Roads & Maritime

Milsons Point Wharf Interchange Expansion

Review of environmental factors

December 2016

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Prepared by

RPS and Roads and Maritime Services

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Executive summary

The proposal

Roads and Maritime Services (Roads and Maritime) propose to redevelop Milsons Point Wharf Interchange (refer Figure 3-2), referred to throughout this Review of Environmental Factors (REF) as the proposal.

The main elements of the proposal include:

- Construction of a new gangway and hydraulic platform
- Expansion of the existing fixed wharf structure
- Construction of landside infrastructure to provide improved access for people with disabilities.
- Ancillary facilities

Construction of the proposal is expected to commence in early 2017 and is likely to take about six months weather permitting, although the REF has been assessed for a period of eight months. During construction the wharf would need to be closed to the public and all non-construction related watercraft to facilitate certain works. Alternative public transport arrangements would be provided during this period and communicated with local residents and ferry users.

Need for the proposal

Milsons Point Wharf was upgraded in 2010, but requires expansion to improve access to the wharf and provide capacity to support additional ferry services provided by the new Inner Harbour and Parramatta River ferries. The expansion would also provide interchange access for people with a disability to meet the requirements of the *Disability Discrimination Act 1992* (DDA) and current legislative standards for disabled access.

Proposal objectives and development criteria

The objectives of the proposal include providing a better experience for public transport customers through the provision of accessible, modern, secure and integrated transport infrastructure. The expansion of the wharf is to provide additional capacity to support additional ferry services. These additional services are outside the scope of this REF.

Options considered

Four options were identified for the proposal. These were:

- Option 1 – The do nothing (base case) option
- Option 2 – Wharf interchange upgrade with existing and new platform, concourse bridge and fixed shelter
- Option 3 – Wharf interchange upgrade with existing and new access bridge, gangway and pontoon wharf
- Option 4 – Demolition of existing landing and gangway and new pontoon wharf

Option 1 would involve no additional works other than the current maintenance regime of the wharf, with Options 2, 3 and 4 meeting the relevant objectives for the ferry wharf program (Chapter 2.1) and objectives for the proposal (Chapter 2.3). However, Option 2 is considered to best meet the criteria as it would have the least visual impact on the amenity of the area, provide suitable berthing facilities for ferry operators, and would provide interchange transport linkages. Option 2 has also been positively received by the community in consultation already carried out.

Statutory and planning framework

State Environmental Planning Policy (Infrastructure) 2007 permits development on any land for the purpose of wharf or boating facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for a wharf and boating facility and is to be carried out by Roads and Maritime, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent is not required.

Community and stakeholder consultation

Key government stakeholders including North Sydney Council, relevant interest groups, local businesses and the local community have been consulted to date and all issues raised have been taken into account during development of the proposal and addressed in this REF. The project team would continue to engage with the community and stakeholders prior to, and during, construction of the proposal.

Environmental impacts

The main environmental impacts of the proposal and the management measures to address those impacts are summarised below.

Noise and vibration

During construction there would be exceedances of the noise criteria for night time periods of construction during hammering in piles required for the expanded waiting area and platform. Exceedances would be:

- Up to 27 dB(A) for the nearest residential receiver (a 13 storey mixed residential and commercial building) at 1 Northcliff St, Milsons Point.
- Up to 20dB(A) for the nearest residential receiver across the harbour from Milsons Point Wharf at (a 16 storey residential building) at 2A Henry Lawson Avenue, McMahons Point

As detailed in Chapter 6.5 of the REF, piling works are required to be undertaken during night-time hours due to the need for calm water conditions. To minimise the impacts, the hammering activity has been restricted to the last two hours of the night time period (5am to 7am). During hammering, it is anticipated that each pile would be hammered for one minute (about 10 hits with a hammer within one minute). For each pile the activity is likely to occur about five times over a period of one hour.

A Noise and Vibration Construction Management Plan would be prepared prior to construction and implemented throughout the construction period. General noise and vibration impacts on the local community would be mitigated by restricting construction to daytime hours wherever possible. However, due to the requirement for calm water conditions during pile installation and for intricate lifts, some activities would need to be carried out at night, with about 30 night shifts (from 11pm to 7am) proposed across the construction period of about eight months. To minimise potential noise impact from the piling installation, the noisiest activity of hammering in piles has been restricted to be carried out from 5am to 7am only, as noted above.

The community would be kept informed of night-time construction activities at least five days before they are undertaken, with a community information email and phone line provided throughout the work to take enquiries and follow up on complaints. The notification area would provide information about noisy works to the wider community. For further information on environmental safeguards proposed in the Noise and Vibration Management Plan refer to Appendix D.

Landscape character and visual impact

As detailed in Chapter 6.6 of the REF a Landscape Character and Visual Impact Assessment (LCVIA) was undertaken for the proposal, provided in Appendix E. The report concluded that within

the immediate vicinity of the wharf the impact on landscape is considered to be moderate to low. Although the zone has a high sensitivity, the works are relatively minor, and replicate the materials and character of the existing wharf structure. There would be an impact on the sea wall, which would be concealed from view more than it is currently. This is considered a moderate impact on the overall character of this zone.

Generally, the wharf structure is relatively recessive in the zone; neutral in colour against the variety of finishes and colours of the backdrop; and dwarfed in scale by the adjacent bridge pylon. Landside works such as the ramps and steps and upgrades to parking would be sensitively integrated with the current design of the promenade, using the same material language.

New elements are also of a consistent scale. Impact on character zones beyond this point, and the character of Sydney Harbour, are considered low, due to its separation from the area locally by topography and buildings, and by distance for other zones. In addition, the wharf structure sits low against the promenade, meaning that the character defining elements of the backdrop are clearly visible, and appreciated as a part of a suite of iconic places and buildings in this part of the harbour.

The wharf is directly overlooked from the entry to Luna Park, the interior of North Sydney Olympic Pool, the end of Alfred Street, and the public promenade that connects these elements along the foreshore. This is a highly sensitive area, with heritage listed items and iconic buildings forming the boundary of the promenade, and with high use levels at times. This area is also within the buffer zone of the Sydney Opera House. The new structure would impact on views from the promenade and adjacent buildings to the harbour, and to the Opera house. Relocation of the roof structure on the wharf would partially obscure views from Luna Park mouth to the Opera House. Views from the interior of the pool to the harbour water and opposite shore would be partially obscured by the new gangway roof. The loss of view is restricted to very limited areas. Views of the harbour and Opera House are available from other points along the promenade. The visual impact in this area would be moderate to high.

Circular Quay and the Opera House are also sensitive viewpoints, with high visitation, and with Luna Park forming an iconic element in views to the west. Views from these points are, however, oblique, with potential for very minor view loss of the Luna Park mouth associated with relocation of the roof. Visual impact from these viewpoints is low.

Visual impact from other viewpoints is considered low to negligible, mitigated by distance.

The overall visual impact is considered moderate to low. The greatest impact would be on views within the foreground zone, where the expanded wharf and relocated roof may cause partial view loss of the harbour and Opera House from some points.

Mitigation strategies employed during the detailed design for the proposal include:

- selection of neutral and transparent materials;
- minimising impact on the foreshore by maintaining the current ramp adjacent to Luna Park;
- coordination ramp and steps to wharf with existing balustrade and seawall;
- design of steps to avoid contact with sea wall;
- location of service pod to reduce view loss;
- careful integration of the new landside steps with existing steps, walls and materials; and
- design of lighting to maintain the primacy of Luna Park lighting in the night-time landscape.

Heritage

A search of the local, state and national heritage registers identified several heritage items in proximity of the project area, including Sydney Harbour Bridge, Luna Park, North Sydney Olympic Pool and Bradfield Park. Furthermore, Milsons Point Wharf is within the buffer zone of the Sydney Opera House.

Proposed landside works will impact a portion of Bradfield Park, a local heritage item which also forms part of the curtilage of the Sydney Harbour Bridge as listed in the State Heritage Register. No works will impact on the fabric of the bridge itself, and the proposed works include minor upgrades of foot paths, kerb and guttering on Alfred Street South, which are considered to fall

under Exemption 7 of Section 57(2). Therefore a Section 60 permit is not considered necessary; however an exemption notification form under Section 57 must be submitted and approved.

A search of the Aboriginal heritage information management system (AHIMS) database was undertaken on 6 October 2016, covering a radius of approximately three kilometres around the project area, and identified 90 previously recorded Aboriginal heritage sites. None of the registered sites are within 500 metres of the project area; the closest site is a shelter with midden approximately 540 metres north of the project area.

Flora and fauna (aquatic ecology)

There is not likely to be a significant impact on threatened species, populations, ecological communities or their habitats; and a Species Impact Statement is not required, nor is a referral to a Commonwealth body.

A permit would be required under Part 7 of the *Fisheries Management Act* to *Harm Marine Vegetation* due to the impacts due to direct and indirect (shading) impacts to macroalgae (Kelp dominated). The combined loss of 746 m^2 of Type 2 and Type 3 Key Fish Habitat would be partially offset by 735 m^2 of vertical, shaded, hard substrate, however as the Fisheries Policy requires a 2:1 offset to loss ratio, an additional offset of 756m^2 (to provide 1491m^2 of new habitat in total) is required. An offset methodology will be determined through consultation with the Department of Primary Industries.

In regards to the biodiversity, ecology and environment protection requirements of the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005, the Proposal would impact marine vegetation (macroalgae) directly and indirectly (shading). Some compensation for this loss would be in establishing alternative hard structure habitat (piles) suited to shade tolerant sessile organisms and shelter for small fish.

Water quality

During construction there is potential for water pollution as a result of materials, spills or wastes accidentally entering the waters of the Parramatta River and the broader Sydney Harbour during demolition and/or transportation. There is also potential for increased water turbidity and release of contaminants in river bed sediments due to the removal and installation of piles and the operation of construction vessels, especially in shallow waters.

The impact on water quality would be minimised through the installation of booms fitted with turbidity curtains around all water based works, including construction vessels, for spill and sediment containment. Emergency spill kits would be kept on site at all times.

Water transport

During construction existing ferry services would continue to run within Sydney Harbour, with existing ferry services using Jeffrey St Wharf. Due to the closure of Milsons Point Wharf no non-construction related vessels would be able to enter the area of the construction site, potentially impacting on movement of watercraft in the Harbour. There would be an increase in water based movements along Sydney Harbour due to construction vessels operating between an off-site facility (operated by a contractor and subject to separate approvals) and the construction site.

During operation the proposal would provide two berthing face for vessels, increasing the capacity of the current wharf and enabling Milsons Point Wharf to support additional ferry services over time as outlined in Sydney's ferry future.

Water transport impacts would be minimised by clearly marking out the construction zone and informing users of the changes to wharf access prior, during and post- construction. A Marine Traffic Management Plan (MTMP) would be prepared, approved by the Harbourmaster and implemented prior to commencing any water based construction works.

Social and economic

Access to the wharf during the construction phase would be prohibited, with alternative transport arrangements provided for ferry users. Impacts during construction would be minimised through continued communication and consultation with the community throughout the construction period.

During construction some local businesses may be affected by the proposal, most notably the restaurants located along the foreshore, at Luna Park and at North Sydney Pool. The construction hours for the proposal would involve works being undertaken during business open hours although the noisiest activities, of drilling and hammering piles, would be undertaken when businesses are closed, minimising impact.

During operation the proposal would provide improved access to Milsons Point Wharf, with the upgraded interchange made compliant with the latest Disability Discrimination Act (DDA) and Building Code of Australia (BCA) requirements. The expanded facility would increase the existing wharf capacity and reduce boarding times. The proposal would contribute to improved commuter experience by providing a practical, functional and robust ferry wharf with appropriate waiting areas, passenger seating, standing and shelters, whilst allowing for the enjoyment of good weather, harbour views and aquatic activity.

Justification and conclusion

The proposal is justified because it would meet the proposal objectives which include providing wharf access within the interchange for people with a disability in accordance with the DDA and current legislative standards for disabled access and providing for an increase in capacity and dual berthing.

The proposal is not likely to have a significant impact on the environment and therefore the necessity of an environmental impact assessment is not required under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Contents

Appendices

1 Introduction

This chapter introduces the proposal and provides the context of the environmental assessment. The proposal objectives and development history are outlined and the purpose of the report provided.

1.1 Proposal identification

NSW Roads and Maritime Services (Roads and Maritime) proposes to redevelop the wharf interchange at Alfred Street, Milsons Point (the proposal), referred to throughout the review of environmental factors (REF) as Milsons Point Wharf Interchange.

The main elements of the proposal include:

- Construction of a new gangway and hydraulic platform
- Expansion of the existing fixed wharf structure
- Construction of landside infrastructure to provide improved access for people with disabilities
- Ancillary facilities

A detailed description of the proposal is provided in Chapter 3.

The proposal is part of the Roads and Maritime Ferry Wharf Upgrade Program (FWUP), the progressive upgrade of ferry wharves across Sydney as part of the NSW Government's Transport Access Program – an initiative to deliver modern safe and accessible transport infrastructure. It is needed to increase capacity of the existing wharf, to support additional ferry services provided by the new Inner Harbour and Parramatta River ferries, and to improve access to the wharf interchange by meeting the requirements of the *Disability Discrimination Act 1992* (DDA) and current standards for disabled access.

The proposal is located on the northern side of Sydney Harbour within the North Sydney Local Government Area (LGA). It is directly adjacent to Luna Park and approximately 1.25km by water from Circular Quay. The site provides views to the Sydney Central Business District (CBD) to the south, Sydney Harbour Bridge and Sydney Opera House to the east and McMahons Point, Goat Island and Balmain to the west (see Figure 1-1).

Immediately to the north of the site is a restaurant, North Sydney Olympic Pool and Luna Park. A mix of residential terrace houses, residential apartment buildings and mixed use developments are located further to the north (see Figure 1-2).

The marshalling and storage of most construction equipment, plant and materials, and the pre-fabrication of parts, pre-casting of headstocks and fit outs for the wharf would be carried out by a contractor at an off-site facility. The operation of this off-site facility does not form part of this proposal but would have the necessary approvals in place for such activities to be undertaken.

Associated construction materials and equipment would be delivered / removed from site using barges. The majority of construction would be undertaken from barges on the water with only minor works being undertaken from land. The marshalling and storage of landside construction equipment, plant and materials, and the pre-fabrication of parts would be carried out by a contractor. The proposal area and indicative site compound location for the proposal are shown in Figure 3-2.

Construction is anticipated to take up to eight months (weather permitting) following commencement of works. During construction the existing wharf would be closed to ferries, and other non-construction related watercraft, with alternative transport provided during this period.

Figure 1-1 Proposal location

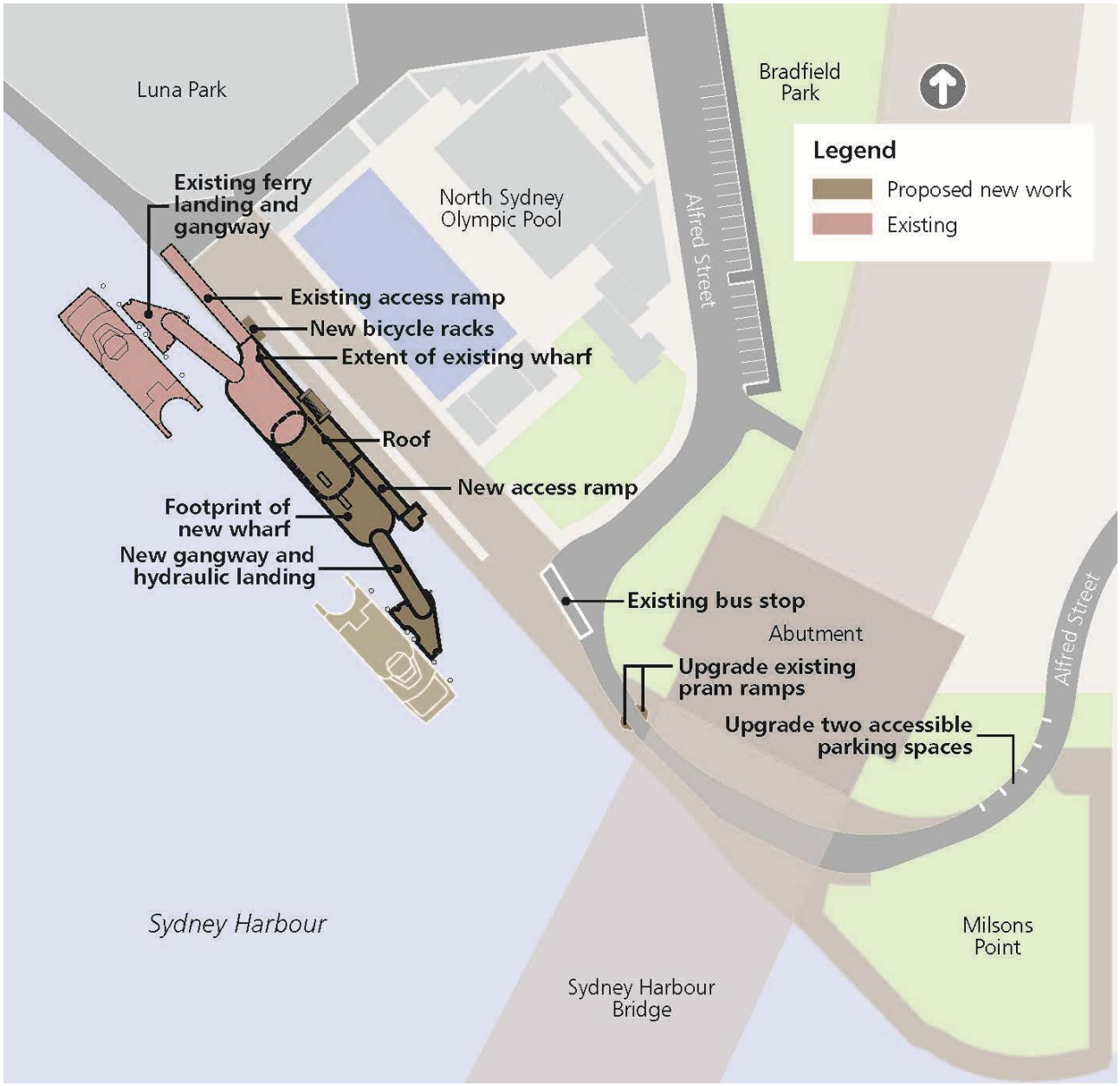

Figure 1-2 Overview of the proposal

1.2 Purpose of the report

This review of environmental factors (REF) has been prepared by RPS on behalf of Roads and Maritime. For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail the environmental safeguards to be implemented.

The description of the proposed work and associated environmental impacts have been undertaken in the context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the factors in *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (Is an EIS required? guidelines) (DUAP, 1995/1996), the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so, the REF helps to fulfil the requirements of Section 111 of the EP&A Act that Roads and Maritime examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement
- The potential for the proposal to significantly impact any matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of Environment and Energy for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2 Need and options considered

This chapter describes the need for the proposal in terms of its strategic setting and operational need. It identifies the various options considered and the selection of the preferred option for the proposal.

2.1 Strategic need for the proposal

Sydney Harbour's ferry wharves are an integral part of the Sydney transport system. The Transport Access Program (TAP) is an ongoing in initiative to deliver modern, safe and accessible transport infrastructure (Transport for New South Wales (TfNSW), 2015). The Milsons Point wharf was upgraded in 2010, however further expansion is required to increase capacity and improve service levels for ferry customers. The additional upgrade would increase the capacity of Milsons Point Wharf by providing a second platform to enable two ferries to berth at the same time.

The *Disability Standards for Accessible Public Transport 2002* (DSAPT) and *Disability (Access to Premises – Buildings) Standards 2010* (Disability Standards 2010) made under the Disability Discrimination Act (DDA) require all public transport infrastructure, including wharves, to provide fully compliant disabled access by 2022.

The proposal is therefore needed to improve ferry commuter services and provide services that meet the requirement of the DDA and current standards for disabled access.

2.1.1 Strategic planning and policy framework

The proposal is consistent with the strategic aims and direction of relevant strategic planning documents. Strategic planning documents most relevant to the proposal are identified below.

NSW 2021 – A Plan to Make NSW No.1

NSW 2021 A Plan to Make NSW No.1 (NSW Department of Premier and Cabinet, 2011) is the NSW Government's strategic business plan, setting out priorities for action and guiding resource allocation over the next 10 years. It sets out five strategies including rebuild the economy, return quality services, renovate infrastructure, strengthen our local environment and communities and restore government accountability.

The goals, targets and actions in this plan set the priorities for funding, guiding decisions and focusing the day to day work of the public sector.

This proposal is particularly relevant to the following NSW 2021 goals:

- Goal 7 – reduce travel times
- Goal 8 – grow patronage on public transport by making it a more attractive choice
- Goal 9 – improve customer experience with transport services
- Goal 14 – increase opportunities for people with a disability by providing supports that meet their individual needs and realise their potential
- Goal 20 – build liveable centres
- Goal 25 – increase opportunities for seniors in NSW to fully participate in community life
- Goal 27 – enhance cultural, creative, sporting and recreational opportunities.

The proposal is also relevant to the NSW to 2021 priority action to 'build wharves to significantly increase the speed at which passengers embark and disembark'.

The plan earmarks delivery of improved coordination between transport modes and a renewed focus on customer satisfaction to deliver the highest possible standards of service to transport users across the NSW network.

The proposal is consistent with the goals of the plan as it would improve the unassisted use of Milsons Point Wharf Interchange by people with a disability, which would increase potential patronage. The proposal would enable wheelchair access simultaneously for those embarking and

disembarking, which would increase boarding efficiency. The new facilities provided by the proposal would improve the overall customer experience for ferry users by increasing capacity and improving service levels and contribute to the liveability of Sydney.

State Infrastructure Strategy 2012-2032

The *State Infrastructure Strategy 2012-2032* (Infrastructure NSW, 2012) is a 20 year strategy that supports the delivery and funding of infrastructure in NSW.

The strategy reaffirms the NSW Government's existing public commitments and outlines a forward vision for the delivery of urban and regional projects and reforms across transport, freight, aviation, energy, water, health, education and social infrastructure.

The strategy outlines that almost 80 per cent of commuter journeys to the Sydney Central Business District (CBD) are by public transport and that public transport infrastructure must increase due to projected employment growth and current parking limitations within the CBD. The proposal is consistent with the strategy as it supports increased patronage of public transport in Sydney.

A Plan for Growing Sydney

*A Plan for Growing Sydney (*Department of Planning and Environment (DPE), 2014) sets out the actions and framework that would deliver goals identified for the growth of Sydney.

One of the four key goals of the plan is to be a competitive economy with world-class services and transport. In order to achieve this goal, one of the key actions identified is delivering the infrastructure that is needed by connecting centres with a networked transport system.

The proposal is consistent with this plan by improving existing public transport services including increased accessibility, increased commuter comfort and more efficient travel times and therefore support increased patronage of public transport in Sydney.

North District

Milsons Point Wharf Interchange is located within the North District under the plan. The region is focused on centres with good public transport and aims to offer a growing diversity of high amenity living and working environments. One of the priorities for the North District is to improve transit connections throughout the Global Economic Corridor to better link centres and transport gateways, and improve connections.

Goal one of the comprehensive draft district plan for the north is to provide 'a competitive economy with world-class services and transport'. Upgrading of the wharf interchange at Milsons Point would provide additional capacity at a transport interchange close to jobs and housing. The plan also recognises Sydney Harbour as one of Greater Sydney's most valuable assets, with the harbour foreshore providing places to enjoy cultural events, and makes an important contribution to the economy through tourism. The proposed expansion of the wharf is consistent with the vision for the North District through improving the harbour and its public access.

The sustainability principles outlined within the plan highlight enhanced access to Sydney Harbour foreshores and waterway including 'enhanced access to and along the foreshore and provide connected green space around the foreshore'. The principles also include 'manage demand for and the design of essential maritime facilities within the natural and built environment'. By expanding the facilities at Milsons Point, the proposal meets the objectives of the plan by providing connections to the park and considering future demand requirements.

Disability Standards for Accessible Public Transport (2002) and Disability (Access to Premises – Buildings) Standards (2010)

The DSAPT and Disability Standards 2010 are both legislative standards made under the DDA. Each standard establishes prescribed minimum standards of accessibility for public transport buildings and conveyances and public transport premises respectively. Both establish a mandatory upgrade timetable for public transport premises to meet the prescribed accessibility requirements.

The proposal includes the expansion and interchange upgrade of the wharf at Milsons Point that will provide access for people with a disability in accordance with current legislative and regulatory standards.

Ferry Wharf Upgrade Program

Roads and Maritime is the delivery agency for the upgrade of the Sydney ferry wharves within the Transport Access Program (TAP). The specific objectives of Ferry Wharf Upgrade Program (FWUP) include the following:

- Improve access for people with disabilities
- Enhance the efficiency of interchanging
- Improve passenger amenities
- Increase the rate at which passengers embark and disembark
- Develop a functional, distinctive and iconic design theme that will unify and identify Sydney Harbour commuter wharves
- Meet current demand and enable future growth
- Minimise construction impacts to customers and wharf operations
- Minimise the cost of ownership and maintenance
- Comply with the Marine Safety (Domestic Commercial Vessel) National Law legislation
- Discourage inappropriate activities at the wharves
- Ensure all wharves achieve compliance by 2022 (where possible) with the Disability Discrimination Act (DDA), standards and codes of practice.

The proposal is consistent with all the objectives of the Roads and Maritime FWUP. In particular the proposal would provide a redeveloped wharf that meets current disabled access standards.

NSW Long Term Transport Master Plan 2012

The *NSW Long Term Transport Master Plan* (LTTMP) is a 20 year plan to improve the transport system in NSW. It sets out the framework for the NSW Government to deliver an integrated, modern transport system that puts the customer first (TfNSW, 2012).

The plan also:

- Identifies the challenges that the transport system (including buses, heavy rail, light rail, ferry and private vehicles) in NSW needs to address to support the State's economic and social performance
- Guides decision-makers to prioritise actions which address the most pressing challenges
- Identifies a planned and coordinated set of actions (reforms, service improvements and investments) to address challenges
- Provides a map of future service and infrastructure developments which future decisions will be required to support, and against which proposed investments can be evaluated
- Guides the NSW Government's transport funding priorities, providing the overall framework for how the NSW transport system develops, whether it is the services that are delivered or the infrastructure that underpins them.

A key element of the plan is the need to address congestion in the Sydney CBD. The plan notes that over the next 20 years, trips into the Sydney CBD are forecast to grow by 31 per cent. This represents an additional 56,500 trips, the equivalent of 942 standard buses. This growth cannot be accommodated on the existing CBD road network, which would compound congestion and affect economic growth. An integrated public transport solution is therefore needed to ease congestion in the CBD, including increasing the patronage of trips to the city by ferry.

The proposal is consistent with the goals of the plan as it would provide a redeveloped wharf, improving access and providing capacity to support additional ferry services over time. The

proposal would facilitate a future increase in public transport to ease congestion by increasing the number of services to the Sydney CBD by ferry.

Sydney's Ferry Future

The NSW Government's Sydney's Ferry Future plan outlines short and long term cost initiatives to get the most out of the ferry network today and invest in the infrastructure and services needed to attract more customers in future. The plan identifies the need for development of new routes and services that respond to emerging employment hubs such as Barangaroo and population growth centres. The proposed redeveloped wharf would support Sydney's Ferry future by providing improved access to the commuter wharf at Milsons Point and a second berthing face to support additional services as part of the future ferry network. Information regarding the additional services and ferry routes is outside the scope of the REF.

2.2 Existing infrastructure

The existing Milsons Point Wharf Interchange comprises:

- A wharf and associated facilities
- Road access via Alfred Street – one way loop from Broughton Street at the north-east connecting to Alfred Street in the west
- Bus stop and interchange facilities at Alfred Street about 100 metres south of the wharf
- Four hour timed kerbside parking on Alfred Street, including two accessible spaces. Under the Building Code of Australia in 2016, 'accessible' is defined as *'having features to enable use by people with a disability'.*
- Non-accessible path from the wharf to the foreshore
- Foreshore access with stone steps
- Uncovered benches along the foreshore

2.2.1 Existing wharf design

The current wharf consists of an existing ramp leading to a fixed waiting area from the foreshore. The waiting area connects to a 16 metre long covered gangway that connects to an uncovered hydraulic platform, held in position by six fender piles (see Figure 2-1). The design of the current landing, embarking and disembarking of ferries is via a portable ramp from the ferry to the platform.

Figure 2-1 Current Milsons Point Wharf looking south east

2.2.2 Existing landside infrastructure

The wharf is located about 100 metres from the nearest bus stop on Alfred Street (see Figure 2-2). The path from the wharf to the bus is flat and paved (see Figure 2-3). There is also uncovered seating located between the wharf and the bus stop, as well as stone steps that can be used as seating. A non-accessible existing ramp leads to the fixed waiting area of the wharf from the foreshore.

Figure 2-2 View of current foreshore looking east with bus stop in the distance

Figure 2-3 Path in Bradfield Park looking east

Figure 2-4 Current car parking on Alfred Street looking north

2.3 Proposal objectives and development criteria

2.3.1 Proposal objectives

The objectives of the proposal are to:

- Provide capacity for additional ferry services provided by the new Inner Harbour and Parramatta River ferries
- Provide a wharf interchange that is accessible to people with a disability in accordance with the DDA, Building Code of Australia (2011), DSAPT, Disability (Access to Premises – Buildings) Standards (2010) and Australian Standard series 1428
- Increase speeds at which passengers embark and disembark to improve boarding efficiency and travel times
- Create a practical, functional and robust ferry commuter wharf with appropriate waiting areas, passenger seating, standing and shelter while allowing for the enjoyment of good weather, harbour, harbour views and aquatic activity
- Provide civilian, fire and marine rescue/safety equipment
- Reduce maintenance through the use of appropriate materials, surfaces and details that facilitate easy cleaning of the structures
- Reduce vandalism with the use of appropriate materials, surfaces and designs
- Eliminate unauthorised and inappropriate use of terminals and facilities

2.3.2 Development criteria

The TfNSW draft report Making Interchange Places (the Draft Product Strategy) published in May 2012 establishes the strategic design principles to deliver high quality, customer–focused transport interchanges.

Making Interchange Places advocates five core themes to focus the development and improvement of interchanges on customers, effectiveness, the integration of public transport and land use solutions and accommodation of future growth.

To address these core themes, design principles are presented by *Making Interchange Places*, outlined in Table 2-1 below

Table 2-1 Wharf core themes and design principles (TfNSW, 2012)

Core Theme	Design Principle
Meet customer needs and improve transport experience	• Provide safe, efficient and convenient access for all • Provide a comfortable, enjoyable and positive customer experience
Optimise access to public transport	• Connect into existing and future transport networks and provide equitable access to centres of employment, services, recreation and education • Provide seamless interchange
Integrate interchange investment with land use plans	• Make attractive and vibrant spaces for employment and housing • Embrace heritage and cultural values
Anticipate growth and change in demand	• Safeguard future extension and property development opportunities based on predicted growth
Ensure the sustainability and future performance of the public transport network	• Deliver sustainable solutions that minimise environmental and community impacts that are adaptable to climate change and accommodate new technologies.

The Business Requirements Specification (F-FWU-001) for the Ferry Wharf Upgrade Program, specifies that interchange access modes to the wharf and associated interchange facilities have been designed with the following priorities:

- Pedestrian access
- Bicycle access and storage
- Bus access
- Taxi access
- Kiss-and-ride (drop off and pick up)
- Motor vehicle park-and-ride (with priority for accessible parking).

As a 'local interchange', the design should encourage pedestrians and cyclists through elements such as convenient and direct paths, bike racks and wayfinding.

2.3.3 Urban design objectives

The urban design objectives for the proposal are to:

- Minimise clutter and work with the shapes and material selection of the landscape context
- Minimise visual impact on the character of the public domain of the foreshore, and on landmark buildings and precincts
- Minimise interruptions to views
- Respect the setting and place
- Promote features that contribute to the character of the setting in any design interventions – contemporary design, robust materials palette
- Retain and enhance existing pedestrian systems
- Where possible retain and protect existing vegetation
- Upgrade facilities and open space to meet current standards and improve amenity

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

Ferry wharves are not easily re-located due to the considerable impacts that result to adjacent public transport and vessel movements within Sydney Harbour, including changes to navigational lanes and routes. For this reason commuter ferry wharves are generally upgraded or redeveloped in or near their existing locations.

A Key Stakeholder Workshop (KSW) was held on 10 May 2016. The workshop included infrastructure and design requirements for the wharf interchange expansion and consideration of various options for the expansion of the wharf. The workshops were attended by representatives from Roads and Maritime, TfNSW, Hansen Yuncken (managing contractor) and Harbour City Ferries (ferry operator). Various options were identified and analysed for the wharf interchange expansion. The preferred options and wharf location was selected as it was found to best meet the project objectives, development criteria and urban design objectives.

2.4.2 Identified options

Four options for the wharf interchange were considered. These options are outlined below.

Option 1 – Do nothing

The do nothing (base case) option (

Figure 2-5) would involve no active measures, outside of routine maintenance, to improve the existing wharf. The existing wharf interchange would continue to be used for ferry commuter services.

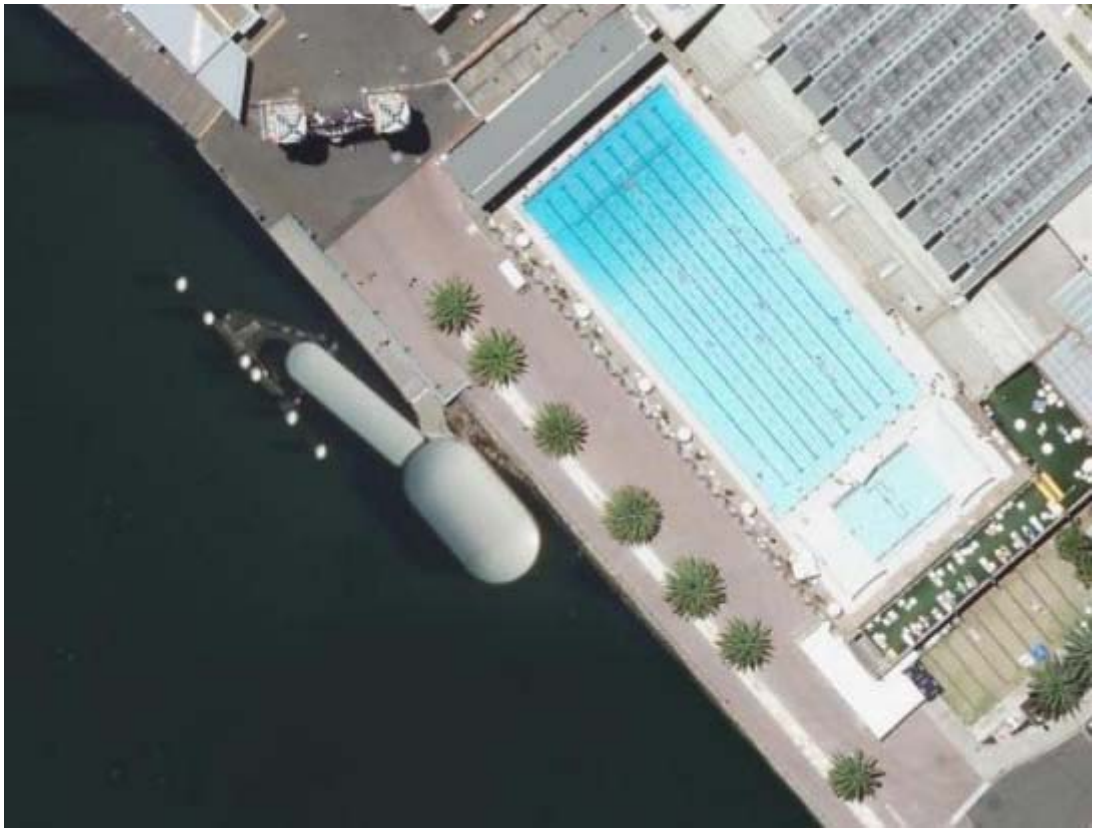

Figure 2-5 Option 1 – do nothing

Option 2 – Wharf with concourse extension and new hydraulic landing

Option 2 (shown in Figure 2-6) would involve duplicating the existing hydraulic landing to provide a second berthing face. The existing gangway and platform would be retained. An 18m long covered gangway would connect to the new hydraulic landing platform, which would be installed to provide a 60m distance between berthing faces to enable a safe distance to be maintained for ferry services. Between the hydraulic platforms, the existing fixed structure would be retained and extended, with the roof of the existing structure relocated into a central position on the new fixed structure.

There would be a new accessible ramp providing compliant access from the foreshore to the wharf, and steps from the foreshore to the centre of the fixed wharf structure. Ten bike racks would be provided on the foreshore and the upgrade of an existing access ramp and stair arrangement would be undertaken, providing compliant access from the foreshore to the existing bus stop (shown in Figure 2-7). The existing accessible parking spaces on Alfred Road to the east of the Harbour Bridge would also be upgraded to comply with the latest accessibility requirements.

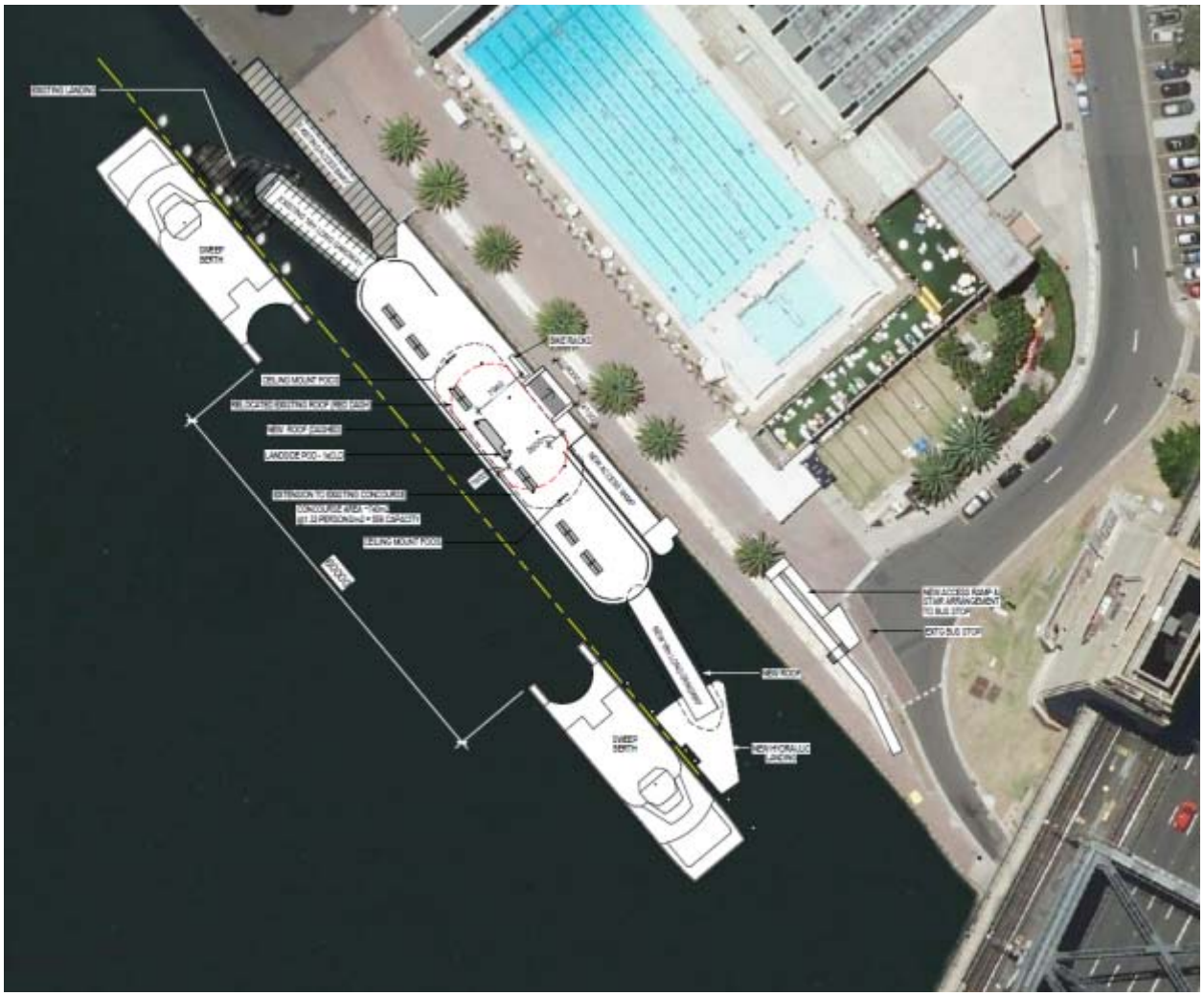

Figure 2-6 Option 2 – Wharf with new access ramp and hydraulic landing

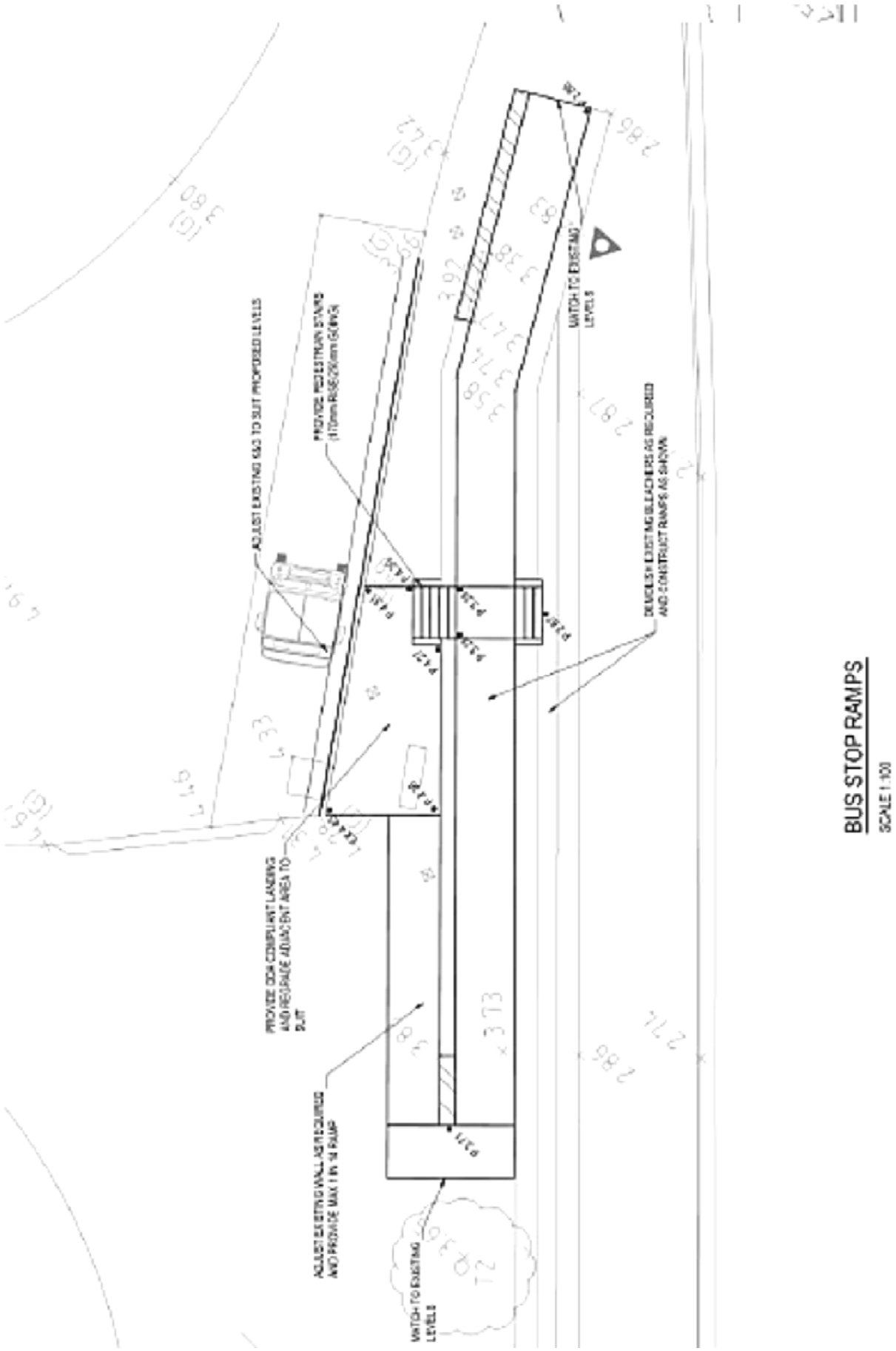

Figure 2-7 Landside upgrade of existing bus stop ramps for Options 2, 3 and 4

Option 3 – Wharf with concourse extension and pontoon

Option 3 (shown in Figure 2-8) would involve the installation of a pontoon to provide a second berthing face. The existing gangway and platform would be retained. An 18m long covered gangway would connect to a 12m covered bridge, leading from the existing wharf waiting area to the new pontoon, installed to provide a 60m distance between berthing faces to enable a safe distance to be maintained for ferry services. The pontoon would be a covered structure 27m x 12m in size, in order to remain stable in the specific hydrological conditions found at Milsons Point and providing capacity for a secondary waiting area. The existing fixed structure would be retained, with access points created for the covered bridge and new accessible ramp providing complaint access from the foreshore to the wharf. 10 bike racks would be provided on the foreshore and the upgrade of an existing access ramp and stair arrangement would be undertaken, providing compliant access from the foreshore to the existing bus stop. The existing accessible parking spaces on Alfred Road to the east of the Harbour Bridge would also be upgraded to comply with the latest accessibility requirements. The bus shelter would be upgraded as per option 2 with the upgrade to the ramp and stair arrangement (shown in Figure 2-7).

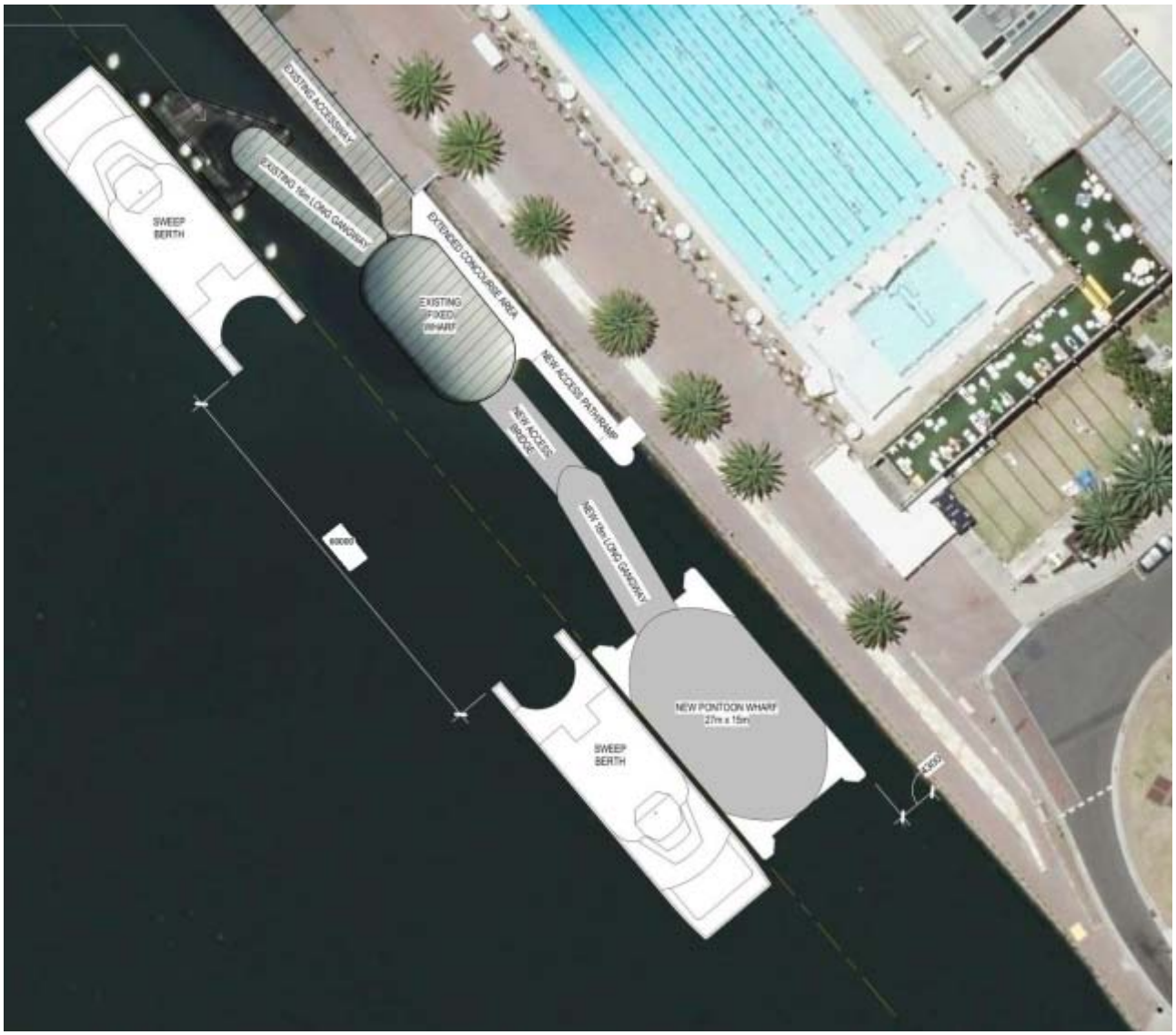

Figure 2-8 Wharf with new concourse bridge and pontoon

Option 4 – Demolition of existing platform and gangway and new pontoon

Option 4 (shown in Figure 2-9) would involve the demolition of the existing gangway and landing platform, and installation of a new gangway and pontoon to provide two berthing faces on the outside and inside of the pontoon. An 18m covered gangway would connect to a second gangway leading to the covered 27m x 12m pontoon, sized in order to remain stable in the specific hydrological conditions found at Milsons Point and to provide capacity for a secondary waiting area. The existing fixed structure would be retained with access points created for the gangway and new accessible ramp providing complaint access from the foreshore to the wharf. 10 bike racks would be installed on the foreshore and the upgrade of an existing access ramp and stair arrangement would be undertaken, providing compliant access from the foreshore to the existing bus stop. The existing accessible parking spaces on Alfred Road to the east of the Harbour Bridge would also be upgraded to comply with the latest accessibility requirements. The bus shelter would be upgraded as per option 2 with the upgrade to the ramp and stair arrangement (shown in Figure 2-7).

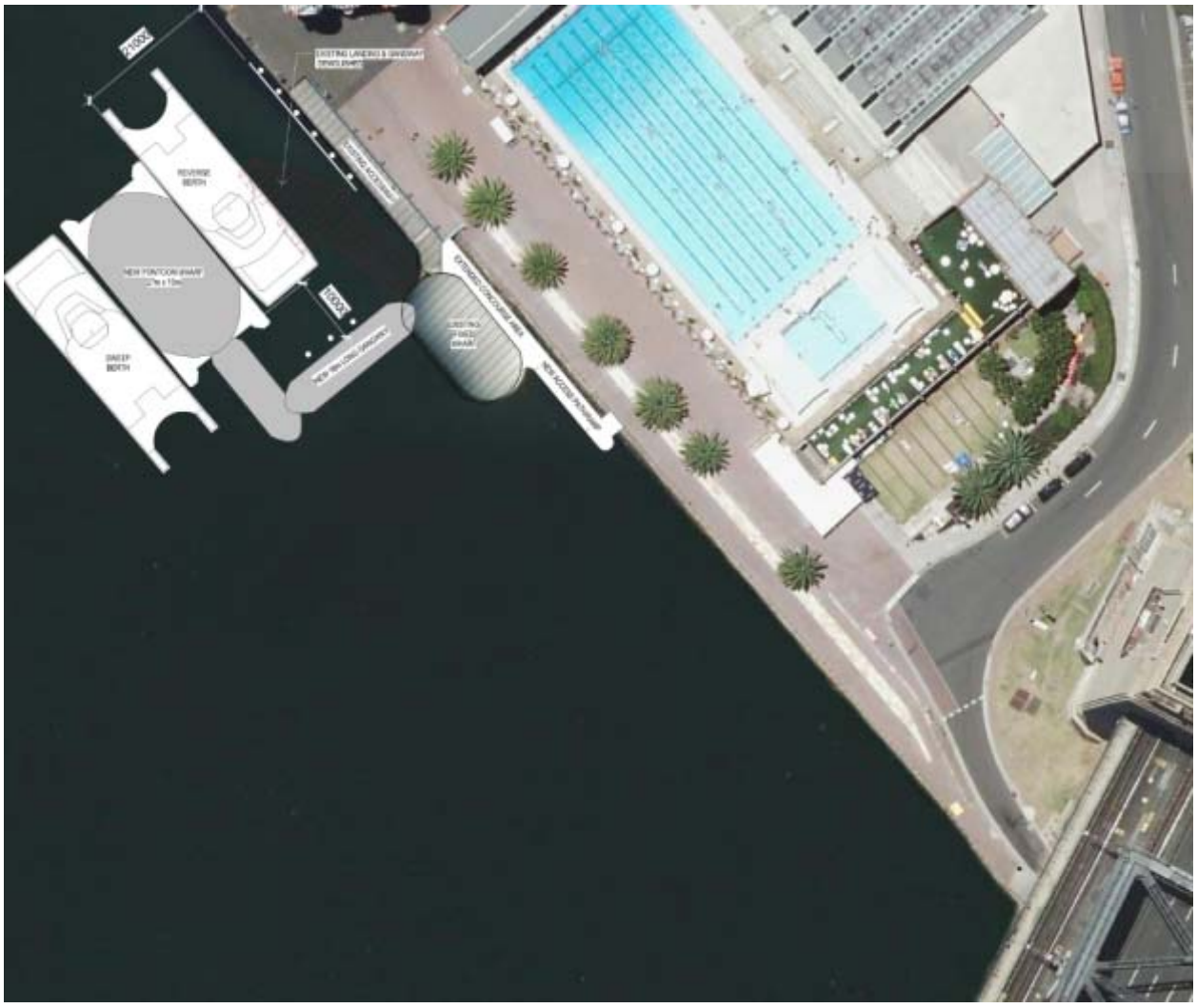

Figure 2-9 Demolition of existing platform and gangway and construction of new pontoon

2.4.3 Analysis of options

Each of the options were analysed against the proposal objectives, development criteria, urban design objectives and the criteria as descried above in Chapter 2.3. A summary of the analysis, including the advantages and disadvantages of each of the options considered for the proposal is outlined below.

Option 1

This option would not require any additional expenditure and would result in views to and from the harbour being maintained. It would also have the least environmental impacts of the four options as there would be no additional structures and disturbance to land surfaces. The wharf would also remain open, maintaining the current facilities and level of service available to users.

The do nothing option would not enable commuter wharf facilities to be improved as per the objectives of the proposed activity. In particular it would not improve the level of accessibility within the interchange in accordance with the requirements of the DDA, DSAPT or the Disability Standards 2010, although the existing wharf structure does comply with these requirements. Maintaining the existing capacity of the wharf would also not provide capacity suitable to enable the new Inner Harbour and Parramatta River ferries to increase ferry frequency throughout the Harbour.

As this option would not achieve the proposal objectives (see Chapter 2.3) or the objectives of the Roads and Maritime FWUP (see Chapter 2.1), particularly in regard to accessibility, it was not pursued further.

Option 2

Option 2 would provide the following benefits:

- Meet the proposal objectives by providing a wharf where two ferries can berth simultaneously, increasing the speeds at which passengers embark and disembark to improve efficiency and travel times.
- Meet the proposal objectives by providing a wharf interchange which would comply with the requirements of the DDA and current legislative standards for disabled access for 80 per cent of the high and low tide levels in standard tide charts
- Meet the proposal objectives through the expansion of the existing waiting area, providing one appropriately sized central waiting area shelter, whilst allowing for the enjoyment of good weather and harbour views through the provision of covered and uncovered areas.
- Retains the existing fixed structure, and extends it to cater for the roof structure which saves on material use, and project cost.
- Reuses the roof of the existing structure by relocating it into a central position on the new fixed structure which saves on material use, and project cost.
- Provides a safe separation distance for ferries to berth with no requirement to reverse.
- The hydraulic platform is smaller in size compared to a pontoon arrangement which will assist with minimising interruption to existing views of the harbour.

The disadvantage of this option is:

- Wharf would be closed during the construction period, temporarily reducing wharf facilities available to users.

The expansion of the existing structure and installation of a second platform would have a visual impact on local residents, businesses and foreshore users views of the harbour, although this would be minimised by maintaining the existing level of coverage provided for the fixed waiting area through relocating the existing roof rather than expanding canopy coverage. Mirroring the existing structure also meets the urban design objective of respecting setting and place, with the new hydraulic platform minimising interruption to views through its size when compared to pontoon arrangements.

Option 3

Option 3 would provide the following benefits:

- Meet the proposal objectives by providing a wharf where two ferries can berth simultaneously increasing the speeds at which passengers embark and disembark to improve efficiency and travel times.
- Meet the proposal objectives by providing a wharf interchange which would comply with the requirements of the DDA and current legislative standards for disabled access for 80 per cent of the high and low tide levels in standard tide charts
- Meet the proposal objectives through the installation of a waiting area with shelter on the new pontoon, in addition to the existing waiting area.
- Retains the existing gangway, platform and wharf waiting area which saves on material use and project cost.
- Provides a safe separation distance for ferries to berth with no requirement to reverse.

The disadvantages of this option are:

- Wharf would be closed during the construction period, temporarily reducing wharf facilities available to users.
- The installation of a pontoon structure would have a visual impact on local residents, businesses and foreshore user's views of the harbour, with the covered pontoon reducing views of the harbour from some locations. The new expanded structure would not meet the urban design objectives to minimise interruption to views and respect setting and place, with pontoon size required for stability in the specific hydrological conditions.
- Provision of a secondary waiting area may impact on the speeds which passengers embark onto ferries berthing at the existing hydraulic platform. Customer information would need to be provided to ensure waiting areas were used in a way which would not introduce confusion and decrease boarding efficiency.

Option 4

Option 4 would provide the following benefits:

- Meet the proposal objectives by providing a wharf where two ferries can berth simultaneously, although the inside face would lead to a requirement for ferries to reverse out, limiting the improvements to efficiency and travel times.
- Meet the proposal objectives by providing a wharf interchange which would comply with the requirements of the DDA and current legislative standards for disabled access for 80 per cent of the high and low tide levels in standard tide charts
- Meet the proposal objectives through the installation of a waiting area with shelter on the new pontoon, in addition to the existing waiting area.

The disadvantages of this option are:

- Wharf would be closed during the construction period, temporarily reducing wharf facilities available to users.
- The installation of a pontoon structure would have a visual impact on local residents, businesses and foreshore user's views of the harbour, with the covered pontoon reducing views of the harbour from some locations. The new pontoon would also be situated further out into the harbour to enable ferries to berth on the inside face, having a further impact on views than the other options proposed. The new expanded structure would not meet the urban design objectives to minimise interruption to views and respect setting and place, with pontoon size required for stability in the specific hydrological conditions.
- The new pontoon would require ferries to reverse out of the inside face berth. During development Harbour City Ferries noted other options would be preferred from an operational perspective.

2.5 Preferred option

The preferred option for the wharf is Option 2 – Wharf extension with hydraulic platform. Whilst Options 2, 3 and 4 would all broadly meet the objectives of the proposal, by providing capacity for a secondary berthing face and providing a DDA compliant wharf interchange, it is Option 2 the would best meet the objective to create a practical, functional and robust ferry commuter wharf with appropriate waiting areas, passenger seating, standing and shelter while allowing for the enjoyment of good weather, harbour, harbour views and aquatic activity. By expanding the existing fixed structure and relocating the existing roof structure to the new centre, the proposal would provide one appropriately sized waiting area with seating and standing under shelter, which would best enable efficient boarding of ferries, enabling an improvement in boarding efficiency and travel times. The uncovered areas of the fixed structure would also allow for the enjoyment of good weather and harbour views. This option is also preferred from an operational perspective as it provides a safe separation distance for ferries to berth with no requirement to reverse.

Option 2 would also best meet the urban design objectives of the proposal, respecting the setting and place by mirroring the existing hydraulic platform, rather than installing a larger pontoon structure. The hydraulic platform is smaller in size compared to the pontoon arrangement which will assist with minimising interruption to existing views of the harbour.

2.6 Design refinements

Following confirmation of the preferred option, consultation was undertaken with key external stakeholders and the local community to capture feedback prior to further development. Following this consultation a decision was made to remove the upgrade of the existing bus stop ramp from the proposal scope. The existing bus stop ramp was installed to provide DDA compliant access from the bus stop on Alfred Street to the lower concourse area, which leads to the existing wharf entrance. The structure is in good condition and minimises visual impact, minimising clutter and respecting setting and place through matching existing sandstone and brick paving used throughout the concourse.

The upgrade of existing accessible parking spaces on Alfred Road to the east of the Harbour Bridge was also refined during the development of a preferred option. Originally the proposal looked to create two new accessible parking spaces on the southern side of Alfred Road and install an accessible footpath between the spaces and an existing footpath located under the Sydney Harbour Bridge. This option would provide a compliant access path from parking spaces to the wharf, however would also result in the loss of existing parkland in the North Sydney Council owned Bradfield Park. Following a meeting with North Sydney Council to review options for the carpark spaces, the preferred option was confirmed as upgrading the existing parking spaces to comply with the latest DDA and DSAPT requirements, and upgrading existing pram ramps to the east of the Harbour Bridge to provide a compliant access route to the wharf. This change in location for the car parking was incorporated into the three options for expanding the wharf discussed in Chapter 2.4.2.

In order to meet the urban design objectives for the proposal by minimising the impact of the proposal, the separation distance between the two platforms was reviewed with the operator following confirmation of preferred design, and has been revised to allow the safe berthing of two ferries at the platforms, with a reduced distance of 50m provided. This has enabled the size of the fixed waiting area to reduce accordingly, minimising the visual impact, and interruption of views, as a result of the proposal.

3 Description of the proposal

This chapter describes the proposal and provides descriptions of existing conditions, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

The proposal would include the duplication of the hydraulic platform and covered gangway, and expansion of the existing waiting area to incorporate this and provide additional capacity. The new gangway and hydraulic platform, as well as the landside infrastructure works, is expected to be as shown in

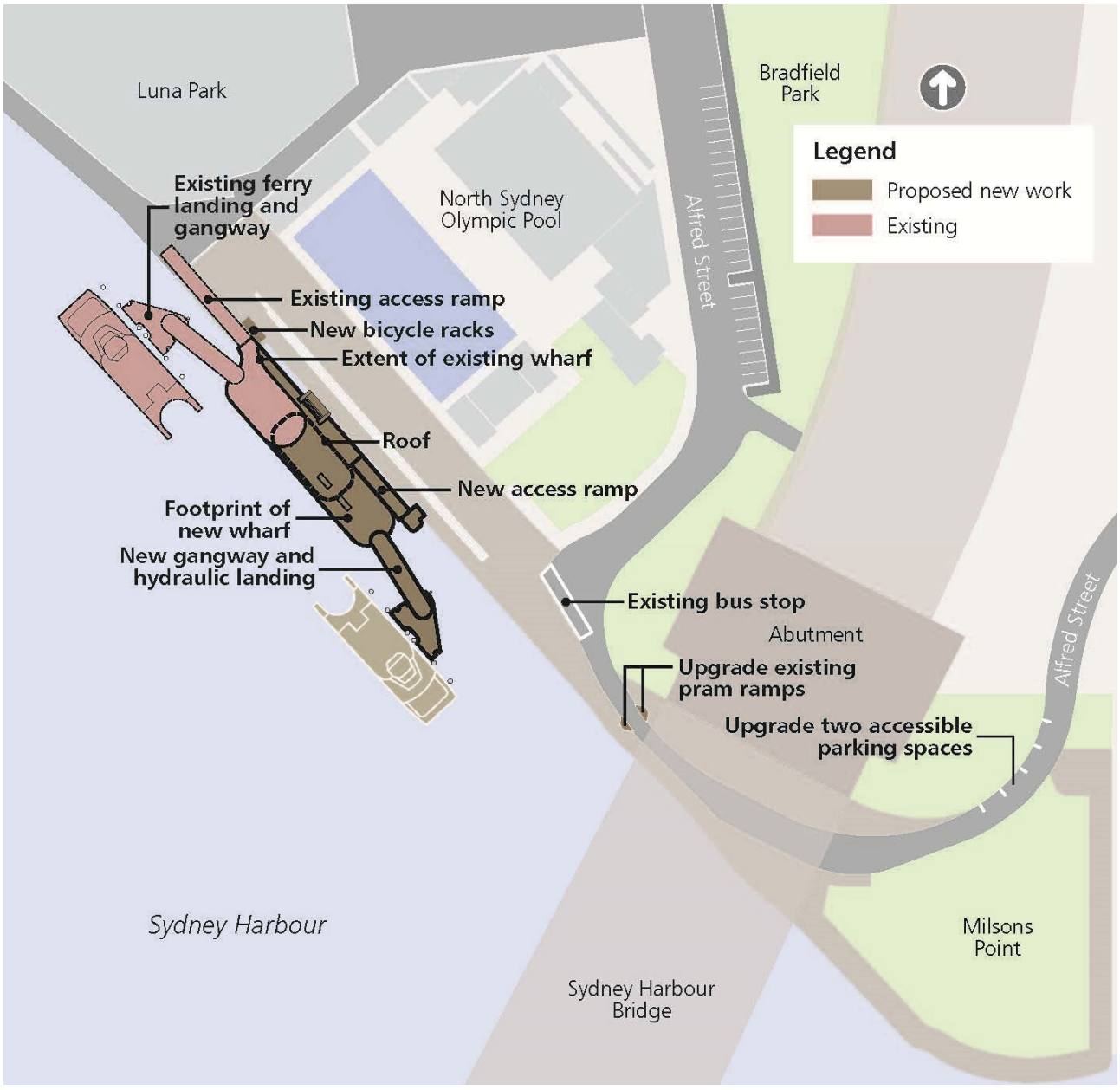

Figure 1-2. However, for the purposes of this REF, an envelope (shown in red outline in Figure 3-2) has been assessed to consider potential changes to the position of the wharf or landside elements should they be required following further design development.

The proposal would be as follows:

Modifications to the existing wharf

- The existing gangway and platform would be retained
- The waiting area within the existing fixed structure would be expanded to support the second berthing face, constructed to the east of the existing fixed structure and supported by about 20 new piles
- The existing waiting area roof would be relocated to sit centrally over the expanded waiting area
- Works to support this expansion would include:
  - Relocating, and increasing seating within the existing wharf
  - Relocating the existing glazed screens to provide weather protection for the expanded section.
  - Installation of new glazed balustrades
  - Installation of new signage and wayfinding
  - A new stairway would connect the waiting area to the existing foreshore
  - Installation of safety and security facilities including lighting and CCTV
  - Relocation of customer information and ticketing equipment

Construction of a new gangway and hydraulic platform

- A new 18m covered aluminium gangway would connect to, and be supported by, the fixed structure and new hydraulic platform. The gradient of the gangway would vary according to the tides
- A new triangular shaped steel hydraulic platform would be constructed at the eastern end of the gangway. The platform would have one berthing face on the southern side for ferries. To support the platform additional piles would be installed
- The wharf would be constructed to be accessible to people with a disability, except for the gangway which would only be accessible for no less than 80 per cent of the high and low tide levels listed in standard tide charts

Construction and modification of landside infrastructure

- A new accessible ramp would be constructed on the southern side of the existing stone sea wall, providing DDA compliant access to and from the wharf
- Upgrade of the two existing accessible parking spaces on northern side of Alfred Street to provide DDA compliant access
- Installation of bicycle racks at the wharf entrance

3.2 Design

3.2.1 Design criteria

The proposal has been designed to meet the Australian Standard AS 4997-2005 Guidelines for the Design of Maritime Structures, the Building Code of Australia and with general compliance to Maritimes' Standard Practice for loadings using various materials and general purpose, heavy duty balustrades.

Horizontal and vertical alignment

The proposal would involve a platform alignment similar to the current alignment at the western side of the wharf. The platform would be located about eight metres from the seawall at its closest point (Figure 3-1).

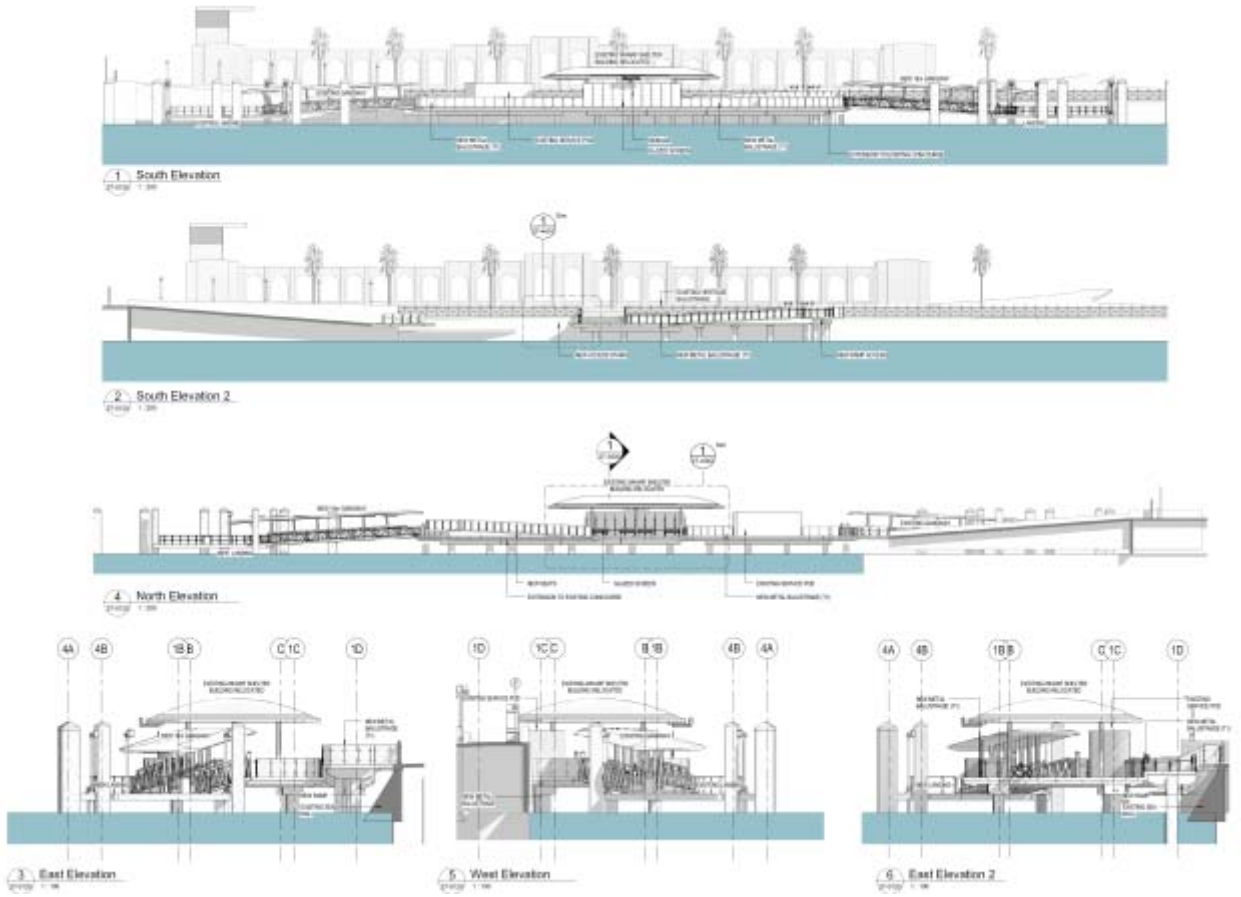

Figure 3-1 Cross section of proposed wharf

The existing waiting area would be expanded as shown in Figure 3-1, providing the required separation distance between berthing faces for ferries and increasing the capacity of the fixed structure. Appropriate capacity for this fixed structure to be used as a waiting area has been determined from current and projected future demand for Milsons Point Wharf over the 50 year lifespan of the structure. This is determined by modelling and projected population growth to 2036.

Consistent wharf design

A consistent thematic design for all upgraded wharves in Sydney Harbour has been developed to unify and identify the harbour wharves and ferry commuter system. The design of the proposal is consistent with the design concept for the Roads and Maritime Sydney Ferry Wharf Upgrade Program.

Service life

Structural replacement and upgrade work would be designed for around a 50 year service life while subject to wear from berthing forces and weather-induced stresses.

3.2.2 Engineering constraints

Constraints identified for the design and construction of the proposal include:

- Disabled access: The new wharf and landside infrastructure upgrades are required to be accessible to people with a disability to meet the standards of the DDA and current legislative standards for disabled access
- Sea level rise: The wharf has been designed for future sea level rise from projected climate change. A sea level rise allowance of 500 millimetres over 50 years has been adopted for the proposal *NSW Sea Level Rise Policy Statement* (DECCW, 2009a)
- Weather and tide: The new platform has been designed to provide appropriate clearance of tide, storm surge and wave action during the operation of the wharf. Calm wind and water

conditions are required for certain construction activities such as the removal and installation of the piles and installation of glass and stainless steel balustrades and screens

3.3 Construction activities

3.3.1 Work methodology

Appropriately approved and licensed facilities would be used for marshalling and storage of equipment, plant and material, pre-fabrication of parts, pre-casting of headstocks and fit outs.

Construction is expected to commence in 2017 and take up to eight months to complete.

The proposed construction activities for the proposal are identified below. This staging is indicative, based on the current preliminary design and may change once the detailed design methodology is finalised. The methodology is based on the current concept design and may need adjustment to meet the site conditions or the type/size of equipment used by the nominated contractor during the construction period in consultation with Roads and Maritime.

Any material changes to the construction methodology which could result in additional environmental impacts to those assessed in this REF, would be the subject of additional environmental assessment.

Site establishment and wharf closure

- Establishment of a temporary compound (erect hoarding, site offices, amenities and plant/material storage areas etc.) on the land. The temporary compound is anticipated to be about 75 square metres in area based on the size of site compounds used on the other recent wharf projects
- Establishment of a construction work area using floating booms to delineate this area. Site entry and exit points would be established for the construction work site
- Traffic control measures (including for vehicles, watercraft, pedestrians and cyclists) would be established in accordance with the Traffic Management Plan (TMP). Appropriate wayfinding signage would be installed advising of alternative transport options where necessary. Environmental controls would be established in accordance with the Construction Environmental Management Plan (CEMP) for the Proposal

Removal of steel piles within the waterway

- Steel locator piles for the expanded waiting area and platform would be installed into bedrock. These piles would be transported by barge to the site from the off-site facility. The installation of the piles would be carried out at or around high tide.
- Constructing pile foundation systems in bedrock consists of three components:
  - ***Phase 1 – drilling piles into rock in calm water***
    Drilling would take three to four hours per pile plus setup time and pack up time (with continuous noise from the diesel generator and large electric motors whilst drilling the pile).
    Each pile would be lifted from the barge and put into place using a barge-mounted crane. A drill rig mounted onto a barge would attach to the pile using a helmet fitting. The drill rig would screw the pile into the bedrock.
  - ***Phase 2 – hammering piles to refusal in calm water***
    The piles are hammered (using about a 30 tonne weight) to refusal. Hammering of piles would take place at least one day after drilling of piles. It is anticipated that each pile would be hammered for one minute (about 10 hits with the hammer within one minute). For each pile this activity is likely to occur five times over a period of one hour.
  - ***Phase 3 – cutting, welding and plugging of piles with concrete***
    The steel piles would then be cut, welded and plugged with concrete.

The Proposal requires about 30 nights to complete the drilling of piles and 15 early mornings to complete the hammering of piles. This work would be spread over a period of about nine weeks to

allow respite from noise and a contingency for unfavourable conditions from weather, seas, swell, wind, and boat wash.

Construction of new gangway and hydraulic platform and fixed wharf structure extension

- Following the completion of the piling activities, in-situ works would include a series of concrete pours to fill the piles and to complete the fixed wharf structure extension. Concrete trucks would access the site from Alfred Street. Traffic would be managed in accordance with the TMP, produced and approved prior to construction
- On completion of piling and concrete pours the installation of precast panels would commence. The precast panels form the majority of the proposed fixed wharf structure
- The fixed wharf structure, gangway, hydraulic platform, ramps and stairs would be installed. Most of the structures would be pre-fabricated or pre-cast, then brought to site from an appropriately approved and licensed facility
- Following installation and construction of the new structure the fit out of the wharf would be undertaken, including relocation and installation of balustrades, screens and seating

Landside infrastructure

- A new accessible ramp would be constructed on the southern side of the existing stone sea wall, providing DDA compliant access to and from the wharf
- Upgrade of the two existing accessible parking spaces on northern side of Alfred Street to provide DDA compliant access
- Installation of 10 bicycle racks

Site clean-up and opening of the new wharf

- The site would be cleaned up and restored to its previous state
- Controls and temporary structures would be removed
- A safety assessment of the structure would be carried out to identify any risks and rectify any safety hazards resulting from construction before opening these areas to the public
- All construction fencing/hoarding and signage would be removed

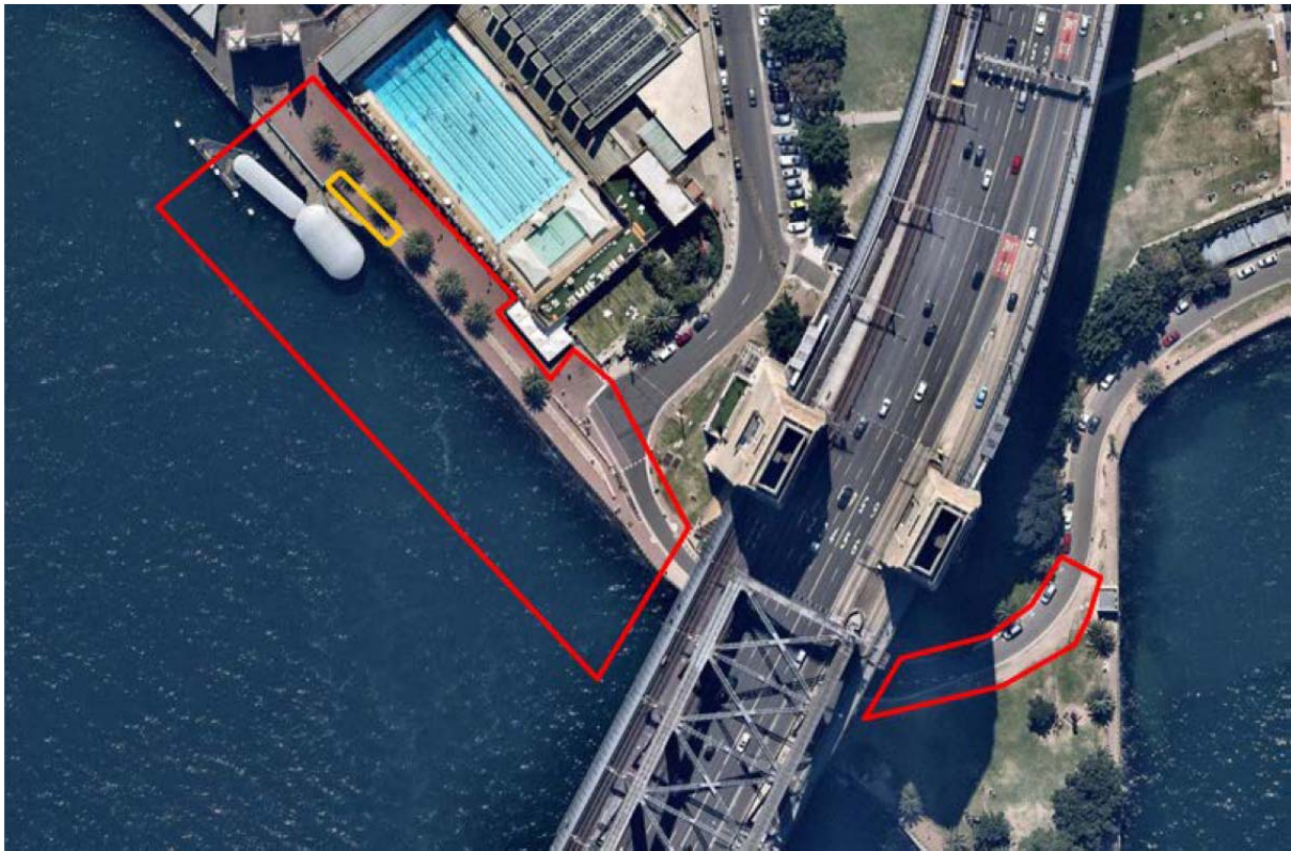

Figure 3-2 Indicative assessment envelope and temporary compound (compound outline in orange)

3.3.2 Construction hours and duration

Roads and Maritime plans to carry out the proposal over a period of about eight months (weather permitting), starting in 2017.

Construction would normally be limited to between the following standard work times:

- 7am to 6pm Monday to Friday.
- 8am to 1pm Saturday.

Work outside of standard hours would be required in order to carry out piling activities and intricate lifts from the barge mounted crane, due to requirements for still water. Activities that are likely to be undertaken outside of standard work hours are outlined below.

Piling activities

Piling work would take about nine weeks to complete (about 30 nights in total) toward the beginning of the construction period.

Installation of the piles would require calm environmental conditions (still water and minimal wind) so that the floating barge used for the piling can remain still for the piles to be installed accurately. Calm conditions are also required to provide safe conditions for the construction crew. The waterway is usually calmer early in the morning, with wind and wind chop increasing throughout the day. The conditions required for piling usually occur during this early morning period. Indicative timing for piling activities are included below.

Summary of hours of night works for piling drilling activities

1. Setup for drilling from 11pm to 12am.
2. Drilling of piles from 12am to 6am.
3. Pack up generally 6am to 7am.

Summary of hours of night works for piling hammering activities

1. Setup for hammering from 4am to 5am.
2. Hammering of piles from 5am to 7am.

Intricate lifting activities

There would be about 35 lifts throughout the duration of the construction period. Intricate lifting and placement of components of the new wharf would be carried out using a barge mounted crane. This activity needs to be undertaken during calm environmental conditions (still water and minimal wind). Each intricate lift and placement can take up to six hours. For lifting and placement to be completed while the environmental conditions are appropriate, intricate lifting and placement is expected to commence around 11pm and continue to about 7am.

3.3.3 Plant and equipment

The equipment to be used would be confirmed during the construction planning process. Typical plant and equipment likely to be used during construction would include:

- Generators
- Lighting towers
- Power hand tools
- Light vehicles
- Boats
- Barges
- Drill rigs
- Cranes (barge mounted)
- Water pumps
- Chainsaws
- Vibratory compactor
- Concrete trucks
- Hammer drills
- Concrete boom pump
- Hand tools

3.3.4 Earthworks

In addition to minor site preparation works, there would be minor excavations required for the installation of the new accessible ramp and new stairway connection from the wharf to foreshore, and upgrade of existing accessible parking spaces.

3.3.5 Source and quantity of materials

The proposal does not require the importation of fill material or disposal of materials from the seabed as no reclamation or filling is required. Natural resources for construction include aggregate for use in concrete batching and bitumen and sand, aggregate and select material for the production of cement and glass. Manufactured items, including steel, pre-cast components and pipes and utilities would also be required.

Materials would be sourced from overseas and local commercial suppliers, using local suppliers wherever feasible and cost effective.

3.3.6 Traffic management and access

Most of the construction plant, equipment, materials and personnel would travel to the site by barge or boat from the off-site compound.

Some construction traffic movements would occur on the road network with around 15 movements per day during peak construction times. Potential impacts on watercraft, pedestrian, vehicular and bicycle would be managed in accordance with the management measures outlined in the TMP.

3.4 Ancillary facilities

A temporary compound would be established at the site. It would be operated for the duration of the work. The compound would include site sheds for use as an office, mess and amenities as well as a lay-down and storage area and potentially a container for storage of some tools, equipment and materials. The indicative location of the temporary compound is located along the foreshore (see Figure 3-2). This land is owned and maintained by Council. The final location of the temporary compound is to be confirmed and would be subject to review and agreement by Council. Vehicular access would be maintained around the temporary compound.

The marshalling and storage of most waterside construction equipment, plant and materials, and the pre-fabrication of parts, pre-casting of headstocks and fit outs for the wharf, would be carried out by a contractor at an approved off-site facility. The operation of this off-site facility does not form part of this proposal but would have the necessary approvals in place for such activities to be undertaken.

The marshalling and storage of landside construction equipment, plant and materials, and the pre-fabrication of parts would be carried out by a contractor.

3.5 Public utility adjustment

Dial Before You Dig (DBYD) investigations would be carried out during the detailed design phase. It is possible that some services may require relocation but such relocation is unlikely to occur outside of the footprint of the works assessed in this REF.

In the event that works would be required outside of this footprint, the Roads and Maritime Senior Environment Officer, Greater Sydney would be contacted and would advise of any further assessment requirements. The appropriate utility providers would be consulted during the detailed design phase.

3.6 Property acquisition

No property acquisition would be required for the proposal. The temporary compound would be leased from North Sydney Council.

4 Statutory and planning framework

This chapter provides the statutory and planning framework for the proposal and considers the provisions of relevant state environmental planning policies, local environmental plans and other legislation.

4.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the system of environmental planning and assessment in NSW. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as NSW Roads and Maritime, which do not require development consent under Part 4 of the Act.

In accordance with section 111 of the EP&A Act, Roads and Maritime, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposal.

Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) defines the factors which must be considered when determining if an activity assessed under Part 5 of the EP&A Act has a significant impact on the environment.

Chapter 6 of the REF provides an environmental impact assessment of the proposal in accordance with the EP&A Act and Appendix B specifically responds to the factors for consideration under clause 228.

4.1.1 State environmental planning policies

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 68(4) of ISEPP permits development for the purpose of wharf or boating facilities to be carried out on any land by or on behalf of a public authority without consent. However, such development may only be carried out on land reserved under the *National Parks and Wildlife Act 1974* if the development is authorised by or under that Act.

As the proposal is for the purpose of wharf or boating facilities and is to be carried out by Roads and Maritime, it can be assessed under Part 5 of the EP&A Act. Development consent from council is not required. The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974*.

The proposal does not affect land or development affected by *State Environmental Planning Policy No. 14 – Coastal Wetlands*, *State Environmental Planning Policy No. 26 – Littoral Rainforests* or *State Environmental Planning Policy (Major Development) 2005.*

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) identifies development that is State significant infrastructure and critical State significant infrastructure.

Clause 14(1) of the SRD SEPP declares development to be State significant infrastructure if the development is, by the operation of a State environmental planning policy, permissible without development consent and the development is specified in schedule 3 of the SEPP.

Schedule 3 specifies that development for the purpose of port and wharf facilities or boating facilities (not including marinas) by or on behalf of a public authority that has a capital investment value of more than $30 million is State significant infrastructure.

The proposal has a capital investment value of less than $30 million and so does not trigger a

State significant infrastructure declaration.

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The proposal is located within the Sydney Harbour Catchment and is subject to the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Harbour SREP), which is a deemed SEPP. The aims of the Sydney Harbour SREP from clause 2 are considered in Table 4-1 below.

Table 4-1: Aims of the Sydney Harbour SREP

Aim	Comment
(a) To ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are recognised, protected, enhanced and maintained: (i) as an outstanding natural asset (ii) as a public asset of national and heritage significance, for existing and future generations.	The proposal protects and maintains the natural and heritage values of the area (i.e. Luna Park, Opera House and Sydney Harbour Bridge) and their contributions to Sydney Harbour and its tributaries.
(b) To ensure a healthy, sustainable environment on land and water.	The proposal would result in ongoing adverse impacts on the environment of the land. The proposed works would impact upon marine vegetation and Key Fish Habitat with the extended waiting area shading existing vegetation. Appropriate safeguards would be applied to the proposal to minimise impacts in both construction and operation, with offsets proposed for the habitat loss.
(c) To achieve a high quality and ecologically sustainable urban environment.	The proposal would introduce a number of ecologically sustainable development measures. The design has sought to minimise waste generation and elements would be recycled and reused wherever possible. The design of the new gangway and hydraulic platform would minimise visual impact.
(d) To ensure a prosperous working harbour and an effective transport corridor.	The proposal would enhance the role of the harbour as both a working harbour and an effective transport corridor by improving the facilities for water-based public transport. Milsons Point Wharf would be closed for the duration of the construction with alternative transport provided (refer Figure 6-21). There would be appropriate communication with commuters ahead of any disruption to ferry services.
(e) To encourage a culturally rich and vibrant place for people.	The proposal would improve access to a range of cultural sites around the harbour.

Aim	Comment
(f) To ensure accessibility to and along Sydney Harbour and its foreshores.	The proposal, once complete, would not significantly change existing arrangements to access to the harbour or foreshore area. During construction there would be some temporary changes to boat and pedestrian movement in and around the location of the wharf. This would not be permanent and would be communicated to users of the waterway and commuters ahead of the work commencing. The Proposal has been designed to respond to the requirements of the DDA and DSAPT Acts.
(g) To ensure the protection, maintenance and rehabilitation of watercourses, wetlands, riparian lands, remnant vegetation and ecological connectivity.	An aquatic ecological impact assessment has been provided in Chapter 6.7 and Appendix F of this REF. Construction and operation of the new gangway, hydraulic platform and expansion of existing wharf would result in impacts to aquatic ecology. The proposed works would impact upon marine vegetation and Key Fish Habitat with the extended waiting area shading existing vegetation. A s205 permit to *Harm Marine Vegetation* would be required for the shading impacts, with offsets required. Environmental impacts are to be offset by environmental compensation. An aquatic ecology report summary is provided at chapter 6.7 and an aquatic ecology report provided at Appendix F.
(h) To provide a consolidated, simplified and updated legislative framework for future planning.	The proposed development and this assessment is consistent with the objective of a consolidated and simplified planning system

The proposal has considered the objectives of clause 17 of the SREP Sydney Harbour zones W8 Scenic Waters Passive Use in which the proposal is located. Table 4-2 provides commentary of how the proposal meets W8 zone objectives.

Table 4-2: Zone W8 Scenic Waters: Passive Use objectives

Objective	Comment
(a) To give preference to unimpeded water access along the intertidal zone, to the visual continuity and significance of the landform and to the ecological value of waters and foreshores.	The proposal would improve access for commuters, tourists and residents along Milsons Point foreshore. Visual impact of the proposal is considered to be moderate to low. Refer to chapter 6.6 for further detail. Ecological values of the area would be adversely impacted as a result of the proposal with a s205 permit to *Harm Marine Vegetation* required to mitigate the impacts of shading, with offsets required. Refer to chapter 6.7 for further detail.

Objective	Comment
(b) To allow low-lying private water-dependant development close to shore only where it can be demonstrated that the preferences referred to in paragraph (a) are not damaged or impaired in any way, that any proposed structure conforms closely to the shore, that development maximises open and unobstructed waterways and maintains and enhances views to and from waters in this zone.	The proposal does not involve private water-dependent development. The proposal aims to provide a better experience for public transport customers through the provision of accessible, modern, secure and integrated transport infrastructure.
(c) To restrict development for permanent boat storage and private landing facilities in unsuitable locations.	The proposal does not involve development for permanent boat storage and private landing facilities.
(d) To allow water-dependent development only where it can be demonstrated that it meets a demonstrated demand and harmonises with the planned character of the locality.	Milsons Point Wharf was upgraded in 2010. Due to an increase in the current ferry network, the current wharf requires expansion to provide dual berthing. Demand for the proposal has been demonstrated in the Sydney Harbour Commuter Ferry Wharf Upgrade Program. A Landscape Character and Visual Impact Assessment (LCVIA) has been undertaken for the proposal. Significant landmarks such as the Sydney Harbour Bridge, Opera House and Luna Park have been considered with the report concluding the expansion will have a moderate to low impact on existing landscape character. Refer to chapter 6.6 for further detail.
(e) To ensure that the scale and size of development are appropriate to the locality and protect and improve the natural assets and natural and cultural scenic quality on the surrounding area, particularly when viewed from waters in this zone or areas of public access.	The scale and size of the development is appropriate to the locality

Under clause 18 of the Sydney Harbour SREP, the proposal is permissible with consent in the W8 zone. It should be noted that the provisions of the ISEPP supersede the zoning provisions of the Sydney Harbour SREP (see clause 7(5) of the Sydney Harbour SREP).

The matters for consideration listed in Division 20 at clauses 21-27 of the Sydney Harbour SREP are provided in Table 4-3.

Table 4-3: Division 2 matters

Division 2 matter	Comment
Clause 21 Biodiversity, ecology and environment protection	Flora and fauna issues have been considered and assessed for the proposal. An aquatic ecology assessment has been undertaken which indicates that the proposed works would impact upon marine vegetation and Key Fish Habitat with the extended waiting area shading existing vegetation. A s205 permit to *Harm Marine Vegetation* would be required for the shading impacts, with offsets required.
Clause 22 Public access to, and use of, foreshores and waterways	There would be some temporary disruptions to public water transport during the construction period, during the closure of the existing however these would not be long term changes. The changes would be communicated to residents, businesses, users and waterway users ahead of the work commencing.
Clause 23 Maintenance of a working harbour	The proposal would enhance the role of the harbour as both a working harbour and an effective transport corridor by improving access to water-based public transport facilities in operation.
Clause 24 Interrelationship of waterway and foreshore uses	The interrelationship of waterway and foreshore uses would be unchanged in the long term as a result of the proposal.
Clause 25 Foreshores and waterways scenic quality	The proposal would have a moderate to low impact on the scenic quality of the area as discussed at chapter 6.6.
Clause 26 Maintenance, protection and enhancement of views	There would be a low impact on the landscape character of the area as a result of the proposal. Refer to chapter 6.6.
Clause 27 Boat storage facilities	The proposal does not involve boat storage facilities.

Clause 31 of the Sydney Harbour SREP requires consultation for certain development proposals not requiring development consent. Consultation, including under the Sydney Harbour SREP (if applicable) is discussed in chapter 5 of this REF.

Part 5 of the Sydney Harbour SREP contains heritage provisions that are to be taken into account in respect of Part 5 activities. Milsons Point Wharf is located:

- within the buffer zone of the World Heritage Listed Sydney Opera House;
- within the State heritage listed curtilage area for the adjacent National heritage site of the Sydney Harbour Bridge; and
- adjacent to the State heritage listed Luna Park precinct.

The heritage objectives from the Sydney Harbour SREP in clauses 53(1) and (2) are considered in Table 4-4 below.

Table 4-4: Heritage objectives

Objective	Comment
1(a) To conserve the environmental heritage of the land to which this Part applies.	A Statement of Heritage Impact (SOHI) has been undertaken for the proposal. The SOHI concludes that it is not anticipated that the proposed works would not damage either the fabric or significance of individual items in proximity to the wharf. Refer to chapter 6.12 for further detail.
1(b) To conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items.	The proposal aims to conserve the heritage significance of the surrounding area.
1(c) To ensure that that archaeological sites and places of Aboriginal heritage significance are conserved.	The SOHI confirms that there are no archaeological sites and places of Aboriginal heritage significance located on Milson Point.
1(d) To allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items.	The proposed works would not impact on any places that have the potential to have heritage significance. The proposal is sympathetic to its surrounding.
2(a) To establish a buffer zone around the Sydney Opera House so as to give added protection to its world heritage value.	The proposal is located within the Sydney Opera House buffer zone. The SOHI has concluded that the impact on the item is low due to the distances between the structures.
2(b) To recognise that views and vistas between the Sydney Opera House and other public places within that zone contribute to its world heritage value.	A LCVIA has been undertaken for the proposal. The Opera House is visible from the proposal site; however impacts are low due to the distances between the proposal area and the item. Other significant landmarks such as the Sydney Harbour Bridge have been considered. Refer to chapter 6.6 for further detail.

Clauses 54-60 provide provision for the protection of: heritage items, places of potential heritage (Aboriginal and non-aboriginal) and Sydney Opera House buffer zone. Chapter 6.6 and 6.12 provide an assessment of the heritage and visual impacts.

Part 6 of the Sydney Harbour SREP relates to wetlands protection. The site is not located within a Wetland Protection Area under the SREP.

4.1.2 Local Environmental Plans

The Proposal is located within the North Sydney Local Government Area (LGA). The provisions of the Infrastructure SEPP mean that Local Environmental Plans (LEPs), prepared by councils for an LGA, do not apply.

However, during the preparation of this REF, the provisions of the North Sydney LEP were considered.

North Sydney Local Environmental Plan 2013

The proposed works would be undertaken on land zoned RE1 Public Recreation. Table 4-5 summarises the relevant aspects of the North Sydney's LEP zoning controls.

Table 4-5: Relevant provisions of the North Sydney LEP

Zone Objective RE 1 (Public Recreation)	Relevance to the Proposal
To enable land to be used for public open space or recreational purposes.	The proposal will not result in a change of current land uses. Access to surrounding public open space and private recreation areas would be improved.
To provide a range of recreational settings and activities and compatible land uses.	The proposal would not have an adverse effect on current land uses.
To protect and enhance the natural environment for recreational purposes.	The proposal would minimise impact to the natural environment and improve access for recreational purposes.
To ensure sufficient public recreation areas are available for the benefit and use of residents of, and visitors to, North Sydney.	The proposal would improve access for residents of, and visitors to, North Sydney.

4.2 Other relevant NSW legislation

4.2.1 Contaminated Land Management Act 1997

The Contaminated Land Management Act 1997 aims to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3.

The Act aims to set out accountabilities for managing contamination if the EPA considers the contamination is significant enough to require regulation under Division 2 of Part 3.

A historical geotechnical report has been provided which does not indicate contaminated land.

4.2.2 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) requires a permit to be obtained for works that are likely to:

- Harm marine vegetation such as mangroves, seagrass and seaweeds
- Involve the use of explosives
- Obstruct fish passage.

The FM Act requires that the Minister for Trade and Investment be notified of works involving dredging or reclamation.

An aquatic ecology assessment has been undertaken for the proposal. The assessment confirmed that no threatened aquatic species or ecological communities (listed under the FM Act and TSC Acts or under the Commonwealth EPBC Act) were noted during the field work and, given the nature of the locality and the aquatic habitats, none are expected. Refer to Chapter 6.7 for further detail.

The proposed works would harm marine vegetation and Key Fish Habitat and will require a s205 permit to *Harm Marine Vegetation*.

4.2.3 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) provides for the conservation of environmental heritage in NSW. Development or activities cannot be carried out which may affect an item on the State

Heritage Register without approval under Section 60 of the Heritage Act. Under section 139 of the Heritage Act, approval is also required prior to the disturbance or excavation of land if it would, or is likely to, result in a relic being discovered, exposed or damaged.

A search of the State Heritage Inventory database on 10 October 2016 found three items within or near the project area, and no items subject to an interim or an authorised interim heritage order. These items include Bradfield Park, located within the curtilage of the Sydney Harbour Bridge; Luna Park precinct, located adjacent to the wharf; the buffer zone for the Sydney Opera House and the Sydney Harbour Bridge. The proposed landside works are within the Sydney Harbour Bridge curtilage. The impacts on this area and anticipated to be minimal, with an application for a Section 57(2) exemption to be submitted.

The SOHI for the proposal is provided in Appendix G. Refer to Chapter 6.11 for further detail.

4.2.4 National Parks and Wildlife Act 1974

Sections 86, 87 and 90 of the *National Parks and Wildlife Act 1974* (NPW Act) require consent from the Office of Environment and Heritage (OEH) for the destruction or damage of Indigenous objects.

A search was undertaken of the Aboriginal Heritage Information Management System (AHIMS) on 6 October 2016 in accordance with the Due Diligence Code (DECCW 2010:11). This search revealed 90 Aboriginal sites within a three kilometre radius of the project area. None of these were within 500m of the project area.

The Proposal is unlikely to disturb any Indigenous objects. Refer to Chapter 6.11 for further information.

4.2.5 Roads Act 1993

Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads.

Alfred Street is defined as being a classified Road. As such approval from Roads and Maritime may be required.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

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

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the proposal has not been referred to the Department of Environment and Energy.

4.3.2 Disability Discrimination Act 1992

The *Disability Discrimination Act 1992* (DDA) is the Commonwealth legislation that seeks to provide equity for people with disabilities. The main objects of the DDA include the elimination, as far as possible, of discrimination against persons on the grounds of disability in relation to access to premises and the provision of facilities and services. The proposal has been designed to respond to the requirements of this Act.

4.3.3 Disability Standards for Accessible Public Transport (DSAPT) 2002

The *Disability Standards for Accessible Public Transport 2002* (DSAPT), made under the DDA, prescribes minimum standards of accessibility in relation to both public transport buildings and

conveyances to remove discrimination from public transport services. The proposal has been designed to respond to the development standards identified under the DSAPT.

4.3.4 Native Title Act 1993

A search of the National Native Title Tribunal search application returned no active native title claims for North Sydney LGA (accessed 20 October 2015).

4.4 Confirmation of statutory position

An assessment of the relevant statutory planning instruments has concluded that the proposal can be carried out as development without consent under ISEPP and can be assessed under Part 5 of the EP&A Act by Roads and Maritime as a determining authority.

5 Consultation

This chapter discusses the consultation undertaken to date for the proposal and the consultation proposed for the future.

5.1 Consultation strategy

RMS has developed a communications plan for the Milsons Point Wharf Interchange Expansion. The plan outlines the consultation and communication approach for the report. The plan is evolving and would change prior to, and throughout, the delivery of the proposal as necessary,

5.2 Community involvement

The first step in the consultation strategy was to obtain community views about the expansion of Milsons Point Wharf Interchange. In order to obtain community feedback initial communications inviting comment were undertaken in October 2016. Communications included a community update, posters, advertising, stakeholder letters and the establishment of a project webpage, all providing information on the expansion and contact details for the project team. Community and stakeholders were also invited to attend a community information and feedback session to find out more and share feedback, or could do so by submitting a form or calling the project team.

The communication package supporting this feedback session included:

- A newspaper advertisement appeared in the Mosman Daily October 2016
- A community update was distributed to about 2500 local residents October 2016
- A letter was distributed to about 150 stakeholders including local clubs, schools, businesses and water user groups
- A poster for the feedback session was displayed at Milsons Point Wharf, Balmain East Wharf, Darling Harbour Wharf and Circular Quay Wharf October 2016
- Meetings were held with North Sydney Council and members from the local Lavender Bay Precinct and local businesses
- Twenty people visited the Community Information Session which was held 19 October 2016 at the Bradfield Park Community Centre and a total of eight feedback forms were submitted via email, on-line or at the feedback session. A summary of these feedback forms and the response provided is included in Table 5-1.

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

Group	Issue raised	Response / where addressed in the REF
Residents	• Dual berthing not required	• Milsons Point Wharf is currently serviced by the F3 Parramatta River and F4 Darling Harbour routes and is the fourth busiest wharf on the Sydney Ferries network. Growing commuter demand and additional services provided by the new Inner Harbour and Parramatta River ferries will increase the number of vessels that will stop at Milsons Point. The dual berthing configuration allows ferries travelling from multiple directions to arrive at the same time, reducing congestion and increasing boarding efficiency. The need for the proposal is addressed in Chapter 2.1
	• Minimise visual impact of pod. Could the pod bulk be reduced by putting hydraulics on land or underneath. • Could the pod be turned sideways or have two separate pods to reduce bulk	• Following this concern being raised, the position of the pod has been adjusted in response to community feedback. The visual impact of the pod structure within the wharf is discussed in the Landscape Character and Visual Impact Assessment report, provided in Appendix E.
	• Any improvements to customer flow would be welcomed	• Additional access points to the wharf are included in the design. We are aware of the very high demand periods that occur and customer experience, including customer flow is considered as part of the planning process. Chapter 3.2 details the proposal objectives to provide additional capacity in further detail.
	• Ensure there is good drainage on the walkways with no water pooling	• Drainage is considered during the design development process for the wharf, with falls to be included in the new structure to prevent pooling. Drainage is further considered in Chapter 6.2.

Group	Issue raised	Response / where addressed in the REF
	• Would like to see a bus shelter at the Alfred Street stop as the location is very unprotected and subject to significant weather conditions • Do not support the installation of a bus shelter due to visual impact however if there is public pressure to erect a bus shelter suggest the simplest of designs (e.g. clear plastic or glass with minimal supporting structure), with NO ADVERTISING and situated as far to the east as possible.	• Chapter 2.6 notes design refinements, undertaken following the community consultation period, have removed the upgrade of the existing bus ramp from the scope of the project.
	• Move the bus stop to the east (i.e. under the bridge) to provide passengers with at least some shelter from the sun and rain	• Relocating the bus stop was considered during the concept development, however for security reasons a bus stop is not permitted under the Harbour Bridge
	• Would like to see Jeffrey Street Wharf used as an alternative wharf should Milsons Point be closed during construction	• F3 Parramatta River and F4 Darling Harbour ferry services would operate to Jeffrey Street Wharf during any temporary closure of Milsons Point Wharf during construction. Existing Manly Fast Ferry services would continue to operate to Jeffrey Street Wharf during this time. Further detail of alternative transport arrangements during the wharf closure are detailed in Chapter 6.10.2.
Local Businesses	• Overall visual impact on North Sydney Pool to be no greater than the current design, while understanding that waiting area roof structure would shift	• A Landscape Character and Visual Impact Assessment report is provided in Appendix E. This report notes the additional gangway roof will obscure more of the pool than the existing structure, although overall loss to views will be restricted to very limited areas.

Group	Issue raised	Response / where addressed in the REF
	• Consideration of the World Heritage Buffer Zone for the Sydney Opera House as set out in the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. Potential for the proposed works to impact the Forecourt and other outdoor locations, indoor events and performances, food and beverage operations and general site activities	• A Statement of Heritage Impact report is provided in Appendix F which considers the buffer zone noted, concluding the scale and location of the proposed expansion at Milsons Point wharf is such that there will be no impact on the universal heritage significance of this World Heritage
Other Groups – Council and Precinct Committee	• Remove the section of the waiting space, adjacent to the covered area, bulging out further into the harbour than the rest of the waiting space (identified during key stakeholder consultation) • Loss of parkland arising from relocation of disabled parking spaces	• Design was adjusted removing this area prior to wider community consultation. Design drawings are provided in Appendix A. • Design modified to upgrade disabled parking spaces in existing location with kerbside ramps on both sides of the street to improve access. Design drawings are provided in Appendix A.

5.3 Aboriginal community involvement

This proposal has been considered against the requirements of the *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (RMS, 2011) (PACHCI). This procedure is generally consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010b). An outline of the procedure is presented in Table 5-2.

Table 5-2: Summary of Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation

Stage	Description
Stage 1	Initial Roads and Maritime assessment
Stage 2	Site survey and further assessment
Stage 3	Formal consultation and preparation of a cultural heritage assessment report
Stage 4	Implement environmental impact assessment recommendations

Aboriginal cultural impacts are not expected as a result of the proposal; refer to Chapter 6.11 for more information.

5.4 ISEPP consultation

Clauses 13, 14, 15 and 16 of the ISEPP states that the public authorities may need to consult with councils and other public authorities when proposing to carry out development without consent. As part of these requirements a formal consultation letter was sent to North Sydney Council on 21 October 2016 notifying them of the proposal in accordance with the ISEPP due to potential impacts on public places.

Issues that have been raised as a result of this consultation are outlined below in Table 5-3.

Table 5-3: Issues raised through ISEPP consultation

Agency	Issue	Response / where addressed in REF
North Sydney Council	• Milsons Point Ferry Wharf is located within the World Heritage Listed Opera House and within the immediate vicinity of a number of heritage items of high local significance. The REF should consider any impacts to these heritage items.	• A Statement of Heritage Impact report is provided in Appendix F which considers the impact of the proposal on the relevant heritage items and concludes no impact on existing heritage items. In addition a Landscape Character and Visual Impact Assessment report is provided in Appendix E which considers the visual impact of the proposal, noting the expansion impact on existing views, although this would be restricted to very limited areas.
	• The proposal should be referred to the Office of Environment and Heritage for their comment and consideration.	• Roads and Maritime would provide the OEH with an electronic copy of the REF for their information, with the OEH invited to provide comment on the proposal during the planned public display of the REF.
	• It is noted the roof and walls will impede views of the Harbour from the Olympic Pool. These views are highly valued and measures should be taken to prevent further obstruction.	• A Landscape Character and Visual Impact Assessment report is provided in Appendix E. This report notes the additional gangway roof will obscure more of the Pool than the existing structure, although overall loss to views will be restricted to very limited areas.

Agency	Issue	Response / where addressed in REF
	• Construction Noise – the schedule of works will cause loss of amenity for some nearby residents and it is requested that a detailed acoustic management plan is developed and implemented. This plan should moderate noise impact to the north and north east of the construction zone.	• A Noise and Vibration Impact Assessment report is provided in Appendix D, which assesses background noise levels and provides construction noise goals for the project. Chapter 6.5 details the construction noise activities and noise management measures and safeguards to be implemented in more detail, for all residential receivers.
	• All lighting relating to the expansion should be considered in a lighting strategy and designed to minimise light spread, including timing and screening for necessary lights. Existing ambivalent lighting in the vicinity should be utilised wherever possible.	• All operational wharf lighting and signage would be designed to comply with the DSAPT 2002. Chapter 6.8.2 considers the socio-economic impacts of lighting during construction and operation, noting during construction the site would be lit at night for safety with lighting directed away from residential areas to minimise potential light spill. Chapter 6.6 further considers the impact of operational lighting on the existing area, including a safeguard to minimise impact by designing lighting to maintain the primacy of Luna Park.
	• All activities that utilise/impact on Council land or infrastructure will need to be agreed by North Sydney Council.	• Further discussion will be held with North Sydney Council prior to the commencement of works, as noted in Chapter 6.8.3.
	• Council has received a submission from the public regarding the works and specifically questioning the need for the expansion. The REF should provide a clear summary of the current and expected demand for the ferry services in order that the community understand the demand levels which justify the expansion.	• Chapter 2 discusses the need for the proposal, noting the expansion of the existing wharf is required to improve access to the wharf and increase capacity to enable a second berth to be provided for the new Inner Harbour and Parramatta River ferries.
	• It would be appreciated if a briefing could be arranged for Council stakeholders when the details of the expansion are further developed.	• Further discussion will be held with North Sydney Council prior to the commencement of works, as noted in Chapter 6.8.3

5.5 SREP (Sydney Harbour Catchment) 2005 consultation

The SREP Sydney Harbour provides requirements for the notification of certain proposals. The Foreshores and Waterways Planning and Development Advisory Committee (FWPDAC), Sydney Water and Ausgrid have been consulted about the proposal as per the requirements of clause 31 of the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. Appendix C contains a SREP (Sydney Harbour Catchment) consultation checklist that documents how the SREP consultation requirements have been considered.

The FWPDAC, Ausgrid and Sydney Water were all consulted via formal correspondence on 21 October 2016 in accordance with Clause 31.

5.6 Government agency and stakeholder involvement

Various government agencies and stakeholders have been consulted about the proposal, including:

- North Sydney Council

Issues that have been raised as a result of consultation with these agencies and stakeholders are outlined in Table 5-3.

5.7 Ongoing or future consultation

If the proposal proceeds, as part of the communications plan the following activities would be undertaken in the lead up to and throughout the works. These activities would ensure the community is fully informed about the proposal:

- Public Display of the Review of Environmental Factors
- Proposal information would continue to be displayed via the proposal website
- Further consultation with North Sydney Council regarding landside works and ancillary site requirement
- On site signage would be installed to provide information about the wharf closure, construction work, contact details and alternative transport arrangements
- A contact number would be provided to the community to register any comments or complaints during the construction of the proposal
- All consultation activities in Chapter 5.1 that are yet to be carried out

6 Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the guidelines *Is an EIS required?* (DUAP 1995/1996) as required under clause 228(1) of the *Environmental Planning and Assessment Regulation 2000* and the *Marinas and Related Facilities EIS Guideline* (DUAP 1996). The factors specified in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* are also considered in Appendix B.

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

6.1 Land surface

6.1.1 Existing environment

Land based

Milsons Point is located on the northern shore of Sydney Harbour, opposite Walsh Bay and the Sydney CBD. At the southern edge of Milsons Point is Bradfield Park, with a one way loop road, timed parking and a bus stop. A partially paved pedestrian path runs from Bradfield Park to the foreshore.

A split level brick paved foreshore promenade located along the edge of the harbour and adjoining the site to the north provides access to the ferry wharf from surrounding locations. The upper level contains landscaping, comprising two rows of mature palm trees on the southern and northern side, street benches, and street lighting. The lower promenade is free of street furniture and landscaping and continues along the harbour in both directions.

Within the vicinity of the wharf, there are five palm trees located along the foreshore. There are no grassed areas until Bradfield Park, which has few trees close to the fencing and a grassed area.

Immediately to the north of the site are harbour side restaurants, the North Sydney Olympic Pool, and Luna Park. A mix of residential terrace houses, residential apartment buildings, and residential and commercial towers are located further to the north.

Water based

Stormwater drainage within the vicinity of the proposal flows from roadside kerb and guttering into an underground pipe system before discharging into the Sydney Harbour.

Run-off from the wharf drains directly into Sydney Harbour from the existing structure. Drainage changes including falls from the new structures would be considered during detailed design.

Sediments conveyed by stormwater from stormwater outlets are a known source of soil contaminants including heavy metals. While there was no sampling of marine sediments undertaken as part of this assessment, it is known that sediments within Sydney Harbour are generally contaminated due to stormwater run-off from surrounding industrial and urban areas over the last century.

Contamination of sediments in many locations in Sydney Harbour and its estuaries has been reported by Birch and Taylor (2006) which reports elevated levels of copper, lead, zinc, dichlorodiphenyltrichloroethane (DDT), Dichlorodiphenyldichloroethane (DDD) and Deildren.

6.1.2 Potential impacts

Construction

Land based

Land based activities would include:

- Installation of a temporary compound during construction
- Construction of new or improved facilities including:
  - Construction of pram ramps within Bradfield Park
  - Upgrade of the two accessible car parking spaces
  - Installation of bike racks

Given the location of the works adjacent to Sydney Harbour, there is potential for exposed soils to be eroded by wind or rain, or polluted by accidental spills or leakages from plant and equipment. This could potentially occur during excavation for the pram ramps and the widening of footpath. Risk of erosion would be low considering the land is generally flat within the vicinity of the wharf and there would be limited excavation exposing soils within the proposal area. Excavated material would be reused to rehabilitate the site back to pre-work conditions where feasible. The potential impacts would be temporary and localised.

There is potential that the proposal may disturb acid sulfate soils (ASS) during the landside works, however due to the minor works in the park this is considered to be unlikely. To minimise impacts, disturbed soils would be checked for potential ASS. Any ASS would be removed, contained and disposed of in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014).

Water based

The majority of the proposed works are to be undertaken within the waterway and below the mean high water mark. The installation of new piles and anchoring of barges would have the potential to destabilise marine sediments, causing turbidity. Turbidity may cause a short term reduction in light penetration power through the water column in the immediate area around the piling work area. Subsequent sedimentation may cause a localised change in the particle size distribution of sediment on the seafloor. The duration and scale of the impacts would be minor given the size of Sydney Harbour as well as the fact that the impacts would be confined to bottom waters and particles would settle rapidly. It should be noted that apart from rocky reef, the seabed within the vicinity of the wharf is predominantly loose sand, which is susceptible to occasional mobilisation from pre-existing conditions such as vessel movements, waves, tides and stormwater release.

Aside from locally to the proposal area, the seafloor would not be considerably altered as a result of the installation of new piles or by the anchors of the construction vessels, although harbour bed rocks and sediments would be disturbed by the works.

The proposal does not involve any dredging, filling or excavations works below the mean high water mark.

Safeguards and mitigation measures to minimise disturbance of sediments during piling works are identified in Chapter 6.1.3

Operation

Land based

The proposal area would be reinstated at the completion of construction, therefore there is unlikely to be any soil disturbance during operation of the proposal.

Water based

The proposal would cater for Sydney Ferry operations. Recreational vessels could also use the proposed wharf interchange.

Ferries would berth on the western faces of the platforms in water depths greater than two metres. There is minimal risk of mobilising bottom sediments at extreme low tide time during vessel arrival and departure due to existing water depths.

The new fixed wharf structure, gangway and hydraulic landing platform would be located to the east of the current structure. Water levels at the berthing face would be similar to those at the western platform.

6.1.3 Safeguards and management measures

Table 6-1 Safeguards and mitigation measures for land and water based land surface

Impact	Environmental safeguard	Responsibility	Timing
Land and water based land surface	A Soil and Water Management Plan (SWMP) would be prepared and implemented as part of the CEMP. The SWMP would identify all reasonable foreseeable risks relating to soil erosion and water pollution and describe how these risks would be addressed during construction	Contractor	Detailed design / Pre-Construction
Land and water based land surface	A site specific Erosion and Sediment Control Plan/s would be prepared and implemented as part of the SWMP. The Plan would include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Detailed design / Pre-construction
Land and water based land surface	Silt and sediment controls would be established prior to any disturbance of the land surface. Controls would be in accordance with edition 4 of “Managing Urban Stormwater, Soils and Construction” (NSW Government, 2004) (the blue book)	Contractor	Pre-construction
Water based land surface	A silt curtain, extending from a minimum of 100 millimetres above the water line and extending to no less than 2.5m to below sea level would be installed around the entire redevelopment work area within the waterway prior to commencement of works that would disturb the seafloor	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Water based land surface	Inspections of the silt curtain or boom device should be undertaken on a daily basis after ebbing tides, with an additional inspection to be carried out after storm events. If excessive turbidity of the water is observed during removal of the first few piles, a second, moveable silt curtain would be installed around the piles being removed during each day of operation Results of the observations of the integrity of the silt curtain are required to be recorded in a site notebook maintained specifically for the purpose. The notebook is required to be kept on the site and to be available for inspection by persons authorised by Roads and Maritime	Contractor	Construction
Water based land surface	Any excavated sediments that require disposal would be sampled, tested and classified in accordance with the EPA's *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA 2014) prior to being disposed of at a waste facility licensed to accept the relevant class of waste. Any materials classified as Hazardous Waste may require treatment or an immobilisation approach in accordance with Part 10 of the *Protection of the Environment Operations (Waste) Regulation* 2014 prior to off-site disposal.	Contractor	Construction
Land surface	Trees located within the vicinity of the temporary compound would be protected by tree protection measures for the duration of construction	Contractor	Construction
Land surface	Following completion of construction activities and the removal of the landside temporary compound, the surrounding landside area would be restored with all affected surfaces rehabilitated	Contractor	Construction
Land surface	Dial Before You Dig (DBYD) investigations would be carried out during the detailed design phase. If any relocation of services is required further assessment would be carried out in accordance with Roads and Maritime Environment Branch requirements and the appropriate utility providers would be consulted	Contractor	Pre-construction

6.2 Hydrological issues

6.2.1 Existing environment

Tides

The proposal is located on the northern side of Port Jackson. Water levels of Port Jackson are subject to ocean tides and the site has similar tides to Fort Denison, that is:

- Tides are semi-diurnal meaning that two high and two low tides normally occur each day
- The mean high water mark would be at about 1.5 metres above the zero of the Fort Denison Tide Gauge (ZFDTG) (which is about 0.5 metres AHD)
- The 50 year average recurrence interval (ARI) tide level would be about 2.4 metres ZFDTG
- The minimum tide level being at about zero metres ZFDTG
- The mean spring tide at Fort Denison is about 1.2 metres and the mean neap tide is 0.7 metres.

Currents

Due to the deep and open nature of Sydney Harbour and Port Jackson, tidal currents are minor. The mean spring and neap tides stated above translate to a maximum current of 0.5 knots or less (0.3 metres per second). Wind shear on the water surface generates the strongest currents in the location of the proposal.

Waves

Given the location of the site exposure to wind wave action is minor. However, given the busy nature of Sydney Harbour, the site is exposed to regular wave action generated from wash from passing vessels.

6.2.2 Potential impacts

Construction

By virtue of the openness of the site to Sydney Harbour, there are unlikely to be any significant changes to tidal flow, currents, wave action or water quality arising from the proposal.

The use of floating barges may have a minor localised reduction in wave energy in the inshore area. This impact would be temporary and contained in the area where the barges are anchored.

Waves experienced during the construction period may result in a safety risk during piling activities and intricate lifts. These activities would be undertaken during calm water conditions, where possible.

The proposal does not involve any construction works that would affect tide levels, tidal flows, currents or water levels. The use of floating barges may have a minor localised reduction in wave energy in the inshore area. This impact would be temporary and contained in the area where the barges are anchored.

Operation

Similar to the existing wharf arrangement, the landing platform would be on top of the water while being held in place by supporting infrastructure. The hydraulic landing platform would be triangular in shape and supported by three piles. It would be approximately 14 metres in length at the northern end before tapering to about three metres at the southern end. Operation would not affect tide levels, tidal flow, currents or water levels.

6.2.3 Safeguards and management measures

Table 6-2 Safeguards and mitigation measures for hydrology

Impact	Environmental safeguard	Responsibility	Timing
Hydrology	Weather forecasts would be checked regularly during construction and where flooding is forecast, all equipment and materials would be removed from the compound site and wharf construction area or appropriately secured	Contractor	Construction

6.3 Water quality and waste management

6.3.1 Existing environment

Water quality

Milsons Point has been developed primarily for residential and special use purposes. Water quality within the harbour in the vicinity of the site is largely influenced by point source water pollution such as stormwater drainage outlets and diffuse water pollution such as urban runoff that does not enter stormwater drains. Stormwater and urban runoff pollutants commonly include:

- Sediments (e.g. soil erosion)
- Pathogens (e.g. bacteria from leaking septic tanks)
- Gross pollutants (e.g. litter)
- Toxicants (pesticides, accidental spills or deliberate dumping)
- Nutrients (e.g. sewage overflows, fertilizers, detergents and animal faeces)
- Oils and lubricants from road and boat based pollutants
- Organic matter (e.g. leaf litter)
- Anti-fouling paints, disposal or overflow of sewerage, and galley wastes from boats.

The NSW Office of Environment and Heritage (OEH) measures the recreational quality of Sydney Harbour and surrounding beaches through the Harbourwatch and Beachwatch programs. Rainfall data is used to predict the likelihood of bacterial contamination at sample sites. The risk of bacterial contamination increases following periods of rainfall. Samples have been taken at various locations in the Sydney Harbour and the lower Parramatta River. The monitoring sites closest to the proposal site are Greenwich Baths and Hayes Street Beach. Both indicate that the annual water quality is good and deteriorates during/following wet weather (OEH 2015).

The waters in the vicinity of the site are used by a variety of vessels, which create propeller wash, anchor on the harbour bed, and have the potential for accidental spills or leaking of hydrocarbons. These are recurring issues for the existing water quality within the waters surrounding the proposal and the harbour in general.

There is an existing inlet pipe that is used for the North Sydney Pool, located under the existing wharf structure. There is no work proposed to this pipe, however it needs to be considered due to the fact that construction works may disturb the sediment, impacting on water quality at North Sydney Pool.

Waste management

Public waste bins are provided at the existing wharf and are managed as part of the existing wharf operations. There is the potential for litter to enter Sydney Harbour from existing wharf activities and from the use of the Milsons Point foreshore.

6.3.2 Potential impacts

Construction

Water quality

All piling works would be undertaken using a crane positioned on top of a barge in Sydney Harbour, minimising disruption to the landside areas. Accidental spills or discharges during construction works would be a risk to water quality. Spills could occur at the construction site or on route to or from the off-site facility. Removal of the previous structure could also lead to debris entering the water.

The proposal has the potential to cause disturbance to contaminated sediment during piling works, resulting in the mobilisation of sediments or precipitated contaminants into the water column and potentially into the inlet pipe to North Sydney Pool. This would however be a minor, localised and temporary impact as there would be negligible mobilisation of the sub-sediments that could contain contaminants. Safeguards included in Chapter 6.1.3 to minimise sediment movement would further mitigate this potential impact.

All barges and construction plant would be refuelled at an appropriately approved and licenced refuelling depot prior to accessing the site.

There is potential for the proposal to result in pollutants (including fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) reaching nearby stormwater drains leading into Sydney Harbour during construction of landside infrastructure, impacting on water quality (refer to discussion in Chapter 6.1.2). However this would be managed by the implementation of safeguards and management measures outlined in Chapters 6.1.3 and 6.3.3.

Waste management

Construction activities would generate various waste streams that would need to be managed and disposed of. Potential wastes include:

- Waste fuels, oils, liquids and chemicals
- Packaging wastes such as cardboard, timber, paper and plastic
- General garbage and sewage from the temporary compound
- Potential for acid sulfate soils (refer Chapter 6.1)
- Various building material wastes (including metals, timbers, plastics and concrete)
- Earthworks spoil
- Asphalt and concrete
- General waste, including food, litter and other wastes generated by the construction workers.

Operation

Water quality

Operation of Milsons Point Wharf may result in water quality impacts from general litter generated by wharf users or from spill incident involving a ferry or other vessel using the wharf. These are existing impacts. Bins would be provided to discourage littering at the site.

Waste management

One of the objectives of the Ferry Wharf Upgrade Program is to increase patronage of the Sydney Harbour ferry network. The proposal would lead to an increase in patronage as a result of improved access and generally improving the wharf facility. As a result, increased waste may be generated but incidences of littering are not expected to increase given that waste management is likely to improve with the installation of new garbage receptacles and improved facilities.

6.3.3 Safeguards and management measures

Table 6-3 Safeguards and mitigation measures for water quality and waste management

Impact	Environmental safeguard	Responsibility	Timing
Water quality	Erosion and sediment measures would be checked prior to forecasted rainfall and following periods of rainfall	Contractor	Construction
Water quality	Emergency spill kits would be kept on site at all times and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site. A spill kit would be kept on each barge and at the temporary compound site. All staff would be made aware of the location of spill kits and trained in their use. If a spill occurs, the Roads and Maritime contract manager would be notified as soon as practicable and the Roads and Maritime Incident Procedure would be followed	Contractor	Construction
Water quality	Equipment barges carrying plant or machinery would be fitted with bunding around equipment which contain chemicals to prevent chemical spills or leakages from entering the water. All equipment, materials and wastes transported between an appropriately approved and licenced facility, and the construction work site would be secured to avoid spills during transportation	Contractor	Construction
Water quality	Any chemicals or fuels stored at the temporary compound would be within double bunded areas	Contractor	Construction
Water quality	Vehicles, vessels and plant would be properly maintained and regularly inspected for fluid leaks	Contractor	Construction
Water quality	No vehicle or vessel would be washed down or refuelled while on site	Contractor	Construction
Water quality	Emergency contacts would be kept in an easily accessible location on the construction work site and on all construction vessels. All construction workers would be advised of these contact details and procedures	Contractor	Construction
Water quality	Daily clean-up of site to be undertaken to ensure no materials could enter the water	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Water quality	Any debris that enters the water must be retrieved as soon as possible. Floating debris to be retrieved by scoop. Sinking debris to be removed by diver	Contractor	Construction
Water quality	In an event of a spill during operation, the incident emergency plan would be implemented in accordance with Sydney Ports Corporation's response to shipping incidents and emergencies outlined in the 'NSW State Waters Marine Oil and Chemical Spill Contingency Plan' (Maritime, 2008)	Operator	Operation
Water quality	Waste disposed of off-site shall be classified in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014) prior to disposal and shall be disposed of at an appropriately licenced facility for that waste. Where necessary, this shall include sampling and analysis	Operator	Operation
Water quality	All equipment, materials and waste transported between an appropriately licenced facility and the construction site would be secured to avoid spills during transportation.	Contractor	Construction
Water quality	A silt curtain, extending from a minimum of 100 millimetres above the water line and extending to no less than 2.5m to below sea level would be installed around the entire redevelopment work area within the waterway prior to commencement of works that disturb the seafloor with regard to the inlet pipe from North Sydney Pool	Contractor	Construction

6.4 Air quality

6.4.1 Existing environment

The existing air quality near the location of the proposal is primarily influenced by emissions from motor vehicles, commercial operations and residential activities. Air quality is also influenced by the prevailing weather and climatic conditions, bushfires and other natural factors such as pollen.

The two air pollution issues of primary concern in Sydney are photochemical smog and particle pollution. Particle pollution is seen as a brown haze usually present in the cooler months of the year. Particle pollution comprises airborne particles from human-made emissions and other natural particle sources such as sea salt, dust, pollen and bush fires. Photochemical smog is seen as a whitish haze, which in Sydney largely comprises nitrogen oxides from motor vehicles (City of Sydney, 2012).

The nearest OEH air quality monitoring stations to the site are located at Rozelle and Chullora. These monitoring stations, along with a station at Lindfield, Randwick and Earlwood make up the Sydney East region.

The closest Bureau of Meteorology (BoM) monitoring station to the location of the proposal is located at Observatory Hill, Sydney. Data from the Bureau of Meteorology (BoM, 2016) reports that the average annual rainfall recorded at Observatory Hill is 1337 millimetres.

According to the Bureau of Meteorology (BoM, 2016) the average annual wind speed ranges between about 10.6 km/h (at 9am) to 16.6 km/h (at 3pm). Wind direction and speed varies throughout the day, usually being calmer in the morning. Wind speed and direction also varies throughout the year.

6.4.2 Potential impacts

Construction

During the construction of the proposal temporary impacts on air quality may arise from:

- Minor generation of particles and dust from general construction work e.g. concrete cutting and breaking
- Minor emissions (primarily diesel exhaust) from plant and machinery
- Minor emissions from construction traffic and water vessels.

These impacts are expected to be short-term, low intensity and be able to be managed through identified safeguard and management measures.

Operation

The level of operation of the ferry services would increase, however there are no additional impacts to the air quality expected from the operation of the proposal.

6.4.3 Safeguards and management measures

Table 6-4 Safeguards and management measures for air quality

Impact	Environmental safeguard	Responsibility	Timing
Air quality	Measures to address air quality impacts would be incorporated into the CEMP and implemented throughout the construction period. As a minimum, the following measures would be included • Covering all loaded trucks and vessels • Machinery to be turned off rather than left to idle when not in use • Maintenance of all vehicles, including trucks and vessels entering and leaving the site in accordance with the manufacturers specifications to comply with all relevant legislation • Maintenance of all plant and equipment to ensure good operating conditions and exhaust emissions comply with the Protection of the Environment Operations Act 1997 • Maintaining the work site in a condition that minimises fugitive emissions such as minor dust • Dust for any excavation works • Appropriate sediment and erosion controls for any exposed earth or stockpiled waste	Contractor	Pre-construction and Construction

6.5 Noise and vibration

A noise and vibration impact assessment was undertaken for the proposal by Acoustic Logic. The full noise report is provided at Appendix D and a summary of the report is provided below.

6.5.1 Methodology

The noise and vibration impact assessment was prepared in accordance with the following:

- Interim Construction Noise Guidelines (ICNG) (DECCW, 2009)
- British Standard 6472: 1992 – Guide to evaluation of human exposure to vibration in buildings (1Hz to 80Hz)
- German Standard DIN 4150-3 (1999-02) – Structural Vibration – Effects of Vibration on Structures
- Construction Noise and Vibration Guidelines (Roads and Maritime, 2016)

6.5.2 Existing environment

The nearest noise sensitive receivers to the proposed Milsons Point Wharf are:

- Residential receivers located to the north within Milsons Point including the representative receiver at 1 Northcliffe Street, Milsons Point
- Commercial receivers to the north of the wharf including the representative receiver at 1 Northcliffe Street, Milsons Point
- Residential receivers to the west of the site within McMahons Point including the representative receiver at 2A Henry Lawson Avenue, McMahons Point

- The active recreation area (North Sydney Pool) located to the north of the wharf.

The vicinity of the proposal to these sensitive receivers can be noted in Figure 6-1 below.

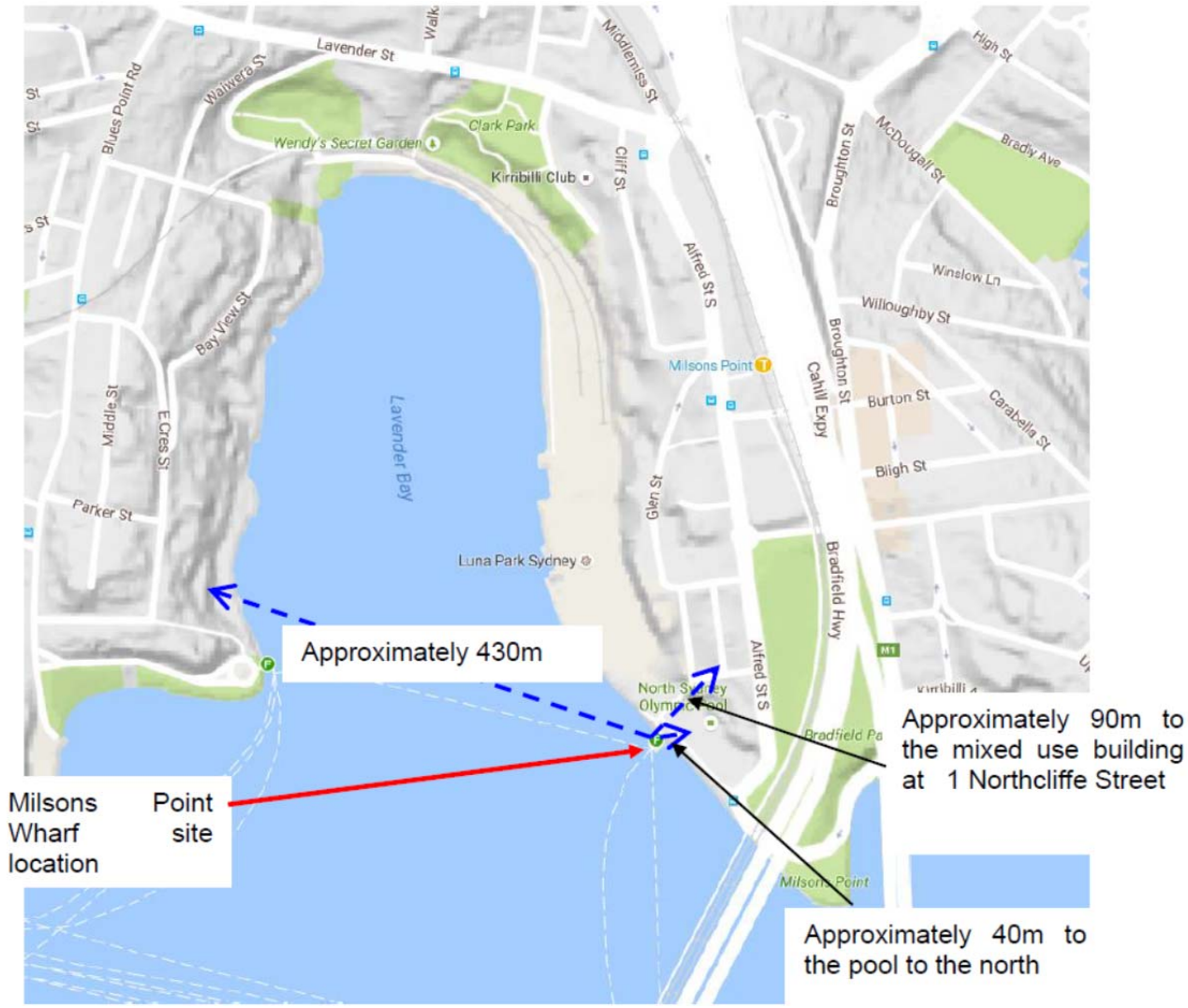

Figure 6-1 Topographic map of proximity of nearest sensitive receivers to the proposal

Long-term unattended noise monitoring was carried out in the vicinity of Milsons Point Wharf Interchange, to determine the existing background noise levels. The location chosen was representative of the potentially worst case residential receivers for Milsons Point, shown in Figure 6-2 below.

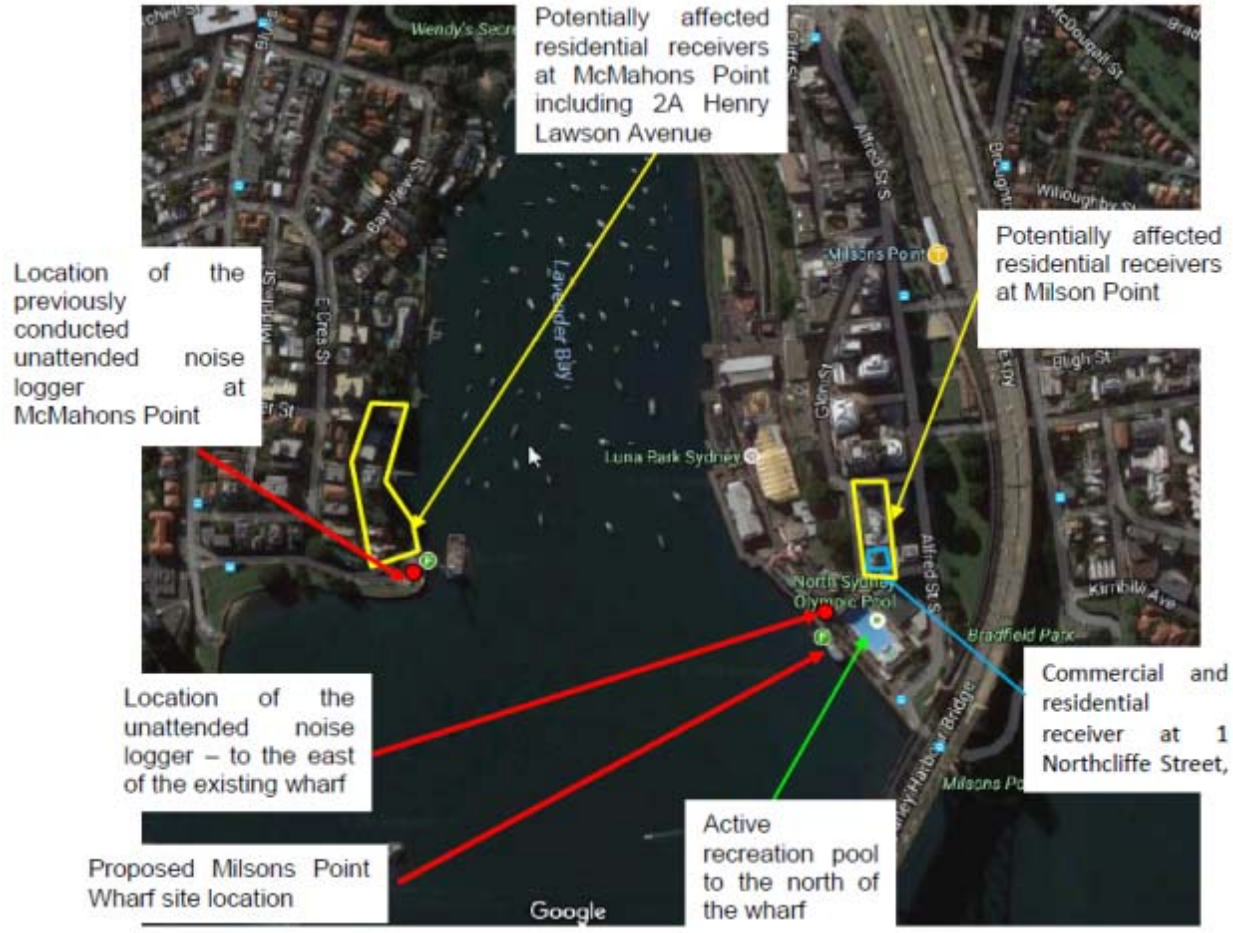

Figure 6-2 Site location, receivers and noise monitoring location

In addition to the unattended noise monitoring carried out for the Milsons Point receivers, due to the proximity of potentially affected receivers at McMahons Point from Milsons Point, long-term unattended noise monitoring data has also been provided from an unattended noise logger located close to McMahons Point Wharf, shown in red in Figure 6-2.

The monitoring results were used to establish the average background noise levels (known as the rating background levels, or RBLs) for the day, evening and night time periods, as shown in Table 6-5. Table 6-5 also contains background noise readings captured for a separate project (the Sydney Harbour Bridge Northern Approach Spans - Protective Coating Maintenance) in their Construction Noise Assessment from 2013, from a logger located at 26 Alfred St, Milsons Point in order to provide a thorough assessment of background noise levels for the proposal.

Table 6-5 Monitoring results at Milsons Point

Location	Description	Day Noise Level 7am to 6pm (dB(A))	Evening Noise Level 6pm to 10pm (dB(A))	Night Noise Level 10pm to 7am (dB(A))
North-west of North Sydney Pool, Milsons Point	Background L90, 15min	60	58	54
26 Alfred St, Milsons Point	Background L90, 15min	60	58	43

Location	Description	Day Noise Level 7am to 6pm (dB(A))	Evening Noise Level 6pm to 10pm (dB(A))	Night Noise Level 10pm to 7am (dB(A))
Henry Lawson Avenue, McMahons Point	Background L90, 15min	49	47	40

The acoustic survey results are considered representative and suitable for identifying construction noise levels at the nearest residential receivers, with background noise levels during daytime dominated by general vehicular traffic movements on surrounding roadways, trains on the Harbour Bridge, helicopters and boats on the harbour.

6.5.3 Potential impacts

Construction - noise

The ICNG provides noise management levels for construction activities. Noise management levels differ depending on the type of sensitive receiver that may be affected and the time of day that the activity is being carried out.

The ICNG notes that, for residential receivers, construction noise levels should be managed with the aim of not exceeding the noise affected level, which is the RBL plus 10 dB(A) during standard working hours or the RBL plus 5 dB(A) outside of standard working hours (refer to Table 6-10). Where construction noise is predicted to exceed the noise affected level, all reasonable and feasible mitigation measures would be applied. The highly noise affected level is 75 dB(A). Where construction noise is predicted to reach this level, respite periods for very noisy activities may be required.

A single criterion is provided by the ICNG for commercial receivers and Active Reserves, which is 70 dB(A) for offices and retail outlets (including shop and restaurant) outlets (Commercial) and 65 dB(A) for Active Reserves. The external noise levels should be assessed at the most-affected occupied point at the premises. The noise management levels are included in Table 6-6.

Table 6-6 Noise management levels

Time of day	Noise management level (LAeq (15 mins))
Recommended standard hours Monday – Friday: 7am to 6pm Saturday: 8am to 1pm No work on Sunday or public holidays	Noise affected RBL + 10dB(A)
	Highly noise affected 75dB(A)
Outside recommended standard hours	Noise affected RBL + 5dB(A)

Based on the construction noise guidelines detailed in the report and background noise monitoring within the vicinity of the site, Table 6-7 details the construction noise goals for the proposed site.

Table 6-7 Construction noise management levels for Milsons Point Wharf Interchange Expansion

Location	Time period	Noise Level (dB(A))
Surrounding residential receivers Milsons Point	Day	70 dB(A) 75 dB(A)
	Evening	63 dB(A)
	Night	48 dB(A)
Surrounding residential receivers McMahons Point	Day	59 dB(A) 75 dB(A)
	Evening	52 dB(A)
	Night	45 dB(A)
Active reserve	All periods of the day and night	65 dB(A)
Commercial receiver	When in operation	70 dB(A)

To assess the potential noise and vibration impacts from the proposal four scenarios were used to undertake the assessment. These scenarios, equipment to be used and noise level for each are outlined in Table 6-8 with noise levels provided at source. intended to be conservative, with levels considered to be at the upper end of the expected noise range as they have not taken into account absorption of noise as it travels across land and water, structures between the source of noise and the receiver that would reduce noise, and any of the noise safeguards and management measures proposed at Chapter 6.5.4.

Table 6-8 Construction noise scenarios and Resulting Noise Levels

Scenario	Description	Equipment to be used	Noise Level
1	Lifting of materials, preparation for piling	Barge	Up to 80dB(A) Leq 15min @ 10m
		Hand tools	
		Crane	
2	Installation of new piles (drilling)	Barges	Up to 85dB(A) Leq 15min @10m
		Piling rig (drilling)	
		Crane	
3	Installation of new piles (hammering)	Barges	Up to 95dB(A) Leq 15min @10m
		Piling rig (hammering)	
		Crane	
4	General construction works	Barge	Up to 85dB(A) Leq 15min
		Concrete trucks	

Scenario	Description	Equipment to be used	Noise Level
		Concrete pump	@10m
		Truck	
		Boat	
		Compressor	
		Hand tools	
		Generator	

Noise levels from each scenario have been predicted for daytime, evening, night time and sleep disturbance periods for the potentially worst affected residential receivers, with detailed results for other receivers presented in Appendix D.

The predicted maximum noise levels in the event of construction activities to be conducted during night time hours is 95 dB(A) for piling, and up to 85 dB(A) for other construction activities. Construction noise goals would be exceeded by 27dB(A) during for the installation of new piles using hammering and exceeded by 17dB(A) for the installation of new piles using drilling. It should be noted the noise levels detailed in Table 6-8 are intended to be conservative, with levels considered to be at the upper end of the expected noise range as they have not taken into account absorption of noise as it travels across land and water, structures between the source of noise and the receiver that would reduce noise, and any of the noise safeguards and management measures proposed at Chapter 6.5.4.

Sleep disturbance criteria and the predicted noise levels indicate that noise from construction activities may cause annoyance and disturbance to surrounding residences for limited periods. Based on the criteria detailed within the guidelines, noise from construction activities at night has the potential to affect the health and wellbeing of surrounding residential receivers. To minimise this impact, the design and methodology of the proposal were reviewed to understand whether the impact could be minimised through elimination, substitution, or provision of engineering or administrative controls.

Potential noise impacts have been minimised through the design of the proposal which involves undertaking as much construction work as possible at a contactors off-site facility rather than at site, including assemblage of pre-fabricated components.

Eliminating the piling activity from the proposal is not possible due to the location of the existing wharf over the water. Expanding the existing structure requires piles to be installed in the water to provide a stable base for the expanded structure. Further piles are also required to provide protection between ferry berthing points and the new hydraulic platform.

As detailed in Chapter 3.3.2 of the REF, piling work for the proposal has an estimated duration of about nine weeks to complete (about 30 nights in total) toward the beginning of the construction period. Installation of the piles would require calm environmental conditions (still water and minimal wind) so that the floating barge used for the piling can remain still for the piles to be installed accurately. Calm conditions are also required to provide safe conditions for the construction crew. The waterway is usually calmer early in the morning, with wind and wind chop increasing throughout the day. The conditions required for piling usually occur during this early morning period.

Timings for piling activities are noted below, with the noisiest activity – hammering the piles restricted to the last two hours of the night-time period to minimise the impact. During these hammering activities, it is anticipated that each pile would be hammered for one minute (about 10 hits with the hammer within one minute). For each pile the activity is likely to occur about five times

over a period of one hour. Of the thirty nights of piling work, about fifteen of these would be used for hammering in piles.

Summary of hours of night works for piling drilling activities:

1. Setup for drilling from 12am to 1am

2. Drilling of piles from 1am to 6am

3. Pack up generally 6am to 7am.

Summary of hours of night work for piling hammering activities:

4. Setup for hammering from 4am to 5am

5. Hammering of piles from 5am to 7am.

Substituting aspects of the piling methodology to minimise the noise impact would be implemented by substituting hammering for drilling, except for when required for the final placement. This substitution has reduced the level of noise generated for piling overall.

Further minimisation of noise is provided through the selection of quieter plant and equipment for noisy tasks wherever possible, reviewing the optimal power and size required to most efficiently perform the required task.

Undertaking the control measures noted above would reduce the impact of noisy activities on the proposal's residential receivers. However, to further minimise the noise impact of night-time activities, notification of all potential affected residents would be undertaken at least five days prior to the proposed night time works. The Noise and Vibration Impact Assessment Report provided in Appendix D, uses the background noise monitoring and predicted construction noise levels to identify potentially affected receivers who would receive either direct or written notification of these works, as shown in Figure 6-3.

As notification of the proposed construction activities will be undertaken prior to the activities commencement, this advance warning will provide opportunity and necessary information to residences to enable precautions to be taken to further reduce noise during these periods e.g. closing property windows.

Figure 6-3 Community notification area

Operation – noise

The position of the proposed new second berth to the wharf is located at similar distance from shore than the existing wharf and the ferry berthing consistent with the existing wharf arrangement.

The increased capacity of the expanded wharf would not significantly change the water vehicle traffic of Sydney Harbour within the vicinity of Milsons Point wharf with the distance between the wharf and the nearest residences maintained, therefore a detailed assessment of the operational noise impacts is not considered necessary.

The resulting noise level impact from the proposed wharf expansion would be similar to those currently experienced.

Construction - vibration

Safe working distances for both cosmetic damage and human comfort are identified in Table 6-9.

Activities that cause vibration would occur within the safe working distances from all non-wharf related structures and receivers.

Table 6-9 Vibration safe working distances

Equipment / Process	Safe distance from cosmetic damage	Safe working distance for human comfort
Piling, up to 900kg impact hammers	5m	17m
Vibration piling equipment	5m	15m
Auger piling	2m	10m
Hand held hammering	No contact with affected structures	No contact with affected structures

Based on the expected vibration levels detailed in the table above it is not expected that vibration would negatively impact the surrounding residential receivers.

Operation – vibration

The new wharf platform would be located a similar distance from the shore and nearby receivers compared to the existing platform. Therefore any change in the noise levels during operation would be negligible.

The incidental bumping of ferries on the platform as they dock would result in some vibration to the supporting piles. These are existing impacts and are not expected to increase in frequency or magnitude as a result of the proposal.

6.5.4 Safeguards and management measures

Table 6-10 Safeguards and management measures for noise and vibration

Impact	Environmental safeguard	Responsibility	Timing
Noise and vibration	Notification of all potentially affected residents would be undertaken at least five days prior to the proposed night time works Properties where noise management levels may be exceeded (those properties within the red line of figure 6-3) would receive indirect notification through a letter drop and residences that may be highly noise affected (those properties within the yellow line of figure 6-3) would receive direct notification through a door knock These notifications would include the timing and nature of works as well as the expected noise levels, duration and impacts prior to the commencement of construction Contact details to lodge noise complaints or receive updates would also be provided at this time.	Project Manager	Pre-construction
Noise and vibration	A Noise and Vibration Management Plan would be prepared and incorporated into the CEMP. The management plan would include, but not be limited to: • Reasonable and feasible noise control measures to reduce noise levels taking into account the control methods specified in the noise and vibration impact assessment for the proposal • Identification of nearby sensitive noise receivers • A construction noise assessment in accordance with EPA Interim Construction Noise Guidelines for qualitative noise assessment and Roads and Maritime Noise and Vibration Guidelines • Details of the assessed hours of work and work to be undertaken • Behavioural practices or other management measures to be implemented to minimise noise"	Contractor	Pre-construction
Noise and vibration	Work would be carried out during the recommended standard construction hours identified in the Interim Construction Noise Guideline (DECC, 2009a) unless Roads and Maritime approval has been provided	Contractor	Construction
Noise and vibration	Preparation and movement of material would be maximised prior to works commencing so that it can be limited during the extended hours period	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Noise and vibration	Temporary hoarding would be erected around the compound site	Contractor	Construction
Noise and vibration	Construction personnel would be informed of the location of sensitive receivers, and the need to minimise noise and vibration from the works, through site induction and regular toolbox talks	Contractor	Construction
Noise and vibration	The use of portable radios, public address systems or other methods of site communication that may impact on residents unnecessarily would be avoided	Contractor	Construction
Noise and vibration	Non-tonal alarms to be used at night.	Contractor	Construction
Noise and vibration	Plant and equipment would be inspected fortnightly to ensure they are in good working order and not emitting excessive noise levels	Contractor	Construction
Noise and vibration	Quieter plant and equipment would be selected based on the optimal power and size to most efficiently perform the required task	Contractor	Construction
Noise and vibration	Continuous noise monitoring will be undertaken during high noise periods of the construction work, including piling. The results of monitoring will be used to devise further control methods where required	Contractor	Construction
Noise and Vibration	Roads and Maritime will consult with local restaurants at least two weeks prior to the commencement of construction to determine reasonable noise management measures during lunch service.	Project Manager	Pre-Construction
Noise and Vibration	A photographic record will be provided for the seawall and North Sydney Pool prior to construction to establish condition.	Contractor	Pre-Construction

6.6 Landscape character and visual impact

A landscape character and visual impact assessment (LCVIA) has been prepared by Jane Irwin Landscape Architecture in accordance with Roads and Maritime *Environmental Impact Assessment – Guidance Note, Guideline for landscape character and visual impact assessment.* The findings of this assessment are discussed below and the full report is provided at Appendix F.

The landscape character and visual impact assessment assesses the proposal area shown in Figure 3-2.

A combination of an area or a view and the magnitude of the proposal (scale, character, distance) were used to determine the landscape character impacts of the proposal (refer Figure 6-4 for grading values).

Sensitivity	Magnitude				
	High	Moderate	Low	Negligible
High	High Impact	High-Moderate	Moderate	Negligible
Moderate	High-Moderate	Moderate	Moderate-low	Negligible
Low	Moderate	Moderate-Low	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Figure 6-4 Landscape character and visual impact grading matrix

6.6.1 Existing environment

Milsons Point Wharf is at the southern end of Milsons Point, immediately to the west of the Harbour Bridge. It sits within an area activated by Luna Park and North Sydney Pool, and is read in the context of these landmarks.

The immediate context of the ferry wharf is the Luna Park face, and the elevation of North Sydney Olympic Pool. To the west, the Harbour Bridge and Pylon form a strong visual edge. The scale and character of the bridge dominates the eastern extent of this zone.

The landscape of the promenade is colourful and diverse, with a plethora of materials in the buildings and other elements that form the immediate backdrop. The buildings and structures are, however, memorable and iconic, and as such are much loved landmarks on Sydney Harbour. Luna Park and the Pool are popular destinations, and when busy the character of this area is enhanced by the colour and movement of crowds.

The wharf and promenade area, with buildings and structures behind, are predominantly viewed in elevation from the water at close proximity, and as an oblique elevation from further afield. High rise residential and commercial buildings are layered up the slope north of the Pool, dwarfing the promenade and its structures in scale. It is, however, the character of the promenade that is the strongest, and that has the highest public profile, from association with Luna Park, North Sydney Olympic Pool and the base of the Harbour Bridge. There are views of the wharf from various residential points around the harbour, with most views from residential areas being located some distance from the wharf, such as Walsh Bay and Blues Point, with these view impacts being considered as moderate to low.

The site is quite separate from the commercial centre of Milsons Point centred around the station. Viewed from the end of Alfred Street and under the bridge, the wharf sits as a distinct element on the water, with the existing sea wall and decorative balustrade defining the promenade edge.

The promenade itself is simply laid out, with a limited palette of materials. A line of palm trees forms a colonnaded edge to the upper promenade, which is further defined by a robust set of stone clad steps running the length of the walkway to the bus stop at the eastern end.

Views and vistas

Key viewpoints for the proposal are shown in Figure 6-6 to Figure 6-19 below, and listed in Table 6-11. Further detail can be found in the LCVIA attached at Appendix F. These viewpoints are representative of the range of viewpoints within the visual catchment, including those of residential properties.

Figure 6-5 Visibility of project and key viewpoints

Figure 6-6 Viewpoint 1 Luna Park Entrance

Figure 6-7 Viewpoint 2 North Sydney Pool

Figure 6-8 Viewpoint 2 North Sydney Pool Lower

Figure 6-9 Viewpoint 3 Alfred Street

Figure 6-10 Viewpoint 3 Alfred Street looking west

Figure 6-11 Viewpoint 4 McMahons Point Wharf - zoom

Figure 6-12 Viewpoint 5 Blues Point Reserve

Figure 6-13 Viewpoint 6 Dawes Point

Figure 6-14 Viewpoint 7 Walsh Bay

Figure 6-15 Viewpoint 8 Balmain East Ferry Wharf

Figure 6-16 Viewpoint 9 Barangaroo Reserve

Figure 6-17 Viewpoint 10 Goat Island

Figure 6-18 Viewpoint 11 Opera House

Figure 6-19 Viewpoint 11 Circular Quay

Table 6-11 Landscape character locations

Viewpoint	Description of view	Visible elements of proposal
Viewpoint 1: Luna Park entrance	The wharf is close to the entrance of Luna Park. This viewpoint has direct and dramatic views to the bridge, the Opera House and Circular Quay (Figure 6-6).	Platform roof, gangway roof, landside upgrades
Viewpoint 2: North Sydney Olympic Pool	Views from the pool interior through a series of windows to the water and opposite shores - Dawes Point and Walsh Bay. The view is, however, often cluttered with people and various pool related items. The roofs of the wharf currently partially obscure views to the water and opposite shore, from the lowest level, particularly at the western end (Figure 6-7).	Platform roof, gangway roof
Viewpoint 3: Alfred Street, Milsons Point	Alfred Street has open views to the harbour and opposite shores. Looking west, the view to Luna Park and the pool is currently obstructed by a temporary cafe shelter - the wharf sits outside this view (Figure 6-9).	Platform roof, gangway roof, landside works
Viewpoint 4: McMahons Point Ferry Wharf	View east toward Milsons Point from the ferry wharf at McMahons Point. The existing wharf structure is currently seen against the backdrop of the bridge pylon and adjacent landscape - it sits low in this elevation (Figure 6-11).	Platform roof, gangway roof
Viewpoint 5: Blues Point	View north east toward Milsons Point from the public reserve at the end of McMahons Point. The existing wharf is currently seen against the backdrop of North Sydney Olympic Pool, sitting mid-level in the brick and glass façade (Figure 6-12).	Platform and roof, gangway and roof
Viewpoint 6: Dawes Point	Views from St Ives steps and from public domain under the bridge. From St Ives steps the existing wharf is seen in direct elevation against the North Sydney Olympic Pool, and the sea wall. From under the bridge, the wharf sits at an oblique angle against Luna Park and the western end of the pool (Figure 6-13).	Platform and roof, gangway and roof

Viewpoint	Description of view	Visible elements of proposal
Viewpoint 7: Walsh Bay	View north east from end of Pier 4 at Walsh Bay. The wharf is seen in elevation against Luna Park and the pool (Figure 6-14).	Platform and roof, gangway and roof
Viewpoint 8: Balmain East ferry wharf	View north east from Illoura Reserve, to the west of Balmain East ferry wharf. This is a distant view, with no detail of existing structures discernible (Figure 6-15).	Platform and roof, gangway and roof
Viewpoint 9: Barangaroo Reserve	View north east from Barangaroo Headland Park, at the foreshore level. This is a distant view, but very similar to views from Walsh Bay (Figure 6-16).	Platform and roof, gangway and roof
Viewpoint 10: Goat Island	View east from ferry at eastern point of Goat Island. This is a very distant view, with very little detail of Milsons Point discernible (Figure 6-17).	Platform and roof, gangway and roof
Viewpoint 11: Opera House and Circular Quay	Views north west and west from Circular Quay and the Opera House. From these viewpoints, the existing wharf structure is seen obliquely against the end of the pool facade, but at a higher level and from the Opera House, the existing wharf reads against the face at Luna Park entry. The existing structure sits lower than the lip of the mouth (Figure 6-18 and Figure 6-19).	Platform and roof, gangway and roof

6.6.2 Potential impacts

Construction

During construction there would be a temporary decrease in the scenic quality of the local area with the introduction of construction equipment, plant, compound site and construction vessels in the water, and personnel.

Operation

The visual impact of the proposal is considered in Table 6-12 below, using the viewpoints provided in Figure 6-5. Further detail can be found in the LCVIA attached at Appendix F.

Table 6-12 Visual impact locations and analysis

Viewpoint	Setting	Visible element	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
Viewpoint 1: Luna Park entrance	Milsons Point promenade - Luna Park and North Sydney Pool	Platform roof, gangway roof, landside upgrades	H	M	FZ	H	Repositioning of the wharf further to the east means that the roof of the platform would obscure views to the Opera House from the mouth of Luna Park. Although this is considered a high impact, it is very localised. Generally, the Opera House would be visible from most points along the promenade.
Viewpoint 2: North Sydney Olympic Pool	Inside pool - pool and stepped bleachers	Platform roof, gangway roof	M	ML	FZ	M	The extra gangway roof would obscure more of the view from the lower levels of the pool than the existing structure. Relocation of the roof would have a negligible impact, as its repositioning would not obscure any particularly sensitive view.
Viewpoint 3: Alfred Street, Milsons Point	Harbour Bridge and Milsons Point promenade - Luna Park and North Sydney Pool	Platform roof, gangway roof, landside works	M	L	FZ	L	From this viewpoint the existing wharf and proposed additions sit outside of views of sensitive elements. Handrails and walls to new access ramp will be no higher than existing handrails. The impact is considered low.
Viewpoint 4: McMahons Point Ferry Wharf	McMahons Point wharf and interchange – Sydney Harbour	Platform and roof, gangway and roof	M	L	MZ	L	Any potential for visual impact from this viewpoint is related to the wharf's position in relation to the bridge pylon and the existing sea wall. The extension of the wharf will not set the structure outside the mass of the pylon, and will not interrupt the shape and mass of the pylon. More of the sea wall will be obscured when viewed from almost any point in the water. The impact is considered low.

Viewpoint	Setting	Visible element	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
Viewpoint 5: Blues Point	Blues Point Reserve	Platform and roof, gangway and roof	M	L	MZ	L	The impact on views from Blues Point Reserve and foreshore is considered low, due to the distance from Milsons Point and the oblique angle of view. More of the facade of North Sydney Olympic Pool and the sea wall will be obscured by the new gangway and roof, but the distance makes this detail barely discernible. This area and the foreshore generally are popular photography and viewing points for the bridge and Opera House. The proposed wharf extensions have no impact on views of these iconic elements.
Viewpoint 6: Dawes Point	Public park with lawns and planting, and access point to harbour.	Platform and roof, gangway and roof	M	L	MZ	ML	Dawes Point provides a public viewing point for the harbour and Luna Park to the north. This point in the harbour is dominated by the scale of the bridge - other elements are dwarfed and less significant. The view from St Ives steps is most vulnerable to visual impact, with the extended wharf elements potentially obscuring more of the pool facade and the heritage wall. The scale of change to the wharf is, however, relatively low, and of the same character. For this reason the impact is considered to be moderate to low.

Viewpoint	Setting	Visible element	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
Viewpoint 7: Walsh Bay	End of Piers at Walsh Bay – public domain areas – residential and commercial buildings.	Platform and roof, gangway and roof	MH	L	BZ	L	The impact on views from the piers at Walsh Bay are considered moderate to low. These are popular points for viewing the harbour and Luna Park, and the view is fairly direct - the existing wharf and extensions are seen in elevation against the background of iconic structures, and the heritage sea wall. More of the facade of North Sydney Olympic Pool and the sea wall will be obscured by the new gangway and roof, but the distance reduces the impact. Views of Luna Park will remain the same.
Viewpoint 8: Balmain East ferry wharf							This point is potentially visually sensitive, as it is a well-used series of public spaces with a very direct relationship with the harbour. Residents may also be sensitive to view issues. Milsons Point is, however, in the far distance, with the view dominated by the Harbour Bridge. Any loss of view or change in character would be barely discernible from this point. The impact is considered low.

Viewpoint	Setting	Visible element	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
Viewpoint 9: Barangaroo Reserve	Northern tip of Barangaroo waterfront	Platform and roof, gangway and roof	MH	L	BZ	L	This point is potentially visually sensitive, as it is a popular public space that will be leased for major events such as New Year's Eve, with a potential for large crowds. It has a very direct relationship with the harbour, as a continuation of harbour headlands. Milsons Point is, however, in the far distance, with the view dominated by the Harbour Bridge. Any loss of view or change in character would be barely discernible from this point. The impact is considered low.
Viewpoint 10: Goat Island	Historic Island - built and landscape elements. Important scenic landmark	Platform and roof, gangway and roof	MH	L	BZ	L	The island is one of many important heritage landmarks in the harbour, and as such has an implied relationship with other heritage/landmark items. Public access is by guided tour. The existing wharf at Milsons Point is seen at an oblique angle from this point, and so does not obscure any of the important elements. It sits well back from the base of the Harbour Bridge, and is not read in context with the Opera House. Milsons Point is in the far distance. Any loss of view or change in character would be barely discernible from this point. The impact is considered low.

Viewpoint	Setting	Visible element	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
Viewpoint 11: Opera House and Circular Quay	Concourse and wharves at Circular Quay, Opera House and concourse	Platform and roof, gangway and roof	H	L	BZ	ML	The area of the wharves and concourse at Circular Quay is cluttered, generally busy, and views to Milsons Point often filtered through passing boats and ferries. Views to Luna Park from this point are not the main focus for visitors or commuters. The view from the concourse at East Circular Quay and the Opera House are significant, as this environment is part of a larger visitor experience of the harbour. Night views of Luna Park are particularly important. The existing wharf structure at Milsons Point is read in elevation in front of the Luna Park face, from the Opera House. The roof does not, however, obscure the face, or impact on the night view. Relocation of the waiting area roof may cause partial obscuring of the lower parts of the face. Milsons Point is in the far distance, with the view dominated by the Harbour Bridge. Any loss of view or change in character would be barely discernible from this point. The impact is considered moderate to low.

N=Negligible; L=Low; ML=Moderate-Low; M=Moderate; HM=High-Moderate; H=High

Foreground zone (FZ): 0-250m from the viewer

Middle ground zone (MZ): 250m to 500m

Background zone (BZ): areas greater than 500m from proposed new wharf

Discussion

The expansion of the existing wharf structure would be visible from a number of points on the harbour. These points vary greatly in sensitivity and in visual relationship to the wharf. The assessment of visual impact from each viewpoint uses the existing wharf as a baseline to measure the degree of change in the view.

The wharf is directly overlooked from the entry to Luna Park, the interior of North Sydney Olympic Pool, the end of Alfred Street, and the public promenade that connects these elements along the

foreshore. This is a highly sensitive area, with heritage listed items and iconic buildings forming the boundary of the promenade, and with high use levels at times. This area is also within the buffer zone of the Sydney Opera House. The new structure will impact on views from the promenade and adjacent buildings to the harbour, and Opera House. Relocation of the roof structure on the wharf would partially obscure views from Luna Park mouth to the Opera House. Views from the interior of the pool to the harbour water and opposite shore would be partially obscured by the new gangway roof. The loss of view is restricted to very limited areas, with views of the harbour and Opera House are available from other points along the promenade. The visual impact in this area would be moderate to high.

Visual impacts from points west of Milsons Point, McMahons Point and Blues Point, are considered low. Although these viewpoints are relatively sensitive, the expansion to the existing wharf structure is minor, and the views are oblique, meaning that there is very minimal view loss. The scale of the Harbour Bridge in the background to this view serves to minimise the potential impact of minor built elements.

Walsh Bay, Dawes Point and Barangaroo Reserve are moderately sensitive viewpoints associated with high visitation and leisure use. These points have varying visual relationships with Milsons Point - some viewing the wharf in elevation against the backdrop of Luna Park and the Pool. Potential partial view loss, and the impact of the structure on the character of existing elements, is mitigated by distance and the minor nature of the proposal. Visual impact from these points is considered moderate to low.

Circular Quay and the Opera House are also sensitive viewpoints with high visitation, with Luna Park forming an iconic element in views to the west. Views from these points are, however, oblique, with potential for very minor view loss of the Luna Park mouth associated with relocation of the roof. Visual impact from these viewpoints is low. Visual impact from other viewpoints is considered low to negligible, mitigated by distance.

The overall visual impact is considered moderate to low. The greatest impact would be on views within the foreground zone, where the expanded wharf and relocated roof may cause partial view loss of the harbour and Opera House from some points.

Material selection, location of services, and a standardised family of elements form the key design strategies for mitigating the impact of the proposal. Attention has been given to installing ramps and walkways within the proposed wharf to meet access standards.

The selection of materials and paint colour respond to the surrounding palette, are low in reflectivity, and complement the surrounding elements of the wharf precinct and the harbour landscape through neutral tones. Overall the proposal would promote a unified palette of materials which, while responding to the maritime heritage and surrounding character, also separates the structure as a piece of architectural design.

Impacts would be managed through careful modelling of the roof to consider the particular viewpoint. The extensions to the wharf are considered to be minor, and mirror the elements already in place.

6.6.3 Safeguards and management measures

Table 6-13 Safeguards and management measures for landscape character and visual impact

Impact	Environmental safeguard	Responsibility	Timing
Landscape character and visual impact	Urban design principles will be integrated throughout the detailed design and construction of the proposal	Contractor	Pre-construction and Construction
Landscape character and visual impact	Selection of neutral and transparent materials will be integrated throughout the detailed design and construction of the proposal	Contractor	Pre-construction and Construction

Impact	Environmental safeguard	Responsibility	Timing
Landscape character and visual impact	The impact of the proposal on the existing foreshore will be minimised by maintaining the current ramp adjacent to Luna Park and coordinating the new ramp and steps to the wharf with the existing balustrade and sea wall during detailed design development	Contractor	Pre-Construction
Landscape character and visual impact	The impact of the proposal on the Luna Park lighting in the night time landscape will be minimised by designing lighting to maintain the primacy of Luna Park during detailed design development	Contractor	Pre-Construction
Landscape character and visual impact	The compound site and works area would be kept clean and clear of rubbish	Contractor	Construction

6.7 Biodiversity

This chapter provides an assessment of the flora and fauna impacts of the proposal, and is supported by the technical papers for the aquatic ecology report prepared by Eco Logical Australia.

6.7.1 Existing environment

Aquatic

The aquatic ecology report as prepared by Eco Logical Australia, including a preliminary aquatic ecology survey of the intertidal seabed areas for the proposed site was undertaken on 14 October 2016.

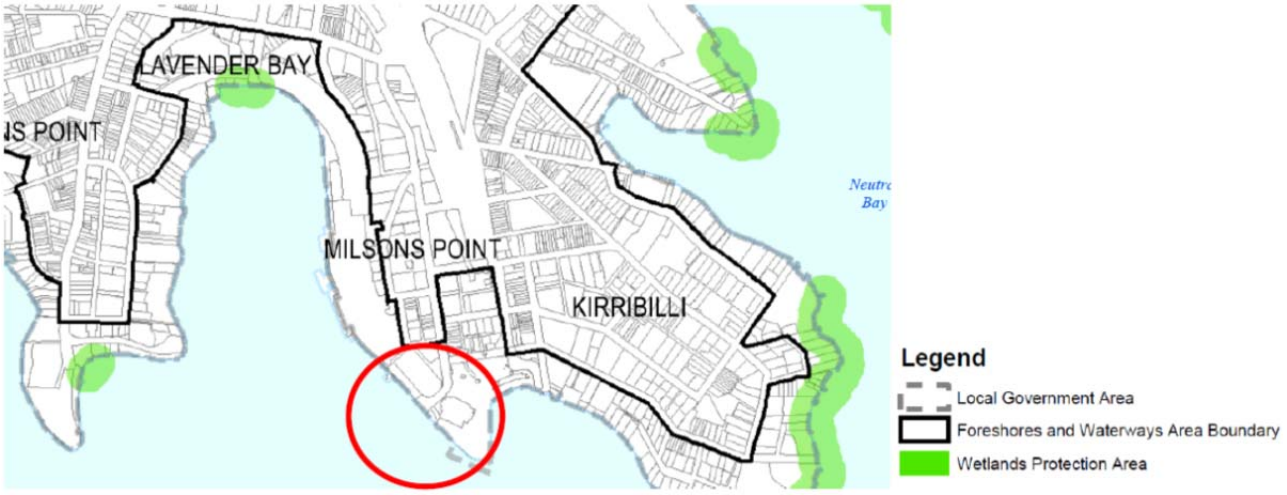

Figure 6-20 SREP mapping for Milsons Point Wharf Interchange (green represents Wetland Protection Area)

A review of existing information on the aquatic habitat within the vicinity of Milsons Point wharf includes:

- Intertidal seawall and piles – the reclaimed foreshore is characterised by a large stone seawall susceptible to regular boat wash. Species dominating this zone are common barnacles,

gastropods (limpets) and algae, such as Chamaesipho tasmanica (Honeycomb Barnacle), Ulva sp. (Sea Lettuce) and various limpets. Existing piles have a dense cover of encrusting organisms, but generally lack large macroalgae species at further depth. No saltmarsh or mangroves can establish in this environment

- Subtidal shallow rocky reef – macroalgae is abundant along the rocky subtidal area, up to 10 m horizontally from the base of the seawall, at depths 1 – 6 m. The macroalgae habitat is dominated by dense Ecklonia radiata (Kelp), with scattered Sargassum sp., Dictyota sp. and Pandina fraseri (Fan Weed). Kelp density is over 70% cover, with sub-stratum algae covering the entire rocky surface. Epiphyte growth is minor, and regular wave action flushes fine sediments. As the rocky reef descends to greater depth, the Kelp bed becomes sparse and dominated by short turfing algae, sponges and a mix of encrusting organisms.
- Subtidal deep rocky rubble – the substrate transitions to rocky rubble with coarse sands towards the base of the macroalgae slope, between 3 – 14 m depth. Mixed marine organisms encrust the scattered hard substrate. Bare sandy sediments and shell fragments comprise 80% cover of this zone. One fish species, Tetrosomus reipublicae (Turretfish), was observed in this zone.
- Subtidal unvegetated sandy sediment – as the seafloor gradient reduces, a large unvegetated area of coarse sands and shell fragments dominate the substrate around depths of 10 – 15 m. Occasional hard substrate occurs towards the bridge, where submarine cables cross the channel. Bioturbation from in-fauna burrows is sparse.
- Subtidal unvegetated fine sediment – at approximately 18 m from the base of the seawall, the gradient becomes gentle, ranging from 12 – 16 m in depth. Substrate is comprised of unvegetated fine sediment, generating minor sediment plumes upon disturbance. Bioturbation from in-fauna burrows is common and noticeably more abundant than the adjacent coarse sandy sediment zone. No seagrasses occur in the study area and are not expected to establish on soft sediments due to limited light availability at this depth. The noxious marine alga Caulerpa taxifolia was not observed in the study area.

No threatened species, populations or communities were observed in the study area, or are expected to utilise the site. Seahorses and their relatives (Syngnathiformes) were not observed, but may occur in the deeper macroalgae beds if adequately protected from boat wash and wave reflection.

Terrestrial

Native vegetation within the North Sydney LGA has been substantially altered and fragmented by urban development. The area immediately surrounding the proposal is used for recreational purposes, with concrete foreshore with few trees.

A search of the Atlas of NSW Wildlife (17 November 2016) found records of 62 threatened species and 22 threatened communities listed under the TSA Act within a 10 km radius of Milsons Point, though none of these records were from within the immediate vicinity of the wharf. The location of the proposal is unlikely to provide suitable habitat, roosting or food resources for any of the listed terrestrial species identified.

An EPBC Act Protected Matters Search Report was generated on 17 November 2016 for a 10 km radius of Milsons Point Wharf. The report identified the potential for 10 threatened ecological communities, 86 threatened species and 72 migratory species to occur within the search area.

6.7.2 Potential impacts

Construction

Aquatic

Direct impacts to the aquatic habitat would occur from pile installation (drilling and hammering). Indirect impacts would be shading of aquatic vegetation from the wharf, gangway and hydraulic landing, leading to plant mortality and loss of foraging and shelter habitat. Other impacts could

arise from construction vessels, such as boat/propeller wash, temporary moorings, accidental spills and localised collision with fauna (e.g. from rock debris during drilling).

Approximately 30 piles would be drilled then hammered into the bedrock. Each pile is up to 1 m in diameter, creating a combined total benthic impact area of approximately 28 m^2. The majority of these impacts would be in Type 2 Key Fish Habitats (KFH), including Kelp beds. KFH is not defined within the FM Act, however the policy definition from the Department of Primary Industries includes *'Oceanic, bay, inlet and estuarine habitats up to the level defined by High Water Solstice Spring tides'.*

Although the noxious alga Caulerpa taxifolia was not observed on site, machinery and vessels have the potential to introduce the weed from other areas.

Disturbance and suspension of sediment would occur during drilling activities, which would largely be contained by a silt curtain. As the drilling is through bedrock and coarse sands, and would be performed during calm conditions, drill cuttings and suspended sediments are likely to settle locally in a similar habitat type. Some sediment plumes may drift onto nearshore macroalgae beds during drill extraction. Hammering of piles is unlikely to create sediment plumes following drilling, with any residual rock/sand being pushed downwards and outwards.

Underwater noise from hammering piles has the potential to cause disturbance or physical impacts to marine fauna such as seals, turtles, dolphins and whales in the area. However, these species are unlikely to be in the area and a lookout would be kept by work crews, with work stopping if those species are reported close.

Another change to habitat from pile installation is the creation of vertical hard substrate, which can provide habitat for sessile marine organisms and protection for small fish. Many of the new piles would be heavily shaded by the extended wharf, and organisms benefiting created habitat would be shade tolerant species.

Indirect impacts to macroalgae beds would occur, due to shading from the proposed wharf and concourse (100% shade), and to a lesser extent from the gangway and hydraulic landing (estimated as <20% shade). Dense macroalgae beds dominated by Ecklonia radiata (Kelp), Sargassum spp. Dictyota spp. and a mix of subdominant turfing algae occurs, on average, within 8 m of the base of the seawall. The 40 m long wharf extension and concourse would heavily shade approximately 269 m^2 of macroalgae attached to the rocky subtidal reef. The gangway and hydraulic landing would partially shade macroalgae in the late afternoon, plus scattered rock rubble with turfing algae and bare coarse sand.

A permit would be required under Part 7 of the *Fisheries Management Act* to *Harm Marine Vegetation* due to the impacts from shading. The combined loss of 746 m^2 of Type 2 and Type 3 Key Fish Habitat would be partially offset by 735 m^2 of vertical, shaded, hard substrate. This is less than the 'no net loss' of Key Fish Habitat in the Fisheries Policy's 2:1 offset to loss ratio equating 1,491 m^2. Further offset, therefore, is required.

Potential direct and indirect impacts caused by construction vessels would include chemical/material spills from machinery, propeller scouring in shallow water, and anchor/mooring impacts from barges. Such risks would increase with unfavourable swell and weather conditions.

Vessels may also be a vector for movement of marine pests, especially if ships are not from the local area. Although the noxious alga Caulerpa taxifolia was not observed on site, machinery and vessels have the potential to introduce the weed from other areas.

Although not noted during a pre-works dive, seahorses and their relatives (Syngnathiformes) may occur in the deeper macroalgae beds. To minimise the potential for harm during construction a pre-clearing survey will be undertaken prior to construction commencing, with a Scientific Collection Permit required under the s37 FM Act.

Terrestrial

It is unlikely that any habitat for terrestrial species would be removed or impacted as a result of the proposal. The proposal would be unlikely to impact on any threatened species. Assessments of significance under the TSC Act were not considered required.

Operation

Aquatic

Operation impacts typical to wharves and boating are due to boat wash, propeller/thrust upwelling of sediments, pollutants and litter. Given the location and existing high intensity use, such impacts are considered minor, with no change to boat wash, propeller/thrust disturbance or potential for pollutants to be expelled from ferries. Litter from passengers/visitors to the wharf would potentially be less than historic conditions due to improved bin locations/design, signage, fencing and glazed screens. As the wharf is currently operational it is not expected that any additional impacts from ferry wash will be observed during the operation of the expanded facility.

Heavy shading of macroalgae would potentially result in a decrease in plant density and reproduction, leading to a shift in structural habitat and flora and fauna composition. A decrease in large macroalgae cover would contribute to fragmentation of the longitudinal connectivity of similar habitat along the foreshore. This in turn may decrease movement corridors for small fish seeking protective habitat, such as seahorses. However, the rock rubble, new piles and altered vegetation structure may provide alternative protection across a relatively short longitudinal area (~60 m including the existing wharf). Due to the relatively small scale and abundance of similar habitat nearby, fragmentation of macroalgae would not significantly harm seahorses and other small fish.

Terrestrial

There would be no additional operational impacts to terrestrial flora and fauna as a result of the proposal.

Conclusion on significance of impacts

The proposal is not likely to significantly impact threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required.

The proposal would directly and indirectly harm marine vegetation (macroalgae) and other Type 2 and Type 3 Key Fish Habitat and impacts will require a s205 FM Act permit to *Harm Marine Vegetation*. Further offset would be required to mitigate the impact of the loss of KFH.

Although not noted during a pre-works dive, seahorses and their relatives (Syngnathiformes) may occur in the deeper macroalgae beds. To minimise the potential for harm during construction a pre-clearing survey will be undertaken prior to construction commencing, with a Scientific Collection Permit required under the s37 FM Act.

The proposal is not likely to significantly impact threatened species, populations, ecological communities or migratory species, within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Department of the Environment is not required for biodiversity matters.

Although the noxious alga Caulerpa taxifolia was not observed on site, machinery and vessels have the potential to introduce the weed from other areas.

A pre-work dive would be undertaken prior to the commencement of works.

6.7.3 Biodiversity offsets

Biodiversity offsets would be required for the proposal. Significant environmental impacts (direct and indirect) are to be offset by environmental compensation. Compensation to offset fisheries resource or habitat losses is considered only after it is demonstrated that the proposed loss is unavoidable, in the best interests of the community in general and is in accordance with the FM Act, Regulations and Fisheries policies and guidelines. Habitat replacement (as a compensation

measure) needs to account for indirect as well as direct impacts of development to ensure that there is 'no net loss' of key fish habitats.

6.7.4 Safeguards and management measures

Table 6-14 Safeguards and management measures for biodiversity

Impact	Environmental safeguard	Responsibility	Timing
Biodiversity	A spill management plan will be developed and communicated to all staff working on site	Contractor	Pre-construction
Biodiversity	Consult with Department of Fisheries regarding offsets	Roads and Maritime	Pre-construction
Biodiversity	The construction work site area used will be the minimum size necessary to safely undertake the proposal • Exclusion zones will be established to identify the work area and prevent damage to marine habitats outside the work area Should the construction work area identified at Figure 3-2 be expanded further environmental assessment would be required.	Roads and Maritime and Contractor	Pre-construction and Construction
Biodiversity	In the event of a spill or paint contamination of the waterway, works would cease and a Roads and Maritime Environmental Officer be contacted immediately. Fisheries NSW (ph. 1800 043 536) and the Office of Environment and Heritage (OEH) (ph. 131 555) are to be immediately notified of any fish kills in the vicinity of the works. In such cases, all works other than emergency response procedures are to cease until the issue is rectified and written approval to proceed is provided by Fisheries NSW or OEH	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Biodiversity	To minimise wash and prevent bottom scouring of the marine sediments, vessels will not use excessive power when manoeuvring barges into place over the course sand and rock rubble habitat Scouring damage will also be minimised by 'working the wind and tides', by only moving floating plant into place on high tides and under favourable or no-wind conditions, where practicable	Contractor	Construction
Biodiversity	In the case that any unexpected threatened species are observed in the construction area, works will cease and Roads and Maritime will be informed to guide further action	Contractor	Construction
Biodiversity	A s205 FM Act permit to *Harm Marine Vegetation* will be required. Further offset would be required to mitigate the impact of the loss of Key Fish Habitat.	Contractor	Pre-construction
Biodiversity	A Construction Environmental Management Plan (CEMP) to address pollution, contamination and unnecessary disturbance would be developed prior to construction	Contractor	Pre-construction
Biodiversity	Establish no-go zones to avoid damage to adjacent habitats. For most of the construction period, the no-go zone generally includes the base of the stone seawall in the intertidal zone and nearshore rocky macroalgae habitat, but may temporarily exclude those areas for one off drilling or piling.	Contractor	Construction
Biodiversity	Works involving placement of barges, drilling and pile driving should occur during calm conditions.	Contractor	Construction
Biodiversity	No anchors or mooring blocks/lines should be placed on the rocky macroalgae habitat. All lines should be suspended off the seafloor to minimise drag across benthic communities.	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Biodiversity	Use a floating boom with silt curtain to contain sediment plumes during drilling and pile hammering. Silt curtains should aim to protect the rocky macroalgae habitat from lateral sedimentation and rock debris during drilling. A curtain is to be suspended parallel to shore between the postposed pile location and macroalgae habitat. If pilot holes are required to be drilled into the rocky macroalgae bed, then silt curtains may need reconfiguration for each individual dill location, aiming to reduce longitudinal displacement of sediment and rock debris. This is in addition to silt curtains required to delineate the outer works area, firstly to establish a construction site and secondly to minimise spread of sediment plumes onto bare sand habitat in deeper water.	Contractor	Construction
Biodiversity	Minor earthworks required at the top of the stone seawall should be constructed and stabilised without debris falling into the waterway.	Contractor	Construction
Biodiversity	All waste material should be disposed of on land and not reused in the construction.	Contractor	Construction
Biodiversity	If drilling into the rocky macroalgae bed, underwater inspection of each drill location should occur to relocate any sensitive flora and fauna, or small rocks with those species attached. Sensitive flora includes macroalgae attached to rubble (limited to <20 kg rocks) and Syngnathiformes (seahorses and their relatives) sheltering in or attached to marine vegetation. Rock rubble habitat, macroalgae and/or Syngnathids can be relocated by a licenced marine/aquatic ecologist to similar macroalgae habitat at least 50 m to the east towards the bridge.	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Biodiversity	A specialist marine/aquatic ecologist would undertake a pre-construction inspection of the piles for syngnathids (seahorses and pipefish) • In the case that any syngnathids (seahorses and pipefish) are observed on the piles, the specialist marine/aquatic ecologist would re-locate these to an adjacent suitable rocky reef habitat away from the construction work site • The marine/aquatic ecologist must hold the appropriate permit under section 37 of the FM Act to undertake the handling and relocation of *Syngnathiformes*. This would be obtained prior to the commencement of works All personnel working within the waters of the construction site would be informed of the potential to encounter syngnathids (seahorses and pipefish).	Contractor	Pre-Construction
Biodiversity	The noxious marine alga Caulerpa taxifolia was not observed in the study area. Care should be taken not to introduce this species to the area by using contaminated vessels and machinery. Best hygiene practices outlined in the NSW Control Plan for the Noxious Marine Alga Caulerpa taxifolia (NSW I&I 2009) are to be followed.	Contractor	Construction

Impact	Environmental safeguard	Responsibility	Timing
Biodiversity	Construction crews should maintain contact with the Port Authority of NSW (Sydney Ports) for advance warning of large marine mammals moving west into the harbour. To avoid disturbing these animals, pile drilling and hammering works should cease until those animals have passed an exclusion zone monitored by staff, or are heading east (i.e. past Kirribilli Point). Gentle start-up hammering is recommended to allow undetected aquatic fauna to leave the area and avoid hearing damage.	Contractor	Construction

Other safeguards and management measures that would address biodiversity impacts are identified in section.7.4.

6.7.5 Biodiversity offsets

Biodiversity offsets would be required for the proposal. Significant environmental impacts (direct and indirect) are to be offset by environmental compensation. Compensation to offset fisheries resource or habitat losses is considered only after it is demonstrated that the proposed loss is unavoidable, in the best interests of the community in general and is in accordance with the FM Act, Regulations and Fisheries policies and guidelines. Habitat replacement (as a compensation measure) needs to account for indirect as well as direct impacts of development to ensure that there is ‘no net loss’ of key fish habitats.

6.8 Socio-economic

6.8.1 Existing environment

Milsons Point is an established suburb with the inner city of Sydney that forms part of the North Sydney LGA. The suburb of Milsons Point is located on the eastern side of Lavender Bay, with McMahons Point to the west, Kirribilli to the east, North Sydney to the north and the Sydney CBD to the south.

Sydney Ferries provide frequent services from Milsons Point between Circular Quay and Parramatta (F3 Service) and Circular Quay and Darling Harbour (F4 Service). The ferry services commuters, residents and tourists, with regular services between Parramatta and Circular Quay, and the Circular Quay loop via Darling Harbour. The services operate regularly from about 6am to 11:50pm on weekdays and about 8am to about 11:50pm on weekends and public holidays.

The nearest residential building in about 100m from the wharf, to the north. The wharf is located adjacent to Luna Park and the North Sydney Pool, with recreational facilities and open space being the main surrounding land uses. In close proximity to the wharf are the restaurants ‘Ripples’, which is located along the promenade adjacent to the North Sydney Pool; ‘The Deck’, located at Luna Park; and ‘Aqua Dining’, located above the North Sydney Pool. The tourist attraction ‘Luna Park’ theme park is located about 40 metres from the existing wharf. The North Sydney Pool contains an inlet pipe that is located under the existing wharf structure.

A bus stop is located along Alfred Street (stop number 206120), close to the wharf. The bus provides services to the Northern Beaches and North Sydney.

Parking is provided with timed spaces between four and seven hours along Alfred Street. There are about 16 spaces in total. It is unlikely that these would be used by commuters. Luna Park also provides some 389 spaces for visitors, which is accessed from Northcliff Street.

The existing wharf provides a waiting area for commuters and includes seating, CCTV, lighting and information screen, Opal readers and an alarmed life ring. The existing services are operational and in good condition.

The current Milsons Point Wharf has a single berthing face oriented to the west. It can be used by commuter ferries, private vessels, water taxis and commercial operators to pick up and set down passengers, with priority given to ferries.

Public infrastructure in the vicinity of the wharf includes bench seating, lighting and bins. Fishing is currently permitted from the foreshore, however it is prohibited from the wharf. There are no commercial fishing operations or aquaculture activities operating in Lavender Bay.

Information taken from the Australian Bureau of Statistics (ABS) Statistical Area Level 2 (SA2) for the North Sydney-Lavender Bay region and Bureau of Transport Statistics (BTS) data is provided in Table 6-15.

Table 6-15 BTS demographic indicators

Demographic Indicator	2009		2014		Total Change		Annual Growth Rate (%)	
Population (people)	9814		11,568		1754		3.3%	
Population by Age Cohort (people)	0-19	1240	0-19	1529	0-19	289	0-19	4.3%
	20-34	3434	20-34	3905	20-34	471	20-34	2.6%
	35-49	2294	35-49	2764	35-49	470	35-49	3.8%
	50-64	1719	50-64	1906	50-64	187	50-64	2.1%
	65+	1127	65+	1464	65+	337	65+	5.4%
Median Household Income ($ per week)	$1,863 (2006)		$2,511 (2011)		$648		6.2%	
Local Jobs (BTS)	52,220 (2011)		54,681 Jobs (2016)		2,461 jobs		0.9%	
Dominant Industries of Employment (Top three)	• Professional, scientific and technical • Financial • IT		• Professional, scientific and technical • Financial • IT		Not applicable		Not Applicable	
Place of Residence (Top three)	Not Applicable		• North Sydney - Lavender Bay • Crows Nest – Waverton • Neutral Bay – Kirribilli		Not applicable		Not Applicable	

Demographic Indicator	2009	2014	Total Change	Annual Growth Rate (%)
Method of Travel to Work	Not Applicable	• Train • Car (as driver) • Bus	Not applicable	Not applicable
Local Employing Businesses	5,497 (2011)	5,667 (2015)	170 Employing Businesses	0.6%
Employment Projections	56,531 (2021)	61,575 (2031)	6,894 (2016-2031)	0.8%

Between 2009 and 2014, the resident population of the SA2 region expanded at a fairly strong rate (3.3% per annum), particularly when compared with the Greater Sydney average (1.5%). The resident population is ageing. As a point of reference, the 65+ age cohort expanded at the most solid rate (5.4% per annum) amongst all age cohorts. Growth in the number of apartments, supporting downsizing activity may be contributing to this trend. There has also been prominent growth in the number of families with the 35-49 and 0-19 age groups expanding at an average annual rate of 3.8% and 4.3%, respectively.

The dominant industries of employment are professional, scientific and technical services, financial and insurance services and IT. The SA2 region encompasses the major employment hubs of Milsons Point and North Sydney, the location of a number of major domestic and multinational corporations. Of people that work in the SA2 region, the majority live in the North Sydney SA2 Region or in proximity (i.e. the commute to work is short). North Sydney, Crows Nest and Neutral Bay are the top three locations of residence. Between 2011 and 2015, the number of employing businesses in the SA2 region increased by 170. Leading growth was registered in professional service related industries, finance and the health care industry.

The majority of residents who work in the SA2 region travel to work by train. There were only 450 people that utilised ferry services at the time of the 2011 Census.

The BTS (based on DP&E projections but updated to have regard for major infrastructure projects), project that the number of jobs in the SA2 region will expand by 6,894 over the next fifteen year period. The largest source of growth is expected to be in professional, scientific and technical related fields followed by finance and then education.

6.8.2 Potential impacts

Construction

The existing Milsons Point Wharf would be closed for the duration of the construction period, with the current wharf waiting structure being redeveloped. As a result, there would be temporary disruptions for commuters as ferry and water taxi services would not operate from Milsons Point for up to eight months during the construction period. During this time, ferry commuters, visitors and residents would need to access alternative transport options including buses, trains and the nearby Kirribilli Jeffrey Street wharf, and/or private vehicle use. The Kirribilli Jeffrey Street wharf is not currently DDA compliant. The nearest DDA compliant wharf is McMahons Point, which is located some 1.5km to the west of the Milsons Point Wharf. Milsons Point train station is located about 500 metres from the wharf, with the nearest bus stop located within about 150 metres from the wharf.

The proposed alternative transport routes are provided in Figure 6-21.

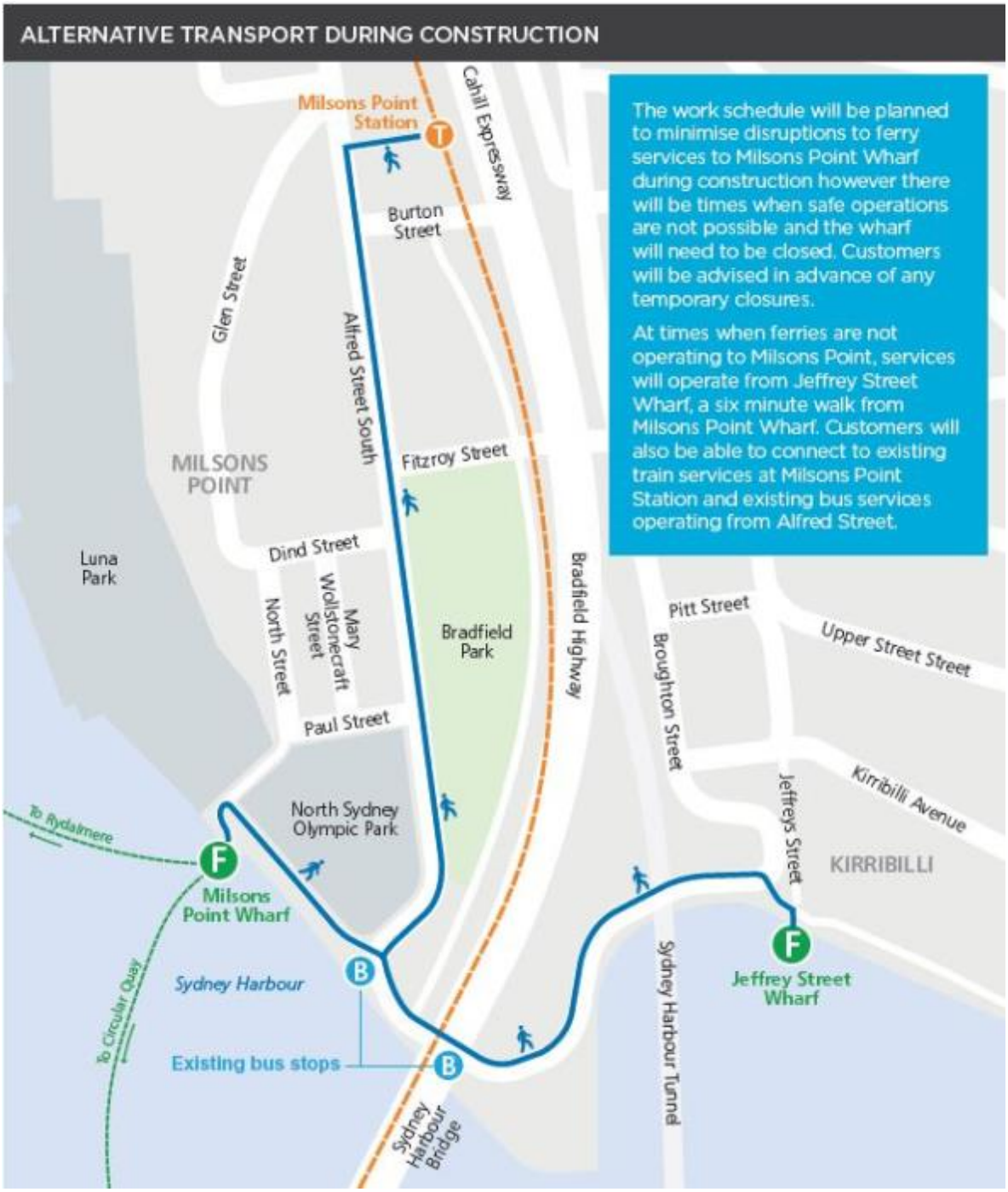

Figure 6-21 Proposed alternative transport routes during construction

There would be a potential for a loss of amenity by those using the existing wharf for recreational boating. The amenity and views from the local businesses would be reduced due to construction noise and the presence of the temporary compound and construction vessels within the outlook from local businesses. Access to local businesses would remain open during the construction period. People who may normally visit the local businesses using the ferry services may choose not to visit whilst the wharf is closed. As such the patronage and profitability of the local businesses may be reduced during construction, although due to the alternative transport arrangements provided it is thought this is unlikely. Construction noise has the potential to affect local businesses, with impact and mitigation considered in Chapter 6.5.

The amenity and character of the Milsons Point foreshore in the vicinity of the wharf would be impacted as the site would be a construction zone. This would temporarily change the character of

the built and natural environment through changes to the area's visual aesthetics, air quality and noise levels.

The temporary compound would be surrounded by hoarding to reduce noise, visual clutter and safety issues to the public. Views would be temporarily disrupted by construction hoarding, vessels and equipment which would be of greater height and scale than the existing wharf. This would impact on the amenity of the area which may discourage its use.

Access to the foreshore during the construction period would be impacted due to the location of the compound and construction areas. This impact would be minor as the majority of the foreshore would be accessible.

Noise from construction activities is likely to temporarily cause annoyance and disturbance to surrounding residence and users of the reserve. Noise impacts on surrounding receivers during the works would vary over the construction period depending on the type of work being carried out at the time.

The construction site would be lit at night for safety. Light spill from the site may cause annoyance to people in nearby properties. These impacts are likely to be minor given that there is already lighting at night to the existing ferry wharf and Luna Park. Lighting would be directed away from residential areas to minimise potential light spill.

The additional construction traffic expected in the area is considered to be minor, and unlikely to affect the capacity of the road network. Potential impacts of construction vehicles and vessels at the sites would be mitigated through the preparation and implementation of a traffic management plan.

Construction works have the potential to impact on water quality at North Sydney Pool, with safeguards proposed in Chapter 6.3.3.

Operation

The operation of the Milsons Point expansion would have positive long term socio-economic impacts. The additional capacity has potential to provide a better public transport solution for residents, commuters and visitors, although the impact of additional ferry services has not been considered within the scope of this REF. The inclusion of a DDA complaint interchange would also have long term positive impacts for users of the wharf and interchange. The proposal aims to support future demand and align to the strategic vision for TfNSW and the greater Sydney Region.

The expansion of the wharf would allow for more recreational vessels to use the wharf, which has a positive benefit.

The LCVIA indicates that the proposal would have a low to medium impact overall from a landscape character and visual impact perspective, however there would be a medium to high impact on the views from the foreshore. These are not anticipated to have a negative impact on the commercial operations located near the wharf in the long-term, due to their location and position, being sited higher than ground level where impacts would be lesser.

6.8.3 Safeguards and management measures

Table 6-16 Safeguards and management measures for socio-economic impacts

Impact	Environmental safeguard	Responsibility	Timing
Socio-economic	North Sydney Council and the local community to be kept informed about details of the works, construction progress, wharf closure, changes to public transport and other impacts throughout the construction period in accordance with the Milsons Point Wharf Interchange Communication Plan	Contractor	Pre-construction and Construction

Impact	Environmental safeguard	Responsibility	Timing
Socio-economic	An internet site and free call phone number for proposal enquiries will be established for the duration of the works. Contact details will be clearly displayed at the site throughout the construction period. Directions will be provided on how to make an enquiry or register a complaint regarding the works	Project Manager	Pre-construction and Construction
Socio-economic	An enquiry and complaint tracking system will be established. Any enquiries or complaints will be acknowledged within 24 hours of being received	Project Manager	Pre-construction and Construction
Socio-economic	All operational wharf lighting and signage is to comply with the DSAPT 2002	Contractor	Construction and Operation
Socio-economic	The construction site will be lit at night for safety. Lights will be positioned so that light is not directed towards nearby residences	Contractor	Construction

6.9 Land transport and parking

6.9.1 Existing environment

Land transport

Milsons Point Wharf Interchange is located at the eastern side of Lavender Bay, Milsons Point. The wharf is located close to Alfred Street, which is a one way loop road. The wharf is accessed from a paved foreshore that is split level known as Olympic Drive. There is a bus stop located along the turning Alfred Street loop that heads north. There is a train station located about 400 metres from the wharf, that operates regular services to the CBD and northern Sydney on the T1 Northern Line.

Parking

The nearest public car parking spaces are about 170 metres from the wharf. There is no dedicated commuter car park at this wharf. There are two signposted accessible spaces, located on the northern side of Alfred Street. Luna Park also has an underground car park with space for about 400 vehicles.

6.9.2 Potential impacts

Construction

Land transport

There would be temporary disruptions to commuters as ferry and water taxi services would not operate from Milsons Point Wharf for up to eight months during the construction period. During this time, commuters would need to access alternative transport options and/or an alternative ferry wharf, with alternative transport options indicated in Figure 6-21.

If ferry users choose to use a car instead of other method of public transport, this may place an additional increase in pressure on the local road network, however these impacts would be temporary throughout the construction period.

The majority of construction personnel, materials, plant and equipment would travel between the off-site facility and the construction site, via Sydney Harbour on a boat or a barge. As a result, land transport/traffic associated with construction activities would be minimal. Traffic generated by

construction works would include about 15 vehicle movements per day comprising sub-contractors and concrete trucks travelling to and from the construction site.

The additional construction traffic expected within the area is considered minor and would be unlikely to affect the capacity of the road network. Any potential impacts associated with construction vehicles at the site would be mitigated through the preparation and implementation of a traffic control plan.

The installation and removal of the temporary compound would be undertaken over a period of two days at the beginning of construction and two days at the completion of the project, between 7am and 6pm. A Traffic Management Plan (TMP) would be produced for the proposal which would indicate the vehicular movements.

Parking

Most workers would travel to and from the site by boat from the off-site facility minimising impacts to parking in the vicinity of the proposal. Most plant, equipment and materials would also be transported to the construction work site by barge or boat. Where parking is required for construction vehicles this would be managed through the Traffic Management Plan (TMP). There would be a loss of local parking due to the upgrading of the accessible spaces and the inclusion of the pram ramp. This would have an impact on the use of the area in the short term.

Operation

Land transport

The proposal would increase capacity of Milsons Point Wharf which may increase the demand for this service. This would reduce pressure on other forms of public transport, and the capacity of the road network.

Parking

The proposal would upgrade two existing dedicated accessible parking spaces on the north of Alfred Street to the east of the Harbour Bridge. It is not proposed that there will be any overall change to existing parking capacity during operation of the expanded wharf.

6.9.3 Safeguards and management measures

Table 6-17 Safeguards and management measures for land transport and parking

Impact	Environmental safeguard	Responsibility	Timing
Land transport and parking	A traffic control plan will be prepared in accordance with the 'Traffic control at work sites manual' (RTA, 2010a) and Australian Standard 1742.3 (manual of uniform traffic controls devices) and will include such things as appropriate wayfinding signage to be installed advising of alternative transport options where necessary	Contractor	Pre-construction
Land transport and parking	Worker parking will be developed in consultation with council prior to work commencing.	Contractor	Pre-construction

6.10 Water transport

6.10.1 Existing environment

Milsons Point Wharf Interchange is part of Sydney Ferries' Parramatta River service, which provides ferries connecting Parramatta, Rydalmere, Meadowbank, Kissing Point, Cabarita,

Abbotsford, Chiswick, Huntleys Point, Drummoyne, Darling Harbour, Cockatoo Island, Woolwich, Greenwich, Birchgrove, Balmain, McMahons Point, Milsons Point and Circular Quay, and Darling Harbour service which connects Circular Quay, Pyrmont Bay, Balmain East, McMahons Point and Darling Harbour with Milsons Point. About 45 services depart from Circular Quay and travel to Milsons Point commencing from about 6:05am to about 11:05pm. About the same number of services depart Milsons Point Interchange and travel to Circular Quay each weekday commencing about 6:54am and concluding at 11:52pm.

About 35 ferry services depart from Circular Quay and travel to Milsons Point Wharf Interchange each Saturday, Sunday and public holiday commencing at 8:05am and concluding at 11:05pm. About the same number of ferry services depart from Milsons Point Wharf Interchange and travel to Circular Quay commencing from about 8:52am and concluding 11:52pm.

Milsons Point Wharf Interchange is a 'priority access wharf', meaning Sydney Ferries has priority to access the wharf based on their timetabling but the wharf can be used by others at other times. The existing ferry wharf is used by a number of water taxis and commercial and recreational vessels which operate on an as needed basis. The wharf has a single berthing face which can lead to congestion during peak times.

6.10.2 Potential impacts

Construction

During the expansion works the existing Milsons Point Wharf will be closed, with ferry services continuing to run to the existing timetable and berthing at Jeffrey Street Wharf in place of the Milsons Point stop, with the nearest accessible wharf at McMahons Point.

The impact of this will be a potential increase in journey time for Milsons Point residents relying on Milsons Point Wharf for transport, leading to a potential loss of customers for ferry services in the Milsons Point catchment and an increased use of private vehicles or other routes of public transport. This impact is anticipated to be minimal due to the proximity of Jeffrey Street Wharf to Milsons Point Wharf.

In terms of water-based construction vessels there would be up to three service barges, all of which would be brought to the construction site from an off-site facility on a daily basis, and smaller craft used to transport construction workers to the site, which has historically been one craft. This would increase water based traffic within Sydney Harbour.

There would be impacts on waterway users as the area around Milsons Point would not be accessible, with the water-based construction zone clearly delineated and marked to prevent non-construction vessels from entering the construction site.

Operation

The proposal is designed to enhance water transport in Sydney Harbour by improving access to commuter ferry services. There would be an increase in boating activity generated by the operation of the proposal with new services and routes included. The proposal is designed to accommodate a projected increase in ferry users over time, aligned to the future network and strategic directions outlined in *Sydney's Ferry Future*.

6.10.3 Safeguards and management measures

Table 6-18 Safeguards and management measures for water transport

Impact	Environmental safeguard	Responsibility	Timing
Water Transport	Commercial, recreational operators and private services that use the existing wharf will be advised of the wharf closure at least two weeks prior to closure.	Project Manager	Pre-construction

Impact	Environmental safeguard	Responsibility	Timing
Water transport	The water-based construction zone will be clearly delineated and marked to prevent non-construction vessels from entering the construction site.	Contractor	Construction
Water transport	• A Marine Traffic Management Plan will be prepared and implemented during water based construction works, in consultation with NSW Maritime and approved by the Harbourmaster. • The proposed works will not interfere with the movement of seagoing ships unless agreed in advance with the Harbourmaster • Buoys will not be laid in or adjacent to shipping channels unless agreed in advance with the Harbourmaster • All buoys will be fitted with lights • All vessels associated with the works are to have Response Plans for emergencies and spills • At least one vessel is to be fitted with an Automatic Identification System (AIS). • The applicant is to consult with NSW Maritime and Harbourmaster regarding any navigation lights placed on the structure • Any marine spill (whether spill occurs on water on land and subsequently enters the water) is to be immediately reported to Sydney Ports VTS and VHF Channel 13 • Any material associated with the construction of the development that enters the water is to be immediately retrieved. Should material not be retrieved, the Port Authority will organise for its removal and recover costs from the Applicant The Applicant is to prepare a Communications Plan for implementation during the works which must include 24/7 contact details, protocols for enquiries, complaints and emergencies.	Contractor	Construction

6.11 Aboriginal heritage

6.11.1 Policy setting

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) provides a framework to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether an Aboriginal Heritage Impact Permit (AHIP) is required. In cases where an AHIP is required, Aboriginal community consultation must be undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010b).

The Roads and Maritime' 5 (Roads and Maritime, 2011) (PACHCI) incorporates all relevant EPA and OEH Aboriginal heritage guidelines and requirements in a staged procedure. The due diligence process outlined in Section 8 of the *Due Diligence Code of Practice for the Protection of*

Aboriginal Objects in New South Wales (DECCW 2010a) has been considered as part of the PACHCI Stage 1 and Roads and Maritime has concluded that an application for an AHIP is not necessary in this case.

6.11.2 Existing environment

A search of the Aboriginal heritage information management system (AHIMS) database was undertaken on 6 October 2016 covering a radius of approximately three kilometres around the project area, and identified 90 previously recorded Aboriginal heritage sites, none of which are within 500 metres of the project area; the closest site is a shelter with midden approximately 540 metres north of the project area.

No sites are within the project area boundary.

6.11.3 Potential impacts

Construction

There are no identified Aboriginal objects within the proposal area, therefore there is no identified risk of harm to known Aboriginal objects and an AHIP would not be required.

Although unlikely, due to the minor nature of the proposal and previous disturbance of the area, there is potential for discovery of previously unknown Aboriginal heritage items as a result of construction activities.

Operation

No operational impacts have been identified as part of the proposal.

6.11.4 Safeguards and management measures

Table 6-19 Safeguards and management measures for Aboriginal heritage

Impact	Environmental safeguard	Responsibility	Timing
Aboriginal	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Roads and Maritime' Aboriginal cultural heritage advisor and the senior regional environmental officer contacted immediately. Steps in the Roads and Maritime Standard Management Procedure: Unexpected Archaeological Finds must be followed.	Contractor	Construction

6.12 Non-Aboriginal heritage

6.12.1 Existing environment

There are no World Heritage Sites located within the project area, however, Milsons Point wharf is within the buffer zone of the World Heritage Listed Sydney Opera House. The scale and location of the proposed expansion at Milsons Point wharf is such that there will be no impact on the universal heritage significance of this World Heritage Site and key views from the site will not be affected detrimentally.

A search of the Australian Heritage Database was undertaken on 10 October 2016, which identified one item of National Heritage significance within or near the project area at Milsons Point (Sydney Harbour Bridge). No items listed on the Commonwealth Heritage list were identified.

A search of the NSW State Heritage Inventory database on 10 October 2016 identified three State heritage items within or near the project area on the State Heritage Register (SHR), being the Sydney Harbour Bridge, Luna Park Precinct and North Sydney Olympic Pool, and no items subject

to an interim or an authorised interim heritage order. Work is proposed at Bradfield Park, which is located within the curtilage of the Sydney Harbour Bridge.

6.12.2 Potential impacts

Construction

Proposed landside works to upgrade two existing accessible parking spaces on Alfred Street, providing pram ramps and widening the existing footpath, will impact a portion of Bradfield Park, a local heritage item which also forms part of the curtilage of the Sydney Harbour Bridge as listed in the SHR. No works will impact on the fabric of the bridge itself, and the proposed works include minor upgrades, which are considered to fall under Exemption 7 of Section 57(2). Therefore a Section 60 permit is not considered necessary, however an exemption notification form under Section 57 must be submitted and approved.

The additional hydraulic platform, gangway and fixed wharf structure are situated parallel to the locally significant coursed masonry sea wall and rock platform, but will not physically impact on the structure.

Operation

Proposed landside and wharf expansion works will occur adjacent to Luna Park, a State listed heritage item, and North Sydney Olympic Pool, a local heritage item, part of the significance of which stem from their aesthetic values. The proposal will alter the views to and from these items; the impact of this is considered further in Chapter 6.6.

6.12.3 Safeguards and management measures

Table 6-20 Non Aboriginal safeguards and management measures

Impact	Environmental safeguard	Responsibility	Timing
Non-Aboriginal heritage	All construction staff will be inducted in the Roads and Maritime Unexpected Archaeological Finds Procedure (2011) and will implement this procedure where necessary. The item will be identified to personnel during induction to ensure care is taken in the vicinity of the item	Contractor	Construction
Non-Aboriginal heritage	Section 57(2) exemption will be submitted and approved prior to construction commencing within the Sydney Harbour Bridge curtilage area.	Roads and Maritime Project Manager	Pre-Construction
Non-Aboriginal heritage	If approval for the Section 57(2) exemption is granted, any impacts temporary or permanent, to the character of Bradfield Park that are outside the descriptions provided in the civil drawings, must be avoided. It is recommended that machinery be restricted to the road side of the works and ground surface disturbance must be limited to the spaces indicated in the descriptions of proposed works.	Contractor	Construction
Non-Aboriginal heritage	In the unlikely event that suspected human skeletal remains are identified, the Roads and Maritime procedure for uncovering bones must be followed	Contractor	Construction

6.13 Hazards

6.13.1 Existing environment

The existing environment is clear of construction hazards.

6.13.2 Potential impacts

Construction

The following hazards and risks would be associated with the proposal during construction:

- Construction materials, wastes and/or objects have the potential to fall from the construction area into the Sydney Harbour causing water pollution and risk to human health
- Construction materials, wastes and/or objects have the potential to fall from construction barges or other construction vessels into the Sydney Harbour causing water pollution and risk to human health
- A spill of hydraulic fluid or fuel used in the construction plant or equipment has the potential to enter the waters of Sydney Harbour
- Construction workers have the potential to fall from the wharf or vessels in the Sydney Harbour potentially resulting in physical injury or drowning
- Sediment may affect the inlet pipe of North Sydney Pool, located under the current wharf.

Operation

The proposal would increase the number of ferries approaching and departing Milsons Point Wharf, which would increase water based traffic. Separation distances have been defined so as to allow for the safe manoeuvring of vessels. The water depths at the wharf are not considered to be an operational issue, with depths expected to minimise the possibility of incidents such as vessels hitting the seafloor, although potential for incidents such as collision of vessels using the wharf remains.

The proposal would improve wharf safety measures, which would reduce the potential for incidents impacting on the environment and human health.

6.13.3 Safeguards and management measures

Table 6-21 Safeguards and management measures

Impact	Environmental safeguard	Responsibility	Timing
Hazards	A life preserving ring and appropriate first aid provisions will be located within the compound and on all barges during the construction period Spill kits will be available as outlined in Chapter 6.3.3 Waste management procedures and incident protocols will be adopted as outlined in Chapter 6.3.3	Contractor	Construction

6.14 Climate change

6.14.1 Strategic framework

The Intergovernmental Panel on Climate Change has produced climate change projections. In Australia, both the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Bureau of Meteorology (BOM) have produced regional downscaled projections for Australia from these projections. In 2008 the NSW Government published refined climate change projections

for each region in NSW, including the Sydney region. In summary, climate change predictions for Sydney, including the location of the proposal, are:

- More intense extreme rainfall events
- Higher average temperatures
- More frequent occurrence of extreme temperatures.

The *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (DoP, 2010) applies to the proposal. This guideline requires that the following eight criteria be considered when designing development proposals:

> *1. Development avoids or minimises exposure to immediate coastal risks (seaward of the immediate hazard line)*
>
> *2. Development provides for the safety of residents, workers or other occupants on-site from risks associated with coastal processes*
>
> *3. Development does not adversely affect the safety of the public off-site from a change in coastal risks as a result of the development*
>
> *4. Development does not increase coastal risks to properties adjoining or within the locality of the site*
>
> *5. Infrastructure, services and utilities on-site maintain their function and achieve their intended design performance*
>
> *6. Development accommodates natural coastal processes*
>
> *7. Coastal ecosystems are protected from development impacts*
>
> *8. Existing public beach, foreshore or waterfront access and amenity is maintained.*

In October 2009 the NSW government released its NSW Sea Level Rise Policy (DECCW, 2009a). The policy provided sea level rise planning benchmarks as follows:

- 40 centimetres by 2050
- 90 centimetres by 2100.

On 8 September 2012, the State government withdrew these benchmarks in order to provide more flexibility in considering local conditions when determining future hazards. Responsibility for adopting sea level rise projections for use in planning was transferred back to local government.

In the absence of an adopted sea level rise benchmark for the locality of the proposal, a desktop analysis using a range of Global Climate Models and a 'best estimate' median result has been undertaken. The results indicate an estimated 50 year sea level rise benchmark of 516mm. This sea level rise allowance has been adopted for the proposal.

The approximate Mean High Water Mark (MHWM) for the site is around 1.48 metres above the zero of Fort Denison Tide Gauge (ZFDTG) (0.555 metres AHD). This converts to RL0.55. The adopted 50 year sea level rise allowance adopted for the project is therefore RL1.066 in 2064. The platform has been designed in consideration the adopted rise.

6.14.2 Potential impacts

Construction

Climatic factors would not constrain construction of the proposal except during adverse weather conditions such as prolonged heavy rain or high winds which may occur during the construction period. These may delay the completion of construction.

Construction would contribute to climate change through the generation of greenhouses gases from construction activities. Greenhouse gases would be generated through the use of fossil fuels by construction plant and equipment, transportation of personnel and materials and the embodied carbon in the materials used such as concrete and steel.

Operation

The proposal has minimised its exposure to climate change risks by including a fixed gangway and hydraulic platform which have been designed to provide appropriate clearances of existing tides, storm surge, sea and wave action whilst also considering projected sea level rise over the next 50 years.

The proposal does include the expansion of an existing fixed structure within the water. The hydraulic platform has been designed to consider the changes in sea level rise.

More extreme and more frequent heat events as a result of climate change may lead to more rapid degradation of the wharf structures. This may result in additional maintenance requirements.

There would be some greenhouse gas emissions emitted during maintenance of the wharf.

Any climate change impacts of constructing, operating and maintaining the proposal are considered minor.

Operation of the wharf will increase compared to existing operations. There would be some greenhouse gas emissions during maintenance of the wharf, although maintenance requirements have been considered in the materials used for the proposal and are considered minor.

6.14.3 Safeguards and management measures

Table 6-22 Safeguards and management measures for climate change

Impact	Environmental safeguard	Responsibility	Timing
Climate change	It is considered the potential for adverse impacts to and by climate change are effectively addressed by the design of the proposal	Contractor	Pre-construction
Climate change	The design of the wharf will allow for a sea level rise of about 500mm over 50 years	Contractor	Detailed design

Additional impacts are discussed in Chapter 6.15.

6.15 Other impacts

6.15.1 Existing environment and potential impacts

Table 6-23 Existing environment and potential impacts for utilities

Environmental factor	Existing environment	Potential impacts
Utilities	Utilities within the proposal area include: • Existing high voltage electricity cables providing power to the existing wharf distribution board	• Existing high voltage cables providing power to the wharf will be redirected as required to power the expanded structure during construction
	• Existing inlet water pipe situated under existing wharf providing freshwater to North Sydney Poo	• Existing inlet water pipe for North Sydney Pool to be protected in-situ during construction. Potential impacts of sediment disturbance to the pipe are considered further in Chapters 6.3 and 6.8.
	• Unknown utilities may exist within the proposal area	• Excavation and piling works undertaken during construction could impact on unknown utilities by hitting and damaging them.
	Known utilities outside the proposal area include: • Existing 132 KV cables in underground conduit along Alfred St to the seawall • Existing fibre submarine cables running from seawall across harbour Stormwater drainage	• No impacts anticipated during construction or operation.

6.15.2 Safeguards and management measures

Table 6-24 Safeguards and management measures for utilities

Impact	Environmental safeguard	Responsibility	Timing
Utilities	Design for the proposal to include all utilities within and outside of the proposal area.	Contractor	Pre-construction
Utilities	Dial Before You Dig (DBYD) investigations would be carried out prior to undertaking any excavation or piling works to identify any additional cables not identified during design.	Contractor	Construction

6.16 Cumulative impacts

The incremental effect of multiple sources of impact (past, present and future) is referred to as ‘cumulative impacts’ (Contant and Wiggins 1991; Council on Environmental Quality 1978). Consideration of cumulative impacts in the context of environmental assessment is necessary so that impacts associated with the proposal and other activities within the region are examined as a whole.

Ongoing vessel movements within the Sydney Harbour would have the potential to contribute to cumulative impacts during construction of the proposal however, given the isolation of the ferry wharf from other uses on the river, cumulative impacts from other uses would be considered to be low.

Roads and Maritime is planning the progressive upgrade of commuter ferry wharves throughout Sydney Harbour under the FWUP. This may involve other wharves on the same route being closed at the same time as Milsons Point, with Cockatoo Island Wharf upgrade and Chiswick Wharf Interchange upgrade confirmed at the time of REF production.

6.16.1 Study area

The broader Sydney Ferries network and local Lavender Bay Precinct within the Milsons Point area have been considered for the purpose of the cumulative impact assessment. The Sydney Ferries Network is defined in Figure 6-22**Error! Reference source not found.** and extent of the Lavender Bay precinct is shown in Figure 6-23.

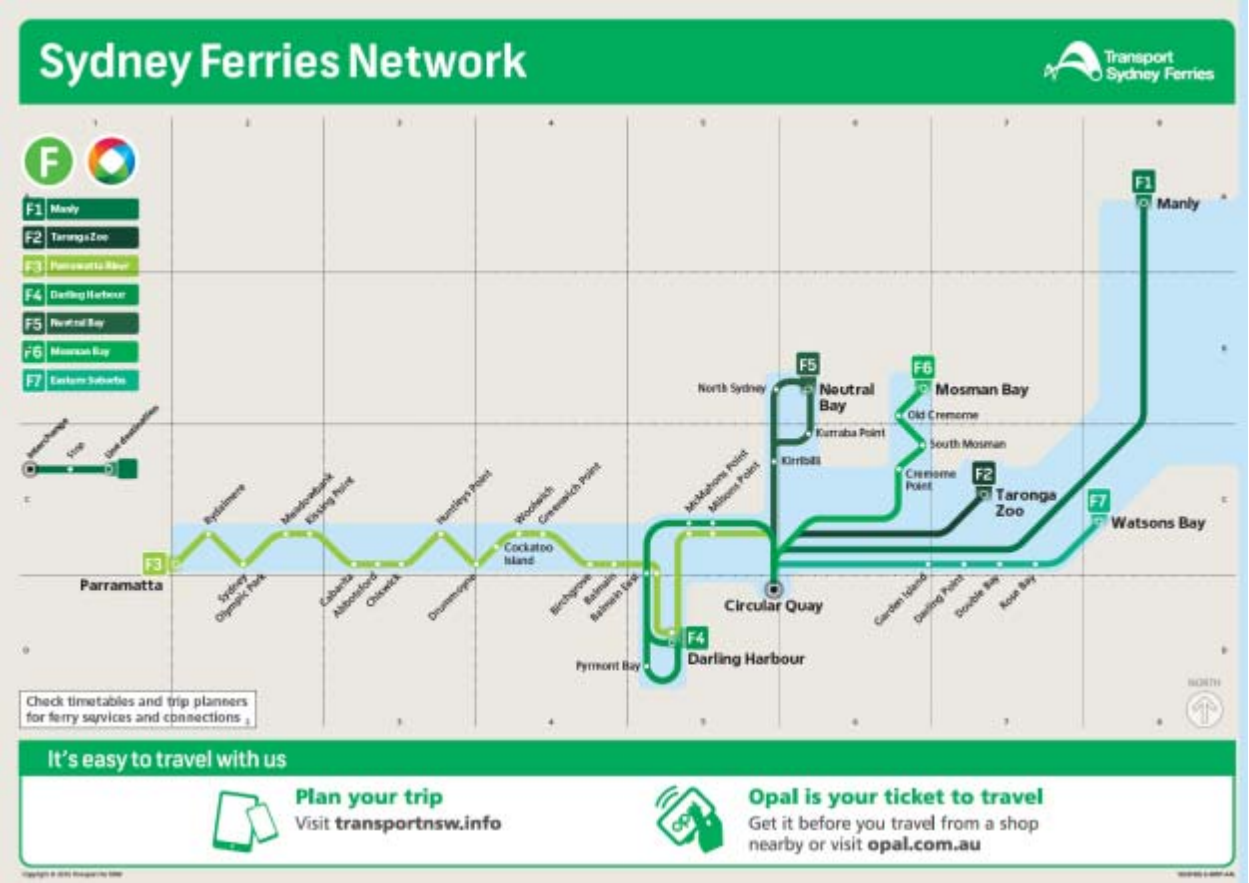

Figure 6-22 Sydney Ferries Network (from TfNSW webpage)

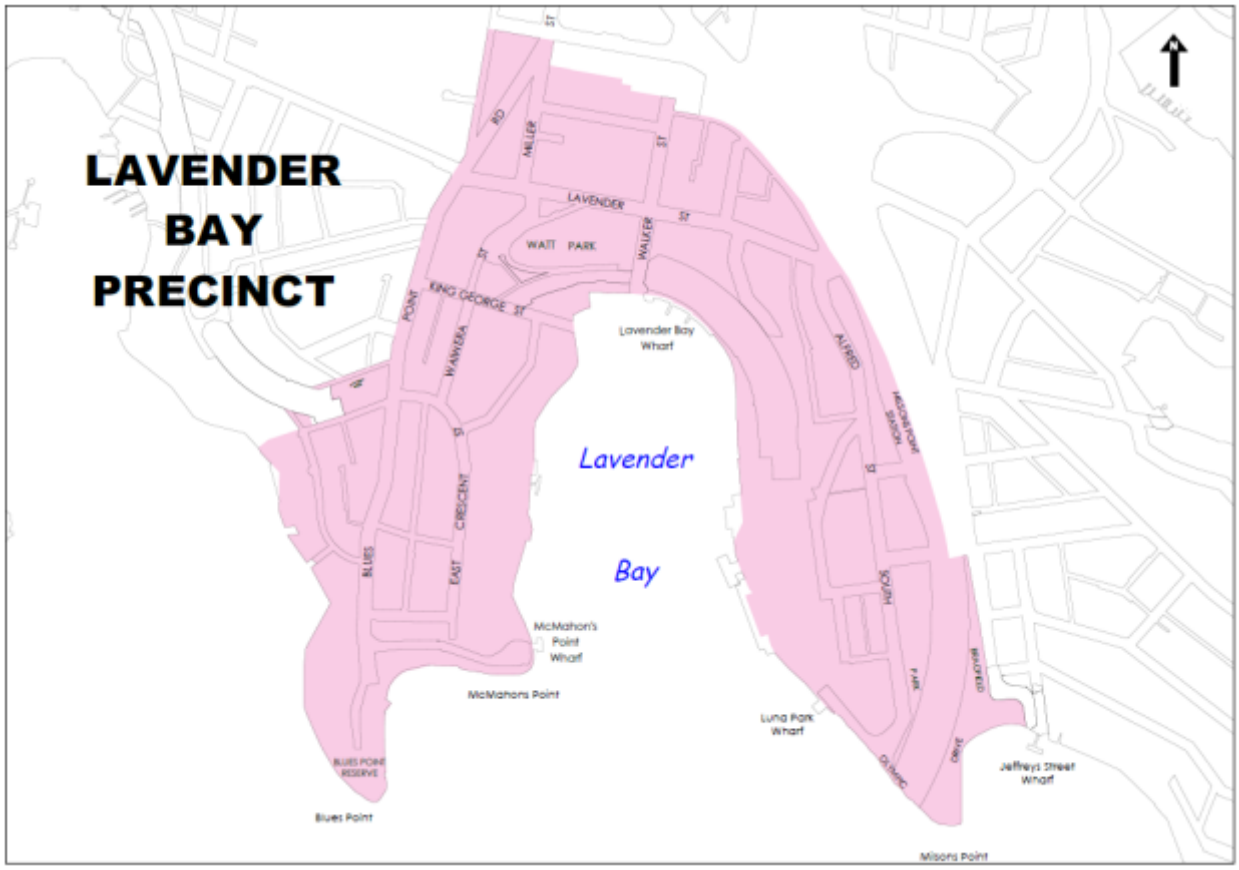

Figure 6-23 Lavender Bay Precinct (from North Sydney Council webpage)

6.16.2 Broader program of work

The proposal forms part of the Sydney FWUP which would create practical, functional and robust ferry commuter wharves within Sydney Harbour and the Parramatta River. The positive cumulative impacts of the proposal would result in improvements to:

- Safety for commuters
- Facilities for recreation
- The public domain and quality of commuter experience
- Safer travelling conditions
- Improved travel times
- Generally improved customer experience due to upgraded facilities
- Unifying and identifying the ferry wharves and the ferry commuter system.

There may be increased pressure on the local road network during this time however it is not expected to have more than a minor cumulative impact on the existing road network. The proposal has the potential to contribute to other cumulative impacts as follows:

Air quality

- There would be a potential minor short term cumulative increase in exhaust emissions from construction projects within the region.

Climate change

- Developments within the region would contribute to climate change through the generation of greenhouses gases from construction activities. Greenhouse gases would be generated through the use of fossil fuels by construction plant and equipment, transportation of personnel and materials and the embodied carbon in the materials used such as concrete and steel. The

climate change impacts of constructing, operating and maintaining the proposal are considered minor.

6.16.3 Past, present and future projects

A search of the Department of Planning and Environment's Major Projects Register, Sydney East Joint Regional Planning Panel Development and Planning Register, and North Sydney Council Development Application Register in November 2016, and a review of Ferry Wharf Upgrades proposed within the FWUP, identified the following projects occurring within the vicinity of the wharf that would create a cumulative impact on the proposal.

Table 6-24: Past, present and future projects

Project	Construction impacts	Operational impacts
Conversion of 19 storey commercial building to a mixed use commercial retail building, Lavender Street, Milsons Point	Potential noise impacts from construction	Potential for additional residents within the area, as building will be converted to commercial and residential. This could result in additional patronage for the proposal.
Cockatoo Island Wharf upgrade, due to commence works in mid-2017 • Upgrade of an existing wharf on the Sydney Ferries network to provide DDA compliant access to the island.	Potential socio-economic impacts for ferry users due to the planned closure of multiple wharves, although this would be minimised through the provision of alternative transport arrangements, with a temporary wharf to be provided to maintain access to Cockatoo Island. Potential to increase ferry user journeys due to the planned closure of multiple wharves and use of alternative transport arrangements such as temporarily relocating services and providing additional bus services.	The upgrade of Cockatoo Island Wharf will provide a DDA compliant wharf, potentially increasing patronage to Cockatoo Island Wharf which may have a minimal impact on Milsons Point patronage accordingly.

Project	Construction impacts	Operational impacts
Chiswick Wharf Interchange upgrade, due to commence works in early 2017 • Upgrade of an existing wharf on the Sydney Ferries network to create a DDA compliant wharf interchange	Potential socio-economic impacts for ferry users due to the planned closure of multiple wharves, although this would be minimised through the provision of alternative transport arrangements, with a temporary bus service to be provided from Abbotsford Wharf to Chiswick Wharf to maintain access to and from ferry services for users. Potential to increase ferry user journeys due to the planned closure of multiple wharves and use of alternative transport arrangements such as temporarily relocating services and providing additional bus services.	The upgrade of Chiswick Wharf Interchange will provide a DDA compliant wharf interchange, potentially increasing patronage to and from Chiswick Wharf Interchange which may have a minimal impact on Milsons Point patronage accordingly.

6.16.4 Potential impacts

Table 6-25 Potential impacts

Environmental factor	Construction impacts	Operational impacts
Socio-economic	The closure of three concurrent wharves for a short period of time will impact on commuters and ferry users, with potential for commuters and users to consider other methods of transport, resulting in a potential reduction in patronage. Alternative transport provisions have been provided for each wharf closure to minimise this impact.	The proposed upgrades would create practical, functional and robust ferry commuter wharves within Sydney Harbour and the Parramatta River. The positive cumulative impacts of the proposal would result in improvements to: • Safety for commuters • Facilities for recreation • The public domain and quality of commuter experience • Safer travelling conditions • Improved travel times • Generally improved customer experience due to upgraded facilities • Unifying and identifying the ferry wharves and the ferry commuter system

Environmental factor	Construction impacts	Operational impacts
Noise	Potential for cumulative construction noise to impact on local community within Lavender Bay Precinct area. Construction noise for the proposal would be minimised in accordance with the safeguards noted in Chapter 6.5.4.	Potential for better wharf facilities to be provided for additional residents within the area, as a result of the planned construction of both proposals.

6.16.5 Safeguards and management measures

No additional safeguards have been proposed, as it is considered existing safeguards will minimise the impacts discussed in this chapter.

7 Environmental management

This chapter describes how the proposal will be managed to reduce potential environmental impacts throughout detailed design, construction and operation. A framework for managing the potential impacts is provided. A summary of site-specific environmental safeguards is provided and the licence and/or approval requirements required prior to construction are also listed.

7.1 Environmental management plans

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

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

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by the Roads and Maritime Environment Officer, Sydney Region, prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the QA Specification G36 – Environmental Protection (Management System).

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in Table 7.1.

Table 7-1: Summary of site specific environmental safeguards

No	Impact	Environmental safeguards	Responsibility	Timing
GEN1	General - minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager prior to commencement of the activity. As a minimum, the CEMP will address the following: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. The endorsed CEMP will be implemented during the undertaking of the activity.	Contractor / Roads and Maritime Project Manager	Pre-construction / detailed design

No	Impact	Environmental safeguards	Responsibility	Timing
GEN2	General - notification	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / RMS Project Manager	Pre-construction
GEN3	General - environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include [the following are examples only: • areas of Aboriginal heritage sensitivity • threatened species habitat • adjoining residential areas requiring particular noise management measures.]	Contractor / RMS Project Manager	Pre-construction / detailed design
4	Land and water based land surface	A Soil and Water Management Plan (SWMP) would be prepared and implemented as part of the CEMP. The SWMP would identify all reasonable foreseeable risks relating to soil erosion and water pollution and describe how these risks would be addressed during construction	Contractor	Detailed design / Pre-Construction
5	Land and water based land surface	A site specific Erosion and Sediment Control Plan/s would be prepared and implemented as part of the SWMP. The Plan would include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Detailed design / Pre-construction

No	Impact	Environmental safeguards	Responsibility	Timing
6	Land and water based land surface	Silt and sediment controls would be established prior to any disturbance of the land surface. Controls would be in accordance with edition 4 of “Managing Urban Stormwater, Soils and Construction” (NSW Government, 2004) (the blue book)	Contractor	Pre-construction
7	Water based land surface	A silt curtain, extending from a minimum of 100 millimetres above the water line and extending to no less than 2.5m to below sea level would be installed around the entire redevelopment work area within the waterway prior to commencement of works that would disturb the seafloor	Contractor	Construction
8	Water based land surface	Inspections of the silt curtain or boom device should be undertaken on a daily basis after ebbing tides, with an additional inspection to be carried out after storm events. If excessive turbidity of the water is observed during removal of the first few piles, a second, moveable silt curtain would be installed around the piles being removed during each day of operation Results of the observations of the integrity of the silt curtain are required to be recorded in a site notebook maintained specifically for the purpose. The notebook is required to be kept on the site and to be available for inspection by persons authorised by Roads and Maritime	Contractor	Construction
9	Water based land surface	Any excavated sediments that require disposal would be sampled, tested and classified in accordance with the EPA’s *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA 2014) prior to being disposed of at a waste facility licensed to accept the relevant class of waste. Any materials classified as Hazardous Waste may require treatment or an immobilisation approach in accordance with Part 10 of the *Protection of the Environment Operations (Waste) Regulation* 2014 prior to off-site disposal.	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
10	Land surface	Trees located within the vicinity of the temporary compound would be protected by tree protection measures for the duration of construction	Contractor	Construction
11	Land surface	Following completion of construction activities and the removal of the temporary compound, the area would be restored with all land surfaces rehabilitated	Contractor	Construction
12	Land surface	Dial Before You Dig (DBYD) investigations would be carried out during the detailed design phase. If any relocation of services is required further assessment would be carried out in accordance with Roads and Maritime Environment Branch requirements and the appropriate utility providers would be consulted	Contractor	Pre-construction
13	Hydrology	Weather forecasts would be checked regularly during construction and where flooding is forecast, all equipment and materials would be removed from the compound site and wharf construction area or appropriately secured	Contractor	Construction
14	Water quality	Erosion and sediment measures would be checked prior to forecasted rainfall and following periods of rainfall	Contractor	Construction
15	Water quality	Emergency spill kits would be kept on site at all times and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site. A spill kit would be kept on each barge and at the temporary compound site. All staff would be made aware of the location of spill kits and trained in their use. If a spill occurs, the Roads and Maritime contract manager would be notified as soon as practicable and the Roads and Maritime Incident Procedure would be followed	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
16	Water quality	Equipment barges carrying plant or machinery would be fitted with bunding around equipment which contain chemicals to prevent chemical spills or leakages from entering the water. All equipment, materials and wastes transported between an appropriately approved and licenced facility, and the construction work site would be secured to avoid spills during transportation	Contractor	Construction
17	Water quality	Any chemicals or fuels stored at the temporary compound would be within double bunded areas	Contractor	Construction
18	Water quality	Vehicles, vessels and plant would be properly maintained and regularly inspected for fluid leaks	Contractor	Construction
19	Water quality	No vehicle or vessel would be washed down or refuelled while on site	Contractor	Construction
20	Water quality	Emergency contacts would be kept in an easily accessible location on the construction work site and on all construction vessels. All construction workers would be advised of these contact details and procedures	Contractor	Construction
21	Water quality	Daily clean-up of site to be undertaken to ensure no materials could enter the water	Contractor	Construction
22	Water quality	Any debris that enters the water must be retrieved as soon as possible. Floating debris to be retrieved by scoop. Sinking debris to be removed by diver	Contractor	Construction
23	Water quality	In an event of a spill during operation, the incident emergency plan would be implemented in accordance with Sydney Ports Corporation's response to shipping incidents and emergencies outlined in the 'NSW State Waters Marine Oil and Chemical Spill Contingency Plan' (Maritime, 2008)	Operator	Operation

No	Impact	Environmental safeguards	Responsibility	Timing
24	Water quality	Waste disposed of off-site shall be classified in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014) prior to disposal and shall be disposed of at an appropriately licenced facility for that waste. Where necessary, this shall include sampling and analysis	Operator	Operation
25	Water quality	All equipment, materials and waste transported between an appropriately licenced facility and the construction site would be secured to avoid spills during transportation.	Contractor	Construction
26	Water quality	A silt curtain, extending from a minimum of 100 millimetres above the water line and extending to no less than 2.5m to below sea level would be installed around the entire redevelopment work area within the waterway prior to commencement of works that disturb the seafloor with regard to the inlet pipe from North Sydney Pool	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
27	Air quality	Measures to address air quality impacts would be incorporated into the CEMP and implemented throughout the construction period. As a minimum, the following measures would be included • Covering all loaded trucks and vessels • Machinery to be turned off rather than left to idle when not in use • Maintenance of all vehicles, including trucks and vessels entering and leaving the site in accordance with the manufacturers specifications to comply with all relevant legislation • Maintenance of all plant and equipment to ensure good operating conditions and exhaust emissions comply with the Protection of the Environment Operations Act 1997 • Maintaining the work site in a condition that minimises fugitive emissions such as minor dust • Dust for any excavation works Appropriate sediment and erosion controls for any exposed earth or stockpiled waste	Contractor	Pre-construction and Construction

No	Impact	Environmental safeguards	Responsibility	Timing
28	Noise and vibration	Notification of all potentially affected residents would be undertaken at least five days prior to the proposed night time works Properties where noise management levels may be exceeded (those properties within the red line of figure 6-3) would receive indirect notification through a letter drop and residences that may be highly noise affected (those properties within the yellow line of figure 6-3) would receive direct notification through a door knock These notifications would include the timing and nature of works as well as the expected noise levels, duration and impacts prior to the commencement of construction Contact details to lodge noise complaints or receive updates would also be provided at this time.	RMS Project Manager	Pre-construction
29	Noise and vibration	A Noise and Vibration Management Plan would be prepared and incorporated into the CEMP. The management plan would include, but not be limited to: • Reasonable and feasible noise control measures to reduce noise levels taking into account the control methods specified in the noise and vibration impact assessment for the proposal • Identification of nearby sensitive noise receivers • A construction noise assessment in accordance with EPA Interim Construction Noise Guidelines for qualitative noise assessment and Roads and Maritime Noise and Vibration Guidelines • Details of the assessed hours of work and work to be undertaken Behavioural practices or other management measures to be implemented to minimise noise"	Contractor	Pre-construction

No	Impact	Environmental safeguards	Responsibility	Timing
30	Noise and vibration	Work would be carried out during the recommended standard construction hours identified in the Interim Construction Noise Guideline (DECC, 2009a) unless Roads and Maritime approval has been provided	Contractor	Construction
31	Noise and vibration	Preparation and movement of material would be maximised prior to works commencing so that it can be limited during the extended hours period	Contractor	Construction
32	Noise and vibration	Temporary hoarding would be erected around the compound site	Contractor	Construction
33	Noise and vibration	Construction personnel would be informed of the location of sensitive receivers, and the need to minimise noise and vibration from the works, through site induction and regular toolbox talks	Contractor	Construction
34	Noise and vibration	The use of portable radios, public address systems or other methods of site communication that may impact on residents unnecessarily would be avoided	Contractor	Construction
35	Noise and vibration	Non-tonal alarms to be used.	Contractor	Construction
36	Noise and vibration	Plant and equipment would be inspected fortnightly to ensure they are in good working order and not emitting excessive noise levels	Contractor	Construction
37	Noise and vibration	Quieter plant and equipment would be selected based on the optimal power and size to most efficiently perform the required task	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
38	Noise and vibration	Continuous noise monitoring will be undertaken during high noise periods of the construction work, including piling. The results of monitoring will be used to devise further control methods where required	Contractor	Construction
39	Noise and Vibration	Roads and Maritime will consult with local restaurants at least two weeks prior to the commencement of construction to determine reasonable noise management measures during lunch service.	RMS Project Manager	Pre-Construction
40	Noise and Vibration	A photographic record will be provided for the seawall and North Sydney Pool prior to construction to establish condition.	Contractor	Pre-Construction
41	Landscape character and visual impact	Urban design principles will be integrated throughout the detailed design and construction of the proposal	Contractor	Pre-construction and Construction
42	Landscape character and visual impact	Selection of neutral and transparent materials will be integrated throughout the detailed design and construction of the proposal	Contractor	Pre-construction and Construction
43	Landscape character and visual impact	The impact of the proposal on the existing foreshore will be minimised by maintaining the current ramp adjacent to Luna Park and coordinating the new ramp and steps to the wharf with the existing balustrade and sea wall during detailed design development	Contractor	Pre-Construction
44	Landscape character and visual impact	The impact of the proposal on the Luna Park lighting in the night time landscape will be minimised by designing lighting to maintain the primacy of Luna Park during detailed design development	Contractor	Pre-Construction

No	Impact	Environmental safeguards	Responsibility	Timing
45	Landscape character and visual impact	The compound site and works area would be kept clean and clear of rubbish	Contractor	Construction
46	Biodiversity	A spill management plan will be developed and communicated to all staff working on site	Contractor	Pre-construction
47	Biodiversity	Consult with Department of Fisheries regarding offsets	RMS Project Manager	Pre-construction
48	Biodiversity	The construction work site area used will be the minimum size necessary to safely undertake the proposal • Exclusion zones will be established to identify the work area and prevent damage to marine habitats outside the work area Should the construction work area identified at Figure 3-2 be expanded further environmental assessment would be required.	Contractor	Pre-construction and Construction
49	Biodiversity	In the event of a spill or paint contamination of the waterway, works would cease and a Roads and Maritime Environmental Officer be contacted immediately. Fisheries NSW (ph. 1800 043 536) and the Office of Environment and Heritage (OEH) (ph. 131 555) are to be immediately notified of any fish kills in the vicinity of the works. In such cases, all works other than emergency response procedures are to cease until the issue is rectified and written approval to proceed is provided by Fisheries NSW or OEH	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
50	Biodiversity	To minimise wash and prevent bottom scouring of the marine sediments, vessels will not use excessive power when manoeuvring barges into place over the course sand and rock rubble habitat Scouring damage will also be minimised by 'working the wind and tides', by only moving floating plant into place on high tides and under favourable or no-wind conditions, where practicable	Contractor	Construction
51	Biodiversity	In the case that any unexpected threatened species are observed in the construction area, works will cease and Roads and Maritime will be informed to guide further action	Contractor	Construction
52	Biodiversity	A s205 FM Act permit to *Harm Marine Vegetation* will be required. Further offset would be required to mitigate the impact of the loss of Key Fish Habitat.	Contractor	Pre-construction
53	Biodiversity	A Construction Environmental Management Plan (CEMP) to address pollution, contamination and unnecessary disturbance would be developed prior to construction	Contractor	Pre-construction
54	Biodiversity	Establish no-go zones to avoid damage to adjacent habitats. For most of the construction period, the no-go zone generally includes the base of the stone seawall in the intertidal zone and nearshore rocky macroalgae habitat, but may temporarily exclude those areas for one off drilling or piling.	Contractor	Construction
55	Biodiversity	Works involving placement of barges, drilling and pile driving should occur during calm conditions.	Contractor	Construction
56	Biodiversity	No anchors or mooring blocks/lines should be placed on the rocky macroalgae habitat. All lines should be suspended off the seafloor to minimise drag across benthic communities.	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
57	Biodiversity	Use a floating boom with silt curtain to contain sediment plumes during drilling and pile hammering. Silt curtains should aim to protect the rocky macroalgae habitat from lateral sedimentation and rock debris during drilling. A curtain can be suspended parallel to shore between the postposed pile location and macroalgae habitat. If pilot holes are required to be drilled into the rocky macroalgae bed, then silt curtains may need reconfiguration for each individual dill location, aiming to reduce longitudinal displacement of sediment and rock debris. Other silt curtains may be required to delineate the outer works area, firstly to establish a construction site and secondly to minimise spread of sediment plumes onto bare sand habitat in deeper water.	Contractor	Construction
58	Biodiversity	Minor earthworks required at the top of the stone seawall should be constructed and stabilised without debris falling into the waterway.	Contractor	Construction
59	Biodiversity	All waste material should be disposed of on land and not reused in the construction.	Contractor	Construction
60	Biodiversity	If drilling into the rocky macroalgae bed, underwater inspection of each drill location should occur to relocate any sensitive flora and fauna, or small rocks with those species attached. Sensitive flora includes macroalgae attached to rubble (limited to <20 kg rocks) and Syngnathiformes (seahorses and their relatives) sheltering in or attached to marine vegetation. Rock rubble habitat, macroalgae and/or Syngnathids can be relocated by a licenced marine/aquatic ecologist to similar macroalgae habitat at least 50 m to the east towards the bridge.	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
61	Biodiversity	A specialist marine/aquatic ecologist would undertake a pre-construction inspection of the piles for syngnathids (seahorses and pipefish) • In the case that any syngnathids (seahorses and pipefish) are observed on the piles, the specialist marine/aquatic ecologist would re-locate these to an adjacent suitable rocky reef habitat away from the construction work site • The marine/aquatic ecologist must hold the appropriate permit under section 37 of the FM Act to undertake the handling and relocation of *Syngnathiformes*. This would be obtained prior to the commencement of works All personnel working within the waters of the construction site would be informed of the potential to encounter syngnathids (seahorses and pipefish).	Contractor	Pre-Construction
62	Biodiversity	The noxious marine alga Caulerpa taxifolia was not overserved in the study area. Care should be taken not to introduce this species to the area by using contaminated vessels and machinery. Best hygiene practices are outlined in the NSW Control Plan for the Noxious Marine Alga Caulerpa taxifolia (NSW I&I 2009) are to be followed.	Contractor	Construction
63	Biodiversity	Construction crews should maintain contact with the Port Authority of NSW (Sydney Ports) for advance warning of large marine mammals moving west into the harbour. To avoid disturbing these animals, pile drilling and hammering works should cease until those animals have passed an exclusion zone monitored by staff, or are heading east (i.e. past Kirribilli Point). Gentle start-up hammering is recommended to allow undetected aquatic fauna to leave the area and avoid hearing damage.	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
64	Socio-economic	North Sydney Council and the local community to be kept informed about details of the works, construction progress, wharf closure, changes to public transport and other impacts throughout the construction period in accordance with the Milsons Point Wharf Interchange Communication Plan	Contractor	Pre-construction and Construction
65	Socio-economic	An internet site and free call phone number for proposal enquiries will be established for the duration of the works. Contact details will be clearly displayed at the site throughout the construction period. Directions will be provided on how to make an enquiry or register a complaint regarding the works	RMS Project Manager	Pre-construction and Construction
66	Socio-economic	An enquiry and complaint tracking system will be established. Any enquiries or complaints will be acknowledged within 24 hours of being received	Project Manager	Pre-construction and Construction
67	Socio-economic	All operational wharf lighting and signage is to comply with the DSAPT 2002	Contractor	Construction and Operation
68	Socio-economic	The construction site will be lit at night for safety. Lights will be positioned so that light is not directed towards nearby residences	Contractor	Construction
69	Land transport and parking	A traffic control plan will be prepared in accordance with the 'Traffic control at work sites manual' (RTA, 2010a) and Australian Standard 1742.3 (manual of uniform traffic controls devices) and will include such things as appropriate wayfinding signage to be installed advising of alternative transport options where necessary	Contractor	Pre-construction
70	Land transport and parking	Worker parking will be developed in consultation with council prior to work commencing.	Contractor	Pre-construction

No	Impact	Environmental safeguards	Responsibility	Timing
71	Water Transport	Commercial, recreational operators and private services that use the existing wharf will be advised of the wharf closure at least two weeks prior to closure.	RMS Project Manager	Pre-construction
72	Water transport	The water-based construction zone will be clearly delineated and marked to prevent non-construction vessels from entering the construction site.	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
73	Water transport	• A Marine Traffic Management Plan will be prepared and implemented during water based construction works, in consultation with NSW Maritime and approved by the Harbourmaster. • The proposed works will not interfere with the movement of seagoing ships unless agreed in advance with the Harbourmaster • Buoys will not be laid in or adjacent to shipping channels unless agreed in advance with the Harbourmaster • All buoys will be fitted with lights • All vessels associated with the works are to have Response Plans for emergencies and spills • At least one vessel is to be fitted with an Automatic Identification System (AIS). • The applicant is to consult with NSW Maritime and Harbourmaster regarding any navigation lights placed on the structure • Any marine spill (whether spill occurs on water on land and subsequently enters the water) is to be immediately reported to Sydney Ports VTS and VHF Channel 13 • Any material associated with the construction of the development that enters the water is to be immediately retrieved. Should material not be retrieved, the Port Authority will organise for its removal and recover costs from the Applicant The Applicant is to prepare a Communications Plan for implementation during the works which must include 24/7 contact details, protocols for enquiries, complaints and emergencies.	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
74	Aboriginal	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Roads and Maritime' Aboriginal cultural heritage advisor and the senior regional environmental officer contacted immediately. Steps in the Roads and Maritime Standard Management Procedure: Unexpected Archaeological Finds must be followed.	Contractor	Construction
75	Non-Aboriginal heritage	All construction staff will be inducted in the Roads and Maritime Unexpected Archaeological Finds Procedure (2011) and will implement this procedure where necessary. The item will be identified to personnel during induction to ensure care is taken in the vicinity of the item	Contractor	Construction
76	Non-Aboriginal heritage	Section 57(2) exemption will be submitted and approved prior to construction commencing within the Sydney Harbour Bridge curtilage area.	RMS Project Manager	Pre-Construction
77	Non-Aboriginal heritage	If approval for the Section 57(2) exemption is granted, any impacts temporary or permanent, to the character of Bradfield Park that are outside the descriptions provided in the civil drawings, must be avoided. It is recommended that machinery be restricted to the road side of the works and ground surface disturbance must be limited to the spaces indicated in the descriptions of proposed works.	Contractor	Construction
78	Non-Aboriginal heritage	In the unlikely event that suspected human skeletal remains are identified, the Roads and Maritime procedure for uncovering bones must be followed	Contractor	Construction

No	Impact	Environmental safeguards	Responsibility	Timing
79	Hazards	A life preserving ring and appropriate first aid provisions will be located within the compound and on all barges during the construction period Spill kits will be available as outlined in Chapter 6.3.3 Waste management procedures and incident protocols will be adopted as outlined in Chapter 6.3.3	Contractor	Construction
80	Climate change	It is considered the potential for adverse impacts to and by climate change are effectively addressed by the design of the proposal	Contractor	Pre-construction
81	Climate change	The design of the wharf should allow for a sea level rise of 500mm over 50 years	Contractor	Detailed design
82	Utilities	Design for the proposal to include all utilities within and outside of the proposal area.	Contractor	Pre-construction
83	Utilities	Dial Before You Dig (DBYD) investigations would be carried out prior to undertaking any excavation or piling works to identify any additional cables not identified during design.	Contractor	Construction

7.3 Licensing and approvals

Table 7-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
Fisheries Management Act 1994 (s205)	Permit to harm marine vegetation from the Minister for Primary Industries.	Prior to start of the activity.
Heritage Act 1977 (s57)	Exemption notification for minor excavation to an item on the State Heritage Register from the Director OEH.	Prior to start of the activity.
Licence/short term lease	Licence/short term lease would be required from North Sydney Council for the location of the temporary compound.	Prior to the start of construction works
Approval from the Deputy Harbour Master	Approval from the Deputy Harbour Master for any works that disturb the seafloor.	Prior to the commencement of any works that disturb the seafloor

8 Justification and conclusion

This chapter provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

8.1 Justification

The proposal is justified because it would improve access to the wharf and ferry services for people with a disability, improving commuter experience and safety and increase capacity for future use. The proposal is also justified as it would meet the proposal objectives outlined in Chapter 2.3 in a manner that would have minimal impact on the environment and the community. The following chapters consider the justification of the proposal in relation to the social and economic factors, biophysical factors and the public interest.

8.2 Objects of the EP&A Act

Table 8-1 Objects of the EP&A Act

Object	Comment
5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	The proposal would contribute to improved management, development and conservation of the Milsons Point Wharf Interchange. The proposal would promote the social and economic welfare of the community by improving the commuter experience for users of the Milsons Point Wharf Interchange. See Chapter 6 for further details.
5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.	The proposal has been coordinated as part of the strategic FWUP (see Chapter 2.1)
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	The proposal would not impact on the provision or coordination of communication and/or utility services. Relevant utility providers have been consulted during the development of the proposal.
5(a)(iv) To encourage the provision of land for public purposes.	The proposal would expand the existing wharf and it would continue to be used for both Sydney Ferry services and other vessels such as taxis and recreational vessels.
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	The new wharf would result in a wharf that complies with the DDA standards for 80 per cent of all tides.

Object	Comment
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	Biodiversity is considered at Chapter 6.7. There is a requirement for a permit from Fisheries.
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in Sections 8.2.1 to 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the project.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Consultation has been undertaken with North Sydney Council, TfNSW and the foreshore authority as detailed in Chapter 5.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	The community consultation and notification program carried out in the lead up to preparing this REF is detailed in Chapter 5 of this REF. There would be ongoing consultation prior to the commencement of construction and throughout the construction period.

8.2.1 The precautionary principle

The precautionary principle upholds that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

When applying the precautionary principle public and private decisions should be guided by:

- Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment
- An assessment of risk-weighted consequences of various options.

A precondition for the operation of the precautionary principle is that there are threats or serious or irreversible damage to the environment. This REF has demonstrated that such threats are not present for the proposal.

Regardless, the proposal has sought to take a precautionary approach to minimise environmental impacts. This has also been applied in the development of safeguards and management measures. Best available technical information, environmental standards and measures have been used to minimise identified environmental risks of the proposal.

Conservative ‘worst case’ scenarios were considered while assessing the environmental impact of the proposal. For example conservative estimates of the number of construction barges, vessels and vehicles were used for the impact assessment. Worst case construction times were also assessed.

Specialist advice in noise and vibration, aquatic ecology, landscape character and visual impact were incorporated for a detailed understanding of the existing environment.

Planning for the proposal involved a risk assessment process that evaluated the environmental risks of the Ferry Wharf Upgrade Program. Measures to avoid the identified risks were then factored into the construction of the proposal. These included:

- The decision to use an off-site facility to undertake much of the construction work as possible was made to minimise impacts to the surrounding residential area.
- The decision to transport most personnel, materials, plant and equipment between the off-site facility, and the construction work site by barge/boat was made to reduce environmental impacts such as traffic, parking and noise impacts

8.2.2 Intergenerational equity

The principle of intergenerational equity upholds that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The proposal would benefit both existing and future generations in the following ways:

- Improved customer experience as a result of upgrading the Milsons Point Wharf Interchange
- Improve the capacity and number of services from the Milsons Point wharf
- Maintaining the local environment and implementing safeguards and management measures to protect the environmental values of Parramatta River and Sydney Harbour
- Providing a facility with a service life of 50 years.

The proposal has integrated short term and long-term social, financial and environmental considerations so that any foreseeable impacts are not left to be addressed by future generations.

Issues with potential long term implications such as the consumption of non-renewable resources, waste disposal and water quality have been avoided and/or minimised through construction planning and the application of safeguards and management measures described at Chapter 7.

8.2.3 Conservation of biological diversity and ecological integrity

The principle of biological diversity upholds that the conservation of biological diversity and ecological integrity should be fundamental consideration.

The construction planning outcomes and safeguard and management measures described at Chapter 7.2 would minimise the impacts of the proposal on aquatic and terrestrial biodiversity and the ecological integrity of Parramatta River, Sydney Harbour and its surrounding landscapes.

8.2.4 Improved valuation, pricing and incentive mechanisms

This principle upholds that environmental factors should be included in the valuation of assets and services, such as:

- Polluter pays, that is, those who generate pollution and waste should bear that cost of containment, avoidance or abatement
- The users of goods and services should pay prices based on the full life cycle of costs or providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste
- Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Environmental issues have been considered in the strategic planning for the proposal. The preservation and/or improvement of social, economic and transport values of Milsons Point Wharf Interchange are the primary reasons that justify the need for the proposal. The environmental goals of the proposal have been pursued in the most cost effective way through the construction planning process.

Safeguards and management measures identified at Chapter 6.3 for avoiding, reusing, recycling, managing waste during construction and operation would be implemented.

8.3 Conclusion

The proposed expansion of the existing ferry wharf and interchange at Milsons Point is subject to assessment under Part 5 of the EP&A Act. This REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration (where relevant) of conservation agreements and plans of management under the NPW Act, joint management and biobanking agreements under the TSC Act, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the project objectives but would still result in some impacts on biodiversity. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also increase capacity and provide DDA compliant paths of travel. On balance the proposal is considered justified and the following conclusions are made.

Significance of impact under NSW legislation
The proposal would be unlikely to cause a significant impact on the environment. Therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act. A Species Impact Statement is not required. The proposal is subject to assessment under Part 5 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation
The proposal is not likely to have a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Department of the Environment is not required.

9 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Katie Allchurch

Planner

RPS

Date: 05/12/2016

I have examined this review of environmental factors and accept it on behalf of Roads and Maritime Services.

Bob Rimac

Senior Project Manager

Roads and Maritime Services Greater Sydney Program Office

Date:

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Terms and acronyms

Term / Acronym	Description
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
AS	Australian Standard
BCA	Building Code of Australia
Berthing	A place for a vessel to dock
BTS	Bureau of Transport Statistics
CCTV	Close circuit television
CEMP	Construction environmental management plan
DDA	*Disability Discrimination Act 1992* (Cth)
EIA	Environmental impact assessment
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process
ESD	Ecologically sustainable development. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
Fetch	An area where ocean waves are being generated by the wind
FM Act	*Fisheries Management Act 1994* (NSW)
FWUP	Ferry Wharf Upgrade Program
Gangway	A landing used by passengers to board or exit ships/vessels
Heritage Act	*Heritage Act 1977* (NSW)
GSC	Greater Sydney Commission
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
Jetty	A structure extending into the harbour as part of a wharf
LALC	Local Aboriginal Land Council
LCVIA	Landscape Character and Visual Impact Assessment

Term / Acronym	Description
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act
LGA	Local Government Area
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers
MEMP	Marine Environmental Management Plan
MHWM	Mean high water mark
MNES	Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
Noxious Weeds Act	*Noxious Weeds Act 1993* (NSW)
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
Piles	Foundations used to support marine structures and offshore platforms
Pontoon	A floating structure serving as a dock
REF	Review of environmental factors
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act
SEPP 14	State Environmental Planning Policy No.14 – Coastal Wetlands
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
QA Specifications	Specifications developed by Roads and Maritime Services for use with roadworks and bridgeworks contracts let by Roads and Maritime Services
Wharf	A landing place or pier where ships may tie up and load or unload
ZFDTG	Zero of Fort Denison Tide Gauge

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