectives and criteria for the area.

The use of Port of Newcastle construction support site (BL15) for the project will be intermittent given the nine to 12 hour transit time for barges to travel from Middle Harbour to Port of Newcastle. The Mayfield No.4 Berth will continue to operate as a general cargo handling facility when Port of Newcastle construction support site (BL15) is not being used for the project.

5.7 Environmental impact assessment

A screening assessment was carried out to determine which key environmental issues require detailed environmental impact assessment with regard to the establishment and operation of Port of Newcastle construction support site (BL15) including any changes in the construction methodology described in Chapter 6 (Construction works) 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, and transportation to and operation

of Port of Newcastle construction support site (BL15). The results of the screening assessment are presented in Table 5-3.

Table 5-3 Screening assessment for the Port of Newcastle construction support site (BL15)

Potential environmental impact issue	Assessment required for Port of Newcastle construction support site (BL15)
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
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 of Port of Newcastle construction support site (BL15) were identified include traffic and transport, noise and vibration, air quality and hydrodynamics and water quality. These potential impacts are further detailed and assessed below in sections 5.7.1 and 5.7.4.

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 and are considered in Section 5.7.5.

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

5.7.1 Traffic and transport

Road traffic

The location of the Port of Newcastle construction support site (BL15) and the surrounding road network is shown on Figure 5-5.

Access to Port of Newcastle construction support site (BL15) would be via Selwyn Street and Industrial Drive:

- Industrial Drive is a major four lane divided, State Road providing connections to the Pacific Highway. It is a B-Double approved vehicle route with a sign posted speed of 80 kilometres per hour. To the east of Industrial Drive, George Street connects to Selwyn Street, which runs adjacent to the rail line and provides access to the temporary construction support site
- Selwyn Street is a local road connecting to Industrial Drive via George Street and provides access to the private roads within the Port of Newcastle. It is a two-lane undivided road with a sign posted speed limit of 50 km/h. Selwyn Street is a B-Double approved vehicle route.

Minimal traffic is generated in the immediate vicinity of the proposed temporary construction support site on Selwyn Street. Traffic is generated in the general area surrounding the temporary construction support site by nearby industrial uses including the Mayfield Cargo Storage Facility and by Port Waratah Coal Services. It is noted however that the primary access for the Port Waratah Coal Services Carrington Terminal is through Port Waratah Drive from Carrington therefore the majority of traffic does not travel on Selwyn Street. Traffic is also generated along Industrial Drive by the nearby Stolthaven Fuel Terminal which is accessed via the Industrial Drive and Ingall Street intersection and Steelworks Road.

Average Annual Daily Traffic (AADT) for Industrial Drive indicates that the existing traffic volumes are in excess of 30,000 vehicles per day (AECOM, 2016) and that during the peak hour traffic counts, of 1500 vehicle movements, there were 114 (7 per cent) movements by heavy vehicles (AECOM, 2012). Travel data analysed as part of the *Cargo Storage Facility, Mayfield Statement of Environmental Effects* (AECOM, 2016) indicates that the intersection of Industrial Drive and George Street operates at a satisfactory level at level of service (LoS), LoS B and LoS A during the AM and PM peak hour periods respectively, with minimal queuing and delays experienced. There is a significant amount of spare capacity at the intersection which will allow for additional traffic generated by Port of Newcastle construction support site (BL15) activities. Queues experienced along Industrial Drive do not impede upon nearby intersections.

The activities at Port of Newcastle construction support site (BL15) are proposed to generate up to 45 trucks (90 heavy vehicle movements) and up to 10 associated construction personnel light vehicles (20 movements) each day. Subsequently, the addition of around 90 heavy vehicles movements over the entire 7.00am to 6.00pm period (up to eight per hour) is considered insignificant compared to existing traffic numbers, particularly noting the current spare capacity of the road network in this area. In addition, the use of Port of Newcastle construction support site (BL15) is only expected to be for a period of around four weeks.

Any potential traffic and transport impacts would be managed through the implementation of the construction traffic and transport environmental management measures CTT6 and CTT8 and CTT13 in Appendix C of this preferred infrastructure report. No new environmental management measures are proposed.

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 by locating the loadout facility at the Port of Newcastle. 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 the Sydney Heads prior to travelling north towards Port of Newcastle. 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.

Vessel tracking data is available from the Australian Maritime Safety Authority and collates vessel traffic data from a variety of sources, including terrestrial and satellite shipborne Automatic Identification System data sources. The maritime traffic data indicates the existence of a shipping route along the east coast of Australia between Newcastle and Melbourne. The number of vessels is particularly significant between Newcastle and Wollongong. Fishing and recreational vessels are also present. As discussed in Section 5.5.2 the required number of maritime vessels for the proposed 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 Sydney and Newcastle.

As described in the Mayfield Concept Plan, 100 ships per annum are expected for the General Purpose Precinct. The turnaround time for ships to load and unload while at berth is normally between one to two days. The Port of Newcastle has capacity to cater for up to 4,000 ships per annum (AECOM, 2010) and currently caters for around 2,300 ships per annum (Port of Newcastle, 2020). The required number of maritime vessels for the proposed operation of the construction support site are unlikely to impact operations of the port. Shipping in the port is managed through the Vessel Traffic Information Centre, the Marine Pilots service and the Port Services Group. The project would adhere to the vessel movement requirements of the Port of Newcastle. Further, the operation of the construction support site would be conducted in consultation with the Port of Newcastle.

In addition, a ferry service operates within the Port of Newcastle between Stockton and Queens Wharf (Newcastle CBD). Ferries operate every 15 minutes during peak periods and every 20-30 minutes outside peak periods. No services operate during a period varying from 50 to 60 minutes at noon depending on the day of the week. The journey time between the two wharves is five minutes. Given the operation of the ferries with the existing maritime traffic, it is unlikely that any disruption to the services would occur with the required number of maritime vessels for the Port of Newcastle construction support site (BL15).

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 this preferred infrastructure report. No new environmental management measures are proposed.

5.7.2 Noise and vibration

Existing environment

Middle Harbour

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.

Port of Newcastle construction support site (BL15)

The proposed Port of Newcastle construction support site (BL15) is situated in an area where the noise environment is dominated by industrial, transport and port related land uses. Mayfield No.4 Berth currently generates noise from berthing of ships, land transport and unloading and loading operations when in use. Other surrounding land uses with the potential to generate noise include truck and pump noise from the Stolthaven Bulk Fuel Terminal, cargo handling activities from the Mayfield Cargo Terminal, traffic noise from Industrial Drive and rail and bulk cargo handling noise from Port Waratah Coal Services. The nearest residential area is the suburb of Mayfield East located over one kilometre to the southwest. An overview of the Port of Newcastle construction support site (BL15) and the nearby assessment receiver locations is presented in Figure 5-6.

The potential noise generating activities associated with the unloading and transport of dredged and excavated material at Port of Newcastle construction support site (BL15) would include:

- Two excavators unloading material
- Up to 45 trucks moving through the facility each day
- Two vacuum trucks to assist with dewatering (where required)
- A docked barge

An assessment of the potential construction noise and vibration impact at Port of Newcastle construction support site (BL15) 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.

The additional assessments have been prepared Renzo Tonin & Associates as per the methodology used within Appendix G (Technical working paper: Noise and vibration).

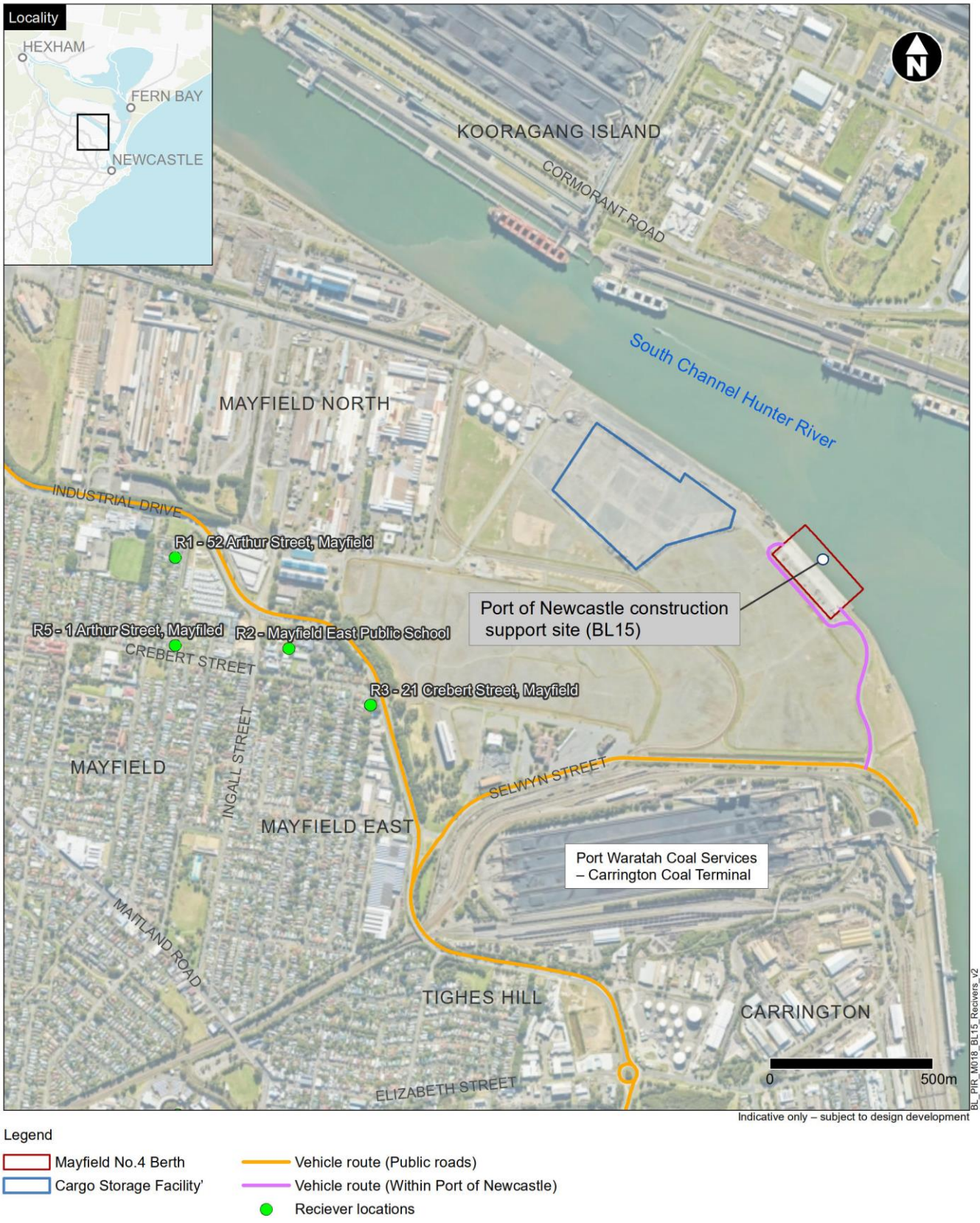


Figure 5-6 Port of Newcastle construction support site (BL15) construction works and receiver locations

Airborne noise impacts from Middle Harbour works

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 5-4 below 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 5-4 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 5-5 for standard hours construction works (updating Table 5-108 of the Appendix G (Technical working paper: Noise and vibration).

Table 5-5 Predicted construction noise levels during standard hours (residential receivers) – $L_{Aeq(15\ minute)}$, 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

NCA	Noise Management Level (NML)		Predicted noise levels[1, 2] "Prepare foundations" MHC_08
	Highly noise affected[3]	NML	MHC_08
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 5-6 (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 5-6 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 this 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 5-7.

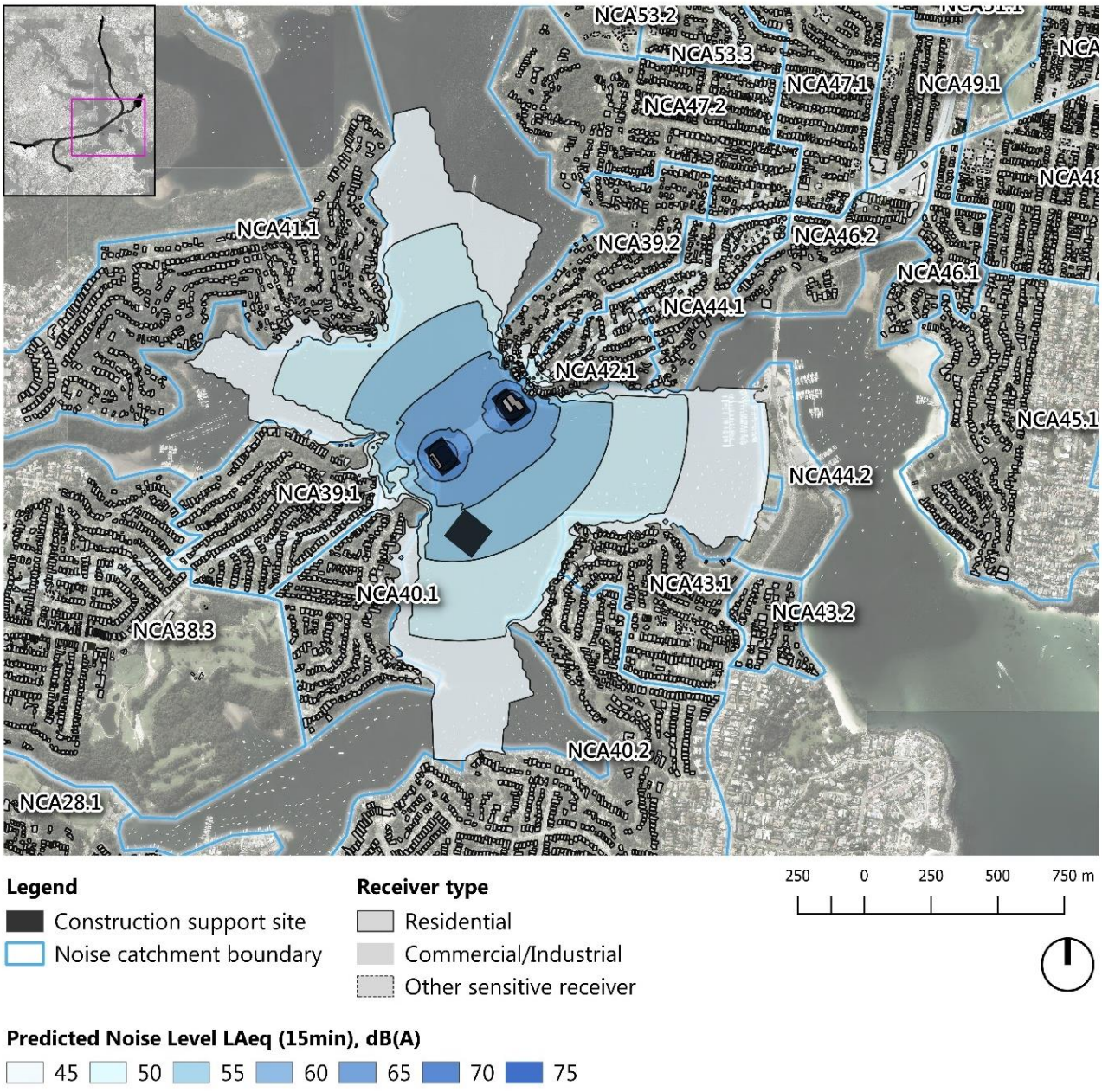


Figure 5-7 Middle Harbour Crossing – Construction noise contour – Standard hours – Prepare foundations (MHC_08)

Noise management levels for Port of Newcastle construction support site (BL15)

The Port of Newcastle construction support site (BL15) is located at Mayfield No. 4 Berth, which currently operates under an existing development application consent, DA 293-08-00 MOD 9, dated 29 August 2013. Condition 5.11 of this consent specifies operational noise levels from activities that take place Mayfield No. 4 Berth.

Although the proposed works at Port of Newcastle construction support site (BL15) are construction related, they would form part of operations at this berth, and so it is appropriate that proposed noise levels are assessed against the existing consent conditions.

Table 5-7 presents the summary of operational noise limits stated in the consent condition for the daytime period.

Table 5-7 Mayfield No. 4 Berth daytime operational noise limits (DA 293-08-00 MOD 9, dated 29 August 2013)

Receiver location	Operational noise limit Daytime, $L_{Aeq\ 15\ minute}$
1. 52 Arthur Street, Mayfield	49
2. Mayfield East Public School	47
3. 21 Crebert Street, Mayfield	49
4. Newcastle TAFE	44
5. 1 Arthur Street, Mayfield	48

Notes:1. The noise limits apply during all assessment periods under winds up to three metres per second (measured at 10 metres above ground level) and Pasquil stability classes from A to F.

Airborne noise impacts from Port of Newcastle construction support site (BL15)

Construction works and activities

Table 5-8 below 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.

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 5-8 Reasonable worst case construction equipment

Plant description	Estimate number of items	Individual source/activity sound power level (L_w re. 1pW), $L_{Aeq,15min}$, dB(A)
Excavator (unloading material)	2	105
Truck	8 per hour	108
Barge (at dock)	1	106
Vacuum truck	2	108

The sound power levels for the majority of construction plant and equipment presented in Table 5-8 are based on maximum noise levels given in Table A1 of Australian Standard 2436 - 2010 *Guide to Noise Control on Construction, Demolition and Maintenance Sites*, the Transport for NSW *Construction Noise and Vibration Guidelines* (Roads and Maritime Services, 2016), information from past projects, and information held in the Renzo Tonin & Associates library files from noise measurements and references.

Predicted airborne noise level

Airborne noise impacts from activities associated with the construction works were assessed by undertaking a screening modelling assessment. This assessment has modelled the noise sources

using a computer noise model (CadnaA) developed for the project conservatively assuming that flat ground between the sources and receivers, and without any acoustic shielding elements (ie. buildings, topography, etc.).

Noise sources have been modelled when they are operating within the Port of Newcastle land area. Once they move outside of this area onto the public road network a different noise assessment methodology is appropriate, as vehicle movements are regarded as 'additional road traffic' rather than as part of the construction activities. This assessment is presented below.

The assessment has adopted the CONCAWE algorithm in order to incorporate the potential noise enhancing noise-enhancing meteorological conditions required under Condition 5.11 of DA 293-08-00 MOD 9. Conservatively, ground absorption of zero has been assumed.

The model calculates the contribution of each noise source to the identified representative noise-sensitive receivers, and allows for the prediction of the total noise from a works area or construction support site for the various stages of construction work.

The predicted noise levels during the reasonable worst case construction scenario are presented in Table 5-9.

Table 5-9 Predicted construction noise levels, LAeq 15 minute dB(A)

Receiver location	Operational noise limit Daytime, $L_{Aeq\ 15\ minute}$	Predicted noise levels Daytime, $L_{Aeq\ 15\ minute}$	Exceedance
1. 52 Arthur Street, Mayfield	49	39	-
2. Mayfield East Public School	47	41	-
3. 21 Crebert Street, Mayfield	49	43	-
4. Newcastle TAFE	44	36	-
5. 1 Arthur Street, Mayfield	48	39	-

Table 5-9 shows that the predicted noise levels are substantially below the daytime operational noise limits for Mayfield No.4 Berth noise generating activities.

Based on the noise assessment results, no additional mitigation or management measures would be required to manage noise levels from the construction works. Any potential impacts would be managed through the implementation of the project construction noise and vibration environmental management measures such as CNV1, CNV2 and CNV5 in Appendix C of this preferred infrastructure report.

Construction road traffic on public roads

Following the loading of the dredged material onto trucks at the Port of Newcastle construction support site (BL15), the treated spoil would be transported to a suitably licensed waste facility. Suitably licensed waste facilities such as Summerhill Waste Management Centre or Cleanaway Beresfield Newcastle are around 20 kilometres from Port of Newcastle construction support site (BL15) however the final disposal location would be determined by the contractor/s once engaged. From the site trucks would travel by arterial roads, leaving the facility by Selwyn Street onto Industrial Drive (A43).

As described in Section 3.4.2.2 of the Appendix G (Technical working paper: Noise and vibration) when construction related traffic moves onto the public road network, it is assessed in accordance with the *NSW Road Noise Policy* (DECCW, 2011) and the *Construction Noise and Vibration Guidelines* (Roads and Maritime Services, 2016). This would occur once the proposed heavy

vehicles move onto Selwyn Street and vehicles move outside off the Port of Newcastle land area, as shown in Figure 5-6.

The *Construction Noise and Vibration Guidelines* (Roads and Maritime Services, 2016) requires an initial screening test to evaluate whether noise levels would increase by more than 2 dB(A) due to construction traffic. The *NSW Road Noise Policy* (DECCW, 2011) states that in assessing feasible and reasonable mitigation measures, an increase of up to 2 dB(A) represents a minor impact. Where increases are 2 dB(A) or less then no further assessment is required.

The construction works is proposed to generate up to 45 trucks (90 movements) and up to 10 associated construction personnel light vehicles (20 movements) each day.

As noted in Section 5.7.1, existing traffic volumes on Industrial Drive are in excess of 30,000 vehicles per day (AECOM, 2016) and that during the peak hour traffic counts of 1500 vehicle movements, there are 114 (7 per cent) movements by heavy vehicles (AECOM, 2012). As such, the addition of 90 heavy vehicles movements over the entire 7.00am to 6.00am period (up to eight per hour) is considered insignificant compared to existing traffic numbers. Accordingly, potential change in traffic noise levels as a result of the proposed construction works on public roads would meet the *Construction Noise and Vibration Guidelines* (Roads and Maritime Services, 2016) and *NSW Road Noise Policy* (DECCW, 2011) requirements.

Any potential construction road traffic noise impacts would be managed through the implementation of the construction noise and vibration environmental management measures CNV1, CNV2 and CNV6 in Appendix C of this preferred infrastructure report.

Maritime traffic noise

Given the volume of maritime traffic that uses the Port of Newcastle, noise impacts 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). While travelling between Middle Harbour and the Port of Newcastle barges would be a sufficient distance from shore to avoid noise impacts.

In regard to ship noise when the barge is not docked at the Port of Newcastle, as detailed in Section 4.2.6 of Appendix G (Technical working paper: Noise and vibration), there are no guidelines for the assessment of noise from vessel movements in NSW, and no clear criteria or management levels for the water-based construction vessel noise once it is away from the construction site or operational dock. When vessels are at or near the construction site, the applicable noise management levels are detailed in the Interim Construction Noise Guideline (Department of Environment and Climate Change (DECC), 2009). In accordance with the *Noise Guide for Local Government* (EPA, 2013), Transport for NSW is the responsible authority for water-based vessel noise.

However, considering the number of existing vessel movements and type of large vessels that move through the Port of Newcastle, the proposed barge movements that would occur are unlikely to substantially change these noise levels at sensitive receivers.

5.7.3 Air quality

Existing environment

Middle Harbour

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.

Port of Newcastle construction support site (BL15)

The Newcastle 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 region is influenced by land and sea breeze flows, which have significant implications for air quality when extended anticyclonic conditions occur (PAE Holmes, 2011a).

The Bureau of Meteorology Williamtown RAAF Automatic Weather Station is located near Port of Newcastle construction support site (BL15). Data from this station indicates that January is the warmest month with an average maximum temperature of 28.3°C. July is the coolest month with an average minimum temperature of 6.4°C. February through April produces the highest average monthly rainfall, whilst the number of rain days is relatively consistent across all months of the year. Winters are generally drier with the highest prevalence of clear conditions.

Newcastle's air quality has improved in recent years following the cessation of steel manufacturing in the area. A number of pollutant sources remain including industrial, domestic and transportation activities, with motor vehicles considered to provide the greatest emission load to local air sheds. The primary pollutants of concern in the Newcastle airshed are particulate matter and photochemical smog/ozone and its precursors (oxides of nitrogen and volatile organic compounds). The wider port area is typified by a range of port and industrial uses. Importantly bulk cargo (coal) handling and related activities generate particulate matter. Other sources include the Tomago Aluminium smelter. Dust emissions arise from the coal and grain terminals while odour emissions from seed processing (Cargill) and coal tar processing (Koppers) commonly affect the Mayfield and Kooragang Island areas (AECOM, 2014). The Port of Newcastle construction support site (BL15) is currently maintained as an open hardstand area and therefore no emissions are currently generated from the site.

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 this preferred infrastructure report).

The primary source of emissions generated during construction activities at Port of Newcastle construction support site (BL15) would be combustion emissions from heavy vehicles and plant such as excavators. These emissions include both products of combustions such as oxides of carbon and nitrogen, as well as particulate matter. Due to the relatively small numbers of plant and equipment that would be required and the short program of works there are unlikely to be any observable impacts. Additionally, as the temporary construction support site is currently a sealed hardstand area and would remain so for the duration of works, no dust generation from exposed soils or sediments would occur. Standard construction air quality mitigation and management measures would be implemented during construction which includes dust suppression measures where required, as outlined in revised environmental management measure AQ1 (refer to Appendix C of this 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.

Notwithstanding material would be treated by the time it arrives at the Port of Newcastle, an odour assessment for Port of Newcastle construction support site (BL15) has also been prepared by ERM to determine the potential for odour impacts at sensitive receivers in the vicinity, and identify any monitoring and management requirements. The assessment has considered odour from the treatment and handling of the dredged material at the Port of Newcastle construction support site (BL15).

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 both Middle Harbour and the Newcastle areas from nearby Bureau of Meteorology and NSW Department of Planning, Industry and Environment weather stations.

For Middle Harbour 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.

For the Newcastle region the year 2018 compared well with the five-year average across all seven stations including Bureau of Meteorology Williamtown RAAF Automatic Weather Station and six air quality monitoring stations operated by Department of Planning, Industry and Environment. On this basis, 2018 is considered a representative year for modelling.

Emissions sources

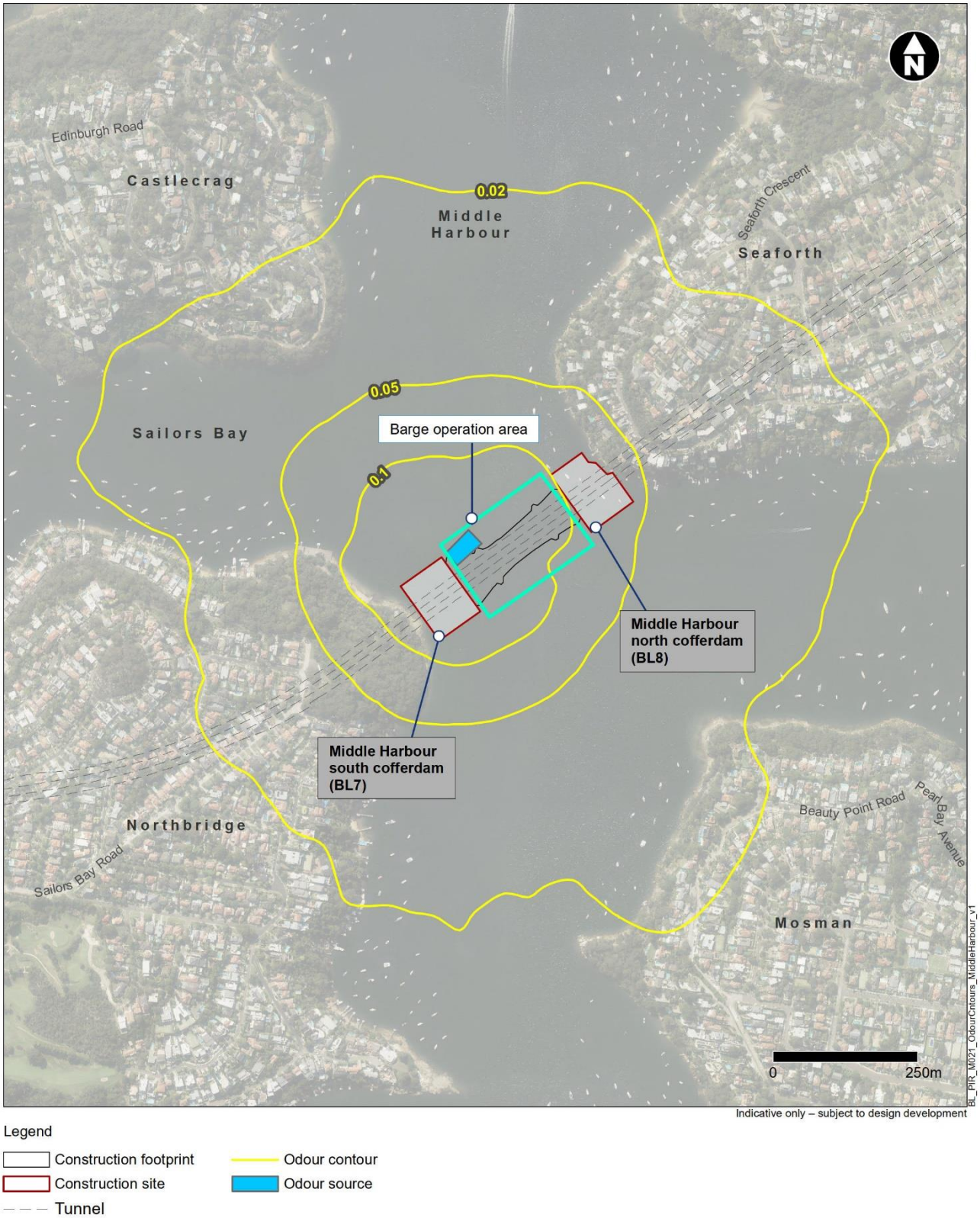
In order to obtain site-specific odour emission rates, odour samples were taken from dredged material within Sydney Harbour near Birchgrove. Odour samples were taken for freshly extracted and undisturbed sediment, freshly extracted and disturbed sediment and a disturbed sample that was allowed to settle 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 at both Middle Harbour and Port of Newcastle, 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 5-8 and Figure 5-9 but locations closest to receptors have been modelled. For the Port of Newcastle, this would be a combination of areas on land and/or on barges as the material is transferred from the barges to sealed trucks for removal off site. 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 $OU.m^3/s$ for both Middle Harbour and Port of Newcastle.

Predicted odour concentration at Middle Harbour

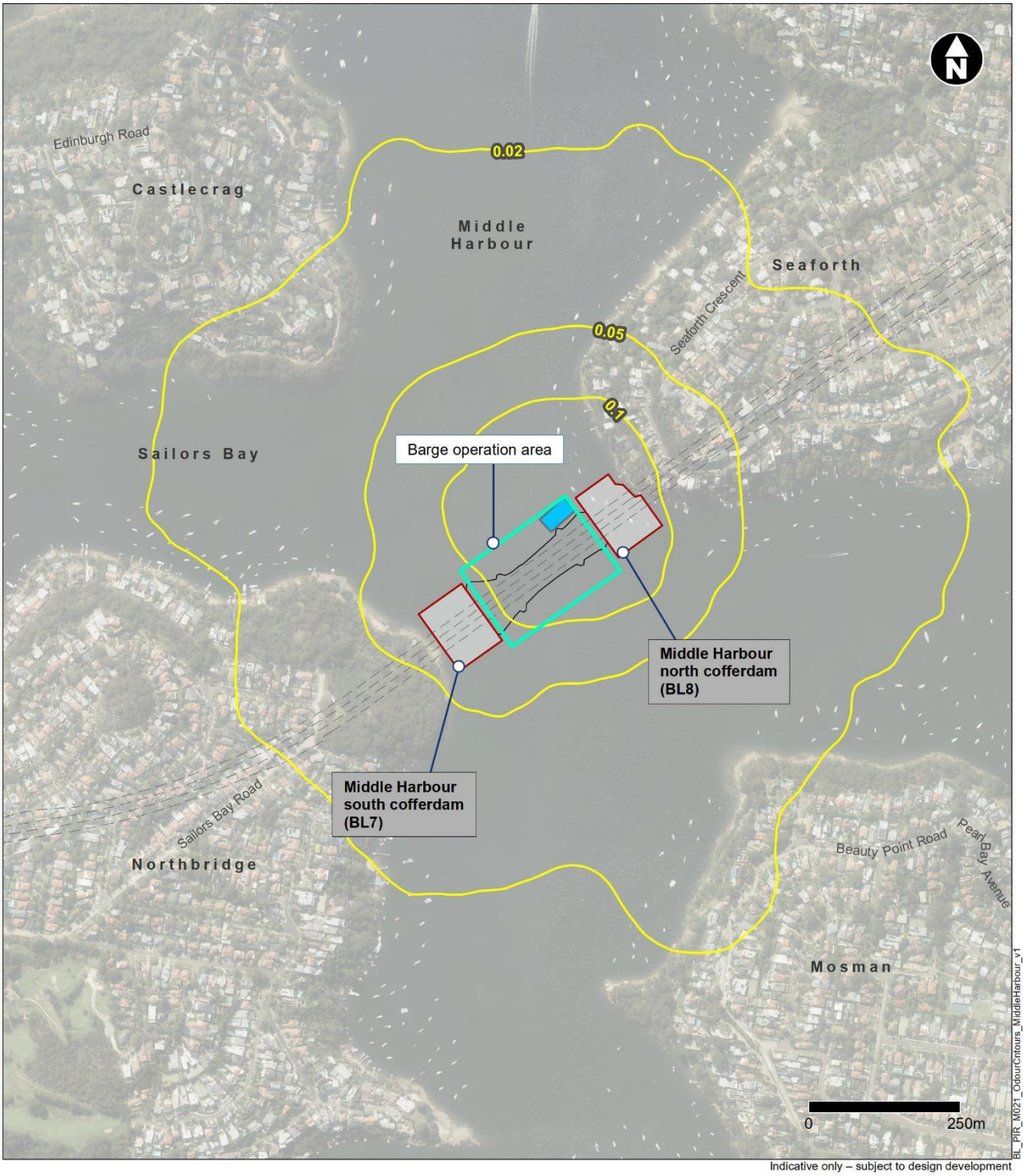
Figure 5-8 and Figure 5-9 present the predicted maximum ground level odour concentration within Middle Harbour near Northbridge and Seaforth, respectively. This assessment has considered the

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 5-8 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 5-9 Predicted maximum ground level odour concentration (OU) near Seaforth in Middle Harbour

Predicted odour concentrations at Port of Newcastle construction support site (BL15

Figure 5-10 presents the predicted maximum ground level odour concentration. 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 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 receptors such as residential properties.

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

Figure 5-10 Predicted maximum ground level odour concentration (OU) at Port of Newcastle construction support site (BL15)

Environmental management measures

The above assessments have been prepared in accordance with the requirements of environmental management measure AQ5 as detailed in Appendix C of this preferred infrastructure report. Subsequently, as the results show odour impacts above 2 OU would not be experienced, an odour management strategy is not required as per environmental management measure AQ6 (refer to Appendix C of this preferred infrastructure report). In regards to Port of Newcastle construction support site (BL15) as assessed in this preferred infrastructure report, the requirements of environmental management measures AQ5 and AQ6 have been satisfied.

5.7.4 Hydrodynamics and water quality

Middle Harbour

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 this 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 this 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 this preferred infrastructure report).

Port of Newcastle construction support site (BL15)

Port of Newcastle construction support site (BL15) is located on the South Arm of the Hunter River which flows to the south of Kooragang Island and is part of the Hunter Estuary at the mouth of the Hunter River. The Hunter estuary has been substantially modified as a result of demand for industrial land. In addition to port-related activities, a range of other commercial activities exist within the estuary, including tourism, commercial and recreational fishing, ship building and maintenance, and general and heavy industry. These types of land use contribute sediments and other pollutants to the estuary, impacting on water quality and habitat integrity (Hunter Valley Research Foundation, 2008).

Port of Newcastle construction support site (BL15) is generally flat and is currently a fully sealed hardstand area. The area has been altered through the remediation works at the Closure Area which included decommissioning of site drainage, grading of the site, installation of a subterranean

barrier wall, capping the surface of the site and installation of a stormwater management system to control runoff and discharge of contaminated suspended sediments and stormwater (HDC, 2008).

Due to the nature of the proposed Port of Newcastle construction support site (BL15) there would be no disturbance of soils and therefore there is no potential for exposed soils that would require the implementation of sediment and erosion controls. As the site is currently entirely impermeable sealed hardstand, the operation of the site would not result in an increase in impermeable surface or runoff generation. Therefore, there would be no change to runoff quantities or peak storm loading that would require a review of the capacity of the existing stormwater management system.

During the transport of dredged material from Middle Harbour to Port of Newcastle construction support site (BL15), no overflow would be permitted from transport barges taking material to the site. Transport of material between Middle Harbour and the Port of Newcastle would occur during an appropriate weather window to ensure safe navigation and minimise the likelihood of overtopping.

Once the barge arrives at Port of Newcastle construction support site (BL15) the material would be transferred onto trucks for disposal at a suitably licensed waste facility. Load out will take place at Port of Newcastle construction support site (BL15) within two to three metre silt curtains located around the barge as per new 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 Middle Harbour or the Port of Newcastle construction support site (BL15). However, should residual water need to be removed from the barges prior to or following completion of the loadout operation at Port of Newcastle construction support site (BL15), a vacuum truck would be used. Subsequently, discharges of water would not be required at Port of Newcastle construction support site (BL15).

With the use of vehicles, plant and machinery in close proximity to the Hunter River 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 (refer to Appendix C of this 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 this preferred infrastructure report).

5.7.5 Other environmental issues

Other environmental issues considered to be of low potential to be impacted by treating material in Middle Harbour and the establishment and operation of Port of Newcastle construction support site (BL15) are detailed in Table 5-10. The environmental management measures presented in Appendix C of this preferred infrastructure report would be sufficient to manage these impacts.

Table 5-10 Other environmental issues potentially impacted by the establishment and operation of Port of Newcastle construction support site (BL15)

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)). As a result of the former remediation works undertaken across the Mayfield Concept Plan area, eight vapour sampling wells were established on the Mayfield Concept Plan area to monitor potential for BTEX (Benzene, Toulene, Ethylbenzene, and Xylene) vapours to escape the capped area and potential present an occupational exposure hazard for workers at Port of Newcastle construction support site (BL15). Due to the negligible level of vapours found to be being emitted from the wells potential risk to construction personnel associated with the establishment and operation of Port of Newcastle construction support site (BL15) would also be negligible.
Non-Aboriginal heritage	Non-Aboriginal heritage database searches were undertaken in July 2021, including searches of: • Newcastle Local Environmental Plan 2012 • World Heritage Properties • National Heritage Places • Commonwealth Heritage Places • The former statutory Register of the National Estate; and • The NSW State Heritage Register. These database searches confirmed that Port of Newcastle construction support site (BL15) does not contain any listed non-Aboriginal heritage items. Furthermore, no lots directly adjoining Port of Newcastle construction support site (BL15) contain heritage items. A non-Aboriginal heritage assessment was undertaken during the preparation of the environmental impact statement carried out for the development of a multi-purpose terminal and remediation of the closure area for BHP Newcastle Steelworks (AECOM, 2010) and approval was sought to demolish 15 heritage-listed items. Archival recording of the 15 heritage-listed items was undertaken and Statements of Heritage Impact were prepared. The significance and archaeological potential of the Mayfield Concept Plan area was re-assessed as part of the Mayfield Concept Plan approval (refer to Section 5.6). Given that the project works would take place on a pre-existing hardstand area with no excavation works, demolition or ground disturbance to be carried out as part of works, any impact to non-Aboriginal heritage items is considered unlikely.
Aboriginal heritage	A search of the Aboriginal Heritage Information Management System (AHIMS) database was carried out on 30 July 2021 and no sites were found within 200 metres of the proposed temporary construction support site. Additionally, as part of the environmental impact statement carried out for the development of a multi-purpose terminal and remediation of the closure area for BHP Newcastle Steelworks, a search of the National Parks and Wildlife Service Register of Aboriginal Sites (now AHIMS) database was carried out (URS, 2000). No Aboriginal heritage sites were identified through that search and therefore it was presumed that any Aboriginal heritage value would have been removed or destroyed during previous reclamation, construction, operational and rehabilitation activities associated with the BHP Steelworks. Given that the project works would take place on a pre-existing hardstand area with no excavation works or demolition to be carried out as part of works any impact to Aboriginal heritage items is considered unlikely.

Issue	Potential impact
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 Section 5.7.4. Port of Newcastle construction support site (BL15) would be located on land that has been highly disturbed through past industrial activities and is characterised by fill material of variable thickness underlain by marine and estuarine sediments and Tomago coal measures. Site reclamation was carried out between 1866 and 1940. Reclamation fill extended from the surface to a depth of approximately 10 m and includes coal washery rejects, copper slag, fly ash, rubble, iron and steel-making slags and process wastes, boiler ash, general waste and building debris from industrial facilities and sand dredged from the South Arm of the Hunter River (SKM, 2004). Remediation activities have been completed for Mayfield Concept Plan area and the establishment and operation of Port of Newcastle construction support site (BL15) is not proposing any ground disturbance activities or interference with groundwater in the area that could subsequently potentially cause the mobilisation of contaminants. The proposed works would not add to contamination within the area as material would remain within the barge until loadout into trucks, and it is not anticipated that stockpiling at Port of Newcastle construction support site (BL15) would be required. In addition, erosion and sedimentation impacts are not expected or are impacts to acid sulfate soils in the area as the establishment and operation of Port of Newcastle construction support site (BL15) would be carried out on hardstand area and are not expected to involve any ground disturbance or earthworks. Any potential impacts would be managed through the implementation of the relevant geology, soils and groundwater environmental management measures in Appendix C of this preferred infrastructure report.
Flooding	Due to the flat nature of the temporary construction support site and its proximity to the South Arm of the Hunter River flooding may occur within the site from runoff from local rainfall, high water levels in the Port of Newcastle itself or a combination of both. The ground levels of the Mayfield Concept plan area range from 1.5 to 5.5 metres AHD. The estimated peak 100 year flood level in the port area is 1.35 metres AHD (AECOM, 2010). Flood emergency management measures for construction and operation of the project will be prepared and incorporated into relevant environmental and/or safety management documentation as required by environmental management measure F3 (refer to Appendix C of this preferred infrastructure report).
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 this 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 Section 5.7.4. 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.

Issue	Potential impact
	Port of Newcastle construction support site is located on an existing hardstand. Surrounding land uses include port related activities, industrial uses and residential and commercial areas. The environment has been highly modified having undergone extensive remediation and been cleared of all vegetation. Therefore, there is no habitat value for threatened flora and fauna species. The Port of Newcastle construction support site (BL15) is located within the Hunter Estuary migratory shorebirds important area map developed by the Department of Planning, Industry and Environment. However, there is no native vegetation, mud, sand or intertidal areas within the temporary construction support site to provide habitat for the six threatened migratory shorebirds associated with the mapping. As such, no threatened migratory shorebirds are considered likely to occur within the temporary construction support site and potential impacts would be negligible. The nearest area of environmental or ecological significance is the Hunter Estuary National Park and the Kooragang Island Nature Reserve, which forms part of the Ramsar-listed Hunter Estuary Wetlands which are located about four kilometres to the north of Port of Newcastle construction support site (BL15). Between the proposed temporary construction support site and the wetlands lies the South Arm of the Hunter River and the industrial areas of Kooragang Island. Works carried about by the project would not require any construction or other ground disturbance works, and no impacts would occur to any flora and fauna in the vicinity of Port of Newcastle construction support site (BL15), including migratory and marine fauna species. Transportation to Port of Newcastle temporary construction support site (BL15) from Middle Harbour may result in interactions with marine mammals such as whales. However, given the relatively slow speeds of the self-propelled barges (about seven to nine knots after they have passed the Sydney Heads entrance to Sydney Harbour), the risk of injury would be negligible as marine mammals would safely avoid the barges.
Land use and property	The land supporting Port of Newcastle construction support site (BL15) (Lot 44 of DP1191982) would be temporarily leased from the Port of Newcastle for the duration of the operation of the support site. The land is currently zone SP1 Special activities and supports the existing Mayfield No.4 Berth, a general cargo handling facility. The proposed use of the berth as a temporary construction support site is aligned with the general industrial nature of the area (refer to Section 5.6). The site would be rehabilitated in accordance with any land owner requirements after the completion of works as required by environmental management measure LP5 (refer to Appendix C of this preferred infrastructure report).
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 measures CTT16 refer to Appendix C of this preferred infrastructure report. Port of Newcastle temporary construction support site (BL15) would be located on the site of the former BHP Steelworks port side land earmarked for further development as part of the Mayfield Concept Plan. The Mayfield Concept Plan area is currently used for the Stolthaven Mayfield Terminal a bulk fuel storage and distribution terminal and the Mayfield Cargo Storage Facility. Port of Newcastle continues to progress the Mayfield Services Project in preparation for the increased

Issue	Potential impact
	capacity needs of a potential new container terminal at Mayfield and a proposal to develop a Multi-purpose Deepwater Terminal at Mayfield. The project's use of Mayfield No.4 Berth would be short term (around 4 weeks) and would not impact on the economic benefits of these projects to the area. The establishment and operation of the Port of Newcastle construction support site (BL15) would not impact on the nearby communities of Mayfield and Mayfield East due to their distance from the proposed site and the minor nature of works. Additionally, the Port of Newcastle construction support site (BL15) would be in an area surrounded by similar industrial uses and removed from residential and sensitive receivers. It is considered unlikely that recreational users of the South Arm of the Hunter River would be impacted by Port of Newcastle construction support site (BL15). The Mayfield No.4 Berth will continue to operate as a general cargo handling facility when Port of Newcastle construction support site (BL15) is not being used for the project.
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 this preferred infrastructure report. The location of Port of Newcastle construction support site (BL15) is currently a sealed hardstand area, demountable buildings, access road and shipping containers. The area surrounding the site facilitates includes land used for industrial related activities and operations of the Port of Newcastle. The area is visually screened from nearby sensitive receivers by other industrial buildings/facilities and roadside vegetation on Industrial Drive. The site currently has no formal lighting arrangements. As part of the Port of Newcastle construction support site (BL15) there may be a need to establish temporary lighting to aid loadout operations. As the works would be short term and temporary and given the visual buffer provided by surrounding development, nearby shipping containers and vegetation, visual impacts are expected to be negligible.
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.
Resource use and waste management	Prior to transport to Port of Newcastle construction support site (BL15), 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 this 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 this preferred infrastructure report.
Sustainability	The Port of Newcastle construction support site (BL15) 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 as required by environmental management measure SU1 (refer to Appendix C of this preferred infrastructure report). A sustainability management plan would be developed as required by SU2 (refer to Appendix C of this preferred infrastructure report).
Climate change and greenhouse gas	Due to the limited number of additional marine vessel movements to Port of Newcastle construction support site (BL15) and the small number of heavy vehicle

Issue	Potential impact
	movements required for transportation of material from Port of Newcastle construction support site (BL15) to a licensed waste disposal facility, estimated construction stage emissions presented within the environmental impact statement are likely to remain unchanged.
Cumulative	Given the minor nature of the activities at Port of Newcastle construction support site (BL15), cumulative impacts with nearby projects are considered unlikely. Cumulative impact of emissions from the entire Mayfield Concept Plan area have been considered. The primary form of emissions from the Stolthaven Bulk Fuel Terminal are volatile organic compounds. As the operation of Port of Newcastle construction support site (BL15) would not be a source of volatile organic compounds no cumulative impacts are anticipated to occur. The operation of the nearby Mayfield Cargo Storage Facility may generate particulate matter. Similarly, as the operation of Port of Newcastle construction support site (BL15) is unlikely to generate large amounts of particulate matter, cumulative impacts are also considered to be unlikely.

5.8 Additional environmental 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, Industry and Environment, prior to the commencement of any on-site work. Transport for NSW would continue to consult with the Port of Newcastle 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 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 Port of Newcastle construction support site (BL15), 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. It is noted that the Port of Newcastle currently operates Mayfield No.4 Berth, the proposed location of Port of Newcastle construction support site (BL15), in accordance with Environment Protection Licence (EPL) 13181 for the scheduled activity shipping in bulk.

As noted in Section 5.7.4, new environmental management measure WQ21 has been developed to minimise impacts to water quality during load out activities at Port of Newcastle construction support site (BL15):

> Barges located at Port of Newcastle construction support site (BL15) will be enclosed within a localised floating silt curtain enclosure to a depth of two to three metres.

However, the treatment of dredged material within Middle Harbour and other activities associated with the establishment and operation of Port of Newcastle construction support site (BL15) will be managed through the implementation of the environmental management measures described in Appendix C of this preferred infrastructure report.