NSW GOVERNMENT | sydney METRO

West

The Bays road relocation works

Review of Environmental Factors

2020

Cover: Aerial photo of The Bays, Sydney.

Executive summary

Sydney Metro is proposing to configure the internal port road network at Rozelle in order to facilitate the orderly urban renewal of the Bays West area while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. This includes long-term urban renewal initiatives for the Bays West area and works for various future developments within the locality, including critical works for the proposed Sydney Metro West. The proposal also provides the opportunity to improve road safety by reducing conflicting traffic movements along the internal port road network.

The Bays has been identified as a location for a future metro station as part of the proposed Sydney Metro West. The proposed station is one of the first major infrastructure projects required to facilitate the long term urban renewal of the Bays West area. As such, Sydney Metro as the proponent is progressing the necessary road network changes to Port Access Road, Sommerville Road and Solomons Way.

Sydney Metro, a NSW Government agency, is the proponent and a determining authority for this proposal under Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The purpose of this Review of Environmental Factors (REF) is to describe the proposal, to document potential impacts of the proposal on the environment, and to detail mitigation measures to be implemented.

Description of the proposal

The proposal would be completed in two phases and would comprise the following key activities:

- Reconfiguration of the intersection at Port Access Road / Sommerville Road / Solomons Way
- Relocation of Port Access Road to the south-west
- Line marking and signage at Port Access Road, Sommerville Road and Solomons Way to establish one-way flows and remove conflicting traffic movements
- Relocation of Cement Australia Truck Parking Licenced Area to the north-east.

The final network arrangement at the completion of the proposal is shown in Figure E-1.

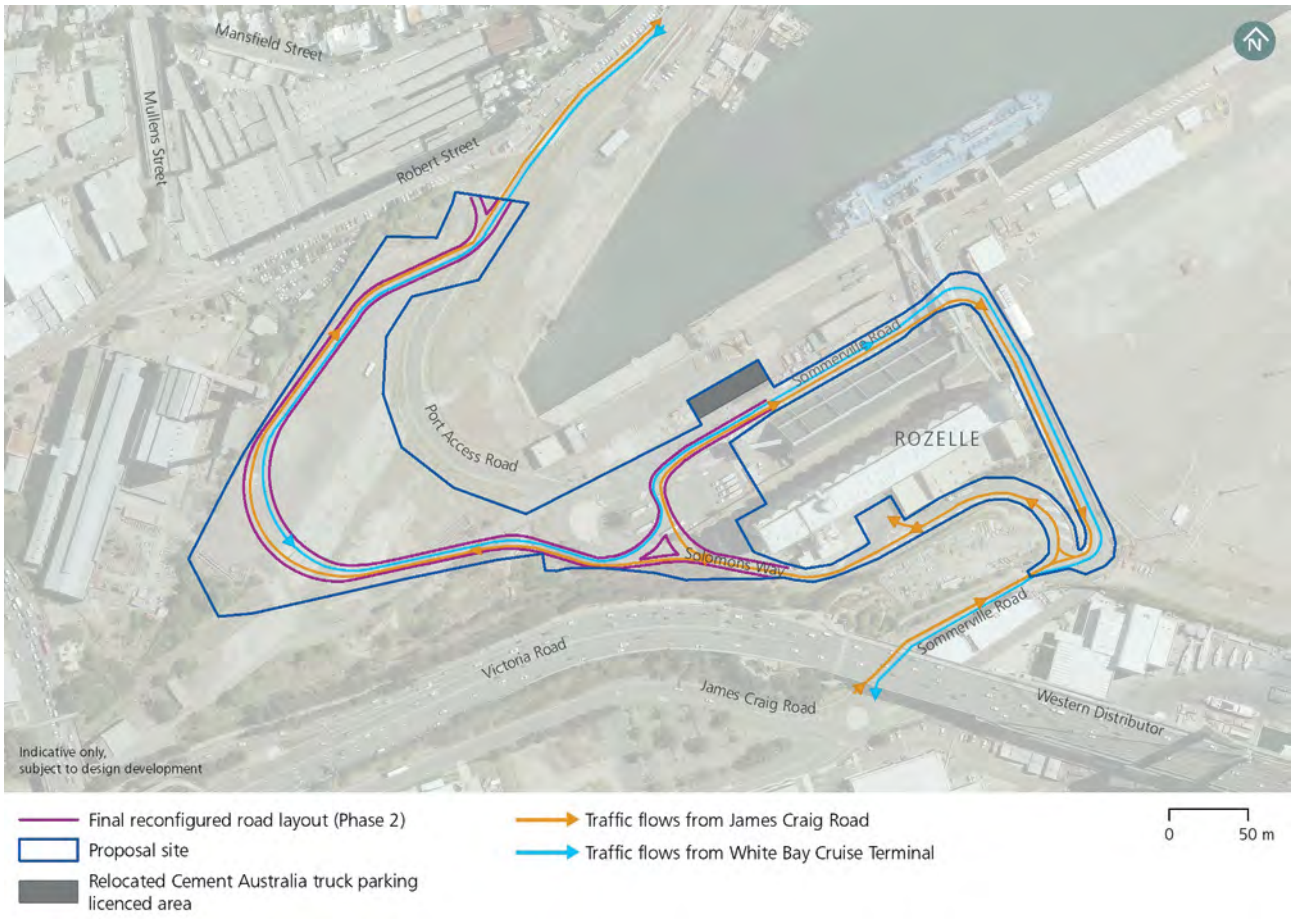

Figure E-1 The proposal, at completion

Need for the proposal

Port Access Road, Sommerville Road and Solomons Way provide access to the White Bay Cruise Terminal and other port operations located in the Glebe Island and White Bay destinations. The current arrangement of the internal port road network results in conflicts between construction works proposed as part of the redevelopment of The Bays and ongoing port and maritime uses, including traffic associated with the White Bay Cruise Terminal. There are also several conflicting movements at the intersections of the Port Access Road / Sommerville Road / Solomons Way including heavy vehicles, buses and cars creating potential road safety risks.

To allow the internal port road network to remain operational while facilitating the long term urban renewal of The Bays, adjustments to current arrangement of the Port Access Road, Sommerville Road and Solomons Way are required. This also provides the opportunity to reduce conflicting movements and improve road safety at various intersections within the proposal. As the proposed reconfigured intersection directly conflicts with the current location of the Cement Australia Truck Parking Licenced Area, this parking area would be relocated to facilitate these adjustments.

Options considered

Following the identification of impacts to Port Access Road associated with future works at The Bays, Sydney Metro considered options to minimise disruptions and ensure public safety. Two options were considered, including a 'do nothing' scenario or a relocation of the Port Access Road.

If the proposed road works were not progressed, there would be conflicts between construction works as part of the redevelopment of The Bays and the need to maintain access to the White Bay Cruise Terminal and ongoing port operations. This would either impact the efficiency of future construction works or result in restricted access to the Cruise Terminal and ongoing port operations at Glebe Island and White Bay.

Undertaking the proposed road works was identified as the preferred option, and is the subject of this REF.

Statutory considerations

The EP&A Act provides for the environmental assessment of development in NSW. Part 5, Division 5.1 of the EP&A Act generally specifies the environmental impact assessment requirements for activities carried out by public authorities, such as Sydney Metro, which do not require development consent.

The proposal is categorised as development for the purpose of roads and road infrastructure facilities pursuant to clause 94 of State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) and, as such, the proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development and accordingly can be assessed under Division 5.1 of Part 5 of the EP&A Act.

This REF has been prepared to assess the construction and operational environmental impacts of the proposal. The REF has been prepared in accordance with clause 228 of the Environment Planning and Assessment Regulation 2000 (the EP&A Regulation).

In accordance with section 5.5 of the EP&A Act, Sydney Metro, 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 proposed activity.

Chapter 7 of this REF presents the environmental impact assessment for the proposal, in accordance with these requirements.

Community and stakeholder consultation

Sydney Metro has prepared the proposal in consultation with Port Authority of NSW (who completed their own consultation with the White Bay Cruise Terminal operations and their tenants including Cement Australia, Gypsum Resources Australia and Sugar Australia), and has consulted relevant Transport for NSW projects including M4-M5 Link and Western Harbour Tunnel and Warringah Freeway Upgrade.

Consultation with Inner West Council and Property NSW will occur during the exhibition of the REF as required under the ISEPP.

Environmental impact assessment

This REF assesses potential construction and operational environmental impacts of the proposal. The following key impacts have been identified should the proposal proceed:

- Construction noise: Potential construction noise impacts associated with the proposal are predicted to generally be compliant or 'minor' for most of the works, however 'moderate' and 'high' impacts are predicted for a short duration during site clearing works. These works would be carried out during standard construction hours.
- Construction vibration: Potential exceedances of the cosmetic damage screening criteria are predicted at two buildings at the former White Bay Power Station site and at the building nearest to the proposed works on the Cement Australia site. Vibration monitoring would be undertaken within close proximity to vibration sensitive buildings to check vibration levels do not exceed the appropriate thresholds. Where recent condition surveys are not available, condition surveys of buildings and structures may be required before and after the works would be carried out.
- Non-Aboriginal heritage: The proposal has been assessed as potentially having a minor direct impact, minor indirect (visual) and potential indirect impact (due to construction vibration) on the State heritage listed White Bay Power Station. As the proposal enters the heritage curtilage listed on the State Heritage Register, it would be necessary to obtain a Section 57 exemption or a Section 60 permit from the Heritage Council of NSW (Heritage Council) or delegate (the Department of Premier and Cabinet (Heritage)) prior to works commencing within the heritage curtilage. The proposal may have minor direct and potential direct vibration impacts on the White Bay Power Station (Inlet) Canal, a Section 170 heritage item, depending on the relative depth of the item to the proposed works
- Cumulative construction traffic: During the evening peak the road network is already operating at capacity and the cumulative impact of construction vehicles from nearby projects would potentially result in increased intersection delays and queue lengths at some locations. Consultation would be carried out with Transport for NSW including Transport Coordination and Port Authority of NSW to manage the potential road network impacts.

An assessment of each of the above and other environmental issues is provided in Chapter 7 of this REF.

Benefits of the proposal

The proposal would provide social and economic benefits by maintaining safe and reliable road access to the White Bay Cruise Terminal and other port operations in the Glebe Island and White Bay destinations during future construction works associated with the development within the White Bay Power Station (and surrounds) destination. This would minimise disruptions to cruise passengers, cruise operations and other port/commercial operations and allow for efficient construction of various projects.

The proposal would also improve road safety outcomes for users of the internal port road network by reducing conflicting movements.

Environmental impacts as a result of the proposal would generally be minimal in nature. With the implementation of the proposed mitigation measures in Chapter 8, any potential environmental impacts of the proposal would be adequately mitigated and managed and are therefore not considered to be significant.

Justification and conclusion

This REF has been prepared having regard to sections 5.5 and 5.7 of the EP&A Act, and clause 228 of the EP&A Regulation that provides for Sydney Metro as a determining authority to take into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the proposal and whether or not the activity is likely to significantly affect the environment.

Should the proposal proceed, any potential associated adverse impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF, and the Conditions of Approval imposed in the Determination Report. This would ensure the proposal is delivered to maximise benefits to the port and commercial operators, cruise passengers and the public.

The proposal would not affect Commonwealth land or have a significant impact on any matters of national environmental significance.

On balance, the proposal's long-term benefits would outweigh its impacts, and the proposal is considered to be justified.

Next steps

Sydney Metro will exhibit the REF for a minimum four week period commencing in April 2020 so the community can provide written comments on the proposal.

The details of engagement activities will be advised at the commencement of public exhibition through advertising (print and digital), a newsletter delivered to properties, emails to registered parties and information provided on the Sydney Metro website. Additional stakeholder and community consultation will continue to be implemented to inform the community and stakeholders prior to and during the proposal's construction (should it be approved during the proposal's determination phase).

Consultation will be undertaken concurrently with public exhibition of the Environmental Impact Statement for Sydney Metro West: Westmead to The Bays.

Sydney Metro will continue to incorporate consultation outcomes based on feedback from residents, community and stakeholders during development of the proposal. Sydney Metro invites comments on this REF during public display. Submissions received during the public display period will be considered and addressed in a Response to Submissions Report, including any amendments to the proposal. This report, along with the REF and any other relevant information, will be used by Sydney Metro to assess and determine the proposal. This report will be made publicly available on the Sydney Metro website.

After this consideration, Sydney Metro will determine whether or not the proposal should proceed as proposed and will inform the community and stakeholders of this decision. If the proposal is determined to proceed, Sydney Metro will continue to consult with the community and stakeholders prior to and during construction.

Correspondence will be sent to people who make a submission which would include contact details for further information and an indication of the anticipated timing of construction work, subject to approval.

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1 Introduction

This chapter describes the background to the proposal, an overview of the proposal, and the purpose and an outline of the structure of this Review of Environmental Factors (REF).

1.1 Background

Sydney Metro is proposing to configure the internal port road network at Rozelle to facilitate the orderly urban renewal of the Bays West area while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. This includes long-term urban renewal initiatives for the Bays West area and works for various future developments within the locality, including critical works for the proposed Sydney Metro West. The proposal also provides the opportunity to improve road safety by reducing conflicting traffic movements in the internal port road network.

The Bays has been identified as a location for a future metro station as part of the proposed Sydney Metro West. The proposed station is one of the first major infrastructure projects required to facilitate the long term urban renewal of the Bays West area. As such, Sydney Metro as the proponent is progressing the necessary road network changes to Port Access Road, Sommerville Road and Solomons Way.

1.2 Overview of the proposal

1.2.1 Location of the proposal

The proposal is located in an established industrial and port context at Rozelle, within the Inner West Council local government area.

The 'proposal site' refers to the area that would be directly impacted by the proposal as shown in Figure 1-1. The proposal site is largely disused with the exception of the Port Access Road and port related lease areas including a Cement Australia Truck Parking Licenced Area to service Cement Australia's operations at the Glebe Island Silos. The proposal site is under the ownership of the Port Authority of NSW.

To the north of the proposal site is the existing Port Access Road that supports access to the White Bay Cruise Terminal and other port operations at White Bay. To the east of the site is the existing Cement Australia and Sugar Australia Glebe Island Silos and the Gypsum Resources Australia facility. The south-eastern border of the site is vegetated land adjoining Victoria Road / Western Distributor. The proposed location for the relocated Cement Australia Truck Parking Licenced Area is currently a hardstand laydown area used by Port Authority of NSW.

Beyond the proposal site, the wider locality features a mix of land uses, including retail, commercial and urban services along Robert Street to the north, port and maritime uses to the east (Glebe Island and White Bay) and to the south, and City West Link Road and residential dwellings to the west in Rozelle.

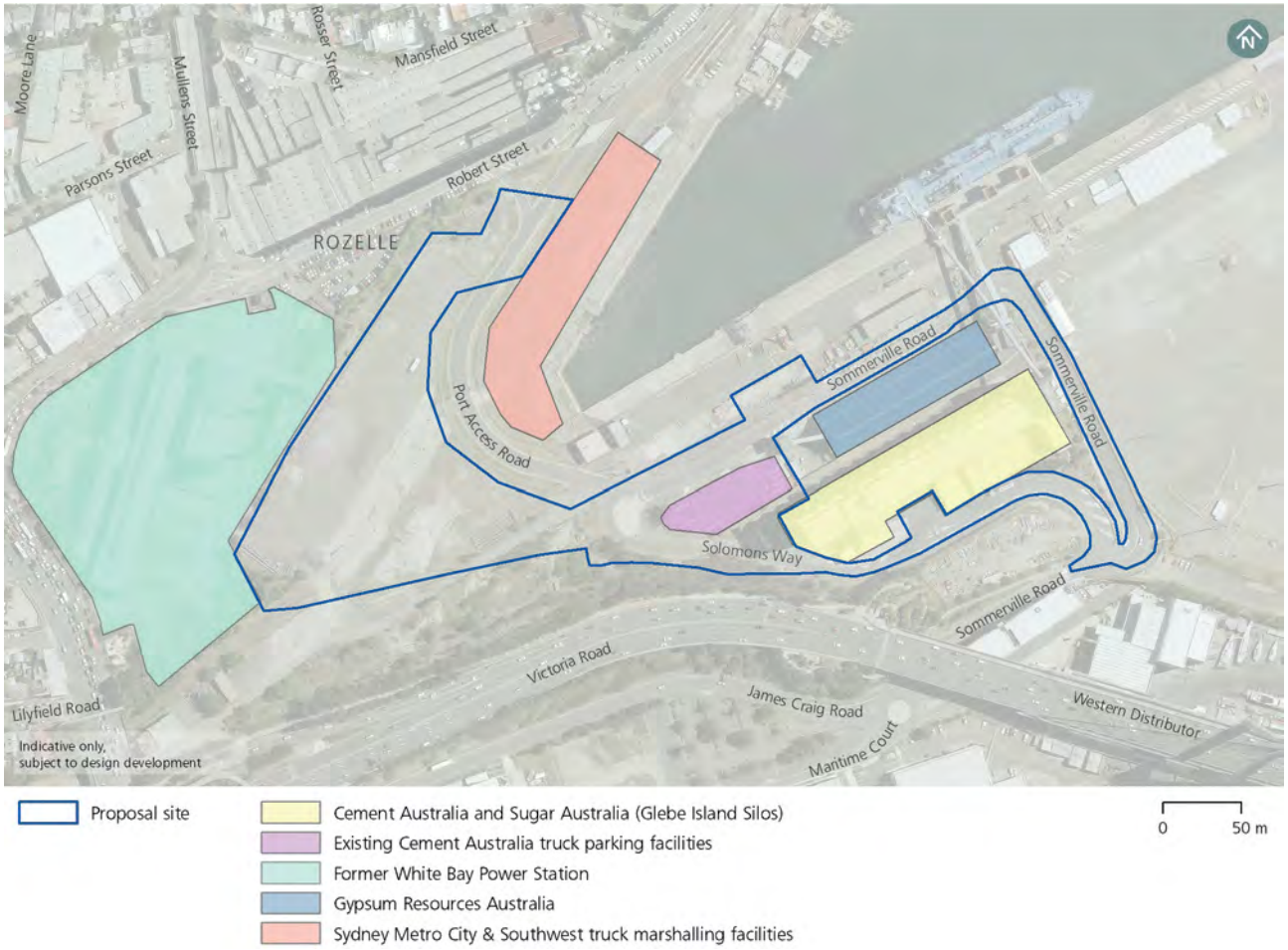

Figure 1-1: Proposal site

1.2.2 Key features of the proposal

The proposal would be completed in two phases and would comprise the following key features:

- Reconfiguration of the intersection at Port Access Road / Sommerville Road / Solomons Way
- Relocation of Port Access Road to the south-west
- Line marking and signage at Port Access Road, Sommerville Road and Solomons Way in the east of the proposal site to establish one-way flows and reduce conflicting traffic movements
- Relocation of Cement Australia Truck Parking Licenced Area to the north-east.

The proposal is described further in Chapter 4 (Description of the proposal).

1.3 Purpose of this Review of Environmental Factors

This Review of Environmental Factors (REF) describes the proposal (refer to Chapter 4), documents its likely environmental impacts (refer to Chapter 7) and details the protective measures that would be implemented to mitigate and manage against any adverse impacts (refer to Chapter 8). The REF has been prepared to meet the environmental assessment requirements of Division 5.1 of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (refer to Section 5.1.1).

The environmental impacts of the proposal have been assessed in accordance with Clause 228(2) of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) (NSW Government, 2000a), the *Biodiversity Conservation Act 2016* (BC Act) and the *Commonwealth Government's Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The REF helps fulfil the requirements of section 5.5 of the EP&A Act; namely that Sydney Metro examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the proposed activity.

The findings of the REF will be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the need for an Environmental Impact Statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.1 of Part 5 of the EP&A Act
- The significance of any impact on threatened species, populations and communities as defined by the *Biodiversity and Conservation Act 2016*, in accordance with Section 5A of the EP&A Act and therefore the requirement to prepare a species impact statement (SIS)
- The potential for the proposal to significantly impact a Matter of National Environmental Significance (MNES) or Commonwealth land and the need to make a referral to the Commonwealth Department of Agriculture, Water and the Environment for a decision by Minister for the Environment on whether assessment and approval is required under the EPBC Act (refer to Section 5.2).

1.4 Structure and content of the REF

The structure and content of the REF is outlined in Table 1-1.

Table 1-1: Structure and content of the REF

Chapter	Description
Chapter 1 – Introduction	Outlines the background of the proposal
Chapter 2 – Need for the proposal	Outlines the need for the proposal
Chapter 3 – Options development and selection	Provides an overview of the options that were considered during the development of the proposal
Chapter 4 – Description of the proposal	Provides a detailed description of the proposal, including the elements of the proposal, construction and operation
Chapter 5 – Statutory considerations	Outlines the relevant environmental planning instruments and policies and provides an assessment of their relevance to the proposal
Chapter 6 – Stakeholder and community consultation	Outlines the planned community and stakeholder engagement activities to be carried out to support the REF exhibition and construction phase
Chapter 7 – Environmental impact assessment	Provides an assessment of the potential environmental impacts associated with the construction and operation of the proposal
Chapter 8 – Environmental management	Outlines the proposed environmental management systems to be implemented and provides the management and mitigation measures to be implemented during construction, operation and maintenance of the proposal, to manage the impacts identified in the REF
Chapter 9 – Justification and conclusion	Provides the justification for the proposal and an outline of the key conclusions of this report

The REF has been informed by key technical papers, which provide detailed assessment of specific environmental issues associated with the proposal. These technical papers form appendices to this REF as follows:

- Appendix B: The Bays road relocation works – Noise and vibration assessment (SLR, 2020)
- Appendix C: The Bays road relocation works – Traffic and transport assessment (Jacobs, 2020)
- Appendix D: The Bays road relocation works – Statement of heritage impact (Artefact, 2020)
- Appendix E: The Bays road relocation works – Aboriginal heritage assessment (Artefact, 2020).

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2 Need for the proposal

This chapter discusses the need, objectives and key benefits of the proposal. It also provides an outline of the consistency of the proposal with relevant NSW Government policies and strategies.

2.1 Need for the proposal

2.1.1 Facilitating long term urban renewal

The Bays is identified in Sydney's regional and district plans as a key 'growth area and urban renewal corridor' on the western edge of the Sydney CBD (Greater Sydney Commission, 2018a). The Eastern City District Plan (Greater Sydney Commission, 2018b) identified the potential for urban renewal at The Bays over the next 20 years, while continuing to support existing port and working harbour functions at Glebe Island and White Bay (Greater Sydney Commission, 2018b).

These existing functions at The Bays are critical to the NSW Freight and Ports Plan 2018-2023 (Transport for NSW, 2018b) by allowing for increased use of coastal freight shipping to reduce road congestion. Port Access Road, Sommerville Road and Solomons Way provide important access to the White Bay Cruise Terminal and other port operations located in The Bays. The development of the Port Access Road was a key action of the White Bay and Glebe Island Master Plan (Sydney Ports Corporation, 2000) 'to improve the efficiency of good movement to and from the port'.

The 'Transformation Plan: The Bays Precinct, Sydney' (INSW formerly UrbanGrowth NSW, 2015) provided an initial strategy for the redevelopment of The Bays over the next 20 to 30 years. A cross-government project team (including Transport for NSW, the Port Authority of NSW and Infrastructure NSW) was formed in 2018 to consider opportunities for integrated planning of transport, land and water uses at Bays West (which includes White Bay, the White Bay Power Station, Glebe Island, Rozelle Bay and Rozelle Rail Yards). The project team has worked with a range of experts to understand how the vision in the 2015 Transformation Plan can be delivered. 'The Bays Precinct Sydney Project Update: Bays West Update (INSW formerly UrbanGrowth NSW, 2018) further develops the vision set out in the Transformation Plan to focus on long term mixed-use urban renewal driven by key road and transport projects and integrated with necessary port and working harbour activities over the next 10 years.

The Bays has been identified as a location for a future metro station as part of the proposed Sydney Metro West. The proposed station is one of the first major infrastructure projects required to facilitate the long term urban renewal of the Bays West area. The current arrangement of the Port Access Road, Sommerville Road and Solomons Way network results in conflicts between the construction works proposed for Sydney Metro West and the need to support ongoing port and maritime uses within the Bays West area. As such, Sydney Metro as the proponent is proposing to progress the necessary road network changes to Port Access Road, Sommerville Road and Solomons Way.

2.1.2 Improving road safety

The current arrangement of Port Access Road, Sommerville Road and Solomons Way results in a number of potential road safety issues. This includes conflicting traffic movements between cars, buses and trucks at the current Port Access Road / Sommerville Road / Solomons Way intersection and the exit from the Cement Australia loading facility.

The proposed conversion of the Sommerville Road and Solomons Way to one way circulation, and the reconfigured Port Access Road / Sommerville Road / Solomons Way intersection substantially reduces these conflicting movements and provides an overall road safety improvements.

2.2 Proposal objectives

The objectives of the proposal are to:

- Facilitate the urban renewal of the Bays West area, including the efficient delivery of construction works for the proposed Sydney Metro West and the integration of port and working harbour activities
- Maintain access to the White Bay Cruise Terminal and other port related businesses in Glebe Island and White Bay during the construction of various urban renewal and major infrastructure projects in The Bays
- Improve road safety by reducing conflicting traffic movements within the internal port road network.

2.3 Benefits of the proposal

The proposal would provide social and economic benefits by maintaining safe and reliable road access to the White Bay Cruise Terminal and other port operations in the Glebe Island and White Bay destinations during future construction works associated with the proposed Sydney Metro West and long term urban renewal and major infrastructure works. This would minimise disruptions to cruise passengers, cruise operations and other port/commercial operations and allow for the efficient construction of various projects.

The proposal would also improve road safety outcomes for users of the internal port road network including customers accessing the cruise terminal by car and bus, and trucks accessing port and maritime operations.

2.4 Consistency with strategic planning and policy

2.4.1 A Metropolis of Three Cities

The Greater Sydney Region Plan: A Metropolis of Three Cities (Greater Sydney Commission, 2018a) sets the 40-year vision and 20-year implementation plan for Sydney to develop as three unique and connected cities – the Western Parkland City, the Central River City and the Eastern Harbour City. The Bays is located in the Eastern Harbour City.

The plan identifies The Bays as a 'Growth Area and Urban Renewal Corridor' on the western edge of the Sydney Harbour CBD, and part of an Innovation Corridor. The plan discusses the need to attract and develop innovation activities in these locations.

The proposal is consistent with the plan as it would facilitate the efficient delivery of initiatives at The Bays and allow for the retention of port activities.

2.4.2 Eastern City District Plan

The Eastern City District Plan (Greater Sydney Commission, 2018b) is the 20-year plan to implement the vision for Greater Sydney established in the Greater Sydney Region Plan. The Eastern City District includes the Sydney CBD as its major Metropolitan Centre, acknowledging its role as Australia's established global gateway and financial capital.

The district plan identifies the potential for renewal areas such as The Bays to enhance views of Sydney Harbour. The plan also states that port functions at Glebe Island and White Bay need to be retained and expanded primarily to meet the needs of the inner city concrete supply chain.

The proposal supports the objectives of the district plan by facilitating the efficient delivery of urban renewal at The Bays and minimising impacts to adjacent port facilities.

2.4.3 Future Transport 2056 strategy

The Future Transport 2056 strategy (Transport for NSW, 2018a) is the NSW Government's overarching strategy to prepare and position NSW for the rapid changes in technology and innovation in the transport system over the next 40 years.

The strategy identifies city-shaping passenger and road corridors to help deliver a safer, more reliable, high performing network. The corridor between Greater Parramatta and the Sydney CBD, connected via Sydney Olympic Park and The Bays is identified as a city-shaping corridor. The proposed Sydney Metro West is positioned to help fulfil the vision of this corridor. The proposal would facilitate the efficient delivery of critical works for Sydney Metro West.

The strategy also identifies the importance of providing efficient public transport and road connections for passengers and freight under the NSW Freight and Ports Plan, discussed in the following section.

2.4.4 NSW Freight and Ports Plan 2018-2023

The NSW Freight and Ports Plan 2018-2023 (Transport for NSW, 2018b) is a supporting plan to the Future Transport 2056 strategy (Transport for NSW, 2018a) and sets out five key objectives to make NSW freight more efficient and safer.

The plan identifies that the efficient operation of Sydney's ports relies on a strong coordination between port owners and other key stakeholders, as well as managing congestion on the connecting roads. Specifically, the retention of Glebe Island and White Bay as a working port is critical, as it provides opportunities for increased use of coastal shipping to transport freight closer to the demand source, thereby reducing road congestion.

The proposal is consistent with the strategy by maintaining existing access arrangements to the White Bay Cruise Terminal and other port operations and ensuring that White Bay and Glebe Island are not operationally impacted during future construction activities.

2.4.5 Glebe Island and White Bay Master Plan 2000

The White Bay and Glebe Island Master Plan was a requirement of the Sydney Regional Environmental Plan No. 26 – City West (SREP 26) to provide for future development of port facilities. One of the actions in Section 2.3.1 of the master plan is to 'build an internal Port link road to improve the efficiency of goods movement to and from the port'. This action was previously completed with the construction and operation of the Port Access Road.

The proposal would acknowledge the requirement for an internal link road actioned by the master plan. Therefore, the proposal is considered consistent with the master plan.

2.4.6 Project Update: Bays West 2018

The NSW Government's ambition for The Bays is to drive an internationally competitive economy, by providing world-class destinations on Sydney Harbour that will transform the city, NSW and Australia. The 'Transformation Plan: The Bays Precinct Sydney' (INSW formerly UrbanGrowth NSW, 2015) provided a vision for the redevelopment of The Bays over the next 20 to 30 years.

Since the launch of the 'Transformation Plan: The Bays Precinct Sydney' (INSW formerly UrbanGrowth NSW) in 2015, the urban renewal initiatives have been developed further in The Bays Precinct Sydney Project Update: Bays West Update to focus for the next decade on planning and delivering major infrastructure projects to manage congestion, improve public transport and integrate port and working harbour activities (INSW formerly UrbanGrowth NSW, 2018).

The longer term vision is for Bays West to be developed as a major employment and mixed-use centre with integrated port and working harbour capability, and to be well-connected by new public transport including Sydney Metro West.

As identified in Section 2.1.1, the proposal directly supports the updated vision for the Bays West area by facilitating the construction of the proposed Sydney Metro West while providing for ongoing access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay.

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3 Options development and selection

This chapter outlines the options considered as part of the proposed works.

3.1 Identified options

Following the identification of impacts to Port Access Road associated with future works at The Bays, Sydney Metro considered options to minimise disruptions and ensure public safety.

The two options considered were 'do nothing' or adjustments to the internal port road network within White Bay. These options are discussed in the following sections.

3.1.1 'Do nothing' option

The 'do nothing' option would make no changes to the existing alignment of Port Access Road, or circulation arrangements on Port Access Road, Sommerville Road and Solomons Way.

This option would require cruise passengers and other port-related uses to navigate around the construction works associated with redevelopment of The Bays and the proposed Sydney Metro West.

The 'do nothing' option would not meet the objectives of the proposal as it would:

- Reduce the reliability and efficiency of cruise and port related traffic movements that would need to travel around construction activities
- Introduce conflicting traffic movements and/or activities, which would result in potential safety implications to cruise passengers, port users and construction workers
- Reduce the efficiency of construction activities associated with redevelopment initiatives at The Bays.

3.1.2 Configure the internal road network

This option would reconfigure the internal port road network arrangements prior to the commencement of redevelopment initiatives associated with the transformation of The Bays.

This option would:

- Realign the Port Access Road / Sommerville Road / Solomons Way intersection and the Ports Access Road to minimise direct conflicts with future construction works as part of the Bays redevelopment
- Maintain access to the White Bay Cruise Terminal and existing port and commercial operations between White Bay and Glebe Island during future construction works
- Improve road safety by providing one-way circulation around the Glebe Island Silos and reducing the number of conflicting vehicle movements.

For the above reasons, this option has been identified as the preferred option.

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4 The proposed activity

The key construction and operational components of the proposal are described in this chapter.

4.1 The proposed activity

The proposal would generally be developed in two phases.

- Phase 1 (refer to Figure 4-1) would involve:
  - A reconfigured intersection at Port Access Road / Solomons Way / Sommerville Road, including an interim connection with the existing Port Access Road until it is relocated (as part of Stage 2)
  - Establishment of one-way traffic circulation along Solomons Way and Sommerville Road around the Glebe Island Silos
  - Relocation of the Cement Australia Truck Parking Licenced Area to the north, prior to the construction of the reconfigured intersection due to the direct conflict with the reconfigured intersection.
- Phase 2 (refer to Figure 4-2) would involve:
  - Relocation of Port Access Road to the southwest. The relocated Port Access road would be tied into the reconfigured intersection (established in Phase 1) and the existing Port Access Road to the north. The redundant section of Port Access Road would likely be removed as part of separate future development project.

Further details are provided in Section 4.2.

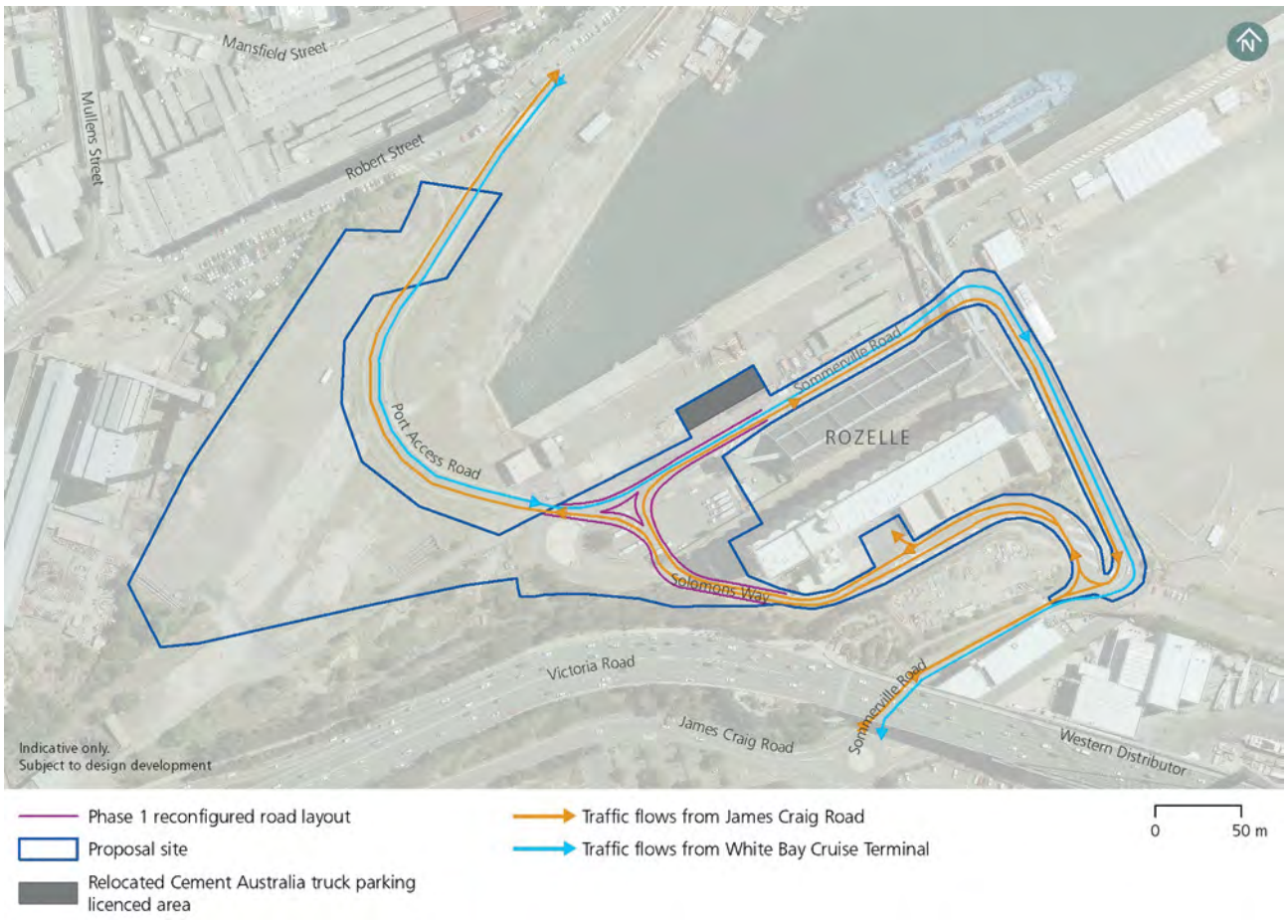

Figure 4-1: Overview of the proposal (Phase 1)

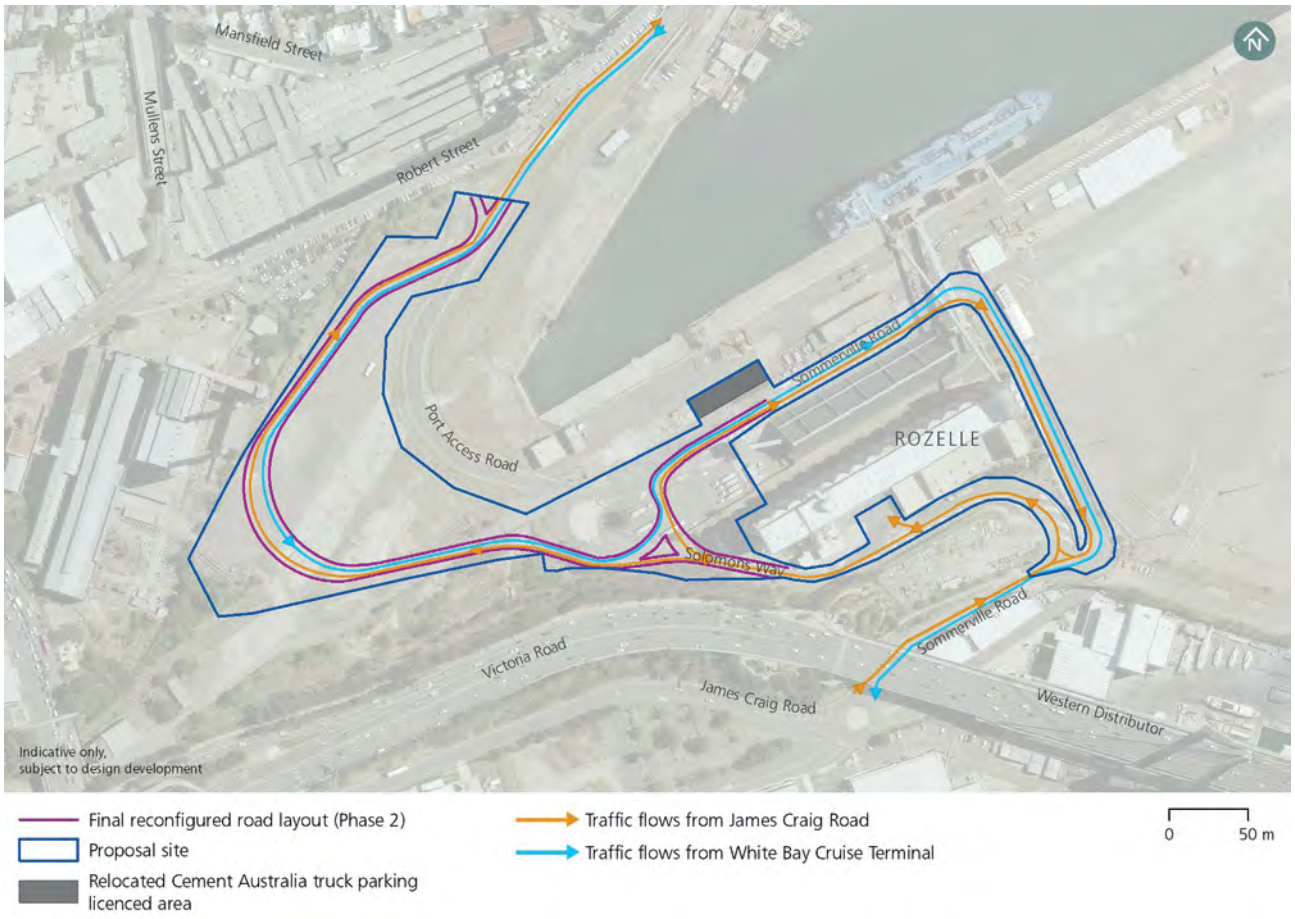

Figure 4-2: Overview of the proposal (Phase 2)

4.2 Key components of the proposal

4.2.1 Operation

Operation of the proposal would adjust the internal road network within the port area at The Bays, however it would not change the vehicle numbers or the time that vehicles operate on the network.

The key change to the internal road network is associated with the one-way circulation of Solomons Way and Sommerville Road around the Glebe Island Silos and the reconfigured intersection (Phase 1 of the proposal). This would provide road safety benefits by reducing conflicting movements.

The road network would further change at the completion of Phase 2 due to the relocation of Port Access Road. Traffic would switch onto the relocated Port Access Road to ensure ongoing access to the White Bay Cruise Terminal and port operators to the north.

To allow for these changes in road layout in Phase 1, the Cement Australia Truck Parking Licenced Area would be relocated to a location to the north-west of the Glebe Island Silos. Minor adjustments would be made to access driveways to maintain access to the revised road network.

Once commissioned, the relocated Port Access Road would be owned and maintained by Port Authority of NSW. The relocated Cement Australia Truck Parking Licenced Area would be maintained by Cement Australia subject to lease agreements with Port Authority of NSW.

The relocated road would be designed in accordance with design specifications for the relevant road type in relation to speed limit and class/weight of vehicles, and as agreed between the Port Authority of NSW and Sydney Metro.

4.2.2 Construction

Construction of the proposal would comprise the key activities outlined in Table 4-1.

Table 4-1: Indicative construction phases and activities

Phase	Key construction activities
Phase 1	• Establishment of construction compound including for a site office and material storage • Installation of environmental controls such as erosion and sediment controls • Site clearing and any necessary contaminated land remediation works around Port Access Road, Sommerville Road and Solomons Way intersection • Establishment of relocated Cement Australia Truck Parking Licenced Area to the north including kerb and guttering, driveway crossover, drainage, lighting and line marking • Construction of reconfigured intersection at Port Access Road and Solomons Way, including a temporary interim connection with the existing Port Access Road until it is relocated (as part of Phase 2). This would require traffic switches which would be completed out-of-hours on a weekend • Line marking and signage at Port Access Road, Sommerville Road and Solomons Way to establish one-way traffic circulation • Reinstatement of driveway access to Cement Australia facilities
Phase 2	• Site clearing and any necessary contaminated land remediation works around proposed relocated Port Access Road • Construction of relocated Port Access Road including concrete island and tie-ins at the southern end, signs and lines • Construction of tie-in between the northern section of the relocated Port Access Road and the existing Port Access Road • Demobilisation of site compounds

The construction methodology may vary from the indicative construction method provided in the following sections due to ongoing detailed design refinements, the identification of additional constraints, community and stakeholder feedback, and construction contractor requirements.

Program

Construction is proposed to commence in late 2020 and be completed in 2021. The total duration of construction is anticipated to be around 11 months. The high-level construction program is provided in Table 4-2.

Table 4-2: Construction program

Activity	2020		2021								
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Phase 1											
Site establishment	●										
Site clearing		●									
Cement Australia Truck Parking relocation			●								
Port Access Road / Solomons Way / Sommerville Road intersection				●	●						
Phase 2											
Port Access Road relocation					●	———	———	———	———	———	●

Out-of-hours work

The NSW Interim Construction Noise Guidelines 2009 (NSW EPA, 2009) (ICNG) have identified recommended standard hours for construction work. This has been established to preserve the local amenity of an area at certain times depending on the surrounding land use.

Works would generally be scheduled during the following standard construction hours:

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm Saturday
- No work on Sundays or during public holidays.

Other activities that may be carried out outside of the standard daytime construction hours would include:

- Work determined to comply with the relevant noise management level at the nearest sensitive receiver
- The delivery of materials outside approved hours as required by the NSW Police or other authorities for safety reasons
- Emergency situations where it is required to avoid the loss of lives and properties and/or to prevent environmental harm
- Situations where agreement is reached with affected receivers.

Two traffic switches at the reconfigured intersection of Port Access Road / Sommerville Road / Solomons Way are intended to be completed out-of-hours during weekends (on non-cruise ship days) to minimise disruption to traffic. These would be carried out in accordance with the ICNG and the Sydney Metro Construction Noise and Vibration Standard (CNVS).

No other out-of-hours works are anticipated as part of the proposal. If out-of-hours works are required, Sydney Metro would follow the ICNG and CNVS and obtain any necessary approvals.

Plant and equipment

The proposal would be constructed using various plant and equipment. An indicative list is provided in Table 4-3.

Table 4-3: Indicative plant and equipment

Scenario	Activity	Equipment
Site clearing	Vegetation clearing	Chainsaw Chipper Excavator (14 tonne) Hand Tools Dumper (5 tonne)
	Demolition / removal of minor existing structures	Concrete Saw Excavator – Breaker Dozer – D9 Truck Excavator (14 tonne) Front End Loader
Site establishment	Establishment of site fencing and compounds	Hand tools Telehandler Mobile crane (100 tonne) Truck Generator (small)
	Contaminated land remediation	Excavator (14 tonne) Front end loader Truck Water Tanker (8000 litre)

Scenario	Activity	Equipment
Intersection reconfiguration and tie-ins	Paving	Grader Paving machine Bobcat Truck
	Concreting	Concrete mixer truck Concrete pump Concrete vibrator Truck
Relocate Cement Australia Truck Parking Licenced Area	Paving	Grader Paving machine Bobcat Truck
	Concreting	Concrete mixer truck Concrete pump Concrete vibrator Truck
Relocate Port Access Road	Paving	Grader Paving machine Bobcat Truck
	Concreting	Concrete mixer truck Concrete pump Concrete vibrator Truck

Resources, materials and sourcing

The type and quantities of resources and materials needed to construct the proposal are relatively minor and readily available within Sydney. Materials required to construct the proposal would be sourced from the surrounding metropolitan area. They would be transferred to the construction compound/laydown area by road, primarily along the connecting motorway network.

Sydney Metro's sustainable procurement policy requirements aim to procure material locally, contain a high recycled content and a low embodied energy. Materials that are cost and performance competitive and comparable in environmental performance will be obtained.

Waste

All generated waste would be appropriately stored within the proposal footprint prior to its transfer off-site. Waste volumes associated with the proposal are anticipated to be minor. The likely materials that would be generated during construction comprise:

- Concrete
- Asphalt
- Green waste (i.e. vegetation)
- Demolition waste
- Spoil (if excavations are necessary).

The waste would then be hauled from the construction site and transported to an appropriately licenced facility. The location where the waste would be transferred for reuse, reprocessing or disposal would depend on its nature, type and classification.

There is potential for contaminated waste to be encountered during construction at the proposal site during surficial excavations and demolition of minor structures. Any required testing and classification would take place on-site. The potential for contamination is discussed further in Section 7.4.

Site access, haul routes and workforce

During the peak construction period (2021), the following vehicle numbers are anticipated:

- About 10 light vehicles per hour through the day
- About four heavy vehicles per hour during the road network peak periods
- About 10 heavy vehicles per hour outside of road network peak periods.

Temporary traffic management controls would be implemented to allow trucks and heavy vehicles to safely enter and leave site.

Site access and egress to and from the construction compound would be left-in, right-out via Port Access Road and Sommerville Road. Access to the relocated Cement Australia Truck Parking Licenced Area works area would be via Sommerville Road (right-in, left-out) (Figure 4-3).

The northern exit from the site at Robert Street is gate-controlled and requires authorisation from the Port Authority of NSW. If heavy vehicle access via the northern gate on Robert Street is required due to unforeseen circumstances, the Port Authority of NSW would be notified in advance.

The peak construction workforce is anticipated to be 20 construction workers. Parking for construction workers would be provided adjacent to the construction compound.

Ancillary facilities

The construction compound would include a small temporary site office and laydown area located within the construction footprint (Figure 4-3). This would be used to temporarily store materials and plant required for immediate use. If excavations are required, this area would also be used to temporarily store excavated spoil prior to its removal off-site. Spoil stockpiles would be managed in accordance with the Sydney Metro Construction Environmental Management Framework.

Traffic management and public access

Traffic management and access measures would be developed during detailed design and implemented in accordance with the Sydney Metro Construction Traffic Management Framework (refer to Section 8.2.1).

The operation of the existing Port Access Road would be maintained during construction to provide ongoing access to the White Bay Cruise Terminal and other port operations.

Public access to the foreshore area at White Bay is currently restricted but can be accessed by cruise passengers and industry workers. There is no access to the proposal site by pedestrians or cyclists. Sydney Metro would consult with Port Authority of NSW to confirm ship and non-ship days, to anticipate and manage cruise passenger traffic through the proposal site.

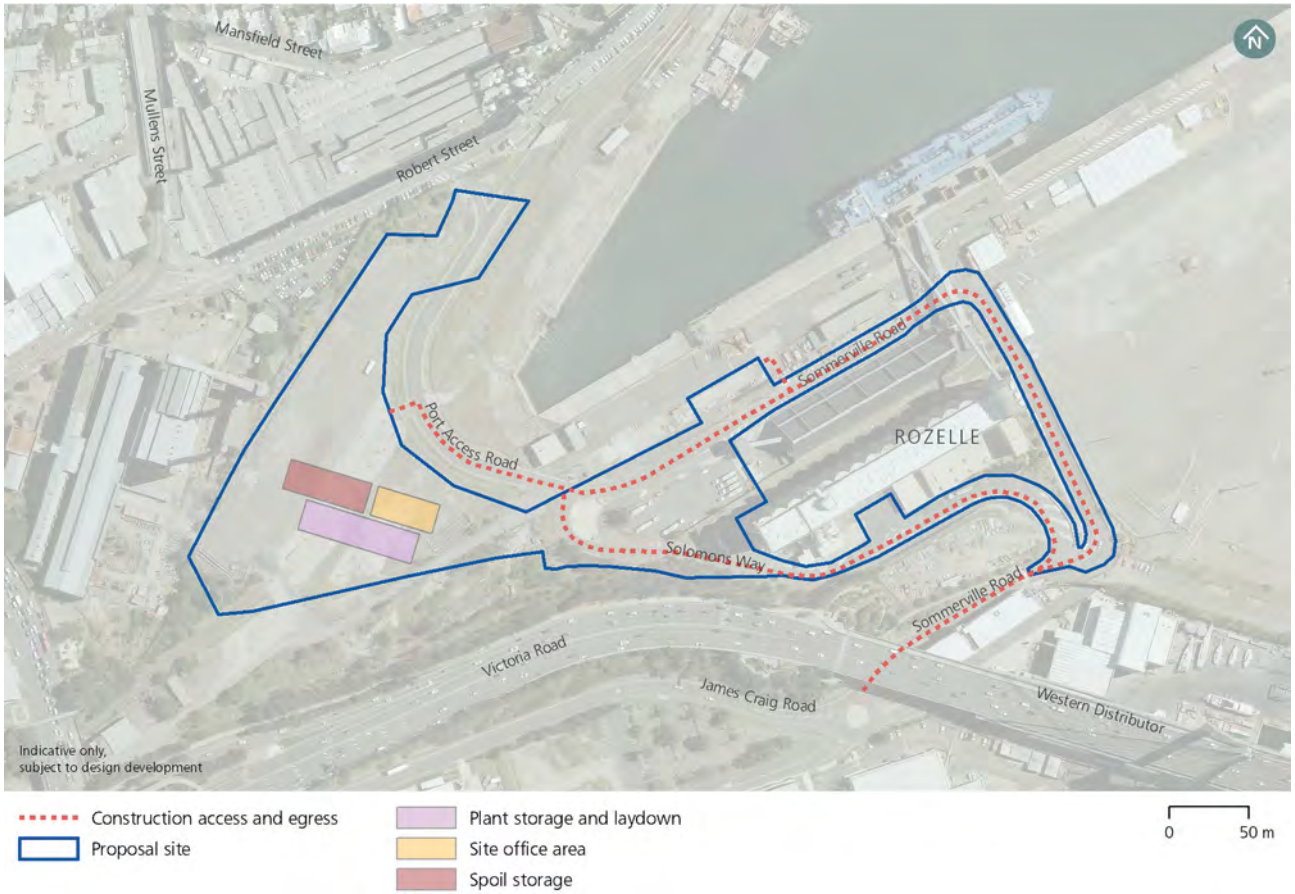

Figure 4-3: Location of construction compound and construction site access

4.3 Property acquisition and leasing arrangements

The proposal would not require property acquisition.

The proposal affects land subject to lease agreements between the Port Authority of NSW and Cement Australia, including the Cement Australia Truck Parking Licenced Area for the Glebe Island Silos. The relocation of the Cement Australia Truck Parking Licenced Area would be carried out prior to works that impact the existing parking area, subject to negotiation with the Port Authority of NSW.

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5 Statutory considerations

This chapter outlines the relevant NSW statutory requirements and explains the environmental planning and approvals process for the proposal. The environmental planning instruments relevant to the proposal are also outlined.

5.1 NSW Legislation and regulations

5.1.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the main legislation regulating land use planning and development assessment in NSW. The applicable planning approvals pathway for a development under the EP&A Act is generally dependent on the development's size, environmental impact and capital cost, as well as relevant planning provisions under other NSW legislation, including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). Further discussion on SEPPs and LEPs likely to be applicable to the proposal is provided below.

The main part of the EP&A Act that is relevant to the proposal (as a development for the purposes of a road that would be carried out by or on behalf of Sydney Metro) is Part 5, which is discussed in the following section.

Part 5 of the EP&A Act

Part 5 of the EP&A Act applies to activities that are permissible without consent and are generally carried out by a public authority. Activities under Part 5 of the EP&A Act are assessed and determined by either a Minister or public authority – referred to as a determining authority. Sydney Metro is a public authority and will be the proponent of the proposed works.

Under Section 5.5 of the EP&A Act, Sydney Metro, as the proponent and determining authority for the purposes of Division 5.1 of Part 5 of the EP&A Act, must:

a. Examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity, in accordance with Section 5.5 of the EP&A Act

b. Consider whether or not the activity is likely to significantly affect the environment or is likely to significantly affect threatened species, populations and ecological communities.

Although Port Authority of NSW is also a determining authority for the proposal under Division 5.1 of the EP&A Act, Port Authority of NSW does not have a duty to consider environmental impact under Section 5.5 as the requirements of that Section are being fulfilled by Sydney Metro.

Chapter 7 of this REF assesses the likely effect of the proposal on the environment and threatened species, populations and ecological communities.

Clause 228 of the EP&A Regulation defines the factors which must be considered when assessing the likely impact of an activity on the environment under Part 5 of the EP&A Act. Appendix A specifically responds to the factors for consideration under clause 228.

An Environmental Impact Statement (EIS) would be required for the proposal if Sydney Metro considers that the proposal is likely to significantly affect the environment, including critical habitat or threatened species, populations or ecological communities and their habitats. Clause 228 of the EP&A Regulation contains a detailed list of factors that must be taken into account when assessing the impact of an activity on the environment. Where the only anticipated significant impacts relate to threatened species, population or ecological communities or their habitats or critical habitat, then a Species Impact Statement (SIS) may be prepared instead of an EIS.

The proposal is not likely to have significant impact on the environment including threatened species, populations or ecological communities or their habitats or critical habitat (refer to Section 7.6); therefore neither an EIS or SIS is required. In this situation a REF is typically prepared, hence the decision to prepare this document.

During the exhibition period, the community would be encouraged to make submissions to Sydney Metro on the proposal and information contained in the REF.

Following the exhibition period, Sydney Metro will consider issues raised in submissions and respond to community and stakeholder feedback in a Response to Submissions Report. If required, Sydney Metro may also propose changes to the proposal and detail these in the Response to Submissions Report. These documents will be available to the public via the Sydney Metro website (sydneymetro.info).

Following the preparation of the Response to Submissions Report, Sydney Metro will determine whether to proceed with the proposal. If the proposal proceeds, it would be designed, constructed and operated in accordance with the project description and mitigation measures outlined in this REF, the Response to Submissions Report and any additional conditions of approval.

The planning approvals process for the proposal under Division 5.1 of Part 5 of the EP&A Act is outlined in Figure 5-1.

Figure 5-1: Planning approvals process for the proposal

Activities assessed under Division 5.1 of Part 5 of the EP&A Act also need to consider a number of environmental planning instruments established under the EP&A Act listed in the following sections.

State Environmental Planning Policy – Infrastructure 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) is the primary environmental planning instrument relevant to the proposed development.

Clause 94 of ISEPP provides that development of road or road infrastructure facilities by or on behalf of a public authority is permissible without consent on any land. Road infrastructure facilities are defined under clause 94 of the ISEPP to include construction works, emergency works or routine maintenance works, alterations or additions to an existing road and environmental management works, if the works are in or adjacent to a road corridor.

With respect to changes to parking, Schedule 1 of the ISEPP provides that development that involves at-grade car parks that are less than 200 spaces and not connected to a classified road are considered as exempt development. Sommerville Road is not a classified road and therefore activities associated with relocation of parking would be exempt development. While the relocation of the Cement Australia Truck Parking Licenced Area would be exempt development, impacts associated with changes to parking have also been included in this REF for completeness and to address potential cumulative impacts. Appendix A specifically responds to the general requirements for exempt development under clause 20 of the ISEPP.

Division 1 of Part 2 of ISEPP also contains provisions for public authorities to consult with local councils and other agencies prior to the commencement of certain types of development. Chapter 6 of this REF discusses the consultation carried out under the requirements of ISEPP.

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.

Clause 8 of the SRD SEPP provides that development that is not permissible without development consent and is development identified in Schedule 1 or 2 of the SRD SEPP is State significant development.

The proposal would not be a development type identified in Schedule 1. Schedule 2 identifies The Bays Precinct Site as a 'State significant development – identified site' for development that has a capital value of more than $10 million.

The proposal does not have a capital value of more than $10 million and is development that is permissible without development consent (through the provisions of the ISEPP).

Clause 14 of the SRD SEPP provides that development is declared to be State significant infrastructure if the development is permissible without development consent under Part 4 of the EP&A Act or specified in Schedule 3 of the SRD SEPP. As identified above, Part 5 of the EP&A Act applies to the proposal and an EIS or SIS is not required.

Therefore, the provisions of the SRD SEPP do not apply to the proposal.

State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. Clause 6 of the SEPP 55 requires a consent authority to consider:

- Whether the land is contaminated
- Whether the land in its contaminated state would be suitable for carrying out of development as proposed
- If the land requires remediation to be suitable for the proposed development and is satisfied that the land will be remediated prior to being used for the proposed purpose.

The majority of works associated with the proposal are surficial (or up to one metre below existing site levels), however there is potential to encounter contamination during excavation or demolition of minor structures. Potential for contamination of soils and groundwater within/beneath the proposal site may be associated with current and historical activities, historical land reclamation and the possible inappropriate management of hazardous building materials in former structures at and adjacent to the proposal site.

Sampling and testing of soils would be carried out to characterise the soils and determine appropriate waste classification. Where necessary, remediation works would be carried out. Prior to demolition of any structure or building, a hazardous building materials audit would be carried out in accordance with relevant guidelines.

The potential for contamination is discussed further in Section 7.4.

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Harbour Catchment SREP) aims to maintain, protect and enhance the natural assets and unique environmental qualities of Sydney Harbour and its islands and foreshores. The proposal site is unzoned under the Sydney Harbour Catchment SREP, however it is identified within the Foreshores and Waterways Area Boundary of the plan.

Clause 14 of Sydney Harbour Catchment SREP sets out planning principles for land within the Foreshores and Waterways Area. Specifically:

f. *public access along foreshore land should be provided on land used for industrial or commercial maritime purposes where such access does not interfere with the use of the land for those purposes,*

The proposal is consistent with the planning principles in the Sydney Harbour Catchment SREP for development within the Foreshores and Waterways Area.

Division 2 of Part 3 of Sydney Harbour Catchment SREP identifies matters which need to be taken into consideration by public authorities before they carry out activities to which Part 5 of the EP&A Act applies. Matters which apply to the proposal and where they are addressed are provided in Table 5-1.

Table 5-1: Matters for consideration under Sydney Harbour Catchment SREP

Matter for consideration	Comment
Clause 21: Biodiversity, ecology and environmental protection	Potential environmental impacts associated with the proposal are discussed in Chapter 7. The proposal would involve the removal of 0.16 hectares of vegetation. This vegetation does not comply with any threatened ecological communities. Therefore, the proposal is unlikely to have a significant impact on biodiversity or ecology. Environmental protection is considered through the proposed implementation of mitigation measures listed in Table 8-1.
Clause 22: Public access to, and use of, foreshores and waterways	Public access to the foreshore area at White Bay is currently restricted with no pedestrian or cyclist access for the general public. The proposal site is accessed by cruise passengers and industry workers. The proposal would maintain public access to the White Bay Cruise Terminal during both construction and operation.
Clause 23: Maintenance of a working harbour	The proposal would maintain the existing connection between White Bay and Glebe Island. This would minimise disruptions to port/commercial users and continue to facilitate operations at White Bay Cruise Terminal, as part of a working harbour.
Clause 24: Interrelationship of waterway and foreshore uses	The area has restricted access based on its current land use, and the proposal would not impact the manner in which foreshore areas or the waterway is used. The proposal would facilitate the orderly redevelopment of The Bays, which will provide future opportunities for changes to foreshore area.
Clause 25: Foreshore and waterways scenic quality	The proposal site is located within an industrial area. The proposed works are consistent with the scenic quality associated with its existing use. Therefore, the proposal is not expected to have a detrimental impact to the scenic quality of the foreshore and waterway.
Clause 26: Maintenance, protection and enhancement of views	During construction, timber hoarding or fencing would be erected around the proposal site, as required, that may affect the amenity of the site and would be visible from the harbour. Operation of the proposal would be consistent with the existing use of the site, therefore visual impacts are not anticipated during operation. This is discussed in Section 7.8.3.

Schedule 2 of the Sydney Harbour Catchment SREP lists development to be referred to the Foreshores and Waterways Planning and Development Advisory Committee. The relocation of a road and parking facilities is not listed under Schedule 2. Therefore, referral to the Foreshores and Waterways Planning and Development Advisory Committee is not required (Table 5-3).

Sydney Harbour Foreshores and Waterways Area Development Control Plan 2005

The Sydney Harbour Foreshores and Waterways Area Development Control Plan applies to the Foreshores and Waterways Area defined in the Sydney Harbour Catchment SREP. The aims of the plan are as follows:

- Protecting ecological communities within the area covered by Sydney Harbour Catchment SREP
- Ensuring that the scenic quality of the area is protected or enhanced
- Providing siting and design principles for new buildings and waterside structures within the area
- Identifying potential foreshore access locations in the area.

The proposal is located within the Foreshores and Waterways Area, however this development control plan is not applicable due to the overriding relevant provisions of the ISEPP. Regardless, the proposal is consistent with the planning principles and aims of the development control plan.

Sydney Regional Environmental Plan No 26 – City West

Sydney Regional Environmental Plan No. 26 – City West (SREP 26) aims to promote the orderly and economic development of land within the area known as 'City West'. It has established planning principles and controls for a number of precincts within City West including The Bays Precinct.

The proposal site is zoned as 'Port and Employment' under SREP 26. Although SREP 26 requires development consent under Part 4 of the EP&A Act for development within the Port and Employment Zone, the provisions of the ISEPP prevail over this requirement and the proposal is permissible without consent under Part 5 of the EP&A Act. Further, under Schedule 3 of the SREP 26, development not requiring consent includes:

Erection and use of public furniture, planter boxes, lighting, bus shelters, public telephone booths or post boxes, or the carrying out of street planting, footpath widening or roadworks and the like, carried out by or on behalf of a public authority.

Nevertheless, the objectives of the Port and Employment Zone have been considered.

The objectives of the Port and Employment Zone are to:

- Facilitate the continuation of commercial port uses
- Allow a range of commercial port facilities (such as buildings, structures, activities or operations and uses ancillary to these, associated with carrying goods from one port to another and associated with storage and handling and access to the port)
- Encourage development on Glebe Island and land adjoining White Bay which requires close proximity to the port
- Encourage a mix of land uses which generate employment opportunities, particularly in relation to port and maritime uses
- Allow a mix of uses which generate employment opportunities at the former White Bay Power Station site
- Provide for the ongoing rail access to the port and related activities
- Provide pedestrian and cyclist links with surrounding public access networks
- Encourage port-related uses which optimise use of existing rail facilities.
- Provide road and rail access to port activities.

The Sydney Regional Environmental Plan No 26 – City West (Amendment No 7-Bays Precinct) outlines planning principles for The Bays relating to role and land use activities, urban design and public domain. The proposal is considered consistent with the objectives of the Port and Employment Zone and planning principles related to The Bays.

Glebe Island and White Bay Master Plan 2000

The White Bay and Glebe Island Master Plan was a requirement of the SREP 26 to provide for future development of port facilities. The proposal site is located within the area detailed in the master plan. One of the actions in Section 2.3.1 of the master plan is to 'build an internal Port link road to improve the efficiency of good movement to and from the port'.

Although SREP 26 and the master plan are not applicable to the proposal as the provisions of the ISEPP prevail, the proposal would maintain the requirement for an internal link road actioned by the master plan. Therefore, the proposal is considered consistent with the master plan.

Local Environmental Plan

The proposal is located within the Inner West local government area. Planning controls for the surrounding area are contained within the Leichhardt Local Environmental Plan 2013. The proposal site is not included in the Leichhardt Local Environmental Plan 2013, and is instead covered by the SREP 26.

5.1.2 Other relevant NSW legislation

Table 5-2 provides an overview of other relevant NSW legislation that is applicable to the proposal.

Table 5-2: Other relevant NSW legislation applicable to the proposal

NSW legislation	Requirements for the proposal
Aboriginal Land Rights Act 1983	The NSW *Aboriginal Land Rights Act 1983* applies to Crown lands that are not lawfully needed for an essential public purpose; referred to as claimable Crown land. No claimable Crown lands would be affected by the proposal.
Biodiversity Conservation Act 2016	The *Biodiversity Conservation Act 2016* provides for the protection of threatened species, populations and ecological communities in NSW. If a threatened species, population or ecological community, or its habitat, is likely to occur in any area that may be affected by the proposal then an assessment of significance must be prepared to determine whether the proposal would have a significant impact. If it is concluded that there would be a significant impact, then Sydney Metro would be required to prepare a Species Impact Statement (SIS) for approval by the Environment, Energy and Science Group of the Department of Planning, Industry and Environment (former NSW Office of Environment and Heritage). Given the highly urbanised and disturbed nature of the proposal site, the provisions of this Act would not influence how the proposal would be approved. The Act has been considered for completeness in accordance with the requirements under Part 5 of the EP&A Act. The site is unlikely to contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community.
Biosecurity Act 2015	The *Biosecurity Act 2015* and its subordinate legislation commenced on 1 July 2017. The *Biosecurity Act 2015* replaces wholly or in part 14 separate pieces of biosecurity related legislation including the *Noxious Weeds Act 1993*. Under the *Biosecurity Act 2015*, all plants, including weeds, are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. The *Biosecurity Act 2015* and regulations provide specific legal requirements for high risk activities and State level priority weeds. The State level priority weeds and associated legal requirements relevant to the region are outlined in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (Greater Sydney Local Land Services, 2017) together with the high risk priority weeds from the regional prioritisation process. As such, if present, priority weeds on the site would be assessed and controlled to fulfil the General Biosecurity Duty and minimise biosecurity risks.
Contaminated Land Management Act 1997	Section 60 of the *Contaminated Land Management Act 1997* imposes a duty on landowners to notify the NSW EPA, and potentially investigate and remediate land if contamination is above NSW EPA guideline levels. One site (former White Bay Power Station) that is currently regulated by the NSW EPA is located within the proposal site. Given the proposed works are predominately surficial or up to one metre below existing site levels, contamination risk is considered minor and manageable. Contamination is discussed further in Section 7.4 of this REF.
Crown Land Management Act 2016	The *Crown Land Management Act 2016* sets out requirements for the management of Crown land in NSW. Crown land is land owned by the State Government for the people of NSW under the care and control of the Minister for Lands. The proposal would not impact on Crown land.

NSW legislation	Requirements for the proposal
Heritage Act 1977	The NSW *Heritage Act 1977* (Heritage Act) provides protection for items of 'environmental heritage' in NSW. Items considered to be significant to the State are listed on the State Heritage Register (SHR) and cannot be demolished, altered, moved or damaged, or their significance altered without approval from the Heritage Council of NSW. The State Heritage Register (SHR) was established under section 22 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. The proposal is partially located within the heritage curtilage for the SHR-listed White Bay Power Station (SHR Listing number 01015, SREP No 26 – City West Part 3 Item No. 11). Section 170 of the Heritage Act requires government agencies to maintain a heritage and conservation register (Section 170 register). These registers provide a list of government assets which may have State or local heritage significance. The White Bay Power Station (Inlet) Canal (Port Authority of NSW s170 4560062) is partially located within the proposal site, and the Glebe Island Silos (Port Authority of NSW s170 4560016) and the Glebe Island Dyke Exposures (Port Authority of NSW s170 4560056) are located immediately adjacent to the proposal site. Sections 139 to 145 of the Heritage Act prevent the excavation or disturbance of land known or likely to contain relics, unless in accordance with an excavation permit. Excavation permits are issued under Section 140 of the Heritage Act, or Section 60 for sites listed on the SHR. Excavation Permit Applications must be supported by an Archaeological Research Design. Section 146 of the Heritage Act requires that any discovery or location of a 'relic' is reported to the Heritage Council. It is unlikely that archaeological relics would be impacted by the works, therefore a Section 139 exception or Section 140 permit are not required for the portion of the proposal site outside the SHR curtilage. Section 7.3 identifies the proposal as having an overall minor impact on the SHR-listed White Bay Power Station. A Section 60 permit or Section 57 exemption from approval would be obtained from the Heritage Council (or delegate) prior to the commencement of works within the SHR curtilage of White Bay Power Station (SHR Listing No. 01015). Any approval or exemption would also account for any archaeological impacts within the SHR curtilage. Impacts to heritage items are discussed further in Section 7.3.
National Parks and Wildlife Act 1974	Sections 86, 87 and 90 of the *National Parks and Wildlife Act 1974* require consent from the Environment, Energy and Science Group of the Department of Planning, Industry and Environment for the destruction or damage of Aboriginal objects. The proposal is unlikely to disturb any Aboriginal objects (refer Section 7.7). However, if unexpected archaeological items or items of Aboriginal heritage significance are discovered during the construction of the proposal, all works would cease and appropriate advice would be sought.
Native Title (New South Wales) Act 1994	This Act provides for native title in relation to land or waters. The proposal would not affect land subject to native title or to which an Indigenous Land Use Agreement applies.

NSW legislation	Requirements for the proposal
Protection of the Environment Operations Act 1997	The *Protection of the Environment Operations Act 1997* (POEO Act) administers environment protection licences (EPLs) for specific activities relating to air, water and noise pollution, and waste management. The Environment Protection Authority (EPA) and local government, where relevant, administer the POEO Act. Development activities require an EPL under the POEO Act if those activities meet the assessment criteria outlined in Schedule 1 of the Act. The proposal does not meet the definition of a scheduled activity under Schedule 1. In addition, the POEO Act would require construction to be managed to prevent and avoid the potential to cause water, noise and/or air pollution. The Act also includes requirements in relation to the management of waste. This would be achieved through implementing the mitigation and management measures identified in Chapter 8. Notification to the EPA would also be required (as the administrators of this Act) in instances where any pollution incident has the potential to 'cause or threaten material harm to the environment' (refer to Section 148 of the Act).
Roads Act 1993	In accordance with Section 138 of the *Roads Act 1993*, consent from NSW Transport for NSW would be required for the carrying out of work in, on or over a classified road. For works on unclassified roads, Clause 5 of Schedule 2 of the Act provides that a public authority is not required to obtain a road authority's consent. Ongoing consultation would be carried out with the relevant road authority (or authorities) in relation to the potential impacts that may occur to all of the roads and to identify any potential construction activities may be require consent.
Waste avoidance and Resource Recovery Act 2001	The purpose of the *Waste Avoidance and Resource Recovery Act 2001* is to develop and support the implementation of regional and local programs to meet the outcomes of a State-wide strategy for waste avoidance and resource recovery. It also aims to 'minimise the consumption of natural resources and final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste'. Waste generation and disposal reporting would be carried out during the construction and operation of the proposal. Procedures would be implemented during construction in an attempt to promote the objectives of the Act.
Water Act 1912 and Water Management Act 2000	The *Water Act 1912* and the *Water Management Act 2000* are the two key pieces of legislation for the management of water in NSW and contain provisions for the licensing of water access and use. The proposal would not involve any water use, water management works, drainage or flood works, controlled activities or aquifer interference.
Fisheries Management Act 1994	The *Fisheries Management Act 1994* provides for the protection of threatened fish and marine vegetation and aims to conserve, develop and share fishery resources and conserve marine species, habitats and diversity. The proposal would not involve explosives, obstruct fish passage or require any dredging or reclamation works.

5.2 Commonwealth Legislation

5.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the EPBC Act as 'matters of national environmental significance'.

Under the EPBC Act, a referral to the Commonwealth Department of Agriculture, Water and the Environment is required for proposed 'actions' that have the potential to significantly impact on any matter of national environmental significance, the environment in general, or the environment of Commonwealth land (including leased land).

An action may include a project, development, undertaking, activity, or series of activities. If the Commonwealth Minister for Environment determines that an approval is required under the EPBC Act, the proposed action is deemed to be a 'controlled action'. It must then undergo assessment and approval under the EPBC Act before the action is carried out. The Act provides that a proponent of an action that may be, or is, a controlled action must refer the proposal to the Minister for the Minister's decision as to whether or not the action is a controlled action.

There are no matters of national environmental significance located within the general area of the proposal, as confirmed in Appendix A. Therefore, an EPBC Act referral is not required.

An EPBC Search identified one Commonwealth land parcel within a one kilometre radius of the proposal site, an Australia Post site. Whilst the EPBC search tool does not explicitly identify the location of the site, no Australia Post site would be impacted by the proposal. In this regard the proposal would not have an impact on Commonwealth land.

5.3 Summary of statutory requirements

A summary of the potential licences, permits, approvals and notifications that may be required for the construction and operation of the proposal are outlined in Table 5-3 below.

Table 5-3: Summary of potential licences, permits and approvals

Legislation	Authority	Requirement	Comment
EP&A Act	Sydney Metro	Consideration: Clause 94 of the ISEPP outlines that development for the purpose of road and road infrastructure facilities which are permissible without the need for development consent under Part 4 of the EP&A Act when carried out by a public authority.	This REF has been prepared to meet the assessment requirements under the EP&A Act.
EP&A Regulation	Sydney Metro	Consideration: under clause 228, of the factors to take into account concerning the impact on an activity on the environment.	This REF has considered factors under clause 228 in Appendix A.
Heritage Act	Heritage Council of NSW	Under this Act, relevant approvals or exemptions must be obtained prior to construction works being carried out within the heritage curtilage of the White Bay Power Station (SHR Listing No. 01015).	The proposal would have an overall minor direct impact on the State heritage listed White Bay Power Station (SHR Listing No. 01015). A Section 60 permit or Section 57 exemption from approval would be obtained from the Heritage Council (or delegate) prior to the commencement of works within the SHR curtilage of White Bay Power Station (SHR Listing No. 01015) (refer to non-Aboriginal heritage – Section 7.3).

Legislation	Authority	Requirement	Comment
ISEPP	Inner West Council	Notification: under Section 14, 21 days' notice is required for development that is likely to affect the heritage significance of a local heritage item, or of a heritage conservation area, that is not also a State heritage item, in a way that is more than minor or inconsequential.	While the potential impact to the White Bay Power Station (Inlet) Canal (listed on the Port Authority of NSW s170 register) is minor, this is subject to confirmation of the depth of the heritage item and final excavation methodologies. As such, notification will be given to the Inner West Council as the proposal is located within the Inner West local government area (refer to Chapter 6).
		Notification: under Section 16, 21 days' notice is required for development in the foreshore area.	Notification will be given to the Sydney Harbour Foreshore Authority as the proposal is located within the Foreshores and Waterways Area Boundary (SREP 2005) (refer to Chapter 6).

6 Stakeholder and community consultation

This chapter summarises the planned community and stakeholder engagement activities to be carried out to support the REF exhibition and construction phase. The REF exhibition period will include targeted consultation to provide an opportunity for stakeholders and the community to provide feedback on the proposal.

6.1 Consultation objectives

Sydney Metro would inform and engage with the local community and key stakeholders across the proposal's lifecycle. The approach to stakeholder and community consultation for the proposal includes:

- Implementing a communication and engagement plan that supports the REF program
- Informing the community and other stakeholders by providing clear, factual and timely information about planned construction and operational work and its associated environmental and social impacts
- Providing a mechanism for prompt issues resolution
- Providing adequate opportunities for community members and other stakeholders to provide feedback
- Ensuring coordinated communications with relevant government agencies and stakeholders.

This REF will be exhibited for a four week period commencing in April 2020. Through this process the community and stakeholders will be invited to make submissions to Sydney Metro, raise issues, seek clarification or ask questions about the proposal. All issues that are raised will be considered and responded to in a Response to Submissions Report. This process will constitute the main way in which Sydney Metro will advise the community about the proposal. A number of community channels will be used to keep stakeholders and local residents informed.

6.2 Statutory notification requirements

6.2.1 ISEPP notification

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to commencing work that would affect various infrastructure. A summary of the ISEPP consultation requirements is detailed below in Table 6-1.

Table 6-1: ISEPP consultation requirements

Consultation required under clauses 13-16 of ISEPP	Relevant agency	Is consultation required?
Are the works likely to have a substantial impact on the stormwater management services which are provided by council?	Inner West Council	No
Are the works likely to generate traffic to an extent that will strain the existing road system in a local government area?	Inner West Council	No
Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system?	Inner West Council	No
Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	Inner West Council	No

Consultation required under clauses 13-16 of ISEPP	Relevant agency	Is consultation required?
Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	Inner West Council	No
Will the works involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Inner West Council	No While the proposal would involve excavation of a roads, these roads are under the management of Port Authority of NSW. Sydney Metro has been in regular consultation with Port Authority of NSW
Is there a local heritage item (that is not also a state heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the item/area are more than minor or inconsequential?	Inner West Council, Port Authority of NSW	Yes The proposal would be adjacent to the heritage curtilage of the Glebe Island Silos, listed on the Port Authority of NSW s170 register. However, the impact to the heritage item is considered neutral. While the potential impact to the White Bay Power Station (Inlet) Canal (listed on the Port Authority of NSW s170 register) is minor, this is subject to confirmation of the depth of the heritage item and final excavation methodologies. As such, consultation with the Inner West Council would be completed during the exhibition of the REF. Sydney Metro has also been in regular consultation with Port Authority of NSW
Are the works located on flood liable land? If so, will the works change flooding patterns to a more than minor extent?	Inner West Council, NSW State Emergency Service	No Areas of the proposal site are mapped as flood liable land, however the proposal would not impact flooding patterns more than a minor extent
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974*?	Department of Planning, Industry and Environment – Environment, Energy and Science Group	No
Development on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone?	Department of Planning, Industry and Environment – Environment, Energy and Science Group	No
Are the works adjacent to a declared aquatic reserve or marine park under the *Marine Estate Management Act 2014*?	Department of Planning, Industry and Environment	No

Consultation required under clauses 13-16 of ISEPP	Relevant agency	Is consultation required?
Are the works in the foreshore area as defined by the *Place Management NSW Act 1998* (formerly known as *Sydney Harbour Foreshore Authority Act 1998*)	Property NSW	Yes The proposal is located within the Foreshores and Waterways Area Boundary (Sydney Harbour Catchment SREP)
Do the works involve the development of a fixed or floating structure in or over navigable waters?	Transport for NSW	No
Are the works for the purpose of residential development, as educational establishment, a health services facility, a correctional facility or group home in an area that is bush fire prone land?	NSW Rural Fire Services	No

Based on the above considerations, the Inner West Council and Property NSW would be notified as the proposal is located within the foreshore area. Consultation with the Inner West Council and Property NSW will occur during the exhibition of the REF.

6.3 Consultation during REF Exhibition

The REF will be exhibited for a minimum four week period commencing in April 2020. During this period, written submissions will be accepted for consideration. The REF will be exhibited online at sydneymetro.info.

Sydney Metro will ensure stakeholders and the community are provided with opportunities to view the REF and engage with the project team. The details of engagement activities will be advised at the commencement of public exhibition through advertising (print and digital), a newsletter delivered to properties, emails to registered parties and information provided on the Sydney Metro website.

As a minimum, consultation activities would meet relevant statutory requirements in place at the time.

Community members and stakeholders are invited to submit their feedback on the proposal to Sydney Metro by:

- Emailing: sydneymetrowest@transport.nsw.gov.au or
- Writing to: Sydney Metro, PO Box K659, Haymarket NSW 1240 and should be clearly marked 'Submissions on The Bays– Road relocation works REF'.

During the exhibition period, community members and stakeholders can direct any enquiries to Sydney Metro:

- Enquiries phone line: 1800 612 173
- Email: sydneymetrowest@transport.nsw.gov.au

6.4 Response to Submissions Report

Following the REF exhibition, a Response to Submissions Report will be prepared by Sydney Metro. This report will:

- Summarise the issues raised in the submissions
- Provide responses to each issue raised in the received submissions
- Describe any proposed changes to the proposal and assesses the environmental impact of these changes
- Identify any proposed new or revised environmental mitigation and management measures.

Sydney Metro will write to individuals and organisations that have made submissions advising them that their submission will be addressed in the Response to Submissions Report. The Response to Submissions Report will be published on the Sydney Metro website www.sydneymetro.info.

6.5 Post-determination engagement activities

Subject to determination of the proposal, Sydney Metro would continue to engage with community and stakeholders in the lead up to, and during the construction of the proposal.

Methods used for engaging and providing proposal information to the community and stakeholders before and during the delivery of the proposal are outlined in Table 6-2. These activities would be carried out by the construction contractor in consultation with Sydney Metro.

Table 6-2: Key community and stakeholder engagement activities during proposal delivery phase

Activity	Purpose	Frequency
Advertisements	To inform of significant traffic changes, detours and traffic disruptions as required to comply with approvals; in local newspapers.	At least seven days prior to change
Community emails	To allow communication with the project team and inform the community of progress key milestones or activities including traffic changes.	Monthly
Community information line (1800 612 173)	Access to the project team via a 1800 number.	24 hours a day, seven days a week
Letterbox notifications	Notification letters to inform identified sensitive receivers (local residents and businesses) affected by changes to road network and traffic conditions.	At least seven days prior to change
Project Website	Documents uploaded to the website (www.sydneymetro.info) would include notification letters and other public material related to the works.	To coincide with distribution
Signposting	Information or directional signage at the location of road tie ins and construction works.	At least seven days prior to change
Variable Message Signs (VMS)	Electronic variable message signs provide advanced notice to road users of major traffic changes, emergencies, incidents and traffic delays.	At least seven days prior to change, or as required
Doorknocking	Used to discuss potential impacts of the proposal on highly impacted stakeholders, especially residents and businesses directly impacted by construction activities.	As required
Meetings with individual/ groups	Discuss project activities, including work in progress, upcoming activities and any issues associated. Meetings will also be used to discuss potential impacts and proposed mitigation measures.	As required

7 Environmental impact assessment

This chapter provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. This includes consideration of the factors specified in the guideline Is an EIS required? (Department of Urban Affairs and Planning, 1999) as required under clause 228(1)(b) of the EP&A Regulation and the factors specified in clause 228(2) of the EP&A Regulation. A checklist of clause 228(2) factors and how they have been specifically addressed in this REF is included at Appendix A

For each potential impact, the existing environment is characterised and then an assessment is carried out as to how the proposal would impact on the existing environment.

7.1 Noise and vibration

A Noise and Vibration Impact Assessment addressing construction noise and vibration for the proposal was carried out by SLR consulting. This assessment is attached as Appendix B of this REF. The methodology and results of this assessment are summarised in this section.

Cumulative noise impacts associated multiple works being completed near the proposal at the same time are discussed in Section 7.14.

7.1.1 Methodology

The noise and vibration assessment involved:

- Defining the existing background noise levels based on ambient noise logging
- Establishing the representative construction scenarios, locations, working times and duration of activities that would apply to construction of the proposal
- Predicting noise levels at receivers within the assessment area due to the proposed construction activities using a noise prediction model
- Assessing construction noise impacts with reference to the Interim Construction Noise Guideline (ICNG) and the Sydney Metro Construction Noise and Vibration Standard (CNVS)
- Assessing construction vibration impacts
- Undertaking a qualitative assessment of operational noise impacts
- Identifying noise and vibration mitigation and/or management measures to minimise and manage the predicted noise and vibration impacts.

Policies and guidelines

The following policies and guidelines were used to assess construction noise and vibration impacts:

- Interim Construction Noise Guideline (ICNG) (Department of Environment and Climate Change (DECC), 2009)
- Assessing Vibration: a technical guideline (Department of Environment and Conservation (DEC), 2006)
- AS2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors
- Road Noise Policy (Department of Environment, Climate Change and Water (DECCW), 2011)
- BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2 (BSI, 1993)
- DIN 4150:Part 3-2016 Structural vibration – Effects of vibration on structures (Deutsches Institute fur Normung, 1999)
- Sydney Metro Construction Noise and Vibration Standard (CNVS) (Sydney Metro, 2020)
- Noise Policy for Industry (Environmental Protection Agency (EPA), 2017)
- Guideline for Child Care Centre Acoustic Assessment Version 2.0 (GCCCAA) (Association of Australasian Acoustical Consultants (AAAC), 2013).

Construction noise assessment

Construction noise was assessed in accordance with the ICNG. The ICNG identifies Noise Management Levels (NMLs), which are the project-specific noise criterion used to help manage noise impacts at all receiver locations. NMLs are defined by existing ambient noise levels and the receiver's sensitivity to construction noise. NMLs are categorised for residential and other sensitive land uses.

If construction noise levels are predicted to exceed NMLs, potential noise impacts would be managed through the implementation of feasible and reasonable mitigation measures.

The construction noise assessment uses the following terms:

- $LA_{eq(15minute)}$ is the 'energy average noise level' considered over a 15-minute period. This parameter is used to assess potential construction noise impacts
- LA90 is the 'background noise level' in the absence of construction activities. This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively. The $LA_{eq(15minute)}$ NMLs are based on LA90 background noise levels
- Rating Background Level (RBL) is representative of the typical lowest ambient noise level not exceeded for more than 90 per cent of the daytime, evening, or night-time period.

The ICNG provides an approach for determining $LA_{eq(15minute)}$ NMLs at residential receivers by applying the measured LA90 background noise levels, as described in Table 7-1.

Table 7-1: Determination of NMLs for residential receivers

Time of day	NML $LA_{eq(15\ minute)}$	How to apply
Standard hours **Monday to Friday 7:00am to 6:00pm** **Saturday 8:00am to 1:00pm** **No work on Sundays or public holidays**	Noise affected RBL + 10 dBA	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $LA_{eq(15minute)}$ is greater than the noise affected level, the proponent would apply all feasible and reasonable work practices to meet the noise affected level. • The proponent would also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restructuring the hours that the very noisy activities can occur, taking into account: • Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools or mid-morning or mid-afternoon for works near residences). • If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dBA	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent would apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practises have been applied and noise is more than 5 dBA above the noise affected level, the proponent would negotiate with the community.

Note: The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Industrial Noise Policy.

The assessment of predicted airborne noise impacts around construction sites is based on the exceedance of the NMLs as per the construction scenarios identified in Table 7-3. The likely subjective response of people affected by the impacts is shown in Table 7-2.

Table 7-2: Exceedance bands and corresponding subjective response to impacts

Exceedance of management level	Likely subjective response	Impact colouring
No exceedance	No impact	
1 to 10 dB	Minor	
11 dB to 20 dB	Moderate	
Greater than 20 dB	High	

Construction scenario descriptions

Representative scenarios have been developed to assess the likely impacts from the various construction phases of the works. These scenarios are outlined in Table 7-3. The assessment uses realistic worst-case scenarios to determine the impacts from the noisiest 15-minute period that are likely to occur for each work scenario, as required by the ICNG. Non-noisy works which are unlikely to generate noise impacts at any surrounding receivers (such as line marking and signage associated with the creation of the one way circuit, or any other work scenarios that exclude noise equipment) have not been included in this assessment.

Some short-term works associated with implementing road traffic reconfigurations would be required to facilitate phases of the works and may need to be undertaken during weekend and/or during the night-time period to avoid disruption to the road network. Noise impacts from any short-term works undertaken during out-of-hours works period would be managed in accordance with the requirements of the Sydney Metro CNVS and have not been included as part of this assessment.

Table 7-3: Construction scenario descriptions

Scenario	Activity	Indicative duration – Number of weeks	Description
Site clearing	Vegetation clearing	2	• Existing features at the site would require removal before the works can begin. Vegetation affected by works would be removed and existing structures such as areas of concrete hardstand and jersey kerbs would require demolition/removal • Vegetation removal works would use chainsaws and wood chippers, which are noise intensive • Demolition works would use noise intensive equipment, including concrete saws and rock breakers during certain phases.
	Demolition	2	
Site establishment / Site demobilisation	Fencing and compounds	2	• Due to the historical industrial uses of the site, undesirable materials may be present within the site. If identified, the material would be removed from the footprint of the work areas • Site establishment works include installation of boundary fencing and establishing the construction compounds • Plant and equipment used in the 'site establishment' scenario would also be used for 'site demobilisation' and the potential noise impacts from these activities are anticipated to be similar. • These works are not expected to require any noise intensive equipment.
	Contaminated land remediation (if required)	20	
Cement Australia Truck Parking Licenced Area relocation	Road base and paving	20	• The existing Cement Australia truck parking area requires relocation. The works required to establish the new parking area are not expected to require noise intensive equipment.
	Concreting	20	

Scenario	Activity	Indicative duration – Number of weeks	Description
Port Access Road / Sommerville Road / Solomons Way intersection reconfiguration	Road base and paving	24	• Road relocation and intersection reconfiguration works would involve importing and placing of suitable road base material and paving of the new road surface • Concreting works would also be required to form the relocated road realignment • These works are not expected to require noise intensive equipment.
	Concreting	24	
Port Access Road relocation	Road base and paving	20	
	Concreting	20	

Construction vibration

The potential impacts during vibration intensive works have been assessed assuming a large rockbreaker could be used anywhere within the proposal site during the 'Site clearing – demolition' construction scenario (see Table 7-3).

The Sydney Metro CNVS states that heritage buildings and structures should be assessed according to the cosmetic damage screening criteria of 7.5 millimetres per second and should not be assumed to be more sensitive to vibration unless found to be structurally unsound. Where heritage items are found to be structurally unsound, a more conservative cosmetic damage objective of 2.5 millimetres per second Peak Particle Velocity (from DIN 4150) would be considered. Based on available information, buildings within the White Bay Power Station heritage curtilage have been considered to be structurally unsound for the purposes of this assessment (refer to Appendix B).

Potentially affected buildings and structures would be determined based on the nature of works, distance of the building or structure to the works and predicted vibration levels. Consideration would also be given to if recent condition surveys are already available for the relevant building or structure.

7.1.2 Existing environment

Background noise levels

Existing noise levels surrounding the proposal site are generally controlled by road traffic noise from Victoria Road and Anzac Bridge, with some industrial noise from White Bay and Glebe Island.

The area immediately surrounding the proposal is mainly commercial and/or industrial. Residential receivers are located to the west and north, however, these are generally distant from the site. The nearest residential receivers are about 200 metres to the west on the opposite side of Victoria Road and residential receivers to the north are over 500 metres away, with intervening buildings which provide shielding (see Figure 7-1).

The surrounding areas of the proposal site have been divided into three Noise Catchment Areas (NCAs). These are detailed in Table 7-4 and shown in Figure 7-1.

Table 7-4: Noise catchment areas

NCAs	Description
NCA01	Located west of Victoria Road in Rozelle. This catchment is mainly residential and the nearest receivers are on Quirk Street, Hornsey Street and Lilyfield Road. Commercial receivers are located along Victoria Road, Darling Street and in the south of the catchment on Lilyfield Road. Sydney Community College, St Joseph's Catholic Church and Rosebud Cottage are to the west of Victoria Road. Multistorey residential receivers are in Pyrmont around 700 m to the south-east.
NCA02	Located east of Victoria Road in Rozelle and Balmain, and includes White Bay, the former White Bay Power Station and Glebe Island. This catchment is mainly residential and the nearest receivers are on Robert Street and Mansfield Street. Various commercial areas surround White Bay and Glebe Island. C3 Church Balmain, Bald Rock Hotel and Inner Sydney Montessori School Child Care are to the north of White Bay.
NCA03	Located south of the Victoria Road/Western Distributor in Glebe. This catchment is mainly residential and the nearest receivers are distant from the site across Rozelle Bay. Commercial areas associated with Rozelle Bay are to the south of Victoria Road/Western Distributor.

Sensitive receivers

Receivers potentially sensitive to noise and vibration have been categorised as residential buildings, commercial/industrial buildings, or 'other sensitive' land uses which includes educational institutions, child care centres, medical facilities, places of worship, outdoor recreation areas. Receiver types and locations are shown in Figure 7-1.

Figure 7-1: Noise Catchment Areas, receiver types and noise logger locations around the proposal

Background noise monitoring

Unattended noise monitoring was completed in the vicinity of the proposal site in July 2016, February 2019 and May 2019. The measured noise levels have been used to determine the existing noise environment and to set criteria to assess the potential impacts from the proposal. The noise monitoring locations are included in Table 7-5 and shown in Figure 7-1.

The results of the unattended ambient noise surveys are summarised in Table 7-5 as the Rating Background Level (RBL), and LAeq noise levels for the ICNG daytime (7 am to 6 pm), evening (6 pm to 10 pm) and night-time (10 pm to 7 am) periods.

Short-term attended noise monitoring was completed at each ambient noise monitoring location. Attended noise monitoring results confirmed the results of the unattended noise monitoring.

Table 7-5: Summary of unattended noise logging results

Noise Monitoring Location	Address	Measured Noise Level (dBA)					
		Background Noise (RBL)			Average Noise Level (LAeq)		
		Daytime	Evening	Night	Daytime	Evening	Night
L01	21 Mansfield Street, Rozelle	43	43	35	56	54	47
L02	22 Lilyfield Road, Rozelle	51	51	45	57	57	54
L03	308 Glebe Point Road, Glebe	48	47	39	59	58	51

7.1.3 Potential impacts

Construction noise

The predicted airborne NML exceedances from construction site works at the proposal site are summarised in Table 7-6. The predicted noise levels assume a worst-case scenario, therefore it is expected that the construction noise levels would frequently be lower than predicted at the most-exposed receiver for most construction activities.

The number of receivers predicted to experience exceedances of the NMLs are summarised in bands of 10 dB as per Table 7-2. No residential receivers are predicted to be Highly Noise Affected (ie predicted noise levels greater than 75 dB(A), (refer to Table 7-1)).

Table 7-6: Overview of NML exceedances

Scenario	Activity	Number of receivers						
		Total	Residential receivers with NML exceedances			Commercial and other receivers with NML exceedances		
			1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
Site clearing	Vegetation clearing	1125	479	11	–	19	–	1
	Demolition	1125	648	78	–	17	7	1
Site establishment/ Site demobilisation	Fencing and compounds	1125	–	–	–	1	–	–
	Contaminated land remediation	1125	4	–	–	1	–	–
Cement Australia Truck Parking Licenced Area relocation	Road base and paving	1125	–	–	–	–	–	–
	Concreting	1125	–	–	–	–	–	–
Port Access Road / Sommerville Road / Solomons Way intersection reconfiguration	Road base and paving	1125	–	–	–	–	–	–
	Concreting	1125	–	–	–	–	–	–
Port Access Road relocation	Road base and paving	1125	2	–	–	1	–	–
	Concreting	1125	1	–	–	1	–	–

The proposal would result in 'minor' noise impacts for the majority of construction scenarios. 'Moderate' and 'high' impacts to receivers under a worst-case scenario are predicted during the 'site clearing' works scenario. This scenario would require the use of noise intensive equipment, such as chainsaws, chippers, concrete saws and rockbreakers, during certain phases.

Worst-case scenario noise levels during the 'site clearing' scenario are predicted to be up to 83 dBA at the closest commercial receivers and 73 dBA at the nearest residential receivers. The following 'other sensitive receivers' predicted to be impacted during the 'site clearing' scenario include:

- 'High' impacts at C3 Church Rozelle
- 'Moderate' impacts at two commercial/industrial receivers (the former White Bay Power Station and the industrial estate to the north of Robert Street), some Inner Sydney Montessori School Child Care buildings and Rosebud Cottage Child Care
- 'Minor' impacts at Sydney Community College, St Joseph's Catholic Church and ANZAC Bridge Park.

The 'site clearing' scenario would only be required during the start of the construction works for a short duration (about two weeks). Overall, the proposal would have 'minor' impacts to residential receivers.

Construction vibration

Vibration intensive equipment is proposed during the demolition works activity (site clearing scenario) which could include the use of a rockbreaker. No other scenarios are expected to require vibration intensive equipment.

The distance from the works to the nearest receivers/structures is generally sufficient for vibration impacts during vibration intensive works to be minimal. Exceedances of the cosmetic damage screening criteria are, however, predicted at the nearest building at the former White Bay Power Station site, at the nearest building at the Gypsum Australia site and at a heritage listed underground canal structure (White Bay Power Station (Inlet)). Demolition works associated with the site clearing scenario may be performed up to four metres from these buildings. Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. Alternative construction methodologies would also be considered (refer to Section 7.1.4).

Exceedances of the human comfort criteria are predicted at the nearest four commercial/industrial buildings, however three of the four buildings may not be occupied. These buildings include:

- Two buildings at former White Bay Power Station (not occupied)
- The nearest lots in the Robert Street commercial warehouses
- The western-most building at Gypsum Australia (not occupied).

The location of human comfort and cosmetic damage criteria exceedances are shown in Figure 7-2.

The assessment does not consider potential vibration impacts to underground utilities or services as the location of these items is currently unknown. The potential vibration impacts to these items would be reviewed in consultation with the asset owners during the detailed design of the proposal.

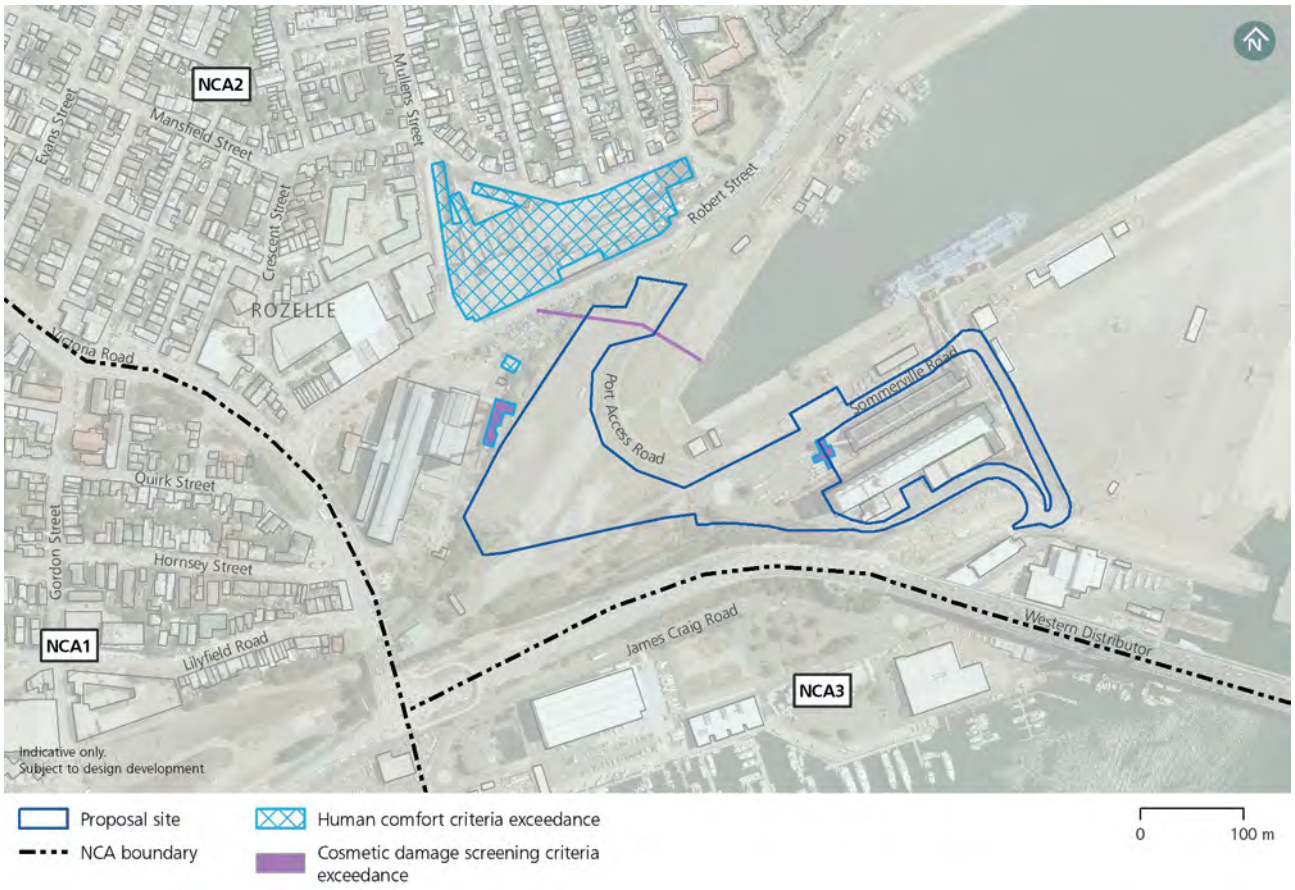

Figure 7-2: Predicted human comfort and cosmetic damage criterion exceedances

Operational road traffic

The proposal would realign existing sections of Solomons Way and the Port Access Road as well as relocate the Cement Australia Truck Parking Licenced Area to the north-east, approximately 40 metres from its existing location. The proposal would not result in any changes to traffic volumes accessing the site.

Operation of the proposal is expected to have a negligible impact on nearby receivers due to the following:

- The separation distance between the proposed roads and residential receivers is over 280 metres to the north, and over 120 metres to 180 metres the north and west respectively to 'other sensitive' receivers. There are also large industrial buildings and topographic features screening these receivers from noise generated by the relocated roads
- Surrounding commercial and industrial land use are less sensitive to operational road noise impacts, and likely have high acoustic performance to mitigate high existing noise levels (such as acoustic windows and doors)
- The existing Victoria Road and Western Distributor/Anzac Bridge road network dominate the local noise environment. The comparatively small contribution from the proposed relocations is not expected to alter the already high existing noise levels.

7.1.4 Management and mitigation measures

The Sydney Metro Construction Noise and Vibration Standard would be applied to the proposal. The Standard aims to manage noise and vibration levels where feasible and reasonable using a variety of mitigation measures, and provides:

- A list of standard mitigation measures that would be implemented where feasible and reasonable
- Trigger levels (based on exceedances of airborne NMLs) for the implementation of additional mitigation measures.

The mitigation measures that would be implemented to address potential noise and vibration impacts are listed in Table 7-7.

Table 7-7: Mitigation measures – noise and vibration

Reference	Impact/issue	Mitigation measure	Phase
NV1	Airborne construction noise and construction vibration	Receivers that would potentially be affected by noise and/or vibration from the works would be appropriately notified before the relevant works start. This would include details on the nature of works to be carried out, the expected noise levels, duration of noise generating construction works, and contact details during construction.	All
NV2	Construction vibration	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage buildings and structures, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	All
NV3	Building condition surveys – construction vibration	Condition surveys of buildings and structures near to the proposal would be undertaken prior to the commencement of vibration intensive works, where appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist.	All
NV4	Alternative construction methodologies – vibration	Alternative construction methodologies would be considered where vibration intensive works (typically, site clearing – demolition) result in exceedances of cosmetic damage screening criteria and may include the following: • The use of hydraulic concrete shears, jaw crushers, coring, and wire sawing in lieu of rockbreakers for demolition of structures • Use of smaller capacity rockbreakers or lower vibration generating rockbreakers • Isolating the vibration sensitive structure from the vibration intensive work area by severing the vibration transmission path using non-vibration intensive means such a sawing.	All
NV5	Construction vibration – utilities	The potential vibration impacts to underground utilities and services would be reviewed as the proposal progresses in consultation with the asset owners.	All

7.2 Traffic, transport and access

A traffic and transport assessment was carried out to assess the impacts of the proposal for all road users and relevant interfaces. This assessment is attached as Appendix C of this REF. The results of this assessment are summarised below.

Cumulative traffic and transport impacts associated with multiple works being completed near the proposal at the same time are discussed in Section 7.14.

7.2.1 Methodology

The traffic and transport assessment involved:

- Identifying existing conditions including site access, road network, traffic conditions, traffic volumes, parking availability, public transport and pedestrian and cyclist provisions
- Assessing the impact of the proposal during construction and operation including potential impacts on road network performance, parking, property access, public transport, pedestrians and cyclists
- Identifying management measures to mitigate adverse impacts of the proposal on the traffic and transport network.

Traffic modelling was carried out using Vissim traffic modelling software (version 11.0) to assess the impacts of construction vehicle movements between the proposal site and the nearest arterial road inclusive of the arterial road interface.

Intersection Level of Service has been determined for intersections within the vicinity of the proposal site based on the criteria in Table 7-8.

Table 7-8: Intersection Level of Service criteria

Level of Service	Average delay per vehicle (seconds/vehicle)	Traffic signals and roundabouts
A	Less than 15	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals, incidents will cause delays
F	Over 70	Extra capacity required

Further details relating to the traffic modelling approach and performance indicators are provided in Appendix C.

7.2.2 Existing environment

Road network and traffic volumes

James Craig Road, Sommerville Road and Robert Street provide access to existing maritime-related land uses in Rozelle Bay, Glebe Island and White Bay including the White Bay Cruise Terminal. These land uses are connected by a series of internal roads including Solomons Way and Port Access Road. Solomons Way currently operates as a one-way road between Sommerville Road and Port Access Road.

The Crescent (between City West Link Road and Victoria Road) is a major arterial road and forms part of the A4 corridor that links Sydney CBD with the Inner West and the M4 Motorway. The intersection of James Craig Road and The Crescent is signalised with all movements permitted.

Traffic volumes are high on City West Link Road, The Crescent and Victoria Road in both directions. These roads carry volumes between 1,500 and 3,940 vehicles per hour in each direction. Eastbound volumes on City West Link Road and The Crescent are generally higher than the traffic volumes in the opposite direction during the morning peak hour. Traffic volumes are about the same in both directions on these roads during the evening peak hour. On Victoria Road, a distinct southbound peak direction is evident during the morning peak hour while a northbound peak direction is evident during the evening peak hour. Substantially lower volumes of up to 330 vehicles per hour are experienced on James Craig Road.

On-street parking is not permitted on James Craig Road and The Crescent (between City West Link Road and Victoria Road). Tenant only parking is permitted on some sections of Sommerville Road.

The future arterial road network within the vicinity of the proposal will be modified to accommodate the WestConnex M4-M5 Link. These changes are anticipated to be complete by 2023. Additional road network changes are also proposed as part of the Western Harbour Tunnel within the vicinity of the portal on City West Link Road. This project is currently in its planning stages and, if approved, would connect to WestConnex M4-M5 Link and the surface road network in Rozelle.

Intersection performance

Modelled intersection performance during the morning and evening peak hours for key intersections in the vicinity of the proposal identified that the following intersections currently perform poorly (Level of Service F):

- City West Link Road/The Crescent during the morning peak hour
- City West Link Road/Catherine Street during the morning peak hour.

Poor performance of these intersections is a result of high volumes of through traffic conflicting with right turning and cross-street traffic, in conjunction with substantial queuing along City West Link Road in the eastbound direction.

Public transport

There are no train stations located in close proximity to the proposal site. The L1 Dulwich Hill light rail line is accessible at the Rozelle Bay stop, located about 500 metres south of the proposal site.

Victoria Road is a major bus corridor adjacent to the proposal site. Two bus operators, Transit Systems and Sydney Buses, provide services via 23 bus routes that travel on Victoria Road and provide connections between the Sydney CBD, the Inner West, northern suburbs and western suburbs. Two additional bus routes from Darling Street and Glebe Point Road are also available in the surrounding area.

School buses also service the surrounding area, with 20 school bus routes.

Other transport facilities

The White Bay Cruise Terminal and White Bay berth 4 is located about one kilometre from the proposal site and serve cruise ships when the Overseas Passenger Terminal at Circular Quay is occupied. The White Bay Cruise Terminal and White Bay berth 4 also serve smaller cruise ships and cruise ships that use Australian ports only. When the White Bay Cruise Terminal and/or White Bay berth 4 are in operation, access to the terminal is provided via Port Access Road. Captain Cook Cruises operates a ferry service between the White Bay Cruise Terminal and Barangaroo on days when cruise ships are berthed at the White Bay Cruise Terminal.

Active transport

Footpaths are provided on both sides of Victoria Road, James Craig Road and Robert Street. Solomons Way and sections of Sommerville Road are not open to the general public, however there are some formal footpaths on sections of one side of both roads.

Pedestrian activity within the immediate vicinity of the proposal site is low to non-existent given the marine and industrial land uses present. However, the predominately residential areas in surrounding suburbs such as Rozelle, Balmain, Glebe and Annandale have a well-developed pedestrian network.

The cycle network surrounding the proposal site is well established with provision of a number of off-road shared paths and on-road cycle routes. There are no formalised provisions for cyclists or pedestrians along Port Access Road.

A number of changes to the active transport network are proposed as part of the approved WestConnex M4-M5 Link project. These include the following:

- Removal of two existing pedestrian bridges, one near the east approach at the Victoria Road / The Crescent intersection and the other adjacent to Lilyfield Road. The bridge adjacent to Lilyfield Road would be replaced with an underpass below Victoria Road that would connect Lilyfield Road and the ANZAC Bridge shared path.
- Rozelle Rail Yards link: provision of an off-road active transport east-west connection between The Bay Run and Greenway in the west to ANZAC Bridge and Sydney CBD in the east
- Whites Creek link: provision of a link between Callan Park, Rozelle Rail Yards and Parramatta Road via a predominately off-road active transport link along Whites Creek to Easton Park
- Rozelle land bridge: provision of a link from Bicentennial Park and Glebe foreshore to Rozelle Rail Yards and Easton Park, providing north-south connectivity between Glebe, Annandale, Rozelle and Balmain.

7.2.3 Potential impacts

Construction impacts on road network performance

Site access and egress to and from the proposal site would be via James Craig Road, Solomons Way, Sommerville Road and Port Access Road (refer to Figure 4-3) prior to the establishment of the proposed one-way circuit in this area). Access and egress by construction vehicles would be during standard construction hours.

Construction traffic impacts to port operations are anticipated to be minor or negligible with a limited construction workforce (with a peak construction workforce of 20). As discussed in Section 4.2.2, during the peak construction period (2021) the following vehicles numbers are anticipated:

- About 10 light vehicles per hour through the day
- About four heavy vehicles per hour during the road network peak periods
- About 10 heavy vehicles per hour outside of road network peak periods.

The majority of plant and equipment would be stored at the proposal site within the laydown areas. If required, mobilisations of large plant and equipment would be carried out at evening or night time outside of peak traffic times, subject to Transport for NSW requirements.

Modelling indicates that intersections that would be used by construction vehicles would continue to perform at the same Level of Service with or without construction vehicles. At some locations, there would be a small reduction in intersection efficiency (reduced through traffic and changes in queue length). However, the reduced intersection efficiency would be such that Level of Service category is unchanged (refer to Table 7-9).

Table 7-9: Modelling peak hour intersection performance without and with the proposal

Intersection	Peak hour	Level of Service (without proposal)	Level of Service (with proposal)
Victoria Road/Robert Street	Morning	C	C
	Evening	D	D
Victoria Road/The Crescent	Morning	B	B
	Evening	C	C
The Crescent/James Craig Road	Morning	A	A
	Evening	A	A
City West Link Road/The Crescent	Morning	B	B
	Evening	C	C
City West Link Road/Catherine Street	Morning	C	C
	Evening	D	D

Consideration of potential cumulative construction traffic impacts associated with construction of WestConnex M4-M5 Link and Western Harbour Tunnel at the same time as the construction of this proposal is outlined in Section 7.14.2.

Construction impacts on parking and property access

Port Access Road, Sommerville Road and Solomons Way provides access to the White Bay Cruise Terminal and other port related operations and businesses, including at Glebe Island. Throughout all phases of the proposed construction, these roads would generally remain open to traffic. However, there be temporary lane closures and occasional periods of access interruption, outside peak periods or peak periods for the White Bay Cruise Terminal. This would be managed in consultation with Ports Authority and other port stakeholders to minimise disruption.

As part of Phase 1, temporary traffic arrangements would be implemented during construction to maintain existing road operations along Port Access Road. This would include the installation of temporary lines and signs and the construction of permanent and temporary link elements at the reconfigured Port Access Road / Sommerville Road / Solomons Way intersection, and the implementation of the one way circuit on Sommerville Road and Solomons Way (completed as part of Phase 1). Port Access Road traffic would be only diverted onto the relocated section of Port Access Road at the completion of Phase 2. The impact of traffic arrangements on travel distance and time during construction is considered to be minimal.

Sydney Metro would consult with Port Authority of NSW to confirm ship days in order to anticipate and manage cruise passenger traffic through the proposal site.

During construction of the proposed Cement Australia Truck Parking Licenced Area, access to the existing truck parking facilities would be maintained. As described in Section 4.2.2, the truck parking facilities would be relocated before the commencement of construction works that impact the existing parking location.

Construction impacts on public and active transport network

The Crescent is used by buses and also forms part of the proposed construction vehicle route. Minimal impacts to buses are expected and would be limited to a potential minor increase in travel time due to the additional construction vehicles on the road network. There would be no impacts to bus stops.

No impacts to the L1 Dulwich Hill Line or the White Bay Cruise Terminal are anticipated during construction.

No impacts to pedestrians and cyclists would occur given that shared paths adjacent to James Craig Road and The Crescent would remain open during construction.

Operation

The final road network arrangement may lead to a minor increase in travel time for road users due to an increase in travel distance in the order of about 200 metres for most traffic.

Vehicles that currently access land uses to the east of The Bays via James Craig Road south of Sommerville Road would not be impacted by the proposal. The proposal would also not change public access arrangements for the White Bay Cruise Terminal (access/egress would be maintained via James Craig Road).

The new one-way circuit would improve road safety by reducing the number of conflicting movements at the intersection of Port Access Road / Solomons Way / Sommerville Road.

The Cement Australia Truck Parking Licenced Area would be relocated about 40 metres north-east of its existing location prior to roadworks commencing. The new location would not result in a loss of any parking spaces, however it would result in marginally longer travel for some trucks using the facility.

7.2.4 Management and mitigation measures

The Sydney Metro's Construction Traffic Management Framework would be applied to the proposal. The framework provides an overall strategy and approach for construction traffic management, and an outline of the traffic management requirements and processes that would be applied, and interactions with relevant stakeholders. It establishes the traffic management processes and acceptable criteria to be considered and following when managing impacts to the road network.

The mitigation measures that would be implemented to address potential traffic, transport and access impacts are listed in Table 7-10.

Table 7-10: Mitigation measures – Traffic, transport and access

Reference	Impact/issue	Mitigation measure	Phase
T1	Changes to the network (wayfinding)	Clear wayfinding and safety signage would be provided to direct and guide vehicles not related to the proposal during road construction works. This would be supplemented by Variable Message Signs to advise drivers of traffic diversions, speed restrictions or alternative routes.	All
T2	Changes to the network	Port Authority of NSW and lease holders would be notified in advance of any proposed road changes within the port area, and the potential for short term delays.	All
T3	Congestion	Construction site traffic would be managed to minimise movements during peak periods.	All
T4	Access	Access to Cement Australia and other leased areas would be maintained in consultation with Ports Authority and lease holders.	All
T5	Parking	All staff parking would be provided on-site and not on surrounding local streets.	All

7.3 Non-Aboriginal heritage

An assessment of non-Aboriginal heritage for the proposal was prepared by Artefact. This assessment is attached as Appendix D of this REF. The results of this assessment are summarised below.

7.3.1 Methodology

The non-Aboriginal heritage assessment involved:

- Identifying heritage items within and adjacent to the proposal site through a search of the following registers and databases in October 2019:
  - NSW State Heritage Register
  - SREP 26
  - Section 170 heritage and conservation registers
  - National Heritage List
  - Commonwealth Heritage List
  - Leichhardt LEP 2013
- Describing the existing environment, background and identified heritage values within the proposal site
- Assessing the value and importance (significance) of the heritage values within the proposal site and impacts to heritage listed items
- Assessing the potential for archaeological deposits to remain within the proposal site and potential impacts associated with the proposal
- Identifying management measures to minimise impacts to non-Aboriginal heritage items and identifying any approvals required for the proposed works.

7.3.2 Existing environment

The proposal site forms part of White Bay, a key area of land with significant water frontage and close proximity to the Sydney CBD enabling reliable water transportation for people and merchandise.

The proposal site is located within the curtilage of the original land grant made to William Balmain in 1800, and is located in an area occupied largely by the original White Bay water body prior to reclamation in the 1890s.

Subdivision in the 19th Century led to the establishment of a number of industries and developments in the White Bay area, including the development of maritime industries and the Glebe Island Abattoirs.

From 1854, White Bay was the site of a prominent timber and joinery works site in Sydney. White Bay principally supplied the boat and ship building industries in Balmain and the timber/manufacturing use continued up until 1923, when the Sydney Harbour Trust purchased White Bay to establish a shipyard.

The turn of the twentieth century marked the closure of the Glebe Island Abattoirs and the introduction of the White Bay Power Station which was in operation up until 1984. Historical aerial imagery (circa 1943) shows the White Bay Power Station during operation, with additional structures which have since been demolished.

The White Bay Power Station (SHR Listing No. 01015) and the White Bay Power Station (Inlet) Canal (Port Authority of NSW s170 4560062) are partly located within the proposal site, while the Glebe Island Silos (Port Authority of NSW s170 4560016) and the Glebe Island Dyke Exposures (Port Authority of NSW s170 4560056) are located immediately adjacent to the proposal site.

The White Bay Power Station and Glebe Island Silos heritage items are also listed on the SREP 26. The White Bay Power Station is also listed on the Sydney Harbour Foreshore s170 register and two non-statutory registers – the Register of the National Estate and the Register of the National Trust. The Glebe Island Dyke Exposures are also listed on the non-statutory Register of the National Estate.

Further detail on the existing historical background of the proposal site and the heritage significance of these items is available in Appendix D (The Bays – Road relocation works – Statement of heritage impact).

Archaeological potential

The archaeological potential for built heritage within the proposal site is considered 'low to moderate' as most of the sites and features in the area are likely to have been disturbed or destroyed by sandstone quarrying, late twentieth century developments and road infrastructure development.

There is 'moderate' potential for reclamation fills from the 1851 – 1912 phase of proposal site that have local heritage significance. Archaeological remains relating to reclamation fills could include discrete stratigraphic historic soil deposits, artefactual (glass, ceramic, bone, timber, brick) materials and infill rubble, and timber retaining or infill structures such as piers, posts, beams or walls.

There is 'high' potential for archaeological remains associated with rail infrastructure and former industrial structures between 1912 and 1984. Heritage items would be considered local in significance for their association with the State significant White Bay Power Station and may include turntables, roundhouses and former industrial structures. These remains would be aesthetically and technically significant, and they would be demonstrative of large-scale industrial and organisational practices of the 20th century.

7.3.3 Potential impacts

The location of the proposal in relation to heritage items is demonstrated in Figure 7-3.

Potential impacts associated with the proposed works are discussed in the following sections.

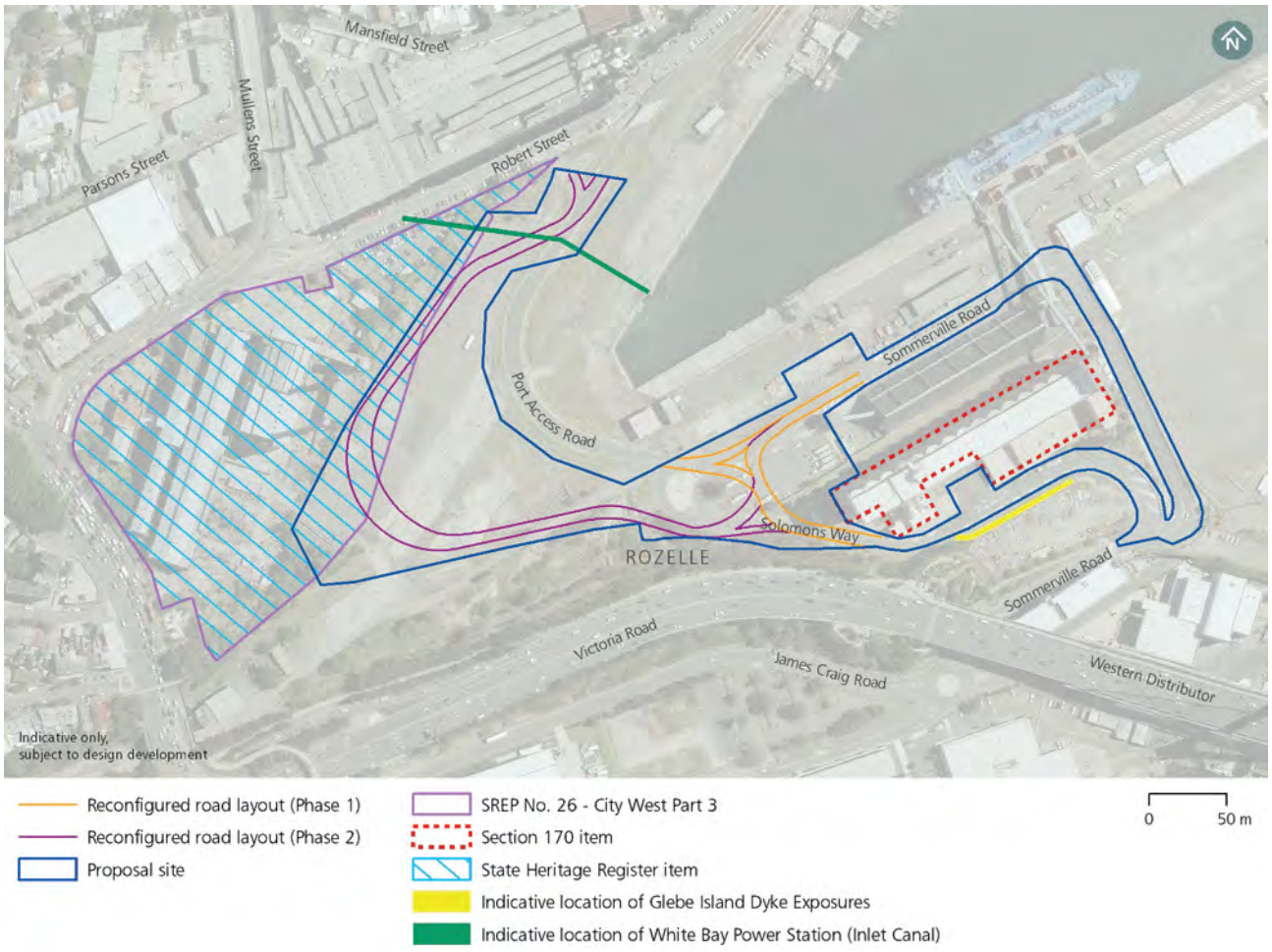

Figure 7-3: Location of the proposed works in relation to heritage listed curtilages

White Bay Power Station

As detailed in Table 7-11, the proposal would have minor direct, potentially direct and indirect (visual) impacts on the White Bay Power Station heritage item due to temporary works and the relocation of a section of the Port Access Road within the heritage curtilage.

The overall impact of the proposal on the heritage item would be minor. While there would be physical permanent changes within the heritage curtilage, there are no significant buildings or structures that form part of the heritage item are within the proposal site and the proposal would not have direct impacts on elements that are of moderate to exceptional significance. The proposal is not expected to diminish the historic, associative, aesthetic, social significance, research potential, representativeness or rarity of the heritage item.

As proposed works within the proposal site include minor direct impacts on heritage curtilage including construction of a road partially within the curtilage, approval or an exemption from approval for the proposed works must first be gained from the Heritage Council of NSW (Heritage Council) or delegate (Heritage DPC). This is discussed in Section 7.3.4.

Table 7-11: White Bay Power Station – heritage impact summary

Item and listing	Significance	Potential impact	Magnitude
White Bay Power Station SHR (01015)	State	**Direct impact – partial demolition** The proposal would encroach on about 0.54 ha of the curtilage of the White Bay Power Station. A section of the relocated Port Access Road would be located within the heritage curtilage. Construction works within the heritage curtilage would involve site clearance and ancillary construction activities. These works would be undertaken in open areas comprising hardstand and port infrastructure (associated with the former coal yard). The former coal yard is not considered to be of exceptional or high significance and does not have designated policies within the White Bay Power Station Conservation Management Plan (CMP). However, section 5.1.12 of the CMP indicates that landscape elements including yards should be conserved and adapted. At present, the former coal yard remains undeveloped and the proposal, including the relocated Port Access Road, would alter this.	Minor
		Potential direct impact – vibration Modelling indicates that one item within the heritage curtilage (coal handling shed) could experience vibration levels above the cosmetic damage screening criteria (refer to Figure 7-2). Further assessment (including a structural assessment) prior to the commencement of vibration-intensive works and vibration impact monitoring (if required) would be completed to ensure vibration levels remain below appropriate limits for that structure. The more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	Minor
		Indirect impact – views and vistas The landscape elements and external spaces that form part of the heritage item and are located in the proposal site have been identified as having spatial significance for their contribution to the scale and industrial quality of the item and its built components. Construction works and the relocation of the Port Access Road would visually alter the presentation of the portion of the heritage item that is located within the proposal site. This would result in temporary and permanent visual changes within the heritage item curtilage and would change the arrangement and configuration of the land surrounding the significant industrial structures. However, the site would maintain its current industrial function and level of development; and the nature of proposal comprises of the relocation of road infrastructure rather than intrusive new development.	Minor

Glebe Island Silos

The proposal is located immediately adjacent to the heritage item, and the overall impact to the heritage item would be neutral. While the proposal would result in a minor change to the wider setting of the heritage item, the views to the heritage item would be maintained and the aesthetic or historical significance of the item would not be diminished. Vibration is also predicted to be below the cosmetic screening criterion, and the proposal would not have a direct impact on the item.

Archaeological potential

For the purposes of this assessment it has been assumed that excavation could be up to one metre in areas where road construction would be undertaken. Based on this assumption, impacts to significant archaeological resources are likely to occur during road realignment and associated works. Subsurface impact associated with road construction would be outside the area assessed as having potential for outbuildings and remains of the former White Bay Hotel. Impact would be within areas assessed as having potential for reclamation fill, and former rail infrastructure which may have local significance. Former rail infrastructure and reclamation fill as a deposit would not be managed as relics under the NSW Heritage Act.

Buried historic soil deposits are likely to be deeper than the proposed impacts, as they would occur beneath the reclamation fill. Therefore, impacts to relics are unlikely. It is likely that impacts to former rail infrastructure and reclamation fill which may be of local significance would occur as a result of excavation associated with road construction.

White Bay Power Station (Inlet) Canal

As detailed in Table 7-12, the proposal would have minor direct and potential direct impacts and neutral indirect (visual) impacts on the White Bay Power Station heritage item due to excavation works within the heritage curtilage.

The overall impact of the proposal on the heritage item would be minor, as this excavation work has the potential to directly impact the subsurface heritage item depending on excavation methods and depths. Once the relative depth of the heritage item is confirmed, in addition to further excavation detail, the direct impact on the item may be reduced to neutral or increased to moderate.

Table 7-12: White Bay Power Station (Inlet) Canal – heritage impact summary

Item and listing	Significance	Potential impact	Magnitude
White Bay Power Station (Inlet) Canal **Port Authority of NSW (s170 4560062)**	Local	**Direct impact – partial demolition** A 70-metre stretch of the s170 heritage-listed White Bay Power Station (Inlet) Canal is located directly within the study area. However, the inlet canal is located entirely underground, with its visible entry point into White Bay located outside the study area. The proposal would include site clearing and any necessary contaminated land remediation works around Port Access Road in addition to the relocation of the Ports Access Road which would include excavation. There is limited information on the precise depth of the heritage item. Depending on excavation methods and depths, this excavation work has the potential to directly impact the subsurface heritage item. The proposal is considered to have a minor direct impact on the s170 heritage listed White Bay Power Station (Inlet) Canal. Once the relative depth of the heritage item is confirmed, the direct impact on the item may be reduced to a neutral impact or increased to moderate.	Minor

Item and listing	Significance	Potential impact	Magnitude
		Potential direct impact – vibration Vibration is predicted to be above the cosmetic damage screening criteria. The item would experience vibration levels above the cosmetic damage screening criteria (refer to Figure 7-2). Further assessment (including a structural assessment) prior to the commencement of vibration-intensive works and vibration impact monitoring (if required) would be completed to ensure vibration levels remain below appropriate limits for that structure. The more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	Minor
		Indirect impact – views and vistas The heritage item is located entirely underground and the proposed works would not impact upon the item visually.	Neutral

Glebe Island Dyke Exposures

The proposal is located immediately adjacent to the heritage item, and the overall impact to the heritage item would be neutral. While the proposal would result in a minor change to the wider setting of the heritage item, the views to the heritage item would be maintained and the aesthetic or historical significance of the item would not be diminished. Vibration is also predicted to be below the cosmetic screening criterion, and the proposal would not have a direct impact on the item.

7.3.4 Management and mitigation measures

Non-Aboriginal heritage impacts would be managed in accordance with Sydney Metro's Construction Environmental Management Framework. The Construction Environmental Management Framework includes heritage management objectives to minimise impacts on items or places of heritage value, avoid accidental impacts on heritage items, and maximise workers' awareness of Aboriginal and non-Aboriginal heritage.

The Construction Environmental Management Framework also includes:

- Procedures for undertaking any recordings of heritage items prior to works commencing
- Procedures for unexpected heritage finds
- Heritage monitoring requirements.

The mitigation measures that would be implemented to address potential non-Aboriginal heritage impacts are listed in Table 7-13.

Table 7-13: Mitigation measures – Non-Aboriginal heritage

Reference	Impact/issue	Mitigation measure	Phase
NAH1	Heritage impacts to the White Bay Power Station	A Section 60 permit or Section 57 exemption (standard exemption 7) from approval would by obtained from the Heritage Council (or delegate) prior to the commencement of works within the SHR curtilage of White Bay Power Station (SHR Listing No. 01015).	Phase 2
NAH2	Heritage impacts to the White Bay Power Station	A program of photographic archival recording would be required within the SHR curtilage of White Bay Power Station (SHR Listing No. 01015) in accordance with NSW Heritage Office's How to Prepare Archival Records of Heritage Items (1998) and Photographic Recording of Heritage Items Using Film or Digital Capture (2006).	Phase 2
NAH3	Non-Aboriginal heritage archaeological remains	An Archaeological Work Method Statement would be prepared and implemented where excavation is required. The Archaeological Work Method Statement would outline the requirements of archaeological monitoring and recording where archaeological remains of potential local significance may be impacted.	All

7.4 Soils and contamination

This section assesses the impact of the proposal on soils and contamination.

7.4.1 Methodology

The soils, geology and contamination assessment involved:

- Reviewing web-based information searches to understand the existing environment and potential risk for contamination in October 2019, including:
  - Available historical aerial imagery
  - NSW Department of Environment, Climate Change and Water's Soil Landscapes of Sydney 1:100,000 Sheet (Tille et al., 2009)
  - NSW Soil and Land Information System (Environment, Energy and Science Group (EESG) of the Department of Planning, Industry and Environment, 2019)
  - NSW EPA Contaminated Sites Register and Record of Notices
- Reviewing publicly available information and Sydney Metro reporting with respect to contamination investigations carried out within and/or adjacent to the site such as:
  - Rozelle Rail Yards – Site Management Works, Review of Environmental Factors (Roads and Maritime Services, 2016)
  - UrbanGrowth NSW (now Infrastructure NSW), Site Wide Remedial Concept Plan, The Bays Precinct Urban Transformation Area (JBS&G, 4 December 2015)
  - Data collected during site investigations for the proposed Sydney Metro West
- Assessing the potential to disturb acid sulfate soils and the associated impacts
- Considering potential impacts associated with erosion and sedimentation
- Assessing potential impacts to receptors by considering the potential for construction activities to interact with contamination and the potential for pathways from a contamination source to a receptor to occur without mitigation measures
- Identifying appropriate mitigation and management measures, or where further investigation or contaminated land remediation may be required.

7.4.2 Existing environment

Soils and geology

Based on the Sydney 1:100 000 Geological Series Sheet, the proposal is predominately located on man-made fill, which is described as dredged estuarine sand and mud, demolition rubble, industrial and household waste. The north-western boundary of the proposal site and the location of the relocated Cement Australia Truck Parking Licenced Area is located on land mapped as medium to coarse-grained quartz sandstone, very minor shale and laminite lenses.

The Soil Landscapes of Sydney 1:100,000 Sheet identifies the land on which the proposal site is located as 'disturbed terrain'. Soils in these locations tend to comprise loose black sandy loam, compacted mottled clay, variable transported fill and dark dredged muds and sands.

Acid sulfate soils

Acid sulfate soils are the common name given to naturally occurring sediments and soils containing iron sulfides (principally iron sulfide or iron disulfide or their precursors). Exposure of the sulfide in these soils to oxygen as a result of drainage or excavation leads to the generation of sulfuric acid. Areas of acid sulfate soils are typically found in low-lying and flat locations that are often swampy or prone to flooding.

Acid sulfate mapping for the proposal site is not provided in the Leichhardt Local Environment Plan 2013 or SREP 26 which the site is subject to. However, as discussed above, the proposal site is located on soils mapped as 'disturbed terrain'. These areas are often reclaimed land, within dredged/mined areas, or on fill and/or alluvium and are associated with the potential presence of acid sulfate soils.

Contamination

Land uses in the area surrounding the proposal site since the 1950s include residential development and commercial and industrial premises. Historical aerial photography reviewed for the proposal site shows that the site has comprised heavy industrial land uses associated with the former White Bay Power Station, including stockpiling, rail and wharf infrastructure. This land use remained largely unchanged until the 1980s when the power station was decommissioned. Since the 1980s, the site has undergone minor changes, including increases in vacant land and the addition of road or rail infrastructure across the site.

Key developments at the proposal site and in the surrounding area since the 1950s include:

- Construction of buildings/structures on the wharf within the eastern portion of the proposal site in the 1970s
- Possible land reclamation in White Bay in the 1970s
- Commercial and industrial development, including earthworks and possible reclamation in the 1970s and 1990s
- Extensions and modifications to residential and commercial/industrial areas in the 1980s
- The use of Glebe Island for the storage of motor vehicles in the 1990s
- Removal of railway lines, demolition of a large industrial-type building and filling/ground disturbance works at the proposal site between 1994 and 2005.

A search of the NSW EPA Contaminated Sites Record of Notices (under section 58 of the *Contaminated Land Management Act 1997*) and the list of contaminated sites notified to the NSW EPA (under section 60 of the *Contaminated Land Management Act 1997*) in October 2019 indicated that there were two sites registered with the NSW EPA within 500 metres of the proposal site that had previously been regulated. The sites are summarised in Table 7-14.

Table 7-14: NSW EPA regulated/notified sites within 500 metres of the proposal site

Site	Suburb	Regulated/ notified	Site address	Site activity	Contamination status	Relative location
1	Rozelle	Regulated	Robert Street	Other industry (former White Bay Power Station)	EHC Act Revocation Notice (Former). Asbestos and PCB contamination.	Within the proposal site
2	Rozelle	Regulated	Reynolds Street	Former Unilever Sulphonation Plant	EHC Act Revocation Notice (Former). Heavy metals, polycyclic aromatic hydrocarbons, linear alkylbenzene and linear alkylbenzene sulphonate compound contamination.	Approximately 100m north of the proposal site

A search of potential per-and poly-fluoroalkyl substances (PFAS) sources within one kilometre of the proposal site was carried out in October 2019. The search involved a review of:

- The NSW EPA Contaminated Sites Record of Notices and the list of contaminated sites notified to the NSW EPA for PFAS; and
- Current and historical (from 1955 onwards) aerial imagery for visually identifiable industry and/or operations which may be associated with PFAS contaminants (as defined by the PFAS National Environmental Management Plan, January 2018).

This review identified the former White Bay Power Station, located within the proposal site, as a potential PFAS source due to firefighting activities.

Based on previous contamination investigations and/or general contamination information for the proposal site, near surface and subsurface fill material within the yard area and foreshore of the former White Bay Power Station site are impacted by lead, benzo(a)pyrene, total PAHs, PFAS, petroleum hydrocarbons and asbestos. Limited subsurface information available for the broader area indicates that soil underlying the proposal site is potentially also contaminated with heavy metals, PAHs including benzo(a)pyrene and petroleum hydrocarbons.

There is potential for groundwater within and adjacent to the proposal site to be contaminated with heavy metals, hydrocarbons, pesticides, polychlorinated biphenyls, asbestos and perfluorooctanesulfonic acid.

7.4.3 Potential impacts

Accidental spills

Major spills could potentially impact the quality and chemistry of the soil landscape or geology. They may also migrate off-site to affect adjacent properties and waterbodies such as White Bay. Due to the implementation of site management controls, the likelihood of a major spill incident occurring is negligible.

The more likely risk would be localised small spills occurring due to poor practices. The corresponding activities taking place within the proposal site with the greatest risk of accidental spillage would include:

- Ground excavation work
- Spoil excavation, transfer and management
- Waste removal off-site (i.e. haulage)
- Material delivery to site (i.e. haulage)
- Loading and unloading.

The effects of an accidental spillage would depend on where it would occur, the type and quantity of materials spilt, and the sensitivity of surrounding land conditions. The greatest risk would be surface spillages next to the stormwater drains adjacent to the existing Port Access Road and White Bay.

Therefore, there is a potential for minor impacts on soils within the proposal site.

Stockpile runoff

Stockpiled materials would be generated as a result of site establishment (including vegetation removal) and road relocation works. Temporary stockpiles would be created at the proposal site. These materials would only remain on-site for a short period of time prior to being transferred off-site. Site management controls would ensure stockpiles are secured and avoid off-site migration.

Contaminated land

Construction activities would be predominately surficial or up to one metre below existing site levels. Given the shallow excavation depths, works are not anticipated to encounter groundwater or acid sulfate soils.

The main potential contamination risks are detailed in Table 7-15.

Potential receptors of contamination include construction workers and visitors, surrounding land users including the general public, nearby residents and commercial workers, and receiving water bodies (White Bay and Rozelle Bay). Exposure pathways to these receptors considered in the assessment were direct contact, ingestion or inhalation by human receptors and uptake by aquatic flora and intake by aquatic fauna.

Table 7-15: Potential contamination constraints

Proposal element	Mechanism	Contamination	Source
Port Access Road relocation and intersection reconfigurations	Excavation of soils (if excavation is necessary)	Heavy metals, hydrocarbons (TRH, BTEX, PAH), asbestos, PFAS	Former power station site, bulk above ground storage, stockpiles (coal and/or ash), railway use and other commercial/industrial land use. Inappropriate management (during demolition) and/or degradation of hazardous building materials within current and former on-site structures. Historical land reclamation and other miscellaneous earthworks and/or filling. Historical firefighting activities using aqueous film forming foam at the former power station.

Proposal element	Mechanism	Contamination	Source
Cement Australia Truck Parking Licenced Area relocation	Demolition and minor excavation	Heavy metals, hydrocarbons (TRH, BTEX, PAH), asbestos	Former bulk above ground storage and other commercial/industrial land use. Inappropriate management (during demolition) and/or degradation of hazardous building materials within current and former on-site structures. Historical land reclamation and other miscellaneous earthworks and/or filling.

Potential impacts during operation

During operation, there would be no equipment at the proposal site that would present a maintenance risk in terms of leaks and spills. Operational risks associated with the proposal would include runoff of pollutants from the relocated road surface and truck parking facilities, vehicular traffic and accidental spills.

7.4.4 Management and mitigation measures

Soils and contamination impacts would be managed in accordance with Sydney Metro's Construction Environmental Management Framework.

The Construction Environmental Management Framework includes requirements for:

- Management measures for contaminated material (soils and water)
- A contingency plan in the case of unanticipated discovery of contaminated material
- Progressive erosion and sediment control plans that would be updated as needed to reflect site conditions.

The mitigation measures that would be implemented to address potential soils, geology and contamination impacts are listed in Table 7-16.

Table 7-16: Mitigation measures – Soils, geology and contamination

Reference	Impact/issue	Mitigation measure	Phase
C1	Management of contaminated soil	Sampling and testing of soils in areas of potential contamination concern would be conducted to characterise the soils (with respect to contamination) and determine the appropriate waste classification (which may include hazardous wastes or special wastes) and management response. Waste classification would be carried out in accordance with the Waste Classification Guidelines Part 1: Classifying Waste (NSW Environment Protection Authority, 2014).	All
C2	Management of soil	Soils would be managed in accordance with the Protection of the Environment Operations (Waste) Regulation 2014 and disposed of to an appropriately licensed waste management licensed facility.	All
C3	Erosion and sedimentation	Erosion and sediment measures would be implemented in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008).	All
C4	Spill containment	All fuels, chemicals and hazardous liquids would be stored in accordance with Australian standards and EPA Guidelines. Any refuelling carried out on-site would be carried out in designated areas only and spill kits would be available as part of any worksite.	All
C5	Acid sulfate soils	Prior to ground disturbance in areas of potential acid sulfate soil occurrence, testing would be carried out to determine the presence of actual and/or potential acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998).	All

7.5 Water quality, hydrology and drainage

This section assesses the impact of the proposal on water quality, hydrology and drainage.

7.5.1 Methodology

The water quality, hydrology and drainage assessment involved:

- A desktop review of publicly available flood study reports from local council(s) and other sources to characterise existing hydrology and flooding conditions at the proposal site. Existing types of flooding relevant to the proposal site include:
  - Intense rainfall: Occurs due to rainfall falling directly onto sites or adjacent to sites during storm events which are not adequately managed by the provided drainage systems
  - Overland flooding: Occurs when local catchment runoff exceeds the capacity of existing drainage systems, with excess flows being conveyed on surface flow paths and ponding in low points
  - Coastal inundation: Occurs due to elevated ocean levels and storm surges during low pressure weather systems and/or highest astronomical tides (i.e. 'king tides')
- Identifying surface and groundwater characteristics at the proposal site
- Reviewing existing drainage and discharge pathways across the proposal site and adjacent catchments
- Identifying key activities that could potentially affect surface or groundwater values
- Identifying adverse impacts that would need safeguarding or managing under the proposal
- Identifying mitigation measures to address potential water quality, hydrology and flooding impacts.

7.5.2 Existing environment

Surface water and drainage

Historically, Sydney Harbour has been heavily impacted by industry, commercial and urban waste disposal as well as stormwater and urban run-off (Mayer-Pinto et al, 2015). These land uses influence the water quality and quantity and speed of flows within the catchment. The catchment is highly urbanised and altered from its natural state, with pockets of open spaces and parkland.

The proposal site is generally three to four metres Australian Height Datum, with some low-lying sections along White Bay (about 1.5 metres Australian Height Datum). The proposal site drains to White Bay (about 60 metres away) in the lower estuary of Sydney Harbour. Johnston Bay is about 500 metres to the east. Whites Creek is the closest surface watercourse, about 530 metres to the south-west, which drains in Rozelle Bay.

The majority of the proposal site is sealed, with areas of hardstand to the east and vegetation to the southeast. There are existing stormwater pits and pipes that are located along Port Access Road. The low-lying areas near the former White Bay Power Station appear to drain out via trunk drainage and overland via Robert Street around the northern end of the proposal site to White Bay.

Flooding

Robert Street to the north of the proposal site is an emergency management route.

The former White Bay Power Station site is understood to be a flood storage area and parts of the proposal site are subject to major overland flooding. During a 1% Annual Exceedance Probability event there is potential for major overland flooding across the north-eastern portion of the proposal site and coastal inundation across low-lying portions. During a Probable Maximum Flood, overland flooding of more than one metre would affect most of the proposal site (Cardno, 2017).

Groundwater

Available data from site investigations undertaken by Sydney Metro indicate that groundwater levels at the proposal site are about two metres below ground level. Groundwater quality at the proposal site is brackish and likely to be influenced by intrusion of saline waters from Rozelle Bay and White Bay.

The closest groundwater monitoring bore to the proposal site is about 300 metres to the north.

The potential for groundwater contamination at the proposal site is discussed in Section 7.4.2.

7.5.3 Potential impacts

Construction

Construction activities may result in increased erosion and sedimentation due to earthworks and removal of existing pavements, which could result in contaminated runoff being discharged into nearby stormwater drains and White Bay (in the absence of mitigation measures). Similarly, there is the potential for accidental spillage of chemicals, fuels, lubricating and hydraulic oils from mobile construction equipment entering adjacent waterways.

The proposal would not involve significant regrading of the proposal site and therefore would not result in obstruction of existing overland flow paths.

The Leichhardt Floodplain Risk Management Study (Cardno, 2017) identifies proposed flood modification works including duplication of existing drainage infrastructure under Robert Street that discharges to White Bay. Consultation would be carried out with Inner West Council so that the detailed design (and construction) of the tie-in of the Port Access Road near Robert Street is coordinated with proposed flood modification works.

No impacts to groundwater are expected as limited excavation is planned.

Operation

The proposal would involve a minor increase in the amount of hardstand within the local catchment, however it is not intended to alter the existing stormwater drainage infrastructure. Further consideration to minimising impacts to flood storage in the north-eastern portion of the proposal site.

No impacts to groundwater are foreseen during operation.

7.5.4 Management and mitigation measures

Water quality, hydrology and drainage impacts would be managed in accordance with Sydney Metro's Construction Environmental Management Framework.

The Construction Environmental Management Framework includes a requirements to prepare:

- Progressive erosion and sediment control plans, that would be updated as needed to reflect site conditions
- Stormwater and Flooding Management Plans (where required) to identify the appropriate design standard for flood mitigation based on the duration of construction, proposed works and flood risks.

The mitigation measures that would be implemented to address potential water quality, hydrology and drainage impacts are listed in Table 7-17.

Table 7-17: Mitigation measures – Water quality, hydrology and drainage

Reference	Impact/issue	Mitigation measure	Phase
WQ1	Floodplain management	Detailed design would seek to minimise changes to existing flood levels along the north-western side of site adjacent to low-lying property, to minimise reduction in floodplain storage.	Phase 2
WQ2	Floodplain management	Inner West Council would be consulted prior to construction, so that the proposal is designed to minimise conflicts with the potential construction of flood mitigation works in Robert Street.	Phase 2

7.6 Biodiversity

This section assesses the impact of the proposal on biodiversity.

7.6.1 Methodology

The biodiversity assessment involved:

- A desktop assessment to describe the existing environment and landscape features, and to identify threatened flora and fauna that may be potentially affected by the proposal. Database searches in October 2019 included:
  - BioNet – the website for the Atlas of NSW Wildlife and Threatened Species Data Collection (NSW Department of Planning Industry and Environment, 2019b)
  - NSW Department of Primary Industries freshwater threatened species distribution maps (NSW Department of Primary Industries, 2019b)
  - The Department of Agriculture, Water and the Environment Protected Matters Search Tool (Department of Agriculture, Water and the Environment, 2019b)
  - BioNet NSW Vegetation Classification database (NSW Department of Planning Industry and Environment, 2019c)
  - Atlas of Living Australia (Atlas of Living Australia website, 2019)
  - Atlas of Groundwater Dependent Ecosystems (Bureau of Meteorology, 2017)
  - Fisheries Spatial Data Portal (NSW Department of Primary Industries, 2019a)
  - Australian Wetlands Database (Department of Agriculture, Water and the Environment, 2019a)
- Identifying and assessing likely impacts to biodiversity
- Identifying a management approach for avoiding, managing or reducing impacts on biodiversity values associated with the proposal.

7.6.2 Existing environment

The proposal site is in a highly disturbed landscape that is almost devoid of vegetation, apart from opportunistic weed species such as *Ricinus communis* and *Acacia saligna* that have grown on unused land in the south. Adjacent land contains a mix of planted vegetation and weeds including *Lantana camara*, *Olea europaea*, *Cortaderia selloana*, and *Cinnamomum camphora*.

Based on the Atlas BioNet search, no previous threatened species have been recorded at the proposal site. A Grey-headed flying-fox record from 2016 is located about 400 metres west of the proposal site.

Figure 7-4: Vegetation at the proposal site

7.6.3 Potential impacts

The proposal is unlikely to significantly affect threatened species or ecological communities, or their habitats given the marginal value of the vegetation that would be removed as a result of the proposal. Further, no endangered ecological communities or declared areas of outstanding biodiversity value would be impacted. The proposal is not a key threatening process, and would not exacerbate key threatening processes as defined under Schedule 4 of the *Biodiversity Conservation Act 2016*, noting controls would be implemented to manage noxious weeds, such as Lantana. As such, a Species Impact Statement is not required.

Flora, vegetation and habitat loss

The proposal would require removal of about 0.16 hectares of degraded vegetation along the southern portion of the proposal site (Figure 7-5). No native vegetation would be impacted. Vegetation adjoining this area of vegetation was cleared as part of construction work associated with the M4-M5 Link.

The Grey-headed Flying-fox may forage on the flowers and/or fruit of both planted and exotic trees within the proposal site. The patch size and the marginal, non-natural structure of the vegetation present means that it is unlikely to be used as breeding habitat by any threatened species. Adjoining construction activities associated with other projects may further reduce the values of the vegetation due to indirect impacts (noise and lighting).

Therefore, the impact of the proposal upon flora, vegetation and habitat loss would be negligible.

Figure 7-5: Vegetation proposed to be removed

Direct loss of fauna

Any highly mobile species (e.g. birds) potentially affected by the proposal would be able to temporarily move from the area. This would not be the case for less mobile species. Consequently, the species most at risk of injury or death from construction works would be small mammals or reptiles that use any vegetation for habitat on-site. The Grey-headed Flying-fox is unlikely to roost or breed in the immediate area.

As the vegetation to be removed is highly degraded and mostly exotic, fauna habitat is unlikely and impacts to fauna limited.

Potential habitat fragmentation impacts

The proposal site is located within a highly disturbed landscape where most habitat has been cleared. The habitats that do remain are fragmented and highly isolated. The exotic vegetation within the proposal site would only play a small role in facilitating the movement of threatened species across the landscape.

Many mobile species, particularly birds and bats, and to a more limited extent mammals and reptiles, may utilise these areas. Flying animals such as birds and bats use the airspace to move between natural habitats and the planted vegetation within the development site is likely to be used as a foraging or perching resource as part of daily movements. Urban vegetation in the landscape elsewhere would be available to these species and the removal of vegetation at the proposal site would not detrimentally impact habitat connectivity.

Potential impacts to habitat fragmentation would be negligible.

Operational impacts

During operation, there is a chance of fauna mortality through vehicle collision. The risk of fauna mortality by vehicle strike is not increased by the proposal and threatened species are unlikely at the proposal site.

7.6.4 Management and mitigation measures

Biodiversity impacts would be managed in accordance with Sydney Metro's Construction Environmental Management Framework. Of relevance, the Construction Environmental Framework includes biodiversity management objectives to maximise workers' awareness of biodiversity values and avoid or minimise potential impacts to biodiversity.

No further mitigation measures are proposed as the potential impacts to biodiversity are limited or negligible.

7.7 Aboriginal heritage

An assessment of Aboriginal heritage for the proposal was prepared by Artefact. This assessment is attached as Appendix E of this REF. The results of this assessment are summarised below.

7.7.1 Methodology

The Aboriginal heritage assessment involved:

- A desktop review of archaeological literature and databases to identify listed Aboriginal sites and places within the proposal site, including:
  - A search of the Aboriginal Heritage Information Management System (AHIMs) or listed Aboriginal sites, carried out in October 2019
  - A search of Leichhardt Local Environment Plan 2013 for listed Aboriginal places
- Developing a predictive model to assist in determining archaeological potential
- Assessing the significance of the archaeological potential
- Assessing the potential impacts of the proposal
- Identifying a management approach to minimise the risk of impacting Aboriginal items or areas of Aboriginal cultural sensitivity.

7.7.2 Existing environment

The White Bay region would have been a suitable location for Aboriginal occupation, surrounded by valuable marine and plant resources, close to reliable water sources, near ridges and cliffs, and close to raw materials suitable for the construction of stone tools.

Extensive historical occupation after European colonisation of Sydney has resulted in phases of demolition, construction, land clearance and modification which has had a significant impact on Aboriginal cultural heritage. The White Bay area has been subject to significant landform modification, including the almost complete reduction of Glebe Island and a large program of reclamation to modify the shoreline and create new level ground for the Glebe Island Container Terminal and the former White Bay Power Station. Within areas of reclaimed land, the natural soil has typically been removed, buried, or greatly disturbed.

The proposal site is largely located within a modified flat landform adjacent to the White Bay foreshore. The majority of the proposal site is currently comprised of hardstand and grassed areas. A large earth stockpile is located in the southern portion of the proposal site.

No registered Aboriginal sites are located within the proposal site. The closest registered Aboriginal site is located about 350 metres to the east of the proposal site.

Based on the existing AHIMS data and previous studies, it is predicted that the most likely site feature associated with potential Aboriginal heritage to be present within the proposal site is artefact deposits or sites utilising formerly exposed sandstone outcrops such as grinding grooves. However, historic reclamation and landform modification is considered to have reduced the potential for these features to occur in the proposal site.

There is low-moderate archaeological potential for Aboriginal objects to be preserved below existing foreshore reclamation in the western portion of the proposal site (refer to Figure 7-6). This area has low-moderate sensitivity. The remainder of the proposal site is considered to have low archaeological sensitivity.

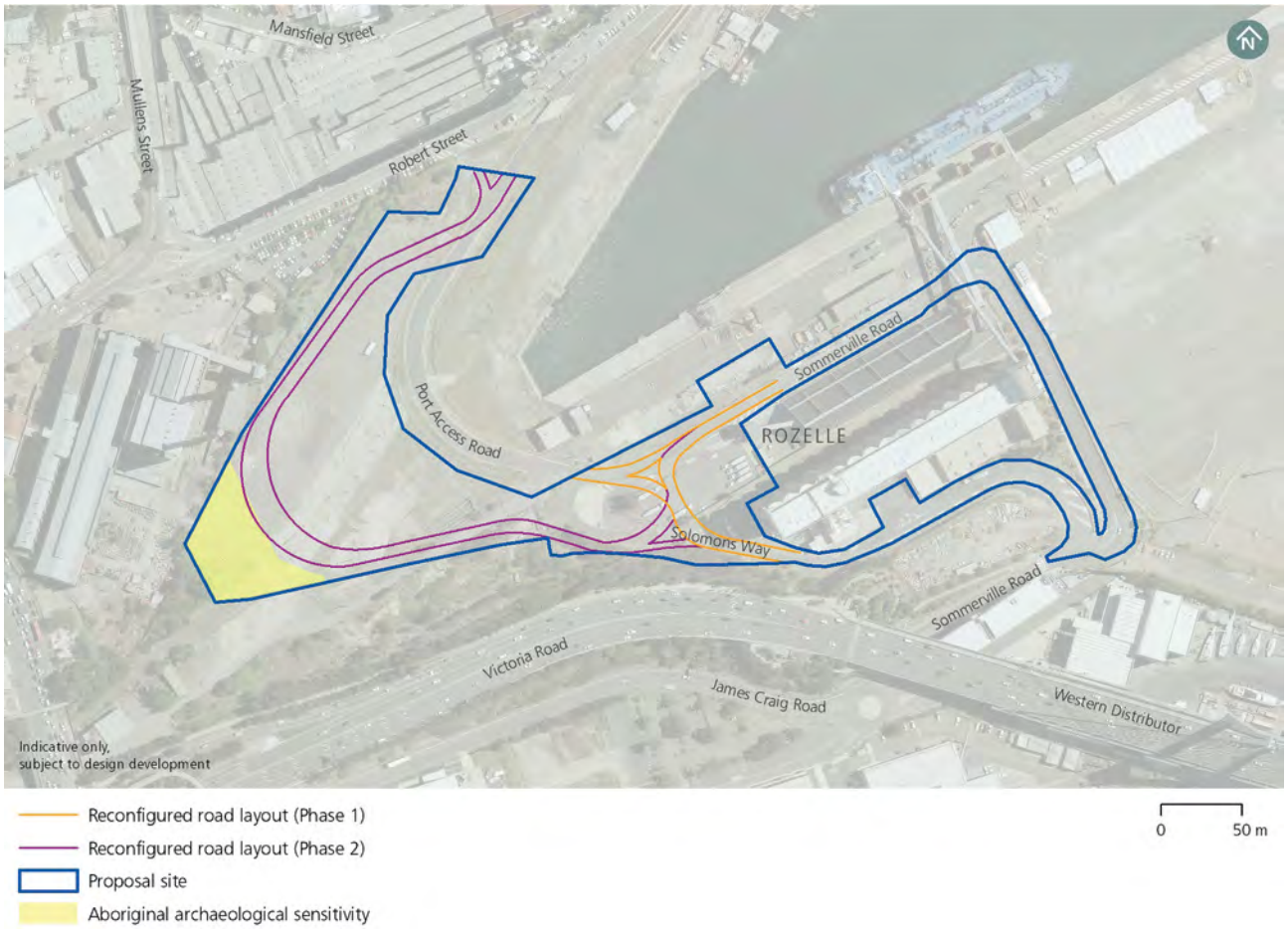

Figure 7-6: Proposed works within area of Aboriginal archaeological sensitivity

7.7.3 Potential impacts

Proposed earthworks within the area of Aboriginal archaeological sensitivity are limited to the relocation of Port Access Road to the south-west of its current location (refer to Figure 7-6).

Intact foreshore deposits associated with the area of archaeological sensitivity have been identified at a depth of 2.8 metres below the current surface within this area. While it is likely that the depth of intact soil varies to some degree across the area of sensitivity, it is unlikely that these soils will be located directly below the surface.

Excavation associated with the proposed works would be limited to a maximum of one metre depth with only small sections of the proposed works extending to that depth in the area of archaeological sensitivity. Therefore, it is considered unlikely that proposed works would result in impact to intact soils and therefore to Aboriginal objects.

7.7.4 Management and mitigation measures

Impacts to Aboriginal heritage due to the proposal are not anticipated. Any impacts to Aboriginal heritage would be managed in accordance with Sydney Metro's Construction Environmental Management Framework, which heritage management objectives to maximise workers' awareness of heritage values such as site inductions and procedures for unexpected heritage impacts. No further mitigation measures are proposed.

7.8 Landscape and visual

This section assesses the potential impact of the proposal on the surrounding landscape and visual character.

7.8.1 Methodology

The landscape and visual amenity impact assessment involved:

- Identifying the existing environmental conditions and future land use strategies for The Bays
- Describing the components and character of the proposed works
- Identifying the existing landscape and visual sensitivity of key receivers
- Assessing potential landscape character impact and visual impact during construction and operation
- Identifying mitigation measures to minimise impacts to landscape and visual amenity.

Landscape impact assessment

Landscape refers to the overall character and function of a place. It includes all elements within the public realm and the interrelationship between these elements and the people who use them.

To identify these impacts, the assessment identified the sensitivity of the element to change and the magnitude of change expected from the proposal, and then made an overall assessment of the level of impact expected.

The degree of sensitivity of each landscape element to change was identified as either neighbourhood, local, regional, State or National.

The magnitude of modification to landscape quality of each landscape element was identified as either considerable reduction, noticeable reduction, no perceived change, noticeable improvement, or considerable improvement.

Table 7-18 provides a description of landscape sensitivity and modification. The landscape impact matrix is provided in Table 7-19.

Table 7-18: Landscape sensitivity and modification levels

Landscape assessment	
Landscape sensitivity	
National	Landscape feature protected under national legislation or international policy.
State	Landscape feature that is heavily used and/or is iconic to the State.
Regional	Landscape feature that is heavily used and valued by residents of a major portion of the city or a non-metropolitan region.
Local	Landscape feature valued and experienced by concentrations of residents and/or local recreational users. Provides a considerable service to the community. For example, it provides a place for local gathering, recreation, sport, street use by cafes and/or shade and shelter in an exposed environment.
Neighbourhood	Landscape feature valued and appreciated primarily by a small number of residents, for example street trees in a local street. Provides a noticeable service to the community. For example, it provides a seat or resting place, passive recreation and/or some shade and shelter in a local street.
Landscape modification	
Considerable reduction or improvement	A substantial portion of the landscape is changed. This may include substantial changes to vegetation cover, the area of open space or public realm area, accessibility, permeability, legibility and wayfinding, comfort and amenity, activation and safety, and diversity of the public realm.
Noticeable reduction or improvement	A portion of the landscape is changed. This may include some alteration to vegetation cover, the area of open space or public realm area, accessibility, permeability, legibility and wayfinding, comfort and amenity, activation and safety, and diversity of the public realm.
No perceived reduction or improvement	Either the landscape quality is unchanged or if it is, it is largely mitigated by proposed public realm improvements. Does not alter or not noticeably alter the vegetation cover, the area of open space or public realm area, accessibility, permeability, legibility and wayfinding, comfort and amenity, activation and safety, and diversity of the public realm.

Table 7-19: Landscape impact level

Landscape modifications	Landscape sensitivity				
	National	State	Regional	Local	Neighbourhood
Considerable reduction	Very high adverse	Very high adverse	High adverse	Moderate adverse	Minor adverse
Noticeable reduction	Very high adverse	High adverse	Moderate adverse	Minor adverse	Negligible
No perceived change	Negligible	Negligible	Negligible	Negligible	Negligible
Noticeable improvement	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial	Negligible
Considerable improvement	Very high beneficial	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial

Visual impact assessment

The assessment of these impacts involved identifying existing visual conditions, views that are representative of these conditions, the sensitivity of the views and the magnitude of change expected during construction and operation of the proposal. An overall assessment was then made of the level of impact expected (based on the matrix in Table 7-20).

Construction and operational visual impacts were considered for both day and night-time.

Table 7-20 provides a description of visual sensitivity and modification. The visual impact matrix is provided in Table 7-21.

Table 7-20: Visual sensitivity and modification level

Visual impact assessment	
Visual sensitivity	
National	Heavily experienced view to a national icon, for example the view to the Sydney Opera House from Circular Quay. There are no nationally sensitive views within the proposal site.
State	Heavily experienced view to a feature or landscape that is iconic to the State.
Regional	Heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space.
Local	High quality view experienced by concentrations of residents and/or local recreational users, local commercial areas and/or large numbers of road or rail users.
Neighbourhood	Views where visual amenity is appreciated by a small number of residents rather than particularly valued by the wider community.
Visual modification	
Considerable reduction or improvement	Substantial part of the view is altered.
Noticeable reduction or improvement	Alteration to the view is clearly visible.
No perceived reduction or improvement	Either the view is unchanged or if it is, the change in the view is generally unlikely to be perceived by viewers.

Table 7-21: Visual impact levels

Visual modification	Visual sensitivity				
	National	State	Regional	Local	Neighbourhood
Considerable reduction	Very high adverse	Very high adverse	High adverse	Moderate adverse	Minor adverse
Noticeable reduction	Very high adverse	High adverse	Moderate adverse	Minor adverse	Negligible
No perceived change	Negligible	Negligible	Negligible	Negligible	Negligible
Noticeable improvement	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial	Negligible
Considerable improvement	Very high beneficial	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial

7.8.2. Existing environment

The Bays has been a key maritime, industrial and infrastructure precinct in Sydney, having been used to support maritime trade and industry since European settlement. Key developments in this area include the White Bay Power Station (opened in 1913), the Glebe Island Silos (constructed in 1975) and the White Bay Cruise Terminal (opened in 2013). The former White Bay Power Station and Glebe Island Silos both provide dominant visual landmarks, being reminders of the area's industrial history.

Current uses at The Bays include port freight and logistics services, commercial activities, and the White Bay Cruise Terminal. The former White Bay Power Station is disused and is surrounded by vacant foreshore land in which the proposed works would be located.

The proposal site is framed by Rozelle (west), Balmain (north), Balmain East (north-east), White Bay (east) and Victoria Road (west and south) (refer Figure 7-7). The adjacent suburbs situated to the north and west are generally elevated, sloping down towards the bay, and are predominantly residential in character. Some other uses, including commercial, retail and public open space are interspersed among these areas.

The proposal site is moderately lit by security lighting at the former White Bay Power Station and the maritime and harbour industries at Rozelle Bay, White Bay and Glebe Island. Visiting ships at the White Bay Cruise Terminal and other maritime vessels would add to night-time lighting levels. Headlights from heavy traffic and street lighting along Victoria Road and Anzac Bridge contribute additional light sources adding to the brightness of the night sky. However, mature vegetation along Victoria Road and adjacent to the site would assist with reducing light spill from the port to adjacent areas. The nearby high-density areas of the Sydney CBD and Pyrmont would further contribute to a high level of sky glow in this part of Sydney.

Public access to the foreshore area at White Bay is currently restricted due to the maritime nature of the area, however there are public open space areas in the immediate surroundings (such as at Mansfield Street). Views are also available from the waterfront areas of White Bay to the Sydney Harbour Bridge and Barangaroo. Likewise, the proposal site would be visible from ferries and other vessels on Sydney Harbour.

There are a number of key transport corridors in the vicinity of the proposal site. Victoria Road, which is a six to eight lane elevated road, is to the west of the proposal site. The Anzac Bridge is a key visual landmark and transitions from a high level eight lane bridge to the surface level City West Link Road to the south of the proposal site.

The surface works for the WestConnex M4-M5 link project extend to the north of Victoria Road into the former White Bay Power Station site near the southern boundary of the proposal site. Construction work for this project has removed vegetation along the southern boundary of the construction site.

The landscape character and visual sensitivity of the area surrounding the proposal is summarised in Table 7-22.

Table 7-22: Landscape and visual sensitivity of the area surrounding the proposal

Location	Landscape and visual sensitivity level
White Bay Cruise Terminal	Regional
Barangaroo Reserve	Landscape – Regional Visual (towards icons) – Regional Visual (towards water) – Local
White Bay and Glebe Island portside, industrial and commercial areas	Neighbourhood
Anzac Bridge and footpaths, Victoria Road, footpaths and bus stops	Local
Peacock Point Reserve	Local
Mansfield Street open space	Local

7.8.3 Potential impacts

Landscape character impacts

There are no landscapes or public realm areas within the proposal site area which would be impacted by construction or operation of the proposal. The proposal is consistent with the existing port and industrial landscape character of the site and surrounding area.

Visual amenity impacts

Five representative viewpoints to assess visual amenity impacts from the proposal are shown in Figure 7-7.

Figure 7-7: Representative viewpoints at the proposal site

During construction, there would be direct impacts on the landscape of the proposal site including to small patches of highly degraded vegetation along the southern portion of the site. Construction would be generally visible in the mid ground catchment of surrounding views, with the construction compound above ground level. However, as discussed above, public access to the proposal site is restricted, therefore construction would not be viewed by the general public except from public open space areas in the immediate surroundings.

The anticipated visual impacts on representative viewpoints as a result of proposal are summarised in Table 7-23.

Recognising the existing industrial setting of the proposal site, construction would result in mostly negligible visual impacts at the viewpoints assessed. There would be a minor adverse impact on viewpoint 1 and viewpoint 5 from construction fencing.

Operation of the proposal would have negligible visual impacts as it would be consistent with existing use of the proposal site. Proposed street lighting along the relocated Port Access Road and Cement Australia Truck Parking Licenced Area would be a similar type to that which currently exists along Port Access Road. Existing street lighting would be effectively relocated, and any additional lighting would be minor. While the Port Access Road is proposed to be relocated up to 130 metres south-west (approximately), the proposed street lighting is not expected to be significantly more noticeable to adjacent receivers. The site is somewhat contained by landform, major roads and existing industrial buildings, so that the lighting of the site would be out of view, including from the elevated residential areas of Balmain and Rozelle.

Table 7-23: Summary of visual amenity impacts

Location	Sensitivity	Construction		Operation	
		Modification	Impact	Modification	Impact
Viewpoint 1: View south-west from Mansfield Street Open Space, Rozelle	Local	Noticeable reduction	Minor adverse	Negligible	Negligible
Viewpoint 2: View south-west from Peacock Point Reserve, Balmain East	Local	No perceived change	Negligible	Negligible	Negligible
Viewpoint 3: View south-west from Barangaroo Reserve, Barangaroo	Regional	No perceived change	Negligible	Negligible	Negligible
Viewpoint 4: View north-west from Victoria Road pedestrian path, near Anzac Bridge	Local	No perceived change	Negligible	Negligible	Negligible
Viewpoint 5: View east from Victoria Road, Rozelle	Local	Noticeable reduction	Minor adverse	Negligible	Negligible

7.8.4 Management and mitigation measures

Landscape and visual amenity impacts would be managed in accordance with Sydney Metro's Construction Environmental Management Framework, which includes visual amenity management objectives to minimise impacts on landscape features and reduce visual impacts (including lighting).

The mitigation measures that would be implemented to address potential landscape and visual impacts are listed in Table 7-24.

Table 7-24: Mitigation measures – Landscape and visual

Reference	Impact/issue	Mitigation measure	Phase
LV1	Visual impacts	The design and maintenance of construction site fencing would aim to minimise visual amenity impact, where visible from public areas.	All
LV2	Lighting	Lighting of construction areas (if required) would be orientated to minimise glare and light spill impacts on adjacent receivers.	All

7.9 Socio-economic, land use and property

This section assesses the potential socio-economic, land use and property impacts of the proposal.

7.9.1 Methodology

The socio-economic, land use and property impact assessment involved:

- Describing the existing environment with reference to existing land uses and planning controls, based on a review of aerial photography and land use zones specified by applicable environmental planning instruments
- Defining the study area for the purposes of the assessment, which included a 400 metre catchment around the proposal site
- Describing the existing social environment using population and demographic data from the Australian Bureau of Statistics and existing regional, district and local social infrastructure
- Reviewing key strategy and policy documentation relevant to the study area, in order to identify planned future land use priorities and developments
- Assessing the potential impacts of construction and operation of the proposal on existing community context, social environment, property and land use in and around the proposal site
- Identifying a management approach to avoid or manage potential impacts to land use, property and community/commercial values of the proposal site and surrounds.

7.9.2 Existing environment

Land use

The proposal would be located at White Bay, between Robert Street, Victoria Road and the Anzac Bridge. Current uses at The Bays include port freight and logistics services, commercial activities, and the White Bay Cruise Terminal.

The proposal site is on land owned by Port Authority of New South Wales. The proposal site is largely unused with the exception of the Port Access Road and port-related lease areas including the Cement Australia Truck Parking Licenced Area which services the Cement Australia at the Glebe Island Silos.

The Bays is subject to SREP 26, which prescribes the land use zone of the site as being 'port and employment'. Future development of The Bays would be informed by strategic plans and strategies such as The Eastern City District Plan and 'The Bays Precinct Sydney Project Update: Bays West Update (INSW formerly UrbanGrowth NSW, 2018). Consistency of the proposal with these plans is outlined in Section 5.1 and Section 2.1 respectively.

Land uses surrounding the proposal site include:

- To the north are a number of retail, commercial, and industrial and urban services uses along Robert Street. Beyond this is the local town centre of Balmain. Residences to the north are over 500 metres away, with intervening buildings between the proposal site and the residences
- To the east is White Bay, including the associated maritime uses within the Glebe Island and White Bay berths (including the White Bay Cruise Terminal and the Glebe Island Silos), Glebe Island Bridge and Anzac Bridge
- To the south is the intersection of the City West Link Road, Western Distributor and Victoria Road. Beyond this is an area of maritime uses along James Craig Road, and Rozelle Bay Beyond this is Rozelle Bay. Additionally, the M4-M5 Link Rozelle Interchange is located to the south of the site, immediately adjacent to City West Link. This site will feature a public park, with road traffic infrastructure located beneath
- To the west is the former White Bay Power Station. Further to the west of the site is Victoria Road and residential dwellings in Rozelle. The nearest residences are about 200 metres to the west on the opposite side of Victoria Road.

Community profile and values

The proposal site is located within the Australian Bureau of Statistics Lilyfield-Rozelle Statistical Area Level 2. The key demographics and community values for this statistical area are:

- In 2016, the population of the statistical area was 13,990, with an average annual rate of 2.2 per cent between 2011 and 2016
- In 2016, the median age was 38 years, with the largest age group between 35 to 55 years old (36 per cent), and a relatively lower proportion of younger residents and older residents

- The demographic composition is comprised of a high proportion of highly skilled urban professionals
- High levels of education, high average household income and very low unemployment rates in 2016
- Anchored by the former White Bay Power Station, this statistical area has historic links to industrialisation. Today there are a range of light industrial and urban services uses throughout the statistical area including car repairs, metal works and port operations
- The former White Bay Power Station contributes to the local character of the area and is highly valued amongst a range of community groups and organisations both within the immediate neighbourhood and more broadly across Sydney. The protection, enhancement and revitalisation of this facility is a key priority for many within the community
- Over the next 20 to 30 years, the precinct is set to transform into a major employment centre connected to high quality public transport and new public spaces.

Social infrastructure

The proposal site is located within an established industrial and port context. There is currently limited provision of social infrastructure in the immediate area. However in the future, a range of social infrastructure is expected to be provided as the planned urban renewal of the area as a mixed-use precinct is delivered.

7.9.3 Potential impacts

Construction – land use and property

There are no acquisition requirements for the proposal and therefore no associated property impacts.

The proposal may affect land subject to lease agreements between the Port Authority of NSW and port operators, including the Cement Australia Truck Parking Licenced Area. Relocation of the Cement Australia Truck Parking Licenced Area would be carried out in the first phase of works prior to works affecting the existing parking area. Adjustments to existing lease arrangement are being managed by the Port Authority of NSW.

Potential impacts on port access has been assessed in Section 7.2.

Construction – socio-economic

Construction impacts to port operations and operators are anticipated to be minor or negligible. Potential impacts on local traffic, transport and access has been assessed in Section 7.2.

Potential noise, visual amenity and air quality impacts are addressed in Section 7.1, Section 7.8, and Section 7.11 respectively.

Operation

The proposal is not considered to change existing land use at the proposal site. The proposal would alter currently unused or underutilised land for use in a way that is consistent with adjoining properties, while minimising impacts to surrounding maritime and port uses.

Operation of the proposal would provide social and economic benefits by maintaining safe and reliable road access between the White Bay Cruise Terminal and other port operations in the Glebe Island and White Bay destinations during future construction works associated with the development within the White Bay Power Station (and surrounds) destination. As discussed in Section 7.1 and Section 7.8, potential noise and visual amenity impacts would be negligible to low, and would unlikely result in negative socio-economic impacts.

7.9.4 Management and mitigation measures

Given the minor impact of the proposal on existing land uses, no specific management and mitigation measures are proposed to be implemented during construction or operation of the proposal. However, ongoing consultation with the community and affected stakeholders such as Port Authority of NSW, Cement Australia and Inner West Council regarding the proposal would be carried out (refer to Chapter 6).

Mitigation measures regarding potential impacts to adjacent land uses during the construction period, such as, noise and vibration impacts, traffic, transport and access impacts, landscape and visual impacts and air quality are discussed in Section 7.1, Section 7.2, Section 7.8 and Section 7.11 respectively.

7.10 Waste and resource management

This section assesses the potential waste management and resource use impacts of the proposal.

7.10.1 Methodology

The waste and resource management assessment involved:

- Identifying likely waste generating activities and likely waste types
- Identifying possible waste streams in accordance with relevant legislation and guidelines
- Identifying mitigation measures to manage potential impacts associated with waste and resource management.

7.10.2 Potential impacts

Resource use

As discussed in Section 4.2, a variety of resources would be needed during construction. The main resources likely to be required during construction are fill, concrete and asphalt. The volumes of resources required would be relatively minor.

Materials used for the operation of the proposal would be limited to those required for ongoing maintenance activities. Ongoing maintenance activities are not included as part of the proposal.

Waste management

Potential waste types that would be generated during construction include:

- Concrete
- Asphalt
- Green waste (i.e. vegetation)
- Demolition waste
- Spoil
- Office waste.

Waste volumes are anticipated to be minor.

Potential waste management issues during construction would include:

- Waste being unnecessarily directed to landfill due to inadequate collection, classification and disposal of waste
- An increase in vermin from the incorrect storage, handling and disposal of putrescible waste from the proposal
- Incorrect classification and/or disposal of waste, including the incorrect storage, handling and disposal of hazardous materials
- Excessive amounts of materials being ordered, resulting in a large amount of left-over, unused resources
- Lack of identification of feasible options for recycling or reuse of resources.

Existing metropolitan waste management facilities would have capacity to receive the anticipated waste streams generated by the proposal. General construction and demolition wastes and wastes from site offices would be collected for off-site recycling wherever practicable.

Wastes that contain hazardous, special or otherwise contaminated materials would be treated and disposed of off-site at a licensed facility in accordance with the relevant guidelines. The disposal of contaminated soils is discussed in Section 7.4.

Recyclables such as containers (plastics, glass, cans, etc.), paper and cardboard would be collected by an authorised contractor for off-site recycling. There are a number of material recovery facilities in Sydney. The recycling facility would be determined by the contractor engaged to collect the material.

Wastewater would also be generated by the use of staff amenities at the proposal site. Sewage and grey water from these amenities would be disposed to sewer or transported to an appropriately licenced liquid waste treatment facility.

During operation, waste generated by maintenance activities would be subject to the activity being carried out. Ongoing maintenance activities are not included as part of the proposal.

7.10.3 Management and mitigation measures

Waste would be managed in accordance with Sydney Metro's Construction Environmental Management Framework.

The Construction Environmental Management Framework also provides the basis for the development and implementation of a design and/or construction sustainability management plan. The framework provides minimum requirements for the plan which includes carbon and energy management, and waste management and recycling.

The mitigation measures that would be implemented to address potential waste and resource management issues are listed in Table 7-25.

Table 7-25: Mitigation measures – Waste and resource management

Reference	Impact/issue	Mitigation measure	Phase
WR1	Waste and resource management	All waste would be assessed, classified, managed, transported and disposed of in accordance with the Waste Classification Guidelines and the Protection of the Environment Operations (Waste) Regulation 2014. The waste management hierarchy principles established under the *Waste Avoidance and Resource Recovery Act 2001* of avoid/reduce/reuse/recycle/dispose would be applied to the construction of the proposal.	All

7.11 Air quality

This section assesses the potential air quality impacts of the proposal.

7.11.1 Methodology

The air quality assessment involved:

- Establishing prevailing climate and meteorological conditions around the proposal site using publicly available data from the Bureau of Meteorology monitoring station at Observatory Hill and Fort Denison
- Establishing prevailing ambient air quality conditions around the proposal using publicly available data from air quality monitoring stations at Rozelle operated by the Environment, Energy and Science Group (EESG) of the Department of Planning, Industry and Environment
- A desktop review of Commonwealth Department of Agriculture, Water and the Environment National Pollutant Inventory data to identify any projects or facilities that may be contributing to local air quality conditions
- Identifying air quality sensitive receivers with the potential to be adversely affected by the proposal
- Assessing potential air quality impacts during construction
- Identifying mitigation measures to address or manage potential air quality impacts.

7.11.2 Existing environment

Climate and meteorology

The closest Bureau of Meteorology monitoring station to the proposal is located about 2.1 kilometres to the north east at Observatory Hill (Station ID: 066062). The monitoring station at Observatory Hill records temperature, humidity, pressure and rainfall observations. Wind observations are from Fort Denison (Station ID: 066022) about 4.3 kilometres north east from the proposal.

The average minimum and maximum temperate recorded at the Observatory Hill monitoring station was 13.8 degrees to 21.8 degrees Celsius. The warmest temperatures were recorded in January (26 degrees Celsius) with the coldest temperatures recorded in July (8.1 degrees Celsius). The average annual rainfall was 1215.7 millimetres, with the wettest month in June (133 millimetres) and the driest month in September (68 millimetres).

Humidity was highest in the morning (9 am) when compared to the afternoon (3 pm). Wind speeds were higher in the afternoon compared to the morning, with the highest average wind speeds occurring in December (19.5 kilometres per hour).

Ambient air quality

Meteorological conditions are important for determining the direction and rate at which air pollution would disperse. Dust generation is the main air quality risk during construction, and long-term climate data is useful for identifying periods throughout the year when conditions conducive to dust generation are most likely (such as warm and/or dry periods).

The EESG uses a standardised measurement known as the air quality index to characterise air quality and acceptability of air quality at a location and compare it in relative terms with other locations throughout NSW. Background air quality conditions were determined from data collected at the EESG ambient air quality monitoring stations located at Rozelle. Average daily air quality index values between 2014 and 2018 ranged from 42 to 47. These values correspond with an air quality index outcome of 'good', indicating that air quality around Rozelle is generally of an acceptable quality.

Background air quality

Air quality data sourced from monitoring stations at Rozelle is summarised in Table 7-26. The data shows the concentrations of air pollutants were generally below the applicable air quality criteria during the 2014 to 2018 reporting periods, with the following exceptions:

- PM_{10} exceeded the applicable criterion of 50 micrograms per cubic metre
- $PM_{2.5}$ exceeded the applicable criterion of 25 micrograms per cubic metre.

These occurrences are generally the result of natural events including dust storms, bushfires and sea spray arising from on-shore winds.

Table 7-26: Background air quality data

Pollutant	Averaging period	Criteria	2014	2015	2016	2017	2018
PM_{10} (µg/m³)	Maximum 24-hour	50	44	**60**	**59**	**54**	**88**
	95th percentile 24-hour	50	30	29	20	31	31
	Annual	30	18	17	17	18	–
$PM_{2.5}$ (µg/m³)	Maximum 24-hour	25	–	–	**49**	**36**	19
	95th percentile 24-hour	25	–	–	14	13	14
	Annual	8	–	–	7.4	7.2	–
Carbon monoxide (mg/m³)	Maximum 1-hour	30	2	2	2	1	1
Nitrogen dioxide (µg/m³)	Maximum 1-hour	246	103	113	94	115	107
	Annual	62	21	17	21	21	21
Sulfur dioxide (µg/m³)	Maximum 1-hour	570	–	73	52	63	79
	Annual	60	–	3	3	3	3

Note: Exceedances are shown in bold and red shaded cells.

Sensitive receivers

Sensitive receivers near the proposal include:

- The nearest residential receivers, located about 200 metres to the west on the opposite side of Victoria Road
- Users of several parks located within the vicinity of the proposal site (the closest being Mansfield Street open space, about 130 metres to the north-east of the proposal site)
- Several educational facilities (more than 300 metres from the proposal site)
- Places of worship, including C3 Church (immediately north of the proposal site)
- Ecologically sensitive receivers associated with White Bay immediately adjacent to the proposal site.

7.11.3 Potential impacts

Construction

Dust is a general term used to describe particulate matter in the form of total suspended particulates or particulate matter with a specified aerodynamic diameter (PM_{10} and $PM_{2.5}$), or particulate matter that has deposited onto surfaces over prescribed periods of time. When not properly managed, elevated airborne dust levels have the potential to cause adverse health or nuisance impacts.

Activities with the highest potential to result in the generation of dust during construction of the proposal include:

- Clearing of the proposal site
- Construction of the relocated section of Port Access Road
- Minor earthworks and ground preparation activities for areas to be concreted
- Importation of materials to be used to level the site, and removal of cleared waste materials from the site.

The volume of dust generated during a typical work day would vary depending on the types of activities occurring at the proposal site, the prevailing weather conditions (i.e. dry windy conditions increase the potential for wind erosion) and controls that are implemented to reduce these emissions.

Given the buffer distance and low density of sensitive receivers around the proposal site, the potential for dust impacts is considered low.

Operation

Air quality impacts are not anticipated during operation of the proposal.

7.11.4 Management and mitigation measures

Potential impacts to air quality would be managed in accordance with the Construction Environmental Management Framework. The framework includes the following air quality management objectives:

- Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable
- Identify and control potential dust and air pollutant sources.

The mitigation measures that would be implemented to address potential air quality are listed in Table 7-27.

Table 7-27: Mitigation measures – Air quality

Reference	Impact/issue	Mitigation measure	Phase
AQ1	Dust	The following best-practice dust management measures would be implemented during all construction works: • Regularly wet-down exposed and disturbed areas including stockpiles, especially during dry weather • Adjust the intensity of activities based on measured and observed dust levels and weather forecasts • Minimise the amount of materials stockpiled and position stockpiles away from surrounding receivers • Regularly inspect dust emissions and apply additional controls as required.	All
AQ2	Plant and equipment emissions	Plant and equipment would be maintained in a proper and efficient manner. Visual inspections of emissions from plant would be carried out as part of pre-acceptance checks.	All

7.12 Climate change and greenhouse gases

The proposal's contribution to NSW's greenhouse gas emissions and the wider effects of climate change has been considered.

7.12.1 Potential impacts

Greenhouse gas emissions – construction

Greenhouse gas emissions would result from the following activities:

- Construction traffic and equipment emissions
- Emissions generated in producing construction materials (embodied energy)
- Electricity-generated emissions in response to the power requirements to service the proposal
- Upstream and downstream lifecycle emissions (e.g. fuel extraction, processing, production, transport, disposal) including emissions at the construction compounds/laydown areas
- Emissions resulting from the decomposition of cleared vegetation.

The proposal would generate only minor greenhouse gas emissions from the above sources during construction.

Climate change – operation

The proposal is not expected to exacerbate impacts associated with climate change as the proposal would not increase vehicular traffic at the proposal site.

As discussed in Section 7.5, the detailed design of the relocated Port Access Road would be designed as to minimise impacts to floodplain storage, noting that the proposal would not involve significant regrading of the proposal site. During detailed design, the design of the road infrastructure would consider relevant design guidelines and relevant climate change projections, with acknowledgement that the relocated Port Access Road would serve the port area in immediate future, and is anticipated to undergo further change as the urban renewal of The Bays is fully realised.

7.12.2 Management and mitigation measures

The Construction Environmental Management Framework provides the basis for the development and implementation of a design and/or construction sustainability measures. The framework provides minimum requirements for matters such as carbon and energy management, and waste management and recycling.

The mitigation measures that would be implemented to reduce greenhouse gas emissions during construction are listed in Table 7-28.

Table 7-28: Mitigation measures – Climate change and greenhouse gases

Reference	Impact/issue	Mitigation measure	Phase
GHG1	Climate change and greenhouse gases	Opportunities to reduce greenhouse gas emissions through the increased use of recycled materials would be investigated during detailed design.	All

7.13 Sustainability

The National Strategy for Ecologically Sustainable Development (Department of Environment and Heritage 1992) defines Ecologically Sustainable Development (ESD) as "using, conserving and enhancing the community's resources so that the ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased". The concept of ESD gives formal recognition to environmental and social considerations in decision-making to ensure that current and future generations enjoy an environment that functions as well as, or better than, the environment they inherit." Consideration of the proposal against the principles of ESD are detailed in Section 9.3.

The proposal would be delivered under the Sydney Metro Construction Environmental Management Framework and Sydney Metro West Sustainability Plan (given the proximity of the proposal to proposed works for Sydney Metro West) reflecting the scope and impacts as appropriate.

7.14 Cumulative impacts

This section assess the cumulative impacts associated with the proposal.

Cumulative impacts can occur when impacts from a project interact or overlap with impacts from other projects, and can potentially result in a larger overall effect on the environment, businesses or local communities. Cumulative impacts may occur when projects are constructed or operated concurrently or consecutively. Projects constructed consecutively (or sequentially) can have construction activities occurring over extended periods of time with little or no break in construction activities. This has the potential for increased impacts and construction fatigue for local communities.

7.14.1 Methodology

The cumulative impact assessment involved:

- Identifying the impacts of the proposal
- Identifying committed projects that are likely to be under construction and/or operation in the area within one kilometre of the proposal site, concurrently or consecutively with the proposal, by referring to:
  - The NSW Department of Planning, Industry and Environment major projects assessments register
  - The Australian Government Department of Environment public notices and the invitation to comment register
  - Public agency websites that are progressing development under Part 5 of the EP&A Act.

  Searches were completed in August 2019.
- Identifying potential impacts of the above projects where known
- Assessing whether the impacts of the proposal would combine with the impacts of these projects to create a cumulative effect
- Assessing whether management measures considered in this REF would be sufficient to manage impacts, or need modifying or supplementing.

7.14.2 Potential impacts

Projects and considered as part of the cumulative impact assessment are provided in Table 7-29 and depicted in Figure 7-8.

Table 7-29: Projects assessed as part of the cumulative impact

Project name, status and expected construction period	Description
M4-M5 Link ***Approved*** **2018 – 2023**	The M4-M5 Link component of WestConnex involves the construction and operation of twin tunnels between the New M4 at Haberfield and the New M5 at St Peters, with an interchange at Rozelle and tunnel connection to Victoria Road at Iron Cove. Components of the project relevant to this cumulative impact assessment include: • Wattle Street surface works • Rozelle surface works • Iron Cove Link surface works • Ventilation facilities at Rozelle and Iron Cove.
Western Harbour Tunnel and Warringah Freeway Upgrade ***Proposed*** **2020 – 2026**	The Western Harbour Tunnel and Warringah Freeway Upgrade project forms part of the Western Harbour Tunnel and Beaches Link Program and comprise a new motorway tunnel connection across Sydney Harbour, and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network, with a connection to the Beaches Link and Gore Hill Freeway Connection project. Components of the proposal relevant to this assessment include: • Construction activities at Rozelle Rail Yards • Construction activities at White Bay.

Project name, status and expected construction period	Description
Sydney Metro West – Stage 1 *Proposed* **2021 – 2024**	Sydney Metro West would involve the construction and operation of a metro rail line around 24 kilometres long between Westmead and Sydney CBD. Stage 1 seeks approval for the major civil construction work between Westmead and The Bays. Components of Sydney Metro West relevant to this assessment includes The Bays Station construction site and future station which is located within parts of the proposal site. The proposal would be completed prior to the commencement of activities associated with Stage 1 of Sydney Metro West.
Sydney Metro City & Southwest (Chatswood to Sydenham) *Approved* **2017 – 2024**	The Chatswood to Sydenham component of Sydney Metro City & Southwest project involves the construction and operation of a 15.5 km metro line from Chatswood, under Sydney Harbour and through Sydney's CBD out to Sydenham. Components of the project relevant to this assessment include the White Bay truck marshalling yard to the east of the proposal site. The White Bay truck marshalling yard would cease operations before the commencement of construction works for the proposal.
Glebe Island concrete batching plant and aggregate handling *Proposed* **No construction program**	This proposal is for the construction and operation of a new aggregate handling and concrete batching facility, with the capacity to produce up to one million cubic metres of concrete per annum.
Glebe Island Multi-User Facility *Approved* **Commencing mid 2020**	This proposal includes the construction and operation of a ship off-loading, storage and dispatch facility for bulk construction materials such as sand and aggregates. The proposal site is located within land owned by the Port Authority on the eastern side of Glebe Island.
Extension to Longitude Office Building – 36 James Craig Road *Proposed* **No construction program**	This proposal involves alternations and extensions to an existing office building on James Craig Road, including: • 5-8 storey extension • Extension of existing floorplates • Internal alterations • Addition of green elements to facades and roof.

There is potential for cumulative environmental impacts between the proposal and projects listed in Table 7-29, particularly in relation to traffic and noise impacts. However, the potential environmental impacts associated with many of the above projects is largely unknown at this stage, and would be subject to detailed construction planning.

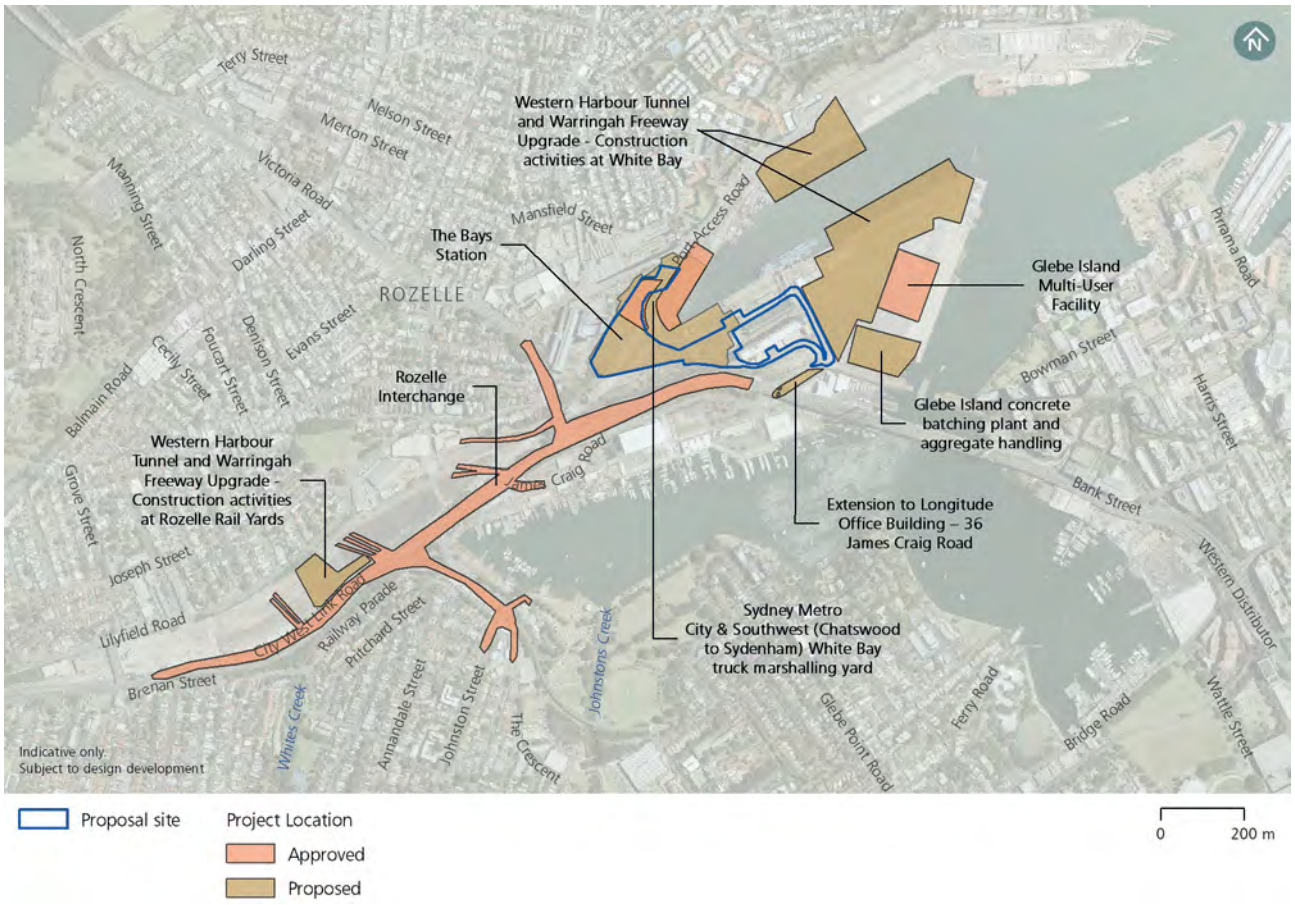

Figure 7-8: Nearby major projects

Construction traffic

Key projects that would be under construction at the same time as the proposal would include WestConnex M4-M5 Link, Western Harbour Tunnel and the Glebe Island Multi-User Facility, which could lead to cumulative impacts on the surrounding road network outside of the Ports precinct. Other projects are not expected to be under construction or would not significantly overlap with the proposal in the assessed peak construction year (2021).

Intersection performance results inclusive of construction vehicles generated the proposal, WestConnex M4-M5 Link and Western Harbour Tunnel indicate a number of intersections would experience a deterioration in Level of Service (Table 7-30).

However, as discussed in Section 7.2.3, the proposal in isolation when compared to existing conditions, would only result in small reductions in intersection performance. Construction traffic volumes generated by the M4-M5 Link and Western Harbour Tunnel are significantly greater when compared to the proposal and therefore have the greater impact on the road network.

The assessment identifies that the cumulative construction traffic assessment would reduce intersection throughput at certain intersections in the evening peak, which indicates that the road network is already operating at capacity and the cumulative impact of construction vehicles has the potential to result in increased intersection delays and queue lengths.

Consultation would be carried out with Transport for NSW including Transport Coordination to manage potential road network impacts as described in Section 7.2.4.

Construction traffic volumes for the Glebe Island Multi-User Facility are expected to be low for the assessed peak construction year (2021) and would be unlikely to alter the assessment outcomes.

Impacts on parking, access, public transport and active transport due to other projects do not directly interface with this proposal, and as such, no cumulative impacts would occur.

Table 7-30: Modelling peak hour intersection performance with cumulative construction traffic

Intersection	Peak hour	Level of Service		
		Without proposal	With proposal only	With cumulative construction traffic
Victoria Road/Robert Street	Morning	C	C	C
	Evening	D	D	D
Victoria Road/The Crescent	Morning	B	B	B
	Evening	C	C	F
The Crescent/ James Craig Road	Morning	A	A	A
	Evening	A	A	B
City West Link Road/ The Crescent	Morning	B	B	B
	Evening	C	C	D
City West Link Road/ Catherine Street	Morning	C	C	C
	Evening	D	D	E

Construction noise

WestConnex M4-M5 Link

Works for WestConnex M4-M5 Link are currently being completed at Rozelle Interchange near the intersection of Victoria Road and The Crescent.

The construction noise impact assessment completed for the proposal (refer to Section 7.1) show that the predicted noise levels would only result in 'minor' worst-case daytime impacts at receivers potentially affected by both projects, and only for a relatively short duration of the proposed construction works, typically at the start of site clearing works. At other times, noise levels in this area are expected to comply with the management levels.

On this basis, the potential cumulative impacts from the proposal and WestConnex M4-M5 Link works are considered minimal. Construction noise would be most effectively managed by the WestConnex M4-M5 Link works as it is closer to receivers.

Western Harbour Tunnel and Warringah Freeway Upgrade

Western Harbour Tunnel and Warringah Freeway Upgrade (if approved) form part of the Western Harbour Tunnel and Beaches Link Program and would include the White Bay construction support site and the Rozelle Rail Yards construction support site which are to the north-east and south-west of the proposal construction site respectively, as shown in Figure 7-8. The closest construction support site, the White Bay construction support site is only 400 metres to the north-east of the proposal construction site and noise from works at this site may affect receivers impacted by the proposal. These concurrent impacts may occur at receivers situated between both sites. Concurrent construction works on both projects (not involving the proposal noise intensive works) could theoretically increase the noise levels in this report by around 3 dB. This may result in 'minor' standard daytime NML exceedances at some receivers in this area that were previously predicted to be compliant, along with marginally higher 'minor' NML exceedances at some receivers already predicted to have exceedances.

For proposal works involving noise intensive equipment, noise levels at the surrounding receivers would generally be dominated by the proposal works.

The likelihood of worst-case noise levels being generated by two different projects at the same time is, however, considered low and rather than increase construction noise levels, the expected impact of concurrent works in this area would generally be an increase in the duration and potential annoyance of noise impacts at the nearest receivers. To manage this risk, co-ordination and consultation with Transport for NSW would occur where required to manage the interface of these projects (refer to Section 7.14.3).

Glebe Island Multi-User Facility and Glebe Island Concrete Batching Plant

The Glebe Island projects are not predicted to substantially affect the same receivers that are potentially impacted by the proposal. On this basis, the potential concurrent impacts from the proposal and the Glebe Island projects works are considered minimal. If cumulative construction noise from these projects exceeds noise management levels, construction noise would be most effectively managed by the proposal as it is closer to receivers.

Consecutive construction noise impacts

In addition to concurrent construction noise level impacts, there may also be an adverse effect on receivers as a result of the extended duration of construction noise impacts from successive projects, known as 'construction fatigue'. The area with the greatest potential to be affected by consecutive construction noise impacts is located between the proposal site and WestConnex M4-M5 Link. In this area, consecutive construction noise impacts are anticipated through the construction of the proposal, Sydney Metro West – Stage 1, Sydney Metro City & Southwest White Bay truck marshalling yard and WestConnex M4-M5 Link projects.

However, the proposal is expected to negligibly influence consecutive construction impacts for most receivers in the vicinity as the proposal only results in minor impacts during site clearing activities, which represent a worst case scenario that occurs for a relatively short duration at the commencement of construction (refer to Section 7.1).

7.14.3 Management and mitigation measures

The mitigation measures that would be implemented to address potential cumulative impacts are listed in Table 7-31.

Table 7-31: Mitigation measures – Cumulative impacts

Reference	Impact/issue	Mitigation measure	Phase
CI1	Cumulative impacts	The likelihood of cumulative (i.e. concurrent and consecutive) construction impacts would be reviewed during detailed design when detailed construction schedules are available. Co-ordination and consultation with the following stakeholders would occur where required to manage the interface of projects under construction at the same time: • Transport for NSW including Transport Coordination • Department of Planning, Industry and Environment • Port Authority of NSW • Sydney Motorways Corporation • Construction contractors. Co-ordination would occur between potentially interacting projects to minimise concurrent or consecutive works in the same areas, where possible.	All

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8 Environmental management

This chapter identifies how the environmental impacts of the proposal would be managed through Environmental Management Plans and mitigation measures. Section 8.3.1 lists the proposed mitigation measures for the proposal to minimise the impacts of the proposal identified in Chapter 7.

8.1 Environmental management systems

The Sydney Metro environmental management system would be used to manage the construction of the proposal. The management system would provide the framework for implementing the environmental management measures documented in this REF, and any conditions of other approvals, licences or permits.

8.2 Environmental Management Plans

8.2.1 Construction Environmental Management Framework

The Sydney Metro Construction Environmental Management Framework details the approach to environmental management and monitoring during construction, which will be applied to this proposal. The framework is a linking document between planning approval documentation (including commitments made within this REF) and construction environmental management documentation, which would be developed by the construction contractors.

The Construction Environmental Management Framework details the environmental, stakeholder and community management systems and processes for the construction of the proposal.

8.2.2 Construction Noise and Vibration Standard

Noise and vibration impacts of the proposal would be managed in accordance with the Sydney Metro Construction Noise and Vibration Standard, which aims to manage noise and vibration levels where feasible and reasonable using a variety of mitigation measures. The Construction Noise and Vibration Standard provides guidance for managing construction noise and vibration impacts to provide a consistent approach to management and mitigation across all Sydney Metro projects.

The Standard also provides:

- A list of standard mitigation measures that would be implemented where feasible and reasonable
- Trigger levels (based on exceedances of airborne NMLs) for the implementation of additional mitigation measures.

8.2.3 Construction Traffic Management Framework

Construction traffic impacts would be managed in accordance with the Sydney Metro Construction Traffic Management Framework. This framework provides an overall strategy and approach for construction traffic management, and an outline of the traffic management requirements and processes that would be applied. It establishes the traffic management processes and acceptable criteria to be considered and followed in managing impacts to the road network.

8.3 Management and mitigation measures

8.3.1 Construction management

Environmental management measures to be implemented during the construction phase of the proposal are listed in Table 8-1.

Table 8-1: Construction environmental management measures (compiled from Section 7 mitigation measures)

Ref	Impact/issue	Safeguard/management measure	Phase
NV1	Airborne construction noise and construction vibration	Receivers that would potentially be affected by noise and/or vibration from the works would be appropriately notified before the relevant works start. This would include details on the nature of works to be carried out, the expected noise levels, duration of noise generating construction works, and contact details during construction.	All
NV2	Construction vibration	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage buildings and structures, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	All
NV3	Building condition surveys – construction vibration	Condition surveys of buildings and structures near to the proposal would be undertaken prior to the commencement of vibration intensive works, where appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist.	All
NV4	Alternative construction methodologies – vibration	Alternative construction methodologies would be considered where vibration intensive works (typically, site clearing – demolition) result in exceedances of cosmetic damage screening criteria and may include the following: • The use of hydraulic concrete shears, jaw crushers, coring, and wire sawing in lieu of rockbreakers for demolition of structures • Use of smaller capacity rockbreakers or lower vibration generating rockbreakers Isolating the vibration sensitive structure from the vibration intensive work area by severing the vibration transmission path using non-vibration intensive means such a sawing.	All
NV5	Construction vibration – utilities	The potential vibration impacts to underground utilities and services would be reviewed as the proposal progresses in consultation with the asset owners.	All
T1	Changes to the network (wayfinding)	Clear wayfinding and safety signage would be provided to direct and guide vehicles not related to the proposal during road construction works. This would be supplemented by Variable Message Signs to advise drivers of traffic diversions, speed restrictions or alternative routes.	All
T2	Changes to the network	The Ports Authority of NSW and lease holders would be notified in advance of any proposed road changes within the port area, and the potential for short term delays.	All
T3	Congestion	Construction site traffic would be managed to minimise movements during peak periods.	All
T4	Access	Access to Cement Australia and other leased areas would be maintained in consultation with Ports Authority and lease holders.	All
T5	Parking	All staff parking would be provided on-site and not on surrounding local streets.	All
NAH1	Heritage impacts to the White Bay Power Station	A Section 60 permit or Section 57 exemption (standard exemption 7) from approval would by obtained from the Heritage Council (or delegate) prior to the commencement of works within the SHR curtilage of White Bay Power Station (SHR Listing No. 01015).	Phase 2

Ref	Impact/issue	Safeguard/management measure	Phase
NAH2	Heritage impacts to the White Bay Power Station	A program of photographic archival recording would be required within the SHR curtilage of White Bay Power Station (SHR Listing No. 01015) in accordance with NSW Heritage Office's How to Prepare Archival Records of Heritage Items (1998) and Photographic Recording of Heritage Items Using Film or Digital Capture (2006).	Phase 2
NAH3	Non-Aboriginal heritage archaeological remains	An Archaeological Work Method Statement would be prepared and implemented where excavation is required. The Archaeological Work Method Statement would outline the requirements of archaeological monitoring and recording where archaeological remains of potential local significance may be impacted.	All
C1	Management of contaminated soil	Sampling and testing of soils in areas of potential contamination concern would be conducted to characterise the soils (with respect to contamination) and determine the appropriate waste classification (which may include hazardous wastes or special wastes) and management response. Waste classification would be carried out in accordance with the Waste Classification Guidelines Part 1: Classifying Waste (NSW Environment Protection Authority, 2014).	All
C2	Management of soil	Soils would be managed in accordance with the Protection of the Environment Operations (Waste) Regulation 2014 and disposed of to an appropriately licensed waste management licensed facility.	All
C3	Erosion and sedimentation	Erosion and sediment measures would be implemented in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and *Volume 2D* (NSW Department of Environment, Climate Change and Water 2008).	All
C4	Spill containment	All fuels, chemicals and hazardous liquids would be stored in accordance with Australian standards and EPA Guidelines. Any refuelling carried out on-site would be carried out in designated areas only and spill kits would be available as part of any worksite.	All
C5	Acid sulfate soils	Prior to ground disturbance in areas of potential acid sulfate soil occurrence, testing would be carried out to determine the presence of actual and/or potential acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998).	All
WQ1	Floodplain management	Detailed design would seek to minimise changes to existing flood levels along the north-western side of site adjacent to low-lying property, to minimise reduction in floodplain storage.	Phase 2
WQ2	Floodplain management	Inner West Council would be consulted prior to construction, so that the proposal is designed to minimise conflicts with the potential construction of flood mitigation works in Robert Street.	Phase 2
LV1	Visual impacts	The design and maintenance of construction site fencing would aim to minimise visual amenity impact, where visible from public areas.	All
LV2	Lighting	Lighting of construction areas (if required) would be orientated to minimise glare and light spill impacts on adjacent receivers.	All
WR1	Waste and resource management	All waste would be assessed, classified, managed, transported and disposed of in accordance with the Waste Classification Guidelines and the Protection of the Environment Operations (Waste) Regulation 2014. The waste management hierarchy principles established under the Waste Avoidance and Resource Recovery Act 2001 of avoid/reduce/reuse/recycle/dispose would be applied to the construction of the proposal.	All

Ref	Impact/issue	Safeguard/management measure	Phase
AQ1	Dust	The following best-practice dust management measures would be implemented during all construction works: • Regularly wet-down exposed and disturbed areas including stockpiles, especially during dry weather • Adjust the intensity of activities based on measured and observed dust levels and weather forecasts • Minimise the amount of materials stockpiled and position stockpiles away from surrounding receivers • Regularly inspect dust emissions and apply additional controls as required.	All
AQ2	Plant and equipment emissions	Plant and equipment would be maintained in a proper and efficient manner. Visual inspections of emissions from plant would be carried out as part of pre-acceptance checks.	All
GHG1	Climate change and greenhouse gases	Opportunities to reduce greenhouse gas emissions through the increased use of recycled materials would be investigated during detailed design.	All
CI1	Cumulative impacts	The likelihood of cumulative (i.e. concurrent and consecutive) construction impacts would be reviewed during detailed design when detailed construction schedules are available. Co-ordination and consultation with the following stakeholders would occur where required to manage the interface of projects under construction at the same time: • Transport for NSW including Transport Coordination • Department of Planning, Industry and Environment • Port Authority of NSW • Sydney Motorways Corporation • Construction contractors. Co-ordination would occur between potentially interacting projects to minimise concurrent or consecutive works in the same areas, where possible.	All

8.3.2 Operational management

During operation of the proposal, it is not envisaged that there would be any substantial environmental impacts. However, should any unforeseen environmental impacts develop during operation, these would be managed through implementation of mitigation measures.

9 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 NSW EP&A Act, including the principles of ESD as defined in Schedule 2 of the NSW EP&A Regulation.

This REF seeks to assess the environmental impacts resulting from construction and operation of the proposed road relocation and associated works in The Bays.

9.1 Justification

9.1.1 Need for the proposal

The Bays is identified in Sydney's regional and district plans as a key 'growth area and urban renewal corridor', with potential for urban renewal at The Bays over the next 20 years, while continuing to support existing port and working harbour functions at Glebe Island and White Bay. Port Access Road, Sommerville Road and Solomons Way provide access to the White Bay Cruise Terminal and other port operations located in the Glebe Island and White Bay destinations. The development of Port Access Road was a key action of the White Bay and Glebe Island Master Plan.

The 'Transformation Plan: The Bays Precinct, Sydney' (INSW formerly UrbanGrowth NSW, 2015) provided an initial strategy for the redevelopment of The Bays. 'The Bays Precinct Sydney Project Update: Bays West Update (INSW formerly UrbanGrowth NSW, 2018) further develops the vision set out in the Transformation Plan to focus on long term mixed-use urban renewal driven by key road and transport projects and integrated with necessary port and working harbour activities over the next 10 years.

The Bays has been identified as a location for a future metro station as part of the proposed Sydney Metro West. The proposed station is one of the first major infrastructure projects required to facilitate the long term urban renewal of the Bays West area. The current arrangement of the internal port road network results in conflicts between the construction works proposed for Sydney Metro West, and the need to support ongoing port and maritime uses within the Bays West area.

Overall, the proposal is required to facilitate the construction of Sydney Metro West, maintain access to the White Bay Cruise Terminal and other port related businesses during the construction of various projects in The Bays, and to improve road safety by reducing conflicting movements.

9.1.2 Benefits and impacts of the proposal

The proposal would maintain safe and reliable road access to the White Bay Cruise Terminal and other port operations in the Glebe Island and White Bay destinations during future construction works associated with the development within the White Bay Power Station (and surrounds) destination. This would minimise disruptions to cruise passengers, cruise operations and other port/commercial operations and allow for efficient construction of various projects.

The proposal would also improve road safety outcomes for users of the internal port road network including customers accessing the cruise terminal by car and bus, and trucks accessing port and maritime operations.

The likely key impacts of the proposal are as follows:

- Construction noise impacts associated with the proposal are predicted to generally be compliant or 'minor' for most of the works, however 'moderate' and 'high' impacts are predicted for a short duration during 'site clearing' works
- Construction vibration exceedances of the cosmetic damage screening criteria are predicted at the nearest building at the former White Bay Power Station site and at the nearest building at the Cement Australia site
- The road network at certain locations is operating at capacity. While the proposal would only have a minor impact on the performance of nearby intersections, there is the potential for cumulative impacts due to the combined impact of projects in the Rozelle area

- The proposal would have an overall minor impact on the State heritage listed White Bay Power Station. A Section 57(2) exemption or Section 60 permit from the Heritage Council of NSW (Heritage Council) or delegate (the Department of Premier and Cabinet (Heritage)) is required prior to works commencing within the heritage curtilage. The proposal may have minor direct and potential direct vibration impacts on the White Bay Power Station (Inlet) Canal, a Section 170 heritage item, depending on the relative depth of the item to the proposed works.

Environmental impacts have been avoided or would be minimised wherever possible through design and the site-specific mitigation measures summarised in Section 8.3. The beneficial effects are considered to outweigh the adverse impacts and the proposal is considered to be justified.

9.2 Objects of the EP&A Act

An assessment of the proposal against the objects of the EP&A Act is provided in Table 9-1.

Table 9-1: Assessment of the proposal against the objects of the EP&A Act

Object	Comment
1.3(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources	Operation of the proposal would provide social and economic benefits by maintaining safe and reliable road access between the White Bay Cruise Terminal and other port operations in the Glebe Island and White Bay destinations during future construction works associated with the urban renewal of the Bays West area, including major infrastructure projects required to facilitate this transformation. This would minimise disruptions to cruise passengers, cruise operations and other port/commercial operations and allow for efficient construction of various projects. Intersection upgrades and the creation of one-way flows would improve road safety outcomes as described in Section 7.2. The proposal would not directly impact natural or artificial resources. The proposal would have no impact on agricultural land, natural areas, forests or minerals.
1.3(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment	Ecologically sustainable development is considered in Section 9.3.
1.3(c) to promote the orderly and economic use and development of land	The proposal site is located within The Bays, an area identified by the NSW Government for significant urban renewal. The Eastern City District Plan (Greater Sydney Commission, 2018b) identifies the potential for urban renewal at The Bays over the next 20 years, while continuing to support existing port and working harbour functions at Glebe Island and White Bay (Greater Sydney Commission, 2018b). The Bays is also nominated for a future metro station as part of the proposed Sydney Metro West. The proposal would ensure the orderly redevelopment of the Bays West area while ensuring access to existing port and commercial operations between White Bay and Glebe Island is maintained. Without the proposal, cruise passengers and other port-related uses would be required to navigate around the construction works. Therefore, the proposal would support the orderly and economic use and development of the land by facilitating urban renewal at the Bays West area and works associated with the proposed Sydney Metro West.
1.3(d) to promote the delivery and maintenance of affordable housing	This objective is not directly relevant to the proposal.

Object	Comment
1.3(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats	The proposal would require the removal of about 0.16 hectares of vegetation including native plantings along the southern portion of the proposal site. This vegetation is highly disturbed area and no remnant native vegetation would be impacted during construction. Potential biodiversity impacts are considered in Section 7.6.
1.3(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)	There is low archaeological potential for Aboriginal remains within much of the proposal site. Proposed construction activities are not anticipated to encounter items of Aboriginal cultural heritage. The proposal would be located within the heritage curtilage of the White Bay Power Station and adjacent to the heritage listed Glebe Island Silos. The proposal would have an overall minor impact on the White Bay Power Station and neutral impact on the Glebe Island Silos. The proposal may also have a minor direct impact on the White Bay Power Station (Inlet) Canal (a s170 heritage item), subject to confirming the relative depth of the heritage item to the proposed excavation works, and a minor potential indirect impact due to construction vibration. The works are not expected to diminish the historic, associative, aesthetic, or social significance, or the research potential, representativeness or rarity of the heritage items. Impacts to non-Aboriginal and Aboriginal heritage would be managed according to the mitigation measures outlined in Section 8.3.
1.3(g) to promote good design and amenity of the built environment	The proposal would be designed according to the agreed road specifications between the Port Authority of NSW and Sydney Metro.
1.3(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants	This objective is not relevant to the proposal.
1.3(i) To promote the sharing of the responsibility for environmental planning between different levels of government in the State	Sharing the responsibility of environmental planning is interpreted under two principal planning approval pathways in the EP&A Act. The Act also describes who is responsible for managing and coordinating these pathways. Part 5, Division 5.1 of the Act describes the responsibilities for public agencies undertaking development without consent. These provisions are supported by the provisions of State Environmental Planning Policy (Infrastructure) 2007. Collectively they describe the sharing responsibilities across all levels of Government in delivering public infrastructure. In delivering the proposal under the above pathway Sydney Metro has fulfilled its obligations in this regard under the EP&A Act.
1.3(j) To provide increased opportunity for public involvement and participation in environmental planning and assessment	Chapter 6 – Stakeholder and community consultation outlines the opportunity for public involvement in the proposal. Consultation would be undertaken with the community and stakeholders as the detailed design is developed, as the pre-construction work takes place, while the proposal is being constructed, and once construction is complete. The exhibition of the REF and the submissions response process will provide an opportunity for the public to raise concerns and comments about the proposal. Sydney Metro will respond to these query submissions and undertake additional environmental assessment or design refinements if and where required.

9.3 Ecologically sustainable development

Sydney Metro is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD). The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 to the EP&A Regulation as:

- Precautionary principle — Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for not implementing mitigation measures or strategies to avoid potential impacts
- Inter-generational equity — The present generation should ensure that the health, diversity and productivity of the environment are equal to or better for the future generations
- Conservation of biological diversity and ecological integrity — Preserving biological diversity and ecological integrity requires that ecosystems, species and genetic diversity within species are maintained
- Improved valuation and pricing of environmental resources — This principle establishes the need to determine economic values for services provided by the natural environment, such as the atmosphere's ability to receive gaseous emissions, cultural values and visual amenity.

As outlined in Table 9-2, the principles of ESD have been adopted by Sydney Metro throughout the development and assessment of the proposal and the proposal would be delivered within the environmental and sustainability framework established for the proposed Sydney Metro West.

Table 9-2: Adherence with the principles of ESD

ESD principle	Comment
Precautionary principle	A precautionary approach has been applied throughout the proposal's development. The REF process has sought to minimise the environmental impact of the proposal. There are no threats of serious or irreversible damage posed by this development. All of the environmental risks have been carefully and thoughtfully considered through the preparation of the REF and would be mitigated through the implementation of a CEMP for the proposal.
Intergenerational equity	This proposal would facilitate the orderly urban renewal of the Bays West area that would serve to deliver innovation and attract the jobs of the future for Sydney and NSW, equipping Sydney for the future and reinforcing its reputation as an internationally-competitive, resilient and prosperous global city to live, work and visit.
Conservation of biological diversity and ecological integrity	Due to the industrial nature of the site, no biodiversity of ecological significance is anticipated to be encountered at the site. However, the adherence to the mitigation measures outlined in this REF would help to ensure that biological diversity and ecological integrity of receiving environments would be retained.
Improved valuation and pricing of environmental resources	Environmental and social issues were considered in the strategic planning and establishment of the need for the proposal, and in consideration of various proposal options. The value placed on environmental resources is evident in the extent of the planning, environmental investigations, design of proposal and proposed mitigation measures. Implementation of these mitigation measures would result in an economic cost to Sydney Metro. Mitigation measures include the avoidance, reuse, recycling and management of waste during construction and operation of the proposal.

9.4 Conclusion

The proposal has been subject to assessment under Division 5.1 of Part 5 of the EP&A Act. The 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 of other environmental planning instruments as well as other NSW and Commonwealth legislation.

The adjustment to the internal port road network at Rozelle is required to facilitate the orderly urban renewal of the Bays West area while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. The proposal also provides the opportunity to improve road safety by reducing conflicting traffic movements along the internal port road network.

The proposal as described in the REF best meets the project objectives, however would still result in some impacts. Environmental impacts associated with the proposal would generally be limited to noise and vibration and non-Aboriginal heritage. Given construction of the proposal would be carried out over a short duration, noise impacts are considered minor to negligible. While the proposal would impact the State heritage listed White Bay Power Station and the s170 listed White Bay Power Station (Inlet) Canal, these impacts are considered to be minor.

Cumulative construction traffic associated with the WestConnex M4–M5 Link and Western Harbour Tunnel and Warringah Freeway Upgrade projects (if approved) would result in a reduction in intersection capacity in the evening peak at some locations. The road network is already operating at capacity and the cumulative impact of construction vehicles has the potential to result in increased intersection delays and queue lengths. Consultation would be carried out with Transport for NSW (including Transport Coordination) to manage potential road network impacts, particularly during the evening peak.

Cumulative and consecutive construction noise impacts may occur if construction of other major projects are carried out at the same time as the proposal. However construction noise levels predicted to be generated by the proposal are generally 'minor' and high noise intensity works such as site clearing are of short duration.

The REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act (refer to Chapter 7, Appendix A). Based on the assessment contained in this REF, it is considered that the proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an EIS is not required, nor is the approval of the Minister for Planning and Public Spaces.

The proposal has also taken into account the principles of ecologically sustainable development and the objects of the EP&A Act. The proposal would be delivered to the maximum benefit for the community, be cost effective and minimise any adverse impacts on the environment. On balance, the proposal is considered justified and in the public interest.

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11 Glossary

Term/acronym	Definitions
AHIMS	Aboriginal Heritage Information Management System
ASS	Acid sulfate soils
CBD	Central business district
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CNVS	Sydney Metro Construction Noise and Vibration Standard (Sydney Metro, 2020). Replaces the Sydney Metro Construction Noise and Vibration Strategy (Sydney Metro, 2017)
CSWMP	Construction Soil and Water Management Plan
CTMP	Construction Traffic Management Plan
DCP	Development Control Plan
dB	Decibel
EESG	Environment, Energy and Science Group of the Department of Planning, Industry and Environment (former NSW Office of Environment and Heritage)
EIS	Environmental impact statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
Heritage Act	*Heritage Act 1977*
ICNG	Interim Construction Noise Guideline
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LEP	Local Environmental Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
NCA	Noise catchment area
NML	Noise management level
NPW Act	*National Parks and Wildlife Act 1974*
NVMP	Noise and Vibration Management Plan
PFAS	per-and poly-fluoroalkyl
POEO Act	*Protection of the Environment Operations Act 1997*
proposal (the)	Refers to all the activities located within the construction footprint shown in Figure 1-1 and described in Chapter 4.
RBL	Rating Background Level
REF	Review of Environmental Factors

Term/acronym	Definitions
Roads Act	*Roads Act 1993*
SEPP	State Environmental Planning Policy
SEPP 55	State Environmental Planning Policy No. 55 – Remediation of Land
SREP 26	Sydney Regional Environmental Plan No. 26 – City West
SREP 2005	Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005
SHR	State Heritage Register
SIS	Species impact statement
TCP	Traffic control plan
TEC	Threatened ecological communities
TfNSW	Transport for NSW
VMS	Variable message signs

Appendix A

Consideration of Environmental Factors, exempt provisions and Matters of National Environmental Significance

Appendix A: Consideration of Environmental Factors, exempt provisions and Matters of National Environmental Significance

Consideration of clause 228(2) factors and matters of national environmental significance

In addition to the requirements of the Is an EIS required? guideline (Department of Urban Affairs and Planning, 1999) as detailed in the REF, the following factors, listed in Clause 228(2) of the EP&A Regulation have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Table A1-1: Review of clause 228(2) environmental factors

Clause 228 considerations	Impact
a) Any environmental impact on a community.	
Construction of the proposal would result in short-term negative impacts on noise and vibration, traffic, transport and access and contamination risk. The proposal would also encroach upon around 0.54 hectares of the 3.9 hectare SHR curtilage of the White Bay Power Station. These issues could impact negatively on the identified sensitive receivers and community as described in Section 7.1 (noise and vibration), Section 7.2 (traffic, transport and access), Section 7.3 (non-Aboriginal heritage) and Section 7.4 (soils and contamination). These impacts would be managed according to the mitigation measures outlined in Section 8.3. The proposal would maintain existing access from the White Bay Cruise Terminal and other port operations in White Bay and Glebe Island during construction works associated with the development of The Bays. As a result, the proposal would ensure that port and commercial operations are maintained during future construction activities.	Short term: Minor adverse Long term: Positive
b) Any transformation of a locality.	
During construction, the proposal would result in impacts on the existing locality, which would be predominantly through negative visual amenity impacts associated with the presence of construction vehicles, plant and equipment within the proposal site. However public access to the proposal site is restricted and therefore construction activities would not be viewed by the general public with the exception of public open space areas in the immediate surroundings. During operation, the proposal would involve road and parking relocation which is considered consistent with the industrial context of the site. Overall, the proposal would generally develop unused or underutilised land consistent with adjoining site uses, while minimising impacts to surrounding maritime and port uses.	Short term: Minor adverse Long term: Nil
c) Any environmental impact on the ecosystems of the locality.	
The proposal would not impact on the ecosystems of the locality.	Nil.

Clause 228 considerations	Impact
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality.	
The construction and operation of the proposal would result in temporary visual impacts associated with the presence of construction vehicles, plant and equipment within the proposal site. Negative visual impacts as a result of the proposal would be temporary and limited to the duration of construction. The proposal site is located within an established industrial and port area. Construction and operation of the proposal would be consistent with the existing land use at the proposal site.	Short term: Minor adverse Long term: Nil
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	
The proposal would be located within the heritage curtilage of the White Bay Power Station and the White Bay Power Station (Inlet) Canal. The proposal is also immediately adjacent to the Glebe Island Silos and the Glebe Island Dyke Exposures. The proposal would have an overall minor impact on the White Bay Power Station, a minor direct impact and minor potential indirect impact on the White Bay Power Station (Inlet) Canal, and neutral impact on the Glebe Island Silos and the Glebe Island Dyke Exposures. The works are not expected to diminish the historic, associative, aesthetic, or social significance, or the research potential, representativeness or rarity of the heritage items. Impacts to non-Aboriginal heritage would be managed according to the mitigation measures outlined in Section 8.3.	Long term: Minor to moderate adverse
f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks & Wildlife Act 1974*).	
The proposal would not impact on the habitat of protected fauna.	Nil.
g) Any endangering of any species of animal, plant or other form of life, whether living on land, water or air.	
The proposal would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air.	Nil.
h) Any long-term effects on the environment.	
The proposal would maintain existing access to port and commercial operations at White Bay. No long-term effects on the environment are anticipated.	Nil.
i) Any degradation of the quality of the environment.	
Construction of the proposal would result in short-term negative impacts on noise and vibration, traffic, transport and access and contamination risk. The proposal would also encroach upon around 0.54 hectares of the 3.9 hectare SHR curtilage of the White Bay Power Station. These issues could impact negatively on the identified sensitive receivers and community as described in Section 7.1 (noise and vibration), Figure 7-2 (traffic, transport and access), Section 7.3 (non-Aboriginal heritage) and Section 7.4 (soils and contamination). These impacts would be managed according to the mitigation measures outlined in Section 8.3.	Short-term: Minor adverse Long term: Minor to moderate adverse
j) Any risk to the safety of the environment.	
Construction of the proposal would result in short-term negative impacts on noise and vibration, traffic, transport and access and contamination risk. The proposal would also encroach upon around 0.54 hectares of the 3.9 hectare SHR curtilage of the White Bay Power Station. These issues could impact negatively on the identified sensitive receivers and community as described in Section 7.1 (noise and vibration), Section 7.2 (traffic, transport and access), Section 7.3 (non-Aboriginal heritage) and Section 7.4 (soils and contamination). These impacts would be managed according to the mitigation measures outlined in Section 8.3.	Short-term: Minor adverse Long term: Minor to moderate adverse

Clause 228 considerations	Impact
k) Any reduction in the range of beneficial uses of the environment.	
The proposal is located on land within the ownership of the Port Authority of NSW. The site is largely unused with the exception of the Port Access Road and areas associated with port-related leases including Cement Australia Truck Parking Licenced Area. Overall, the proposal would generally develop unused or underutilised land consistent with adjoining site uses, while minimising impacts to surrounding maritime and port uses.	Nil.
l) Any pollution of the environment	
During construction, the proposal has the potential to result in minor short-term air pollution from vehicle and machinery emissions, and there is a low risk of accidental spills and leaks. There is also a low risk of water pollution from turbid stormwater following ground disturbance. These impacts would be managed in accordance with the mitigation measures outlined in Section 8.3.	Short-term: Minor adverse Long-term: Nil.
m) Any environmental problems associated with the disposal of waste	
Sampling and testing of soils in areas of potential contamination concern would be conducted to characterise the soils (with respect to contamination) and determine the appropriate waste classification (which may include hazardous wastes or special wastes). Soils would be managed in accordance with the waste classification and disposed of off-site. The proposal is unlikely to result in any environmental problems associated with waste.	Nil.
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.	
The proposal would require limited quantities of common construction materials including concrete, gravel and water. The proposal would not create a substantial demand on these resources.	Nil.
o) Any cumulative environmental effect with other existing or likely future activities.	
Cumulative construction traffic associated with the WestConnex M4–M5 Link and Western Harbour Tunnel and Warringah Freeway Upgrade projects would result in a reduction in intersection capacity in the evening peak at some locations. The road network is already operating at capacity and the cumulative impact of construction vehicles has the potential to result in increased intersection delays and queue lengths. Consultation would be carried out with Transport for NSW, including Transport Coordination to manage potential road network impacts, particularly during the evening peak. Cumulative construction noise impacts may occur if construction of other major projects in the Rozelle area are is carried out at the same time as the proposal. However construction noise levels predicted to be generated by the proposal are generally 'minor' and high noise intensity works such as site clearing are of short duration.	Short-term: Moderate adverse
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions.	
The proposal would not result in any impact on coastal processes and coastal hazards including those under projected climate change conditions	Nil.

Exempt development considerations

Clause 20 of State Environmental Planning Policy (Infrastructure) 2007 outlines general requirements that applies to any development that the policy identifies as exempt development. As discussed in Section 5.1, the relocation of the Cement Australia Truck Parking Licenced Area would be exempt development but is considered as part of the proposal for completeness. The general considerations listed in Clause 20(2) of the policy are considered in Table A1-2.

Table A1-2: General requirements for exempt development

Considerations
To be exempt development, the development –
a) must meet the relevant deemed-to-satisfy provisions of the Building Code of Australia, or if there are no such relevant provisions, must be structurally adequate, and
The Cement Australia Truck Parking Licenced Area component of the proposal does include any building structures. Any associated infrastructure (fencing, lighting) would meet any relevant standards.
b) Must not, if it relates to an existing building: **i. Cause the building to contravene the Building Code of Australia, or** **ii. Compromise the fire safety of the building or affect access to any fire exit, and**
Not applicable. The Cement Australia Truck Parking Licenced Area component of the proposal does not relate to an existing building
c) must be carried out in accordance with all relevant requirements of the Blue Book, and
Works would be carried out in accordance with the relevant requirements of the Blue Book.
d) must not be designated development, and
The proposal is not designated development.
e) if it is likely to affect a State or local heritage item or a heritage conservation area, must involve no more than minimal impact on the heritage significance of the item or area, and
The Cement Australia Truck Parking Licenced Area is located in proximity to the section 170 heritage listed Glebe Island Silos. As discussed in Section 7.3, the proposal in totality would have a neutral impact on the heritage item.
e1) must not involve the demolition of a building or work that is, or is part of, a State or local heritage item, and The Cement Australia Truck Parking Licenced Area component of the proposal
Not applicable. The Cement Australia Truck Parking Licenced Area component of the proposal would not involve the demolition of a building or work that is, or is part of, a State or local heritage item.
e2) if it involves the demolition of a building, must be carried out in accordance with Australian Standard AS 2601—2001, The demolition of structures, and
Not applicable. No buildings would be demolished.
f) must be installed in accordance with the manufacturer's specifications, if applicable, and
Any related infrastructure (eg lighting) would be installed in accordance with any relevant manufacturer specifications.
g) must not involve the removal or pruning of a tree or other vegetation that requires a permit or development consent for removal or pruning, unless that removal or pruning is undertaken in accordance with a permit or development consent, and
Not applicable. The site for the Cement Australia Truck Parking Licenced Area is devoid of vegetation.
h) must not involve the removal of asbestos, unless that removal is undertaken in accordance with Working with Asbestos: Guide 2008 (ISBN 0 7310 5159 9) published by the WorkCover Authority.
As detailed in Section 7.4, there is the potential to encounter asbestos. The Construction Environmental Management Framework includes management measures for contaminated materials and a contingency plan to be implemented in the case of unanticipated discovery of contaminated material, including asbestos. These measures would meet the requirements of Working with Asbestos: Guide 2008.

Consideration of Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government's Department of Energy and the Environment. These issues are considered in Table A1-3.

Table A1-3: Checklist of EPBC Act matters

Matters of national environmental significance	Impact
a) World heritage properties.	
There are no items within the proposal site listed on the World Heritage List.	Nil.
b) National heritage places.	
There are no items within the proposal site listed on the National Heritage List.	Nil.
c) Wetlands of international importance.	
There are no wetlands of international importance in the proposal site or likely to be affected by the proposal.	Nil.
d) Nationally threatened species and ecological communities.	
The proposal would be located within existing, disturbed areas including existing residential area and road reserve. The proposal would have no impact on a listed threatened species or community.	Nil.
e) Migratory species	
The proposal would have no impact on a listed migratory species.	Nil.
f) Commonwealth marine areas.	
The proposal would have no impact on a Commonwealth marine area.	Nil.
g) The Great Barrier Reef Marine Park	
The proposal would have no impact on The Great Barrier Reef Marine Park.	Nil.
h) Protection of water resources from coal seam gas development and large coal mining development	
The proposal would have no impact on water resources from coal seam gas development and large coal mining development.	Nil.
i) Nuclear actions (including uranium mining).	
The proposal does not involve a nuclear action.	Nil.
j) Any impact (direct or indirect) on Commonwealth land?	
The proposal would have no impact (direct or indirect) on Commonwealth land.	Nil.

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Appendix B

The Bays road relocation works – Noise and vibration assessment (SLR, 2020)

SYDNEY METRO WEST

The Bays - Road Relocation Works
Noise and Vibration Assessment

Prepared for:

Sydney Metro
Level 43, 680 George Street
Sydney NSW 2000

SLR Ref: 610.18331-R03
Version No: -v2.0
April 2020

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Sydney Metro (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.18331-R03-v2.0	14 April 2020	Antony Williams	Dominic Sburlati	Antony Williams
610.18331-R03-v1.0	28 February 2020	Antony Williams	Dominic Sburlati	Antony Williams

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Glossary and Abbreviations

Item	Description / Definition
Attended noise monitoring	Operator attended noise monitoring which is completed to determine the various contributors to the noise environment of an area. It is usually done over a short period, such as 15 minutes.
CNVMP	Construction Noise and Vibration Management Plan
CNVS	Sydney Metro Construction Noise and Vibration Standard. Replaces the Sydney Metro Construction Noise and Vibration Strategy (Sydney Metro, 2017)
Construction compound	An area used as the base for construction activities that include, but are not limited to, construction work areas, sediment basins, temporary water treatment plants, pre-cast yards and material stockpiles, laydown areas, parking, maintenance workshops and offices, and construction compounds.
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact assessed on its own. Cumulative construction impacts can occur where multiple works are being completed near a particular location at the same time concurrently or if more than one project or proposal occurs in the same area consecutively.
dBA	Decibel, A-weighted
DEC	Department of Environment and Conservation (now EPA)
DECC	Department of Environment and Climate Change (now EPA)
DECCW	Department of Environment, Climate Change and Water (now EPA)
Detailed design	The stage of design where proposal elements are designed in detail, suitable for construction
EPA	Environment Protection Authority
Heavy vehicles	A heavy vehicle is classified as a Class 3 vehicle (a two-axle truck) or larger, in accordance with the Austroads Vehicle Classification System.
HNA	Highly Noise Affected. Relates to construction noise levels of ≥75 dBA and is the point above which there may be strong community reaction to noise construction noise levels.
ICNG	Interim Construction Noise Guideline
INP	Industrial Noise Policy
L_{Aeq}	The average noise level during a measurement period, such as the daytime or night-time
L_{AFmax}	The maximum noise level measured during a monitoring period, using 'fast' weighting
NATA	National Association of Testing Authorities
NCA	Noise Catchment Area
NML	Noise Management Level
Noise intensive equipment	Construction equipment that is particularly noisy and causes annoyance. Includes items such as rockbreakers and concrete saws
NPfI	Noise Policy for Industry
OOH	Out of Hours
OOHW	Out of Hours Work
PNTL	Project Noise Trigger Level

Item	Description / Definition
PPV	Peak particle velocity
Proposal, the	The construction and operation of The Bays road relocation works
RBL	Rating Background Level. This is the background noise level measured at a particular location. The method for calculating the RBL is defined in the NSW *Noise Policy for Industry*.
Realistic worst-case scenarios	Realistic worst-case construction scenarios have been developed to assess the potential impacts from the proposal. These scenarios are based on the noisiest items of equipment which would likely be required to complete the works.
REF	Review of Environmental Factors
RMS	Root Mean Square
RNP	Road Noise Policy
SLR	SLR Consulting Australia Pty Ltd
Standard Construction Hours	Monday to Friday 7 am to 6 pm and Saturdays from 8 am to 1 pm
Study area, the	The study area is defined as the wider area including and surrounding the construction site, with the potential to be directly or indirectly affected by the proposal. The study area includes all sensitive receivers within around 600 metres of the construction site.
SWL	Sound Power Level
Transport for NSW	New South Wales government agency responsible for development and management of transport services.
Unattended noise monitoring	Noise monitoring which is typically completed over a seven day period using unattended noise monitoring equipment. The equipment is left in a certain location to measure the existing background noise levels during the daytime, evening and night-time.
VDV	Vibration Dose Value
Worst-case impacts and noise levels	The worst-case (i.e. highest) impacts or noise levels predicted in this report

1 Introduction

Sydney Metro is proposing to configure the internal port road network at Rozelle to facilitate the orderly urban renewal of the Bays West area while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. This includes long-term urban renewal initiatives for the Bays West area and works for various future developments within the locality, including critical works for the proposed Sydney Metro West.

Port Access Road, Sommerville Road and Solomons Way currently provides provide access to the White Bay Cruise Terminal and other port operations located in the Glebe Island and White Bay destinations. The current arrangement of the internal ports road network results in conflicts between the construction works proposed as part of the redevelopment of the Bays West area, and the need to support ongoing port and maritime uses.

To allow the internal port road network to remain operational, it is proposed to adjust the current arrangement of Solomons Way, Sommerville Road and Port Access Road. The proposal would also include the relocation of the adjacent Cement Australia Truck Parking Licenced Area and provides an opportunity to remove conflicting movements and an overall road safety improvement.

1.1 Terminology

The assessment has used specific acoustic terminology and an explanation of common terms is included in **Appendix A**. A glossary is also provided at the start of this document which lists the various terms.

2 Existing Environment

The noise and vibration impact assessment study area is centred on the proposal site and includes receivers within around 600 metres of the proposal site in the suburbs of Rozelle, Balmain and Glebe. Existing noise levels are generally controlled by road traffic noise from Victoria Road and Anzac Bridge, with some industrial noise from White Bay and Glebe Island.

The area immediately surrounding the proposal is mainly commercial and/or industrial. Residential receivers are located to the west and north, however, these are generally distant from the proposal site area. The nearest residential receivers are around 200 metres to the west on the opposite side of Victoria Road and residential receivers to the north are over 500 metres away, with intervening buildings which provide shielding. The heritage listed former White Bay Power Station is to the immediate west and the proposal construction site footprint extends partially into the heritage curtilage of the former power station to accommodate the relocation of Port Access Road as part of Phase 2 of the proposal.

The assessment of impacts uses a number of Noise Catchment Areas (NCAs) that reflect the existing noise environment and land uses near the proposal site. The NCAs and study area are shown in **Figure 1** and described in **Table 1**.

Figure 1 Study Area

Table 1 Noise Catchment Areas and Surrounding Land Uses

NCA	Description
NCA01	Located west of Victoria Road in Rozelle. This catchment is mainly residential and the nearest receivers are on Quirk Street, Hornsey Street and Lilyfield Road. Commercial receivers are located along Victoria Road, Darling Street and in the south of the catchment on Lilyfield Road. Sydney Community College, St Joseph's Catholic Church and Rosebud Cottage are to the west of Victoria Road. Multistorey residential receivers are in Pyrmont around 700 m to the south-east.
NCA02	Located east of Victoria Road in Rozelle and Balmain and includes White Bay, White Bay Power Station and Glebe Island. This catchment is mainly residential and the nearest receivers are on Robert Street and Mansfield Street. Various commercial areas surround White Bay and Glebe Island. C3 Church Balmain, Bald Rock Hotel and Inner Sydney Montessori School Child Care are to the north of White Bay.
NCA03	Located south of Victoria Road/Western Distributor in Glebe. This catchment is mainly residential and the nearest receivers are distant from the proposal site area across Rozelle Bay. Commercial areas associated with Rozelle Bay are to the south of Victoria Road/Western Distributor.

2.1 Sensitive Receivers

Receivers potentially sensitive to noise and vibration have been categorised as residential buildings, commercial/industrial buildings, or 'other sensitive' land uses which includes educational institutions, child care centres, medical facilities, places of worship, outdoor recreation areas, etc. Receiver types and locations are shown in **Figure 1**.

The 'other sensitive' non-residential receivers identified in the study area are shown in **Table 2**.

Table 2 'Other Sensitive' Receivers (Non-Residential)

NCA	Description	Address	Type
NCA01	St Joseph's Catholic Church	7 Gordon Street, Rozelle	Place of worship
	Sydney Community College	2A Gordon Street, Rozelle	Educational
	Rosebud Cottage Child Care	5 Quirk Street, Rozelle	Child care centre
NCA02	Bald Rock Hotel	17 Mansfield Street, Rozelle	Hotel
	C3 Church Balmain	46 Robert Street, Rozelle	Place of worship
	Inner Sydney Montessori School	44 Smith Street, Rozelle	Child care centre
	The former White Bay Power Station	Robert Street, Rozelle	Commercial (heritage)
	Anzac Bridge Park	Solomons Way, Rozelle	Passive Recreation
NCA03	Blackwattle Bay Park	Oxley Street, Glebe	Passive Recreation
	Bicentennial Park	Federal Road, Glebe	Passive Recreation

The former White Bay Power Station is currently in a disused state and unoccupied. Notwithstanding, it has been included in this assessment for completeness.

2.2 Existing Noise Surveys and Monitoring Locations

2.2.1 Unattended Noise Monitoring Results

Unattended noise monitoring was completed in the study area in February and May 2019, and also in July 2016 (as part of WestConnex M4-M5 Link). The measured noise levels have been used to determine the existing noise environment and to set criteria to assess the potential impacts from the proposal.

The noise monitoring locations were selected with reference to the procedures outlined in the NSW Environmental Protection Authority (EPA) *Noise Policy for Industry* (NPfI). The measured existing noise levels are representative of receivers in each NCA that would likely be most affected by the proposal.

The noise monitoring equipment continuously measured existing noise levels in 15-minute periods during the daytime, evening and night-time. All equipment carried current National Association of Testing Authorities (NATA) calibration certificates and the calibration was checked before and after each measurement.

The results of the noise monitoring have been processed with reference to the NPfI to exclude noise from extraneous events and/or data affected by adverse weather conditions, such as strong wind or rain (measured at Canterbury and Observatory Hill Weather Stations), to establish representative existing noise levels for each NCA.

The noise monitoring locations are shown in **Figure 1**, and the results are summarised in **Table 3**. Details of each monitoring location together with graphs of the daily measured noise level are in **Appendix B**.

Table 3 Summary of Unattended Noise Monitoring Results

Location ID	Address	Measured Noise Level (dBA)[1]					
L01	21 Mansfield Street, Rozelle	43	43	35	56	54	47
L02[3]	22 Lilyfield Road, Rozelle	51	51	45	57	57	54
L03	308 Glebe Point Road, Glebe	48	47	39	59	58	51

Note 1: The RBL and L_{Aeq} noise levels have been determined with reference to the procedures in the NPfI.

Note 2: Daytime is 7.00 am to 6.00 pm, evening is 6.00 pm to 10.00 pm and night-time is 10.00 pm to 7.00 am.

Note 3: Data taken from WestConnex M4-M5 Link EIS.

2.2.2 Attended Noise Measurements

Short-term attended noise monitoring was completed at each ambient noise monitoring location. The attended measurements allow the contributions of the various noise sources at each location to be determined. Detailed observations from the attended measurements are provided in **Appendix B**.

The attended measurements were generally found to be consistent with the results of the unattended noise monitoring and showed that existing noise levels are typically dominated by road traffic noise and industrial noise.

3 Policy Context

3.1 Relevant Guidelines

The guidelines and standards used to assess construction noise and vibration impacts from the proposal are listed in **Table 4**. The guidelines aim to protect the community and environment from excessive adverse noise and vibration impacts when projects are constructed and operated.

Table 4 Construction Noise and Vibration Guidelines

Guideline/Policy Name	Where Guideline Used
Interim Construction Noise Guideline (ICNG), Department of Environment and Climate Change (DECC), 2009	Assessment of airborne noise impacts on sensitive receivers
Assessing Vibration: a technical guideline, Department of Environment and Conservation (DEC), 2006	Assessment of vibration impacts on sensitive receivers
AS2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors	Provides recommended design sound levels for internal areas of occupied spaces
Road Noise Policy (RNP), Department of Environment, Climate Change and Water (DECCW), 2011	Assessment of road traffic noise impacts
BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2, BSI, 1993	Screening assessment of vibration impacts (cosmetic damage) to sensitive buildings and structures
DIN 4150:Part 3-2016 Structural vibration – Effects of vibration on structures, Deutsches Institute fur Normung, 1999	Screening assessment of vibration impacts (cosmetic damage) to heritage sensitive structures, where the structure is found to be unsound
Sydney Metro Construction Noise and Vibration Standard (CNVS), Sydney Metro, 2020	Provides the assessment and management protocols for construction of Sydney Metro projects. This Sydney Metro standard is based on the requirements of the ICNG and Transport for NSW CNVS, as appropriate to Sydney Metro and is the guiding strategy for assessing and managing the potential impacts during construction. This Sydney Metro standard replaces the *Sydney Metro Construction Noise and Vibration Strategy* (Sydney Metro, 2017)
Noise Policy for Industry (NPfI), Environmental Protection Agency (EPA), 2017	Ambient noise monitoring and analysis procedures, and assessment of sleep disturbance
Guideline for Child Care Centre Acoustic Assessment Version 2.0 (GCCCAA), Association of Australasian Acoustical Consultants(AAAC), 2013	Contains reference criteria for child care centres

3.2 Construction Airborne Noise Guidelines

The *Sydney Metro Construction Noise and Vibration Standard* (CNVS) references the NSW *Interim Construction Noise Guideline* (ICNG) for assessing and managing impacts from construction noise on projects undertaken by Sydney Metro.

The ICNG contains procedures for determining proposal specific Noise Management Levels (NMLs) for sensitive receivers. The 'worst-case' noise levels from construction of a proposal are predicted and then compared to the NMLs in a 15 minute assessment period to determine the likely impact.

The NMLs are not mandatory limits, however, where construction noise levels are predicted or measured to be above the NMLs, feasible and reasonable work practices to minimise noise emissions are to be investigated.

3.2.1 Residential Receivers

The ICNG approach for determining NMLs at residential receivers is shown in **Table 5**.

Table 5 ICNG NMLs for Residential Receivers

Time of Day	NML $L_{Aeq(15minute)}$	How to Apply
Standard Construction Hours: Monday to Friday 7:00 am to 6:00 pm Saturday 8:00 am to 1:00 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practises to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

	Highly Noise Affected
	75 dBA
		The Highly Noise Affected (HNA) level represents the point above which there may be strong community reaction to noise.
		• Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restructuring the hours that the very noisy activities can occur, taking into account:
		  ◦ Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools or mid-morning or mid-afternoon for works near residences.
		  ◦ If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Outside Standard Construction Hours:	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1: The RBL is the Rating Background Level and the ICNG refers to the calculation procedures in the NSW *Industrial Noise Policy* (INP). The INP has been superseded by the NSW EPA *Noise Policy for Industry* (NPfI). The RBLs have been determined in accordance with the calculation procedures outlined in the NPfI as described in **Section 2.2**.

In the ICNG, works are recommended to be completed during Standard Construction Hours. More stringent requirements are placed on works that are required to be completed outside of Standard Construction Hours (i.e. during the evening or night-time) which reflects the greater sensitivity of communities to noise impacts during these periods.

Construction works for the proposal would be scheduled during Standard Construction Hours. However, some short-term works associated with implementing road traffic reconfigurations would be required to facilitate phases of the works and may need to be undertaken during weekend and/or during the night-time period to avoid disruption to the road network. These activities, if required, would be managed in accordance with the CNVS and would be short-term. As such, noise impacts outside of Standard Construction Hours, including evening, night-time and sleep disturbance impacts, are not considered further in this assessment.

3.2.1.1 Summary of Residential NMLs

The residential NMLs for the proposal have been determined using the results from the unattended ambient noise monitoring (see **Section 2.2**) and are shown in **Table 6**.

Table 6 Residential Receiver Construction NMLs

NCA	Representative Background Monitoring Location	NML ($L_{Aeq(15minute)}$ – dBA)
		Standard Construction Hours (RBL +10 dB)
NCA01	L02	61
NCA02	L01	53
NCA03	L03	58

The noise monitoring locations were selected to measure background noise levels representative of the potentially most affected receivers in each NCA. These locations would likely be most affected during construction of the proposal. While background noise levels may be lower at receivers which are further back from the construction sites, construction noise tends to reduce at a faster rate than background noise with increasing distance. The worst-case noise impacts are, therefore, generally at the closest receivers and are used to determine the recommended mitigation measures for the proposal.

3.2.2 Other Sensitive Land Uses and Commercial Receivers

Non-residential land uses have been identified in the study area. These include 'other sensitive' land uses such as educational facilities, medical facilities, outdoor recreational areas, and commercial properties. The ICNG NMLs for 'other sensitive' receivers are shown in **Table 7**.

Table 7 ICNG NMLs for 'Other Sensitive' Receivers

Land Use	Noise Management Level $L_{Aeq(15minute)}$ (dBA) (Applied when the property is in use)	
	Internal	External
Classrooms at schools and other educational institutions	45	55[1]
Hospital wards and operating theatres	45	65[1]
Places of worship	45	55[1]
Active recreation areas (characterised by sporting activities and activities which generate noise)	-	65
Passive recreation areas (characterised by contemplative activities that generate little noise)	-	60
Commercial	-	70
Industrial	-	75

Note 1: The criteria is specified as an internal noise level for this receiver category. As the noise model predicts external noise levels, it has been conservatively assumed that all schools and places of worship have openable windows and external noise levels are 10 dB higher than the corresponding internal level, which is representative of windows being partially open to provide ventilation. Hospital wards are assumed to have fixed windows with 20 dB higher external levels.

The ICNG references *AS2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors* for criteria for 'other sensitive' receivers which are not listed in the guideline. Neither the ICNG nor AS2107 provide criteria for child care centres so the Association of Australian Acoustical Consultants *Guideline for Child Care Centre Acoustic Assessment* (GCCCAA) has also been referenced. The NMLs for 'other sensitive receivers' are shown in **Table 8**.

Table 8 NMLs for Other Sensitive Receivers

Use	Period	NML Derived From	Noise Management Level $L_{Aeq(15minute)}$ (dBA)	
			Internal	External
Hotel	Daytime and evening	AS2107: Bars and lounges	50	70[1]
	Night-time	AS2107: Sleeping areas: Hotels near major roads	40	60[1]
Café	When in use	AS2107: Coffee bar	50	70[1]
Bar/Restaurant	When in use	AS2107: Bars and Lounges / Restaurant	50	70[1]
Child care centres	Daytime	GCCCAA: Outdoor play areas	-	55
		GCCCAA: Sleeping areas	40	50[2]
Public building	When in use	AS2107: Public space	50	60[2]

Note 1: The criteria is specified as an internal noise level for this receiver category. As the noise model predicts external noise levels, it has been assumed that these receivers have fixed windows with a conservative 20 dB reduction for external to internal noise levels.

Note 2: Receiver conservatively assumed to have openable windows and a 10 dB outside to inside facade performance.

3.3 Construction Traffic Noise Guidelines

The proposed construction activities are not expected to generate a significant volume of construction traffic in relation to the existing volumes on the nearby major roads. No noise impacts from construction traffic are therefore expected and have not been considered further in this assessment.

3.4 Construction Vibration Guidelines

The effects of vibration from construction works can be divided into three categories:

- Those in which the occupants of buildings are disturbed (human comfort)
- Those where building contents may be affected (building contents)
- Those where the integrity of the building may be compromised (structural or cosmetic damage).

The criteria for these categories are taken from a number of guidelines and are discussed in the following sections. It is noted that a number of assessment parameters are used to assess the various vibration impacts.

3.4.1 Human Comfort Vibration

People can sometimes perceive vibration impacts when vibration generating construction works are located close to occupied buildings.

Vibration from construction works tends to be intermittent in nature and the EPA's *Assessing Vibration: a technical guideline* (2006) provides criteria for intermittent vibration based on the Vibration Dose Value (VDV). The 'preferred' and 'maximum' VDVs for human comfort impacts are shown in **Table 9**.

Table 9 Vibration Dose Values for Intermittent Vibration

Building Type	Assessment Period	Vibration Dose Value[1] ($m/s^{1.75}$)	
		Preferred	Maximum
Critical Working Areas (e.g. operating theatres or laboratories)	Day or night-time	0.10	0.20
Residential	Daytime	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night-time	0.40	0.80
Workshops	Day or night-time	0.80	1.60

Note 1: The VDV accumulates vibration energy over the daytime and night-time assessment periods, and is dependent on the level of vibration as well as the duration.

3.4.2 Effects on Building Contents

People perceive vibration at levels well below those likely to cause damage to building contents. For most receivers, the human comfort vibration criteria are the most stringent and it is generally not necessary to set separate criteria for vibration effects on typical building contents.

Exceptions to this can occur when vibration sensitive equipment, such as electron microscopes, is located in buildings near to construction works. No receivers with vibration sensitive equipment have been identified in the area surrounding the proposal site and no further consideration of vibration sensitive equipment has been made.

3.4.3 Cosmetic Damage Vibration

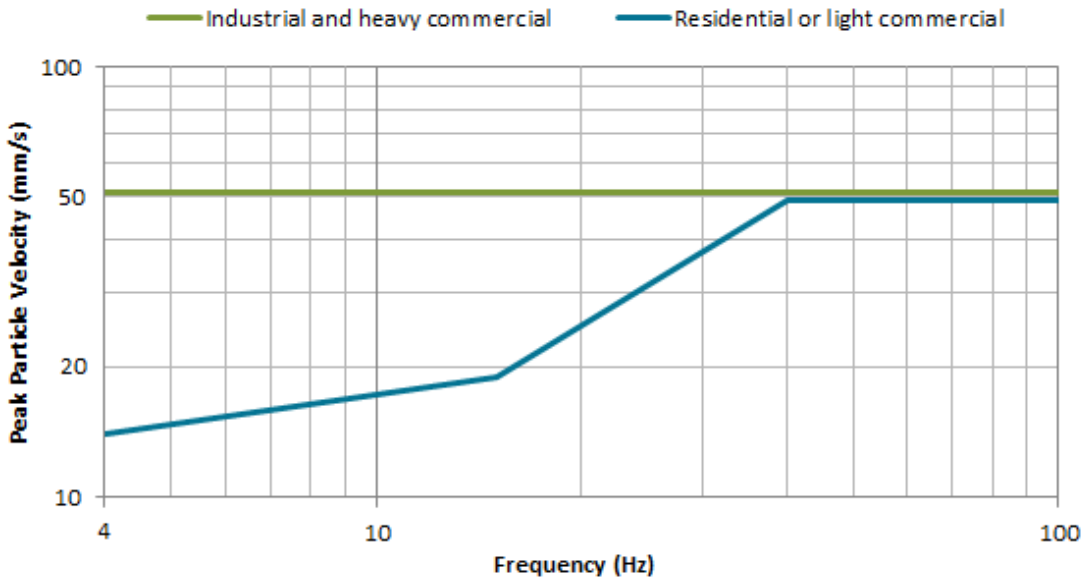
If vibration from construction works is sufficiently high it can cause cosmetic damage to elements of affected buildings. Examples of damage that can occur includes cracks or loosening of drywall surfaces, cracks in supporting columns and loosening of joints. The levels of vibration required to cause cosmetic damage tends to be at least an order of magnitude (10 times) higher than those at which people can perceive vibration.

Industry standard cosmetic damage vibration limits are contained in Australian Standard AS 2187-2, British Standard BS 7385 and German Standard DIN 4150, which are referenced in the Sydney Metro CNVS. Cosmetic damage vibration limits for residential and commercial buildings, heritage structures, and utilities are provided below.

3.4.3.1 General Cosmetic Damage Vibration Screening Criterion

The Sydney Metro CNVS recommends limits for transient vibration which correspond to minimal risk of cosmetic damage for residential and industrial buildings. The limits are shown in **Figure 2**.

Figure 2 Transient Vibration Values for Minimal Risk of Cosmetic Damage



The Sydney Metro CNVS notes that where dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in **Figure 2** may need to be reduced by up to 50 percent. On this basis, the Sydney Metro CNVS recommends the following conservative cosmetic damage screening limits shown in **Table 10**.

Table 10 Transient Vibration Values for Minimal Risk of Cosmetic Damage

Type of Building	Peak Particle Velocity[1]
Reinforced or framed structures. Industrial and heavy commercial buildings	25 mm/s
Unreinforced or light framed structures. Residential or light commercial type buildings	7.5 mm/s

Note 1: Cosmetic damage vibration limits are reduced by 50 percent to account for dynamic loading caused by continuous vibration dynamic magnification due to resonance.

3.4.3.2 Heritage Buildings and Structures

The Sydney Metro CNVS states that heritage buildings and structures should be assessed according to the cosmetic damage screening criteria in **Table 10** and should not be assumed to be more sensitive to vibration unless found to be structurally unsound.

Where heritage items are found to be structurally unsound, a more conservative cosmetic damage objective of 2.5 mm/s Peak Particle Velocity (PPV) (from DIN 4150) would be considered.

Sydney Metro West would complete condition surveys of potentially affected buildings and structures near to the proposal site area prior to the commencement of the works, where appropriate. Potentially affected buildings and structure would be determined based on the nature of works, distance of the building or structure to the works and predicted vibration levels. Consideration would also be given to recent condition survey information if suitable and available for the relevant building or structure.

For heritage buildings and structures the surveys would consider the heritage nature in consultation with a structural engineer to ensure suitably stringent vibration criteria are identified and sensitive heritage buildings and structures are adequately monitored and managed.

Based on currently available information, the only heritage building or structure identified to require the 2.5 mm/s cosmetic damage screening criterion is the former White Bay Power Station. This facility has several buildings, all of which have been assigned the 2.5 mm/s criterion.

3.4.3.3 Utilities and Other Vibration Sensitive Assets

Construction of the proposal could potentially affect other utilities and assets which may be particularly sensitive to vibration. Examples include pipelines, tunnels, fibre optic cable routes and high pressure gas pipelines.

German Standard DIN 4150 provides the guideline vibration limits for buried pipework shown in **Table 11**.

Table 11 DIN 4150 Guideline Values for Short-term Vibration on Buried Pipework

Line	Pipe Material	Guideline Values Vibration Velocity at the Pipe (mm/s)
1	Steel, welded	100
2	Vitrified clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80
3	Masonry, plastics	50

For other potentially affected assets, specific vibration limits should be determined on a case-by-case basis in consultation with the asset owner.

3.5 Operational Noise Guidelines

3.5.1 Noise Policy for Industry

The NPfI was released in 2017 and sets out the NSW Environment Protection Authority (EPA)'s requirements for the assessment and management of noise from industry in NSW.

Operational noise from the relocated truck parking area is considered a fixed source of industrial noise and requires assessment against the NPfI.

Trigger Levels

The NPfI describes 'trigger levels' which indicate the noise level at which feasible and reasonable noise management measures should be considered. Two forms of noise criteria are provided – one to account for 'intrusive' noise impacts and one to protect the 'amenity' of particular land uses.

- The **intrusiveness** of an industrial noise source is generally considered acceptable if the L_{Aeq} noise level of the source, measured over a period of 15 minutes, does not exceed the background noise level by more than 5 dB. Intrusive noise levels are only applied to residential receivers. For other receiver types, only the amenity levels apply
- To limit continual increases in noise levels from the use of the intrusiveness level alone, the ambient noise level within an area from all industrial sources should remain below the recommended **amenity** levels specified in the NPfI for that particular land use.

Proposal Specific Criteria

The Project Noise Trigger Levels (PNTLs) for industrial noise source from the proposal are shown in **Table 12**.

Table 12 PNTLs – Industrial Noise

NCA	Reference Monitoring Location	Type	Period	Measured Noise Level (dBA)		Project Noise Trigger Levels $L_{Aeq(15minute)}$ (dBA)	
				RBL[1]	$L_{Aeq(period)}$	Intrusive	Amenity [2,3]
NCA01	L02	Residential (suburban)	Daytime	51	57	56	53
			Evening	51	57[4]	56	45
			Night-time	45	54[4]	50	42
NCA02	L01	Residential (suburban)	Daytime	43	56	48	53
			Evening	43	54	48	43
			Night-time	35	47	40	38
NCA03	L03	Residential (suburban)	Daytime	48	59	53	53
			Evening	47	58[4]	52	46
			Night-time	39	51[4]	44	39
-	-	Commercial	When in use	-	-	-	65
-	-	Place of worship	When in use	-	-	-	40 (internal)

Note 1: RBL = Rating Background Level.

Note 2: The recommended 'amenity noise levels' have been reduced by 5 dB, where appropriate, to give the 'project amenity noise levels' due to other sources of industrial noise being present in the area.

Note 3: The 'project amenity noise levels' have been converted to a 15 minute level by adding 3 dB.

Note 4: The measured L_{Aeq} noise level was dominated by traffic noise and exceeds the recommended amenity noise level by 10 dB or more, therefore the 'high traffic project amenity noise level' is the existing $L_{Aeq(traffic)}$ noise level minus 15 dB.

3.5.2 Road Noise Policy

The NSW *Road Noise Policy* (RNP) is used to assess and manage potential airborne noise impacts from new and redeveloped road projects. The RNP provides non-mandatory criteria for residential and 'other sensitive' land uses. Where a project results in road traffic noise levels which are predicted to be above the criteria, feasible and reasonable noise mitigation measures should be investigated to minimise the impacts.

The RNP states when assessing impacts from road redevelopment projects and determining feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is barely perceptible to the average person.

4 Methodology

4.1 Construction Noise and Vibration Assessment

4.1.1 Airborne Noise Assessment

A noise model of the study area has been used to predict noise levels from the various construction sites to all surrounding receivers. The model uses ISO 9613 algorithms in SoundPLAN software to predict noise levels at external building facades and outdoor recreation areas.

Local terrain, receiver buildings and structures were digitised in the noise model to develop a three-dimensional representation of the proposal site area and surrounding areas.

4.1.1.1 Works Descriptions

Representative scenarios have been developed to assess the likely impacts from the various construction phases of the works. These scenarios are shown in **Table 13** together with a high level description of each works activity. The location of the various work scenarios are shown in **Figure 3**.

Some short-term works associated with implementing road traffic reconfigurations would be required to facilitate phases of the works and may need to be undertaken during weekend and/or during the night-time period to avoid disruption to the road network. Noise impacts from any short-term noisy works undertaken during out-of-hours works period would be managed in accordance with the requirements of the Sydney Metro CNVS, and have not been included as part of this assessment.

The assessment uses 'realistic worst-case' scenarios to determine the impacts from the noisiest 15-minute period that are likely to occur for each work scenario, as required by the ICNG. The impacts represent construction noise levels without mitigation applied.

The assessment is generally considered conservative as the calculations assume several items of construction equipment are in use at the same time within individual scenarios.

Non-noisy works which are unlikely to generate noise impacts at any surrounding receivers (such as line marking works on Solomons Way and Sommerville Road, or any other works scenarios that exclude the use of noisy equipment) have not been included in this assessment.

The proposal would generally be developed in two phases:

- Phase 1 would involve:
  - A reconfigured intersection at Port Access Road / Solomons Way / Sommerville Road, including an interim connection with the existing Port Access Road until it is relocated (as part of Phase 2).
  - Establishment of one-way traffic circulation along Solomons Way and Sommerville Road around the Glebe Island Silos.
  - Relocation of the Cement Australia Truck Parking Licenced Area to the north, prior to the construction of the reconfigured intersection.
- Phase 2 would involve:
  - Relocation of Port Access Road to the southwest. The relocated Port Access road would be tied into the reconfigured intersection (established in Phase 1) and the existing Port Access Road to the north.

Table 13 Construction Scenario Descriptions

Works Phase	Scenario[1]	Activity	Description
Phase 1	Site clearing	Vegetation Clearing	Existing features at the proposal site would require removal before the works can begin. Vegetation affected by the proposed activity would be removed and existing structures such as areas of concrete hardstand and jersey kerbs would require demolition/removal. Vegetation removal works would use chainsaws and wood chippers, which are noise intensive. Demolition works would also use noise intensive equipment, including concrete saws and rockbreakers during certain phases such as breaking out existing road base and hardstand.
		Demolition	
	Site establishment / site demobilisation	Fencing & compounds	Due to the historical industrial uses of the proposal site area, undesirable materials may be present within the proposal site. If identified, the material would be removed from the footprint of the work areas. *Site establishment* works would also include installation of boundary fencing and establishing the compound areas. The construction footprint as well as the plant and equipment used in the *Site establishment* scenario would also be used for site demobilisation and the potential noise impacts from these activities are anticipated to be similar. These works are not expected to require any noise intensive equipment.
		Land remediation (if required)	
	Truck parking reconfiguration	Road base & paving	The existing Cement Australia truck parking area requires relocation. The works required to establish the new parking area would include minor works for kerb and guttering, driveway crossovers, drainage, lighting and line marking. These works are not expected to require noise intensive equipment.
		Concreting	
	Intersection modifications	Road base & paving	Road relocation and intersection configuration works would involve importing and placing of suitable road base material, and paving of the new road surface. Concreting works would also be required to form the new road alignment. These works are not expected to require noise intensive equipment.
		Concreting	
Phase 2	Port Access Road relocation	Road base & paving	
		Concreting	

Note 1: Equipment lists for each scenario and Sound Power Level data are provided in **Appendix C**.

Figure 3 Construction Works Locations

Working Hours

The works would be carried out during Standard Construction Hours. Standard Construction Hours are defined in the ICNG as:

- 7 am to 6 pm Monday to Friday
- 8 am to 1 pm Saturdays
- No work on Sundays or public holidays.

While the majority of the construction site activities would be carried out during Standard Construction Hours, some short-term works associated with implementing road traffic reconfigurations may need to be undertaken during weekend and/or during the night-time period to avoid disruption to the road network. Justification for out-of-hours works of this nature is provided in the ICNG along with the following activities:

- The **delivery of oversized equipment or structures** that require special arrangements to transport on public roads
- **Emergency work** to avoid the loss of life or damage to property, or to prevent environmental harm
- **Maintenance and repair of public infrastructure** where disruption to essential services and/or considerations of worker safety do not allow work within standard hours

- **Public infrastructure works** that shorten the length of the project and are supported by the affected community
- Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

Noise impacts from any noisy works undertaken during out-of-hours works period would be managed in accordance with the requirements of the Sydney Metro CNVS.

Works Schedule

Subject to planning approval, the works are planned to start in late 2020 with peak construction occurring in 2021. The indicative construction program is shown in **Table 14**.

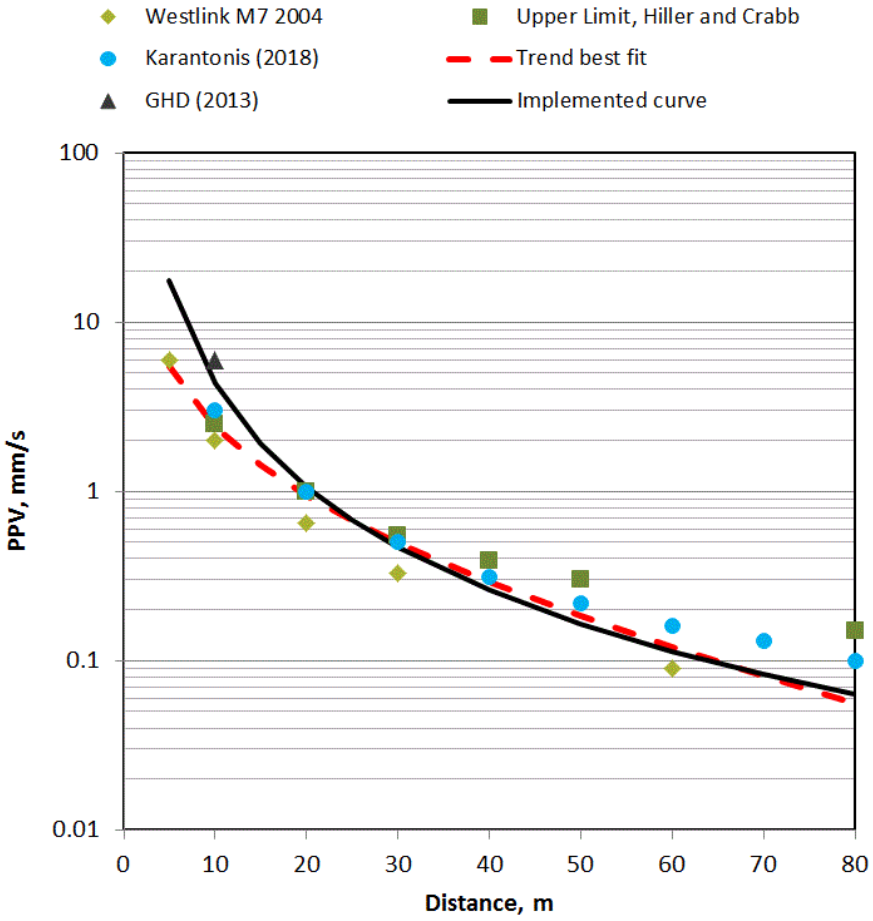
Table 14 Indicative Construction Schedule

Activity	2020												2021											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Phase 1																								
Site establishment																								
Site clearing																								
Truck parking reconfiguration																								
Intersection modifications																								
Phase 2																								
Port Access Road relocation																								

4.1.2 Construction Vibration

The potential impacts during vibration intensive works have been assessed assuming a rockbreaker could be used anywhere within the proposal site area (see **Figure 3**) during *Site clearing – demolition*. The PPV levels from a rockbreaker are shown in **Figure 4**. Reference information sources are provided for comparison.

Figure 4 Modelled Levels versus Distance for Rockbreakers – PPV



4.2 Operational Noise Assessment

The proposal would realign sections of Solomons Way, Sommerville Road and the Port Access Road as well as relocate the existing Cement Australia truck parking area to be around 40 metres to the north-east, as shown in **Figure 5**.

The area surrounding the proposal site area is commercial/industrial and is around 25 metres to the north of the Western Distributor/Anzac Bridge. The nearest residential receivers are generally distant from the proposed operational changes.

Figure 5 Road and Parking Area Relocation

4.2.1 Operational Road Traffic Noise Assessment

A qualitative assessment of the potential changes to operational noise impacts at the nearest receivers from the proposed road reconfigurations has been completed by comparing the position of the new road alignment to the existing roads.

It is noted that the realignment would not alter the traffic volumes on the Port Access Road or surrounding roads.

4.2.2 Industrial Noise Assessment

A qualitative assessment of the potential operational noise impacts from the relocation of the Cement Australia truck parking area has been completed by comparing the position of the new parking area to the existing parking area.

It is noted that the relocation would not alter the number of trucks accessing the parking area nor the time in which truck movements occur.

5 Impact Assessment

5.1 Construction Noise and Vibration Assessment

5.1.1 Construction Airborne Noise

The following overview is based on the predicted impacts at the most affected receivers and is representative of the worst-case situation where construction equipment is at the closest point to each receiver.

The assessment shows the predicted impacts based on the exceedance of the management levels, as per the categories in **Table 15**. The likely subjective response of people affected by the impacts is also shown in the table, noting that the subjective response would vary and depends on the period in which the impacts occur (i.e. people are generally less sensitive to impacts during the daytime and more sensitive in the evening and night-time).

Table 15 Exceedance Bands and Corresponding Subjective Response to Impacts

Exceedance of Management Level	Likely Subjective Response	Impact Colouring
No exceedance	No impact	
1 to 10 dB	Minor to marginal	
11 dB to 20 dB	Moderate	
>20 dB	High	

The predicted construction airborne noise impacts are presented for the most affected receivers. Receivers which are further away from the works and/or shielded from view would have substantially lower impacts. The assessment is generally considered conservative as the calculations assume several items of construction equipment are in use at the same time within individual scenarios.

A summary of the predicted construction airborne noise levels (without additional mitigation) in each NCA for the various construction activities is shown in **Table 16** for residential, commercial, and 'other sensitive' receivers. The number of predicted NML exceedances in the above exceedance bands is shown in **Table 17** for the various receiver types in the study area. A breakdown of the various 'other sensitive' receiver types is also presented in **Table 18**.

The noise levels presented in this report are based on a realistic worst-case assessment of each works scenario. For most construction activities, it is expected that the construction noise levels during less intensive activities would frequently be lower than predicted.

Table 16 Predicted Worst-Case Airborne Noise Impacts from Surface Sites - All Works and All NCAs

NCA	NML (dBA)	Predicted Worst-case $L_{Aeq(15minute)}$ Noise Level (dBA)[1]																											
		Site clearing						Site establishment						Truck parking reconfiguration						Intersection modifications						Port Access Road relocation					
		'Typical'			'Peak'			'Typical'			'Peak'			'Typical'			'Peak'			'Typical'			'Peak'			'Typical'			'Peak'		
		Vegetation clearing			Demolition			Fencing & compounds			Land remediation			Road base & paving			Concreting			Road base & paving			Concreting			Road base & paving			Concreting		
Residential – Daytime																													
NCA01	61	58	to	67	62	to	71	37	to	46	46	to	55	46	to	47	45	to	46	47	to	50	46	to	49	47	to	55	46	to	54
NCA02	53	60	to	69	64	to	73	39	to	48	48	to	57	52	to	52	52	to	52	49	to	51	48	to	50	48	to	57	47	to	56
NCA03	58	38	to	59	42	to	63	<30	to	38	<30	to	47	<30	to	<30	<30	to	<30	37	to	44	36	to	43	37	to	47	36	to	46
Commercial																													
NCA01	70	56	to	62	60	to	66	35	to	41	44	to	50	42	to	43	42	to	43	44	to	48	43	to	47	44	to	50	43	to	49
NCA02	70	62	to	79	66	to	83	41	to	58	50	to	67	52	to	54	52	to	54	50	to	54	49	to	53	50	to	67	49	to	66
NCA03	70	51	to	63	55	to	67	30	to	42	39	to	51	40	to	41	40	to	41	39	to	46	38	to	45	39	to	51	38	to	50
Other Sensitive[1]																													
NCA01	-	45	to	60	49	to	64	<30	to	39	33	to	48	42	to	42	42	to	42	43	to	48	42	to	47	33	to	48	32	to	47
NCA02	-	61	to	77	65	to	81	40	to	56	49	to	65	48	to	50	48	to	50	49	to	54	48	to	53	49	to	65	48	to	64
NCA03	-	35	to	55	39	to	59	<30	to	34	<30	to	43	<30	to	<30	<30	to	<30	<30	to	39	<30	to	38	<30	to	43	<30	to	42

Note 1: NMLs and NML exceedance shading not provided for other sensitive receivers as the NMLs differ depending on the receiver type (see **Section 3.2.2**)

Legend
No Exceedance | 1 - 10 dB above NML | 11 - 20 dB above NML | >20 dB above NML

Table 17 Overview of NML Exceedances - Standard Daytime Construction Hours

Scenario	Activity	No. Weeks[1]	Activity Duration within Overall Proposal Program[2]				Number of Receivers									
							Total	HNA[3]	With NML Exceedance[4]							
									All Receiver Types			Residential			Commercial and Other Sensitive		
			20 %	40 %	60 %	80 %			1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
Site clearing	Vegetation clearing	2					1125	-	498	11	1	479	11	-	19	-	1
	Demolition	2					1125	-	665	85	1	648	78	-	17	7	1
Site establishment	Fencing & compounds	2					1125	-	1	-	-	-	-	-	1	-	-
	Land remediation	20					1125	-	5	-	-	4	-	-	1	-	-
Truck parking reconfiguration	Road base & paving	20					1125	-	-	-	-	-	-	-	-	-	-
	Concreting	20					1125	-	-	-	-	-	-	-	-	-	-
Intersection modifications	Road base & paving	24					1125	-	-	-	-	-	-	-	-	-	-
	Concreting	24					1125	-	-	-	-	-	-	-	-	-	-
Port Access Road relocation	Road base & paving	20					1125	-	3	-	-	2	-	-	1	-	-
	Concreting	20					1125	-	2	-	-	1	-	-	1	-	-

Note 1: Durations should be regarded as indicative and represent a typical worksite. The duration of these impacts is less than the overall duration, and depends on the rate of progress in the works areas.
Note 2: Approximate percentage (rounded to the nearest 10 percent) of activity duration within overall proposal program.
Note 3: Highly Noise Affected, based on ICNG definition (i.e. predicted $L_{Aeq(15minute)}$ noise at residential receiver is 75 dBA or greater).
Note 4: Based on worst-case predicted noise levels.

Table 18 Overview of Commercial and 'Other Sensitive' Receiver NML Exceedances

Scenario	Activity	No. Weeks[1]	Number of Receivers														
			Commercial			Child care			Educational			Passive Recreation			Place of Worship		
			1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
Site clearing	Vegetation clearing	2	8	-	-	6	-	-	2	-	-	1	-	-	2	-	1
	Demolition	2	10	2	-	1	5	-	3	-	-	1	-	-	2	-	1
Site establishment	Fencing & compounds	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
	Land remediation	20	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Truck parking reconfiguration	Road base & paving	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concreting	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Intersection modifications	Road base & paving	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concreting	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Port Access Road relocation	Road base & paving	20	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
	Concreting	20	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-

The above assessment shows that:

- The construction works are generally predicted to result in 'minor' or compliant worst-case noise impacts at the nearest receivers during most scenarios. 'Moderate' and 'high' worst-case impacts are, however, predicted at the nearest receivers during *Site clearing – Vegetation clearing* and *Site works – Demolition.* These are the first works that would occur at the proposal site, would occur for a short duration of around two weeks, and require the use of noise intensive equipment, such as chainsaws, chippers, concrete saws and rockbreakers, during certain phases.
- The worst-case impacts during the remaining works are predicted to be substantially lower, with most works resulting in compliant noise levels or 'minor' impacts at a few receivers.
- Worst-case noise levels at the closest commercial receivers are predicted to be around 83 dBA during use of noise intensive equipment such as chainsaws, chippers, concrete saws and rockbreakers. Worst-case noise levels at residential receivers are predicted to be up to 73 dBA.
- Noise intensive equipment is expected to only be required for relatively short durations, typically at the start of the works during *Site clearing*.
- Certain 'other sensitive' receivers are predicted to be impacted during *Site clearing* and some of the other noisier works. These are of short duration and include:
    - 'High' impacts at C3 Church Rozelle.

- 'Moderate' impacts at two commercial/industrial receivers (at the former White Bay Power Station and the industrial estate to the north of Robert Street), some Inner Sydney Montessori School Child Care buildings and Rosebud Cottage Child Care.
- 'Minor' impacts at Sydney Community College, St Joseph's Catholic Church and ANZAC Bridge Park.

The worst-case impacts from all scenarios are shown in **Figure 6**. These highest impacts are expected to generally occur for a short period of around two weeks during *Site clearing*. The worst-case impacts for all scenarios excluding S*ite clearing* are shown in **Figure 7**.

Figure 6 Worst-case NML Exceedances - All Construction Scenarios

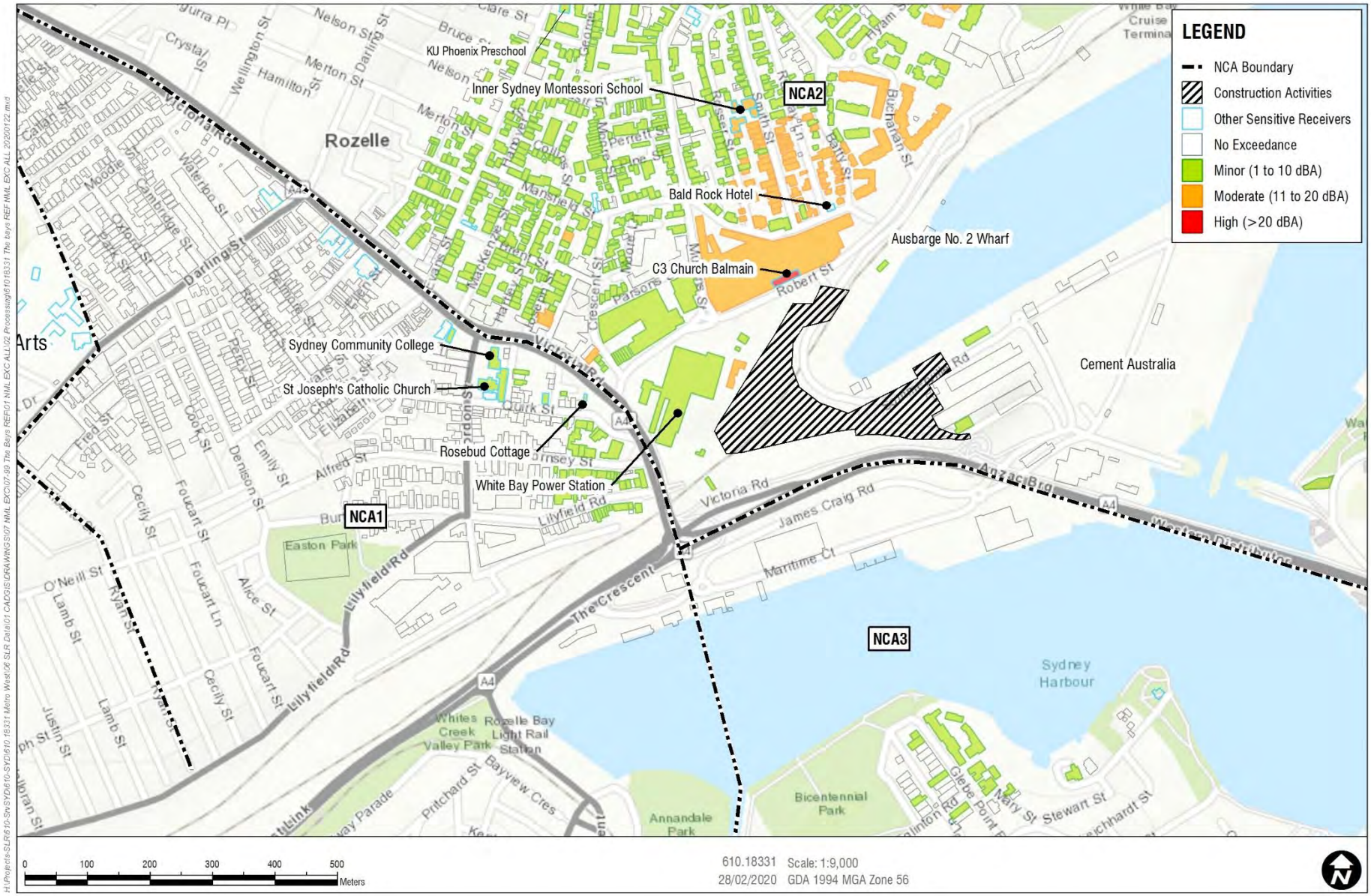
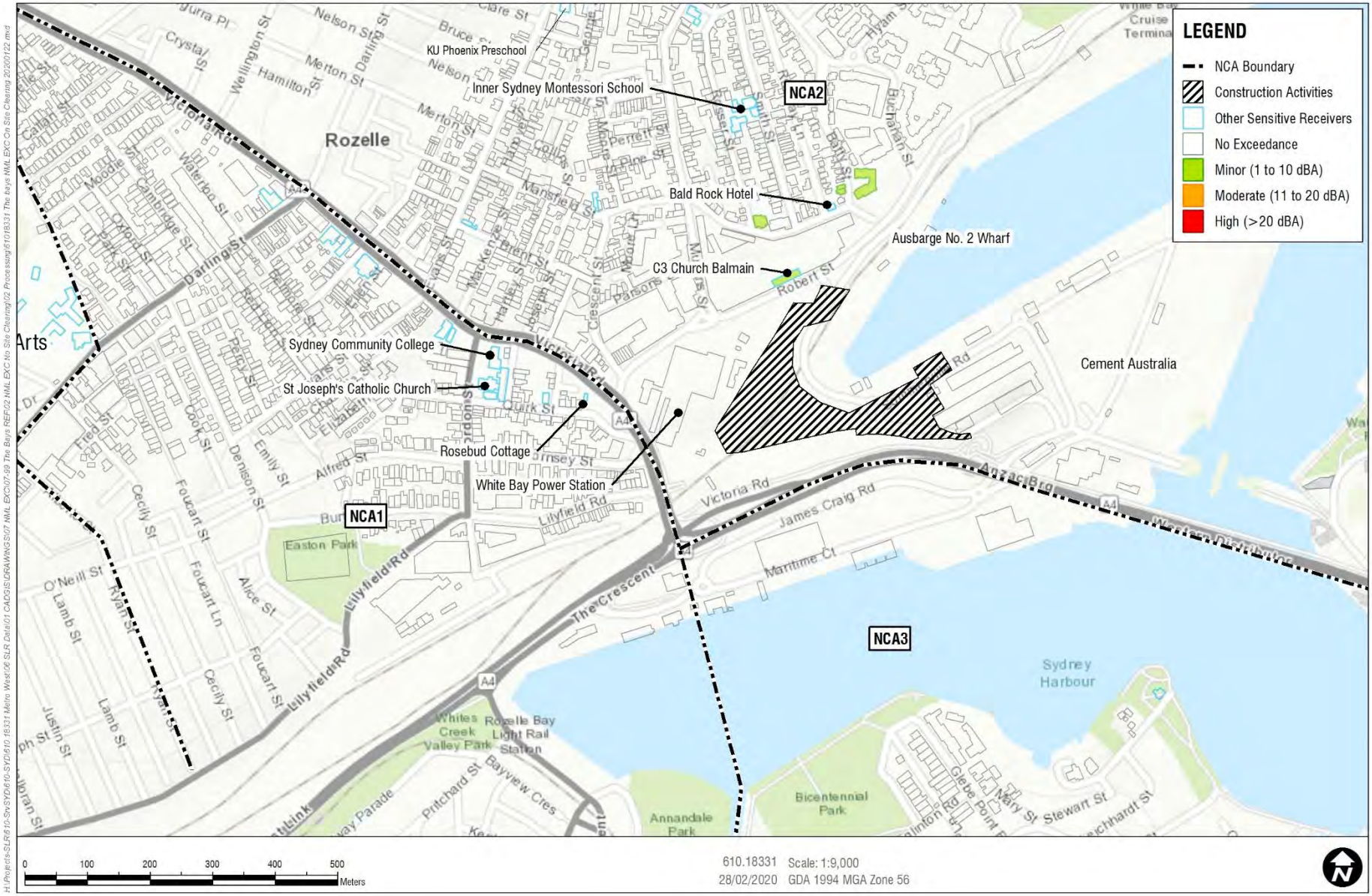


Figure 7 Worst-case NML Exceedances - All Construction Scenarios Excluding Site Clearing



Individual receivers would be subject to a range of impacts, depending on how far from the works they are. The highest impacts would be expected when works are nearby and are generally much lower when works are further away, due to the increased separation distance.

The impacts presented above are based on all equipment working simultaneously in each assessed scenario. There would be periods when construction noise levels are much lower than the worst-case levels predicted and there would be times when no equipment is in use and no NML exceedances occur.

The proposed noise mitigation measures for construction airborne noise impacts are discussed in **Section 7.1**.

5.1.2 Construction Vibration

Vibration intensive equipment is proposed during the demolition works activity (site clearing works scenario) which includes the use of a rockbreaker. This piece of vibration intensive equipment could be used anywhere within the construction footprint presented in **Figure 8** and is considered the greatest risk for vibration impacts.

The predicted vibration impacts in each NCA during use of a rockbreaker are shown in **Table 19** for all receiver types and are assessed against the applicable human comfort and cosmetic damage criteria, with the number of criteria exceedances presented.

The predictions represent the likely highest vibration levels at nearby sensitive structures during the use of vibration intensive equipment in operation at the closest point to the building.

Table 19 Overview of Construction Vibration Exceedances – All Receiver Types

NCA	Number of Receivers With Vibration Criteria Exceedance[1]		
	Cosmetic Damage	Human Comfort	
	Day / Night	Day	Night[2]
NCA01	-	-	-
NCA02	3	4	-
NCA03	-	-	-

Note 1: Based on worst-case predicted vibration levels.

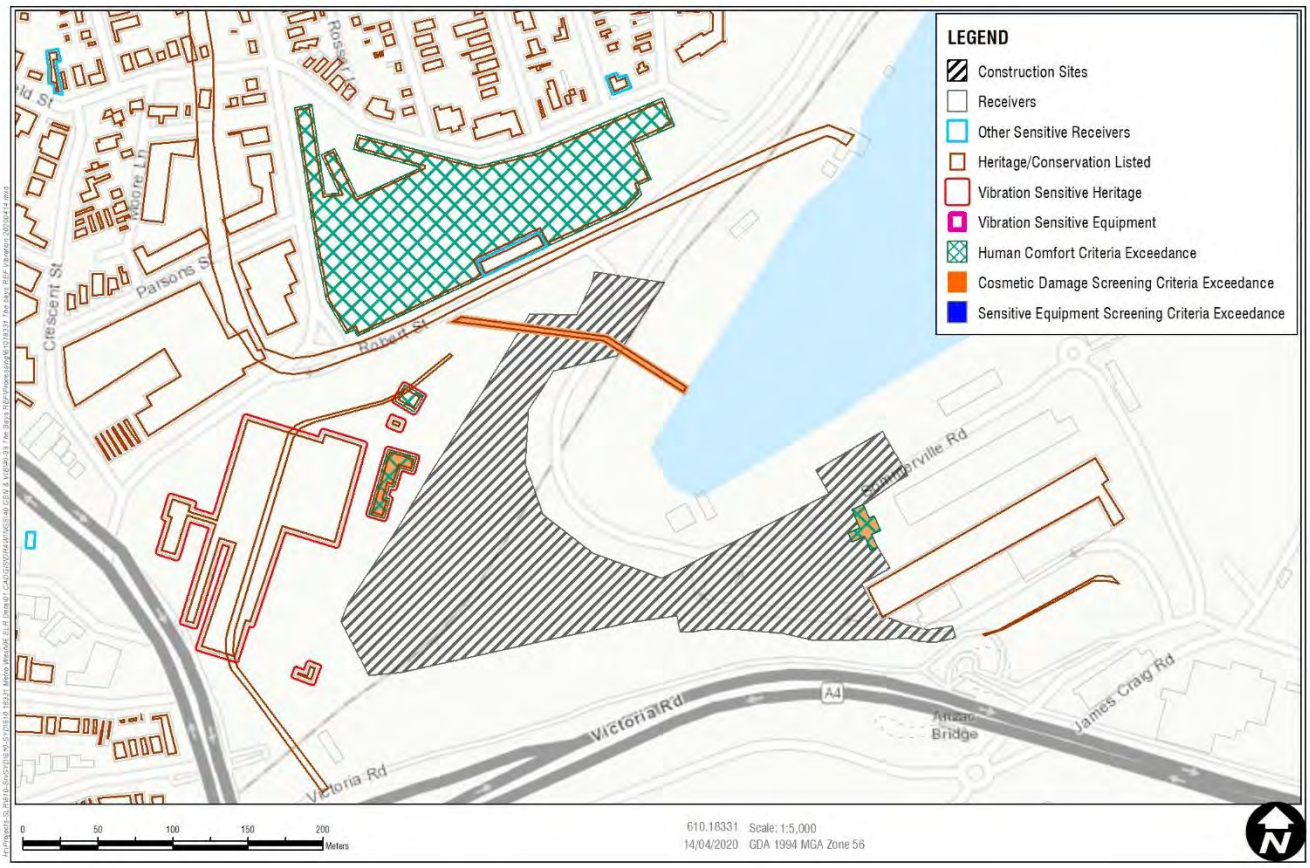
Note 2: Works included in this assessment are scheduled during the daytime period only (see **Section 4.1.1.1**)

The above assessment shows that:

- The distance from the works to the nearest receivers/structures is typically sufficient for vibration impacts during vibration intensive works to generally be minimal. Exceedances of the cosmetic damage screening criteria are, however, predicted at:
    - The closest building in the former White Bay Power Station Site and at the closest building on the Gypsum Resources Australia complex. Demolition works associated with the Site clearing works scenario may be performed as close as four metres from these buildings
    - One heritage listed underground canal structure crossing the construction site between the former White Bay Power Station and the bay.
- Exceedances of the human comfort criteria are also predicted at the nearest four commercial/industrial receivers, including:
    - Two buildings at the former White Bay Power Station
    - The closest lots in the Robert Street commercial warehouses
    - The western-most building at Gypsum Resources Australia.
- The worst-case vibration impacts from the works may therefore be perceptible at times at these receivers, however, the White Bay Power Station and the western-most Gypsum Resources Australia building are not occupied.
- Rockbreakers are only required at part of the initial works during the *Site clearing – Demolition*. No other scenarios are expected to require vibration intensive equipment.

The location of human comfort and cosmetic damage criteria exceedances are shown in **Figure 8**.

Figure 8 Predicted Human Comfort and Cosmetic Damage Criterion Exceedances



Exceedances of the cosmetic damage screening criteria at the closest building in the former White Bay Power Station are predicted when a rockbreaker is used within around 15 metres of the structure. If smaller sized rockbreakers are used, it may be possible for the works to be closer. Vibration monitoring would be required to check the cosmetic damage criteria is not exceeded when works are near structures.

With the exception of the heritage listed underground canal structure outlined above, this assessment does not consider potential vibration impacts to underground utilities or services as the location of these items is currently unknown. The potential vibration impacts to these items should be reviewed as the proposal progresses in consultation with the asset owners, using the utility vibration criteria in **Section 3.4.3.3**.

5.2 Operational Noise Assessment

The proposal would realign existing sections of Solomons Way, Sommerville Road and the Port Access Road as well as relocate the existing Cement Australia truck parking area to be around 40 metres to the north-east, as shown in **Figure 5**. It is noted that the proposal does not result in any changes to the volume or timing of traffic accessing the site in the operational phase.

The area surrounding the proposed new site is commercial/industrial and is around 25 metres to the north of the Western Distributor/Anzac Bridge.

The relocation of the existing Port Access Road and truck parking area is expected to have a negligible impact on the nearest receivers due to:

- The nearest sensitive receivers to the relocated road are over 120 metres to the north and 180 metres to the west. There are also large industrial buildings and topographic features screening these receivers from noise generated by the relocated roads.
- The residential receivers nearest the relocated parking area are over 280 metres to the north.
- The receivers nearest the relocated road and parking area are close to Victoria Road and Anzac Bridge/Western Distributor, and are already subject to high levels of existing road traffic noise. Noise levels at these receivers would be dominated by the much closer Victoria Road and/or the Western Distributor, and the comparatively small contribution from the proposed relocations is not expected to alter the already high existing noise levels.
- Commercial/industrial receivers to the immediate north and west of the site which would potentially be impacted by noise from the parking area and road relocations would likely already have high acoustic performance building constructions (such as acoustic windows and doors) to mitigate the high existing noise levels.
- Operation of the proposal not change the vehicle numbers or the time that vehicles operate on the network.

6 Cumulative Impacts

Cumulative construction impacts can occur where multiple works are being completed near to a particular location at the same time concurrently or if more than one project or proposal occurs in the same area consecutively.

6.1 Nearby Developments

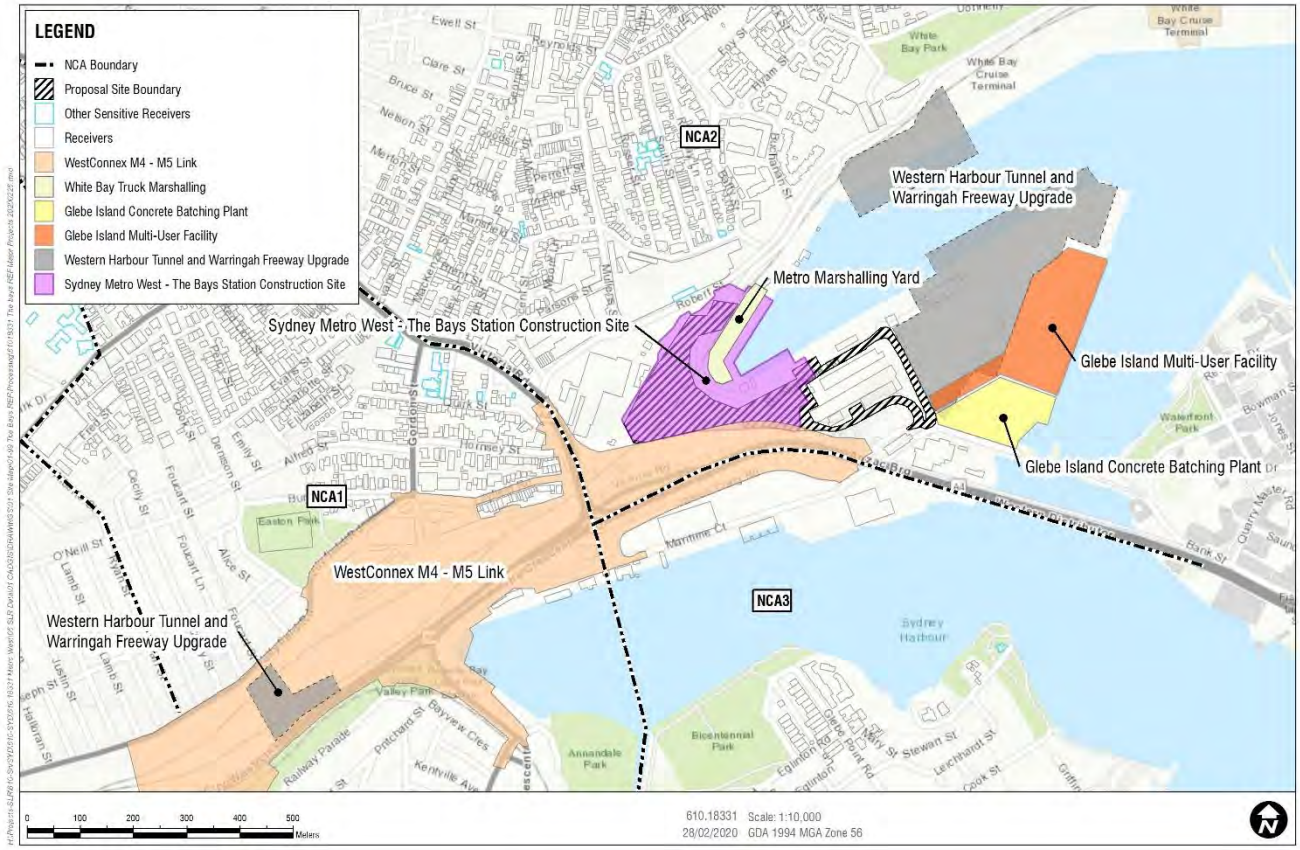
The proposal site is near to a number of major projects that have recently been constructed or are currently under construction. These projects are listed in **Table 20** and their locations are shown in **Figure 9**.

Table 20 Nearby Major Developments

Project	Details
WestConnex M4–M5 Link *Approved*	The Rozelle interchange and Iron Cove Link are part of WestConnex M4–M5 Link. The interchange in Rozelle will be mostly underground and is located at the site of the old Rozelle Rail Yards, which is located to the west of the proposal site. Construction of Stage one began in late 2018 and is due for completion in late-2022. Stage two also began in late 2018 and is planned for completion in late-2023.
Western Harbour Tunnel and Warringah Freeway Upgrade *Proposed*	Transport for NSW is proposing to construct a new tunnel from the Rozelle Interchange, under Sydney Harbour to the Warringah Freeway. Upgrades to the Warringah Freeway are also proposed. Construction sites would be located at the Rozelle Rail Yards and White Bay. The project is currently in the planning stages with construction planned to begin in late 2020 and be complete in early 2026.
Sydney Metro City & Southwest (Chatswood to Sydenham), White Bay truck marshalling yard *Approved*	Sydney Metro has established a truck marshalling yard at White Bay for the Sydney Metro City & Southwest project that is currently operational. The truck marshalling yard is expected to cease operation prior to the commencement of the proposal works.
Glebe Island Multi-User Facility *Approved*	The Port Authority of NSW are proposing the construction of a multi-user facility for the import, storage and distribution of dry bulk materials at Glebe Island. The project was approved in 2019 and construction is anticipated to commence in mid-2020.
Glebe Island Concrete Batching Plant *Proposed*	The Glebe Island Concrete Batching Plant will supply concrete and aggregate to a range of concrete intensive projects around Central Sydney using Glebe Island Berth 1. The construction program for this project is not currently known.
Sydney Metro West Concept and Stage 1 - The Bays Station construction site *Proposed*	Sydney Metro West would involve the construction and operation of a metro rail line around 24 kilometres long between Westmead and Sydney CBD. Stage 1 seeks approval for the major civil construction work between Westmead and The Bays. Components of Sydney Metro West relevant to this assessment includes The Bays Station construction site and future station which is located within parts of the proposal site. The proposal would be completed prior to the commencement of activities associated with Stage 1 of Sydney Metro West. Stage 1 of Sydney Metro West would also include the launch and support of two tunnel boring machines westward from The Bays Station. Stage 1 works at The Bays are anticipated to be carried out between quarter four 2021 and quarter two 2024.

Concurrent construction noise impacts may occur if construction of Western Harbour Tunnel and Warringah Freeway Upgrade and WestConnex M4–M5 Link is carried out at the same time as the proposal. There is also potential for consecutive impacts if certain receivers are affected by construction noise from two or more of the above projects/proposals occurring in succession near an area.

Figure 9 Other Major Construction Projects



6.2 Concurrent Construction Noise Impacts

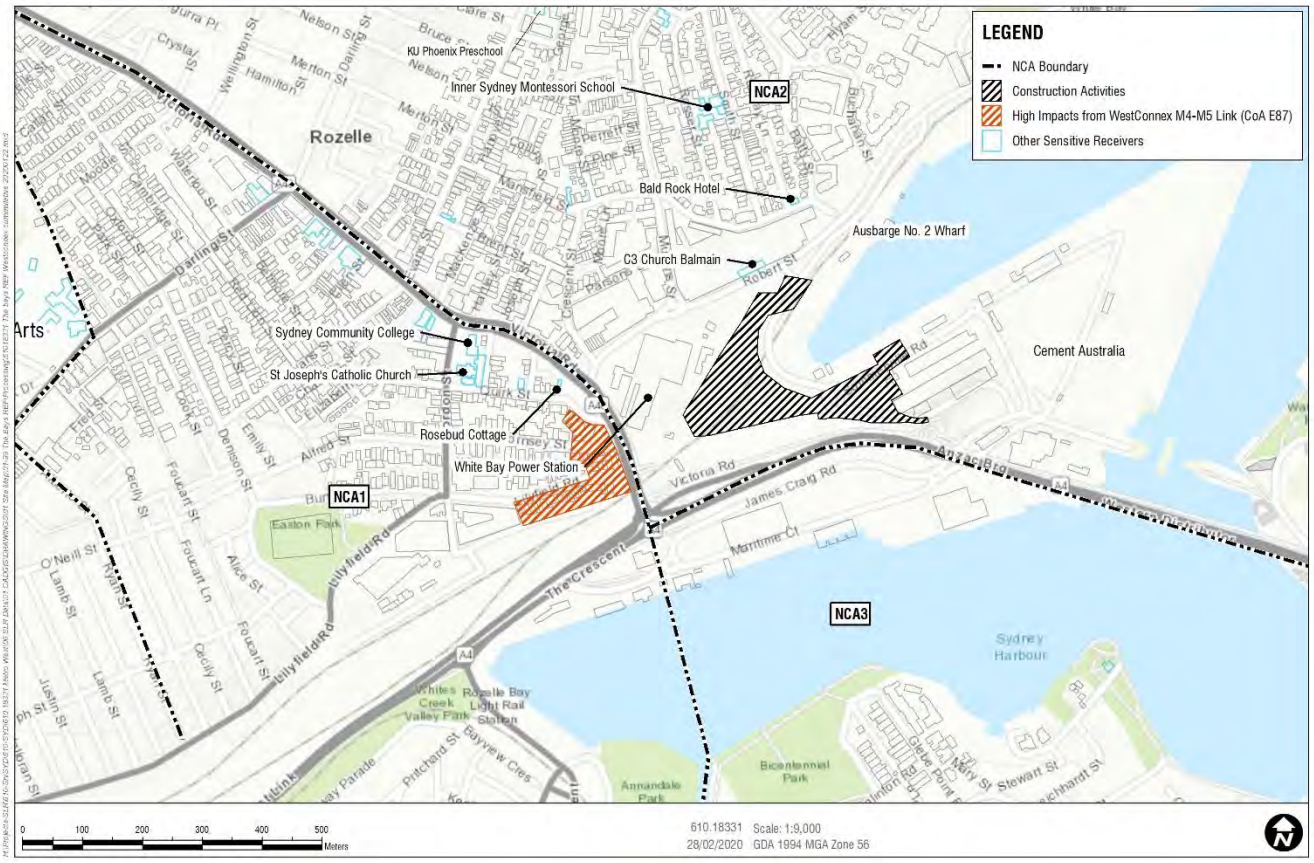
Concurrent construction noise impacts can occur where multiple works are being completed near to a particular receiver at the same time.

WestConnex M4-M5 Link

Works for WestConnex M4-M5 Link are currently being completed at Rozelle Interchange meaning works may occur at the same time as the proposal is being constructed and potentially impact receivers near the intersection of Victoria Road and The Crescent (in NCA01).

The Conditions of Approval for WestConnex M4-M5 Link identified areas of receivers near that project that are likely to be impacted by long-term, high impact works (in Condition E87). One area is along Victoria Road and is located between WestConnex M4-M5 Link and the proposal site area. The location is shown in **Figure 10**.

Figure 10 WestConnex M4-M5 Link – High Impact Location



Reference to the predictions in **Section 5.1** show that the proposal would only result in 'minor' worst-case daytime impacts at receivers near to the area identified in **Figure 10**. These impacts would occur during *Site clearing – Vegetation clearing* and *Site clearing – Demolition* works when noise intensive equipment is in use, such as chainsaws, chippers, concrete saws and rockbreakers.

Noise intensive equipment is expected to only be required for a relatively short duration of the proposal, typically at the start of *Site clearing* works. Noise levels in this area when noise intensive equipment is not in use are expected to comply with the management levels.

On this basis, the potential concurrent impacts from the proposal and WestConnex M4-M5 Link works are considered minimal. If works were occurring on both projects at the same time near this area, construction noise levels at these receivers would generally be controlled by the much closer WestConnex M4-M5 Link works.

Western Harbour Tunnel and Warringah Freeway Upgrade

Western Harbour Tunnel and Warringah Freeway Upgrade would include the White Bay construction support site and the Rozelle Rail Yards construction support site which are to the north-east and south-west of the proposal construction site respectively, as shown in **Figure 9**. The Rozelle Rail Yards construction support site is within the footprint for the Rozelle Interchange, which forms part of the M4-M5 Link site and is over 800 metres to the south-west of the proposal site and sufficiently far for concurrent impacts to be unlikely at receivers surrounding the proposal. The White Bay construction support site is, however, only 400 metres to the north-east of the proposal construction site and noise from works at this site may affect receivers impacted by the proposal.

The highest impacts during works at the White Bay construction support site are expected to occur during spoil handling activities which would be undertaken during Standard Construction Hours[1]. 'Minor' noise impacts from the Western Harbour Tunnel and Warringah Freeway Upgrade works are predicted at receivers to the north of Robert Street in Rozelle, between Rumsay Street and Stephen Street, and also at receivers to east of the site across White Bay in Pyrmont.

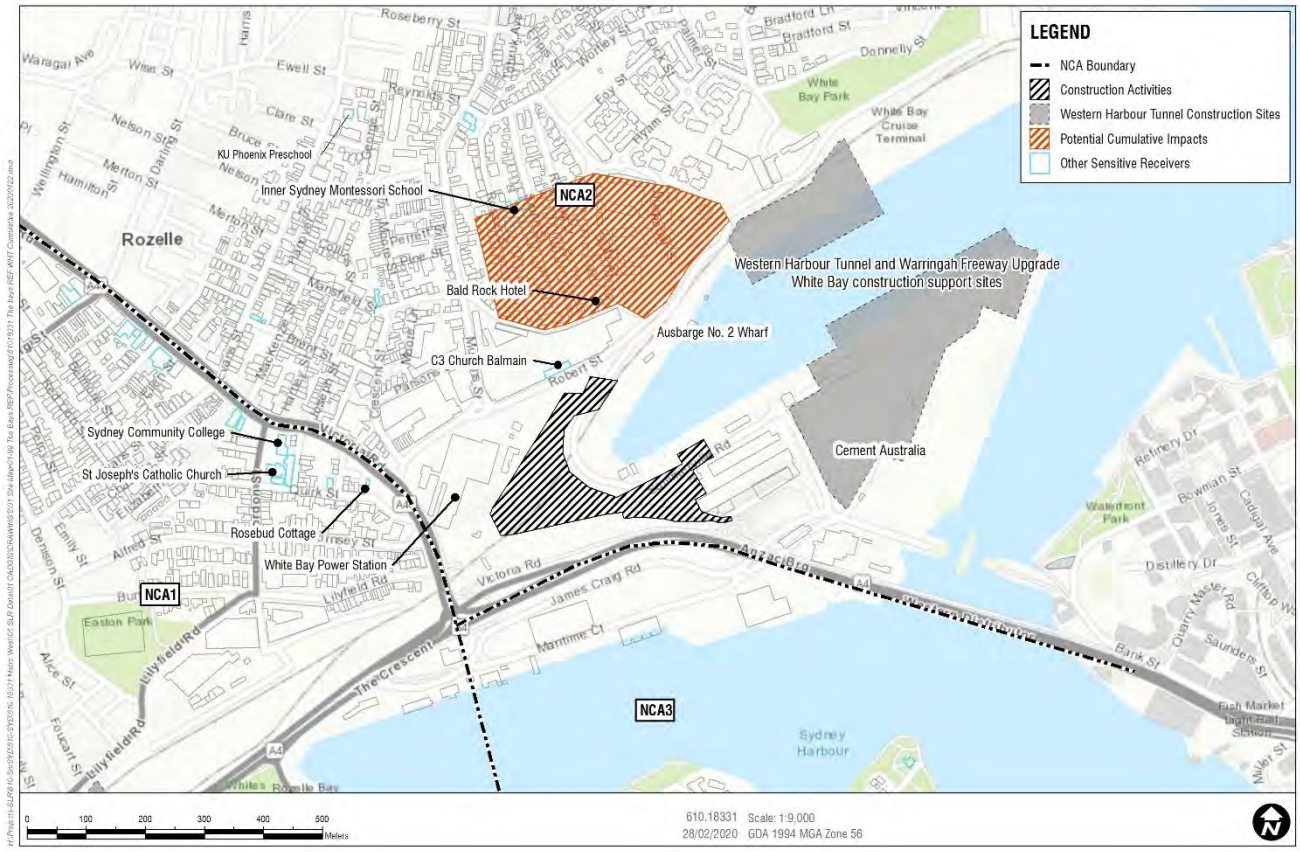
Reference to the predictions in **Section 5.1.1** show that the proposal works not involving noise intensive equipment would also result in 'minor' worst-case daytime NML exceedances at receivers impacted by Western Harbour Tunnel and Warringah Freeway Upgrade works to the north of the proposal site. For proposal works involving rockbreakers, noise levels at the surrounding receivers would generally be dominated by the proposal works meaning concurrent impacts are unlikely.

On this basis, concurrent impacts from the proposal and Western Harbour Tunnel and Warringah Freeway Upgrade works may occur at receivers situated between both sites as shown in **Figure 11**. Concurrent construction works on both projects (not involving the proposal noise intensive works) could theoretically increase the noise levels in this report by around 3 dB (ie a logarithmic adding of two sources of noise at the same level). This may result in 'minor' standard daytime NML exceedances at some receivers in this area that were previously predicted to be compliant, along with marginally higher 'minor' NML exceedances at some receivers already predicted to have exceedances.

The likelihood of worst-case noise levels being generated by two different projects at the same time is, however, considered low. Rather than increase construction noise levels, the impact of concurrent works in this area would generally be expected to be an increase in the duration and potential annoyance of noise impacts at the nearest receivers.

[1] *Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement – Appendix G*, Roads and Maritime, 2020.

Figure 11 Western Harbour Tunnel and Warringah Freeway Upgrade – Potential Concurrent Impacts



Glebe Island Multi-User Facility and Glebe Island Concrete Batching Plant

Construction works for the Glebe Island Multi-User Facility are anticipated to begin in mid-2020 and would overlap with the proposal. The worst-case construction noise levels for this project are predicted to comply with the NMLs at the potentially most affected receivers in Rozelle and produce minor NML exceedances of less than 2 dB at the potentially most affected receivers in Glebe[2].

The construction timing for the Glebe Island Concrete Batching Plant has not been defined at this stage, however, it is possible that it could overlap with the proposal. The worst-case construction noise levels for this project are predicted to comply with the NMLs at the potentially most affected receivers in Rozelle and Glebe[3].

Construction noise from the two Glebe Island projects is not predicted to produce substantial NML exceedances at receivers that are potentially impacted by the proposal. On this basis, the potential concurrent impacts from the proposal and these Glebe Island projects works are considered minimal. If works were occurring on both projects at the same time near this area, construction noise levels at these receivers would generally be controlled by the proposal.

[2] Glebe Island Multi-User Facility Review of Environmental Factors, Appendix D
[3] Glebe Island Concrete Batching Plant Environmental Impact Statement, Appendix D

6.3 Consecutive Construction Noise Impacts

In addition to concurrent impacts, if more than one project occurs in the same area consecutively, there may be a prolonged effect from the extended duration of construction noise impacts. This effect is termed 'construction fatigue'.

Mitigation measures aimed at short-term construction works may be less effective where receivers are affected by longer duration impacts from several projects. Where receivers are affected by 'construction fatigue', it may be necessary to consider specific mitigation and management measures to minimise the impacts.

The area with the greatest potential to be affected by consecutive construction noise impacts is located between the proposal site and WestConnex M4-M5 Link site as identified in **Figure 10**. In this area consecutive construction noise impacts are anticipated through the construction of the proposal, Sydney Metro West, Sydney Metro City & Southwest White Bay truck marshalling yard and WestConnex M4-M5 Link projects.

Similar to the discussion regarding concurrent impacts in this location, the proposal is expected to negligibly influence consecutive construction impacts for most receivers in the study area as the proposal only results in 'minor' worst-case impacts during *Site clearing*, which would occur for a relatively short duration at the start of the construction works. The proposal is scheduled to occur at the same time as construction of WestConnex M4-M5 Link and is, therefore, not expected to extend the duration of construction noise impacts in this region.

7 Management of Impacts

7.1 Construction Impacts

The ICNG acknowledges that due to the nature of construction works it is inevitable that there will be impacts where construction is near sensitive receivers. Where exceedances of the noise and vibration management levels are predicted, the following mitigation and management measures should be applied, where feasible and reasonable.

7.1.1 Standard Mitigation Measures

The Sydney Metro CNVS contains a number of 'standard mitigation measures' for mitigating and managing construction impacts on Sydney Metro projects/proposals. The measures are shown in **Appendix D** and would be applied to the works where feasible and reasonable.

7.1.2 Additional Noise Mitigation Measures

Where impacts remain after the use of 'standard mitigation measures', the Sydney Metro CNVS requires 'additional mitigation measures' to be applied, where feasible and reasonable.

The 'additional mitigation measures' are determined on the basis of the exceedance of the appropriate management levels. Descriptions of the various measures are in **Appendix D.** The CNVS defines how 'additional mitigation measures' are applied to airborne noise impacts and the approach is shown in **Table 21**.

Table 21 Additional Mitigation Measures Matrix – Airborne Construction Noise

Time Period		Mitigation Measure			
		$L_{Aeq(15minute)}$ Noise Level above Background (RBL)			
		0 to 10 dBA	10 to 20 dBA	20 to 30 dBA	>30 dBA
Standard	Mon-Fri (7am - 6pm)	-	-	M, LB	M, LB
	Sat (8am - 1pm)				
	Sun/Pub Hol. (Nil)				
OOHW Period 1	Mon-Fri (6pm - 10pm)	-	LB	M, LB	M, IB, LB, PC, RO, SN
	Sat (7am - 8am) & (1pm - 10pm)				
	Sun/Pub Hol. (8am - 6pm)				
OOHW Period 2	Mon-Fri (10pm - 7am)	-	M, LB	M, IB, LB, PC, RO, SN	AA, M, IB, LB, PC, RO, SN
	Sat (10pm - 8am)				
	Sun/Pub Hol. (6pm - 7am)				

Note: The following abbreviations are used: Alternative accommodation (AA), Monitoring (M), Individual briefings (IB), Letter box drops (LB), Project specific respite offer (RO), Phone calls (PC), Specific notifications (SN).

While the predictions in **Section 5** result in 'moderate' and 'high' worst-case impacts at some of the nearest receivers, reference to **Table 21** shows the requirements for 'additional mitigation measures' are expected to be limited to 'monitoring' and 'letter box drops' due to the works being proposed to occur during Standard Construction Hours only.

The application of 'additional mitigation measures' to mitigate and manage the potential impacts would be determined in accordance with the requirements of the CNVS as the proposal progresses, when detailed construction information becomes available.

7.1.3 Proposal Specific Mitigation

On the basis of the predictions, **Table 22** lists the proposal-specific mitigation measures which are recommended to be used to minimise the impacts.

Table 22 Recommended Proposal Specific Noise Mitigation Measures

Item	Discussion and Recommendations
Notification	Receivers that would potentially be affected by noise and/or vibration from the works would be appropriately notified before the relevant works start.
Alternative construction methodologies	Alternative construction methodologies would be considered where vibration intensive works result in exceedances of cosmetic damage criteria and may include the following: • The use of hydraulic concrete shears, jaw crushers, coring, and wire sawing in lieu of rockbreakers for demolition of structures • Use of smaller capacity rockbreakers or lower vibration generating rockbreakers • Isolating the vibration sensitive structure from the vibration intensive work area by severing the vibration transmission path using non-vibration intensive means such a sawing.
Vibration impacts and building condition surveys	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure (in consultation with a structural engineer) and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure, prior to the commencement of vibration intensive works. For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed. Condition surveys of buildings and structures near to the tunnel and excavations would be undertaken before and after the works, where appropriate. For heritage buildings and structures the surveys would consider the heritage values of the structure in consultation with a heritage specialist. Consideration would also be given to recent condition survey information if suitable and available for the relevant building or structure.
Underground utilities and services	The potential vibration impacts to underground utilities and services would be reviewed as the proposal progresses in consultation with the asset owners.
Cumulative construction impacts	The likelihood of cumulative (i.e. concurrent and consecutive) construction noise impacts would be reviewed during detailed design when detailed construction schedules are available. Co-ordination would occur between the various projects to minimise concurrent works in the same areas, where possible. Consecutive construction impacts, or 'construction fatigue', may occur in the areas surrounding the proposal due to the construction of several projects. The potential consecutive impacts from the proposal and other major projects would be investigated further as the proposal progresses. Sydney Metro would co-ordinate with other projects where consecutive impacts are considered likely. Specific additional management and mitigation measures designed to address potential consecutive impacts would be developed, where necessary, and used to minimise the impacts as far as practicable.

7.2 Operational Impacts

Negligible operational road traffic noise impacts are expected from the proposed truck parking area and road relocations. As such, there is no requirement to consider mitigation.

8 Conclusion

Sydney Metro is proposing to carry out road relocation works at The Bays Precinct. The proposed activities would generally be completed during standard daytime construction hours and include clearing and establishing the proposal site, and reconfiguration of certain existing roads and parking areas. The existing land use surrounding the proposal site is mostly commercial/industrial with distant residential receivers.

The potential construction noise and vibration impacts during the works have been predicted to the nearest receivers.

The impacts are predicted to generally be compliant or 'minor' for most of the works, however, 'moderate' and 'high' impacts are predicted during *Site clearing* works. These works include vegetation clearing and demolition of existing structures and would require the use of noise intensive equipment such as chainsaws, chippers, concrete saws and rockbreakers during certain phases.

Noise intensive equipment is, however, expected to only be required for relatively short durations, typically at the start of the works.

The main potential source of construction vibration would be from rockbreakers. Exceedances of the cosmetic damage screening criteria are predicted at the closest building in the former White Bay Power Station site and at the closest building on the Gypsum Resources Australia complex. Exceedances are also predicted for one heritage listed underground canal structure crossing the construction site between the former White Bay Power Station and the bay. Alternative construction methodologies/equipment would be considered where cosmetic damage criteria exceedances are predicted. Where vibration intensive works are close to vibration sensitive buildings and structures, vibration monitoring would be completed to check vibration levels do not exceed the appropriate thresholds.

Exceedances of the human comfort criteria are also predicted at the nearest commercial/industrial receivers meaning the worst-case vibration impacts may be perceptible at times, however, some of these buildings may not be occupied.

The impacts would be mitigated and managed as per the strategies documented in this report.

APPENDIX A

Acoustic Terminology

1 Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that in common usage 'noise' is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or L_P are commonly used to represent Sound Pressure Level. The symbol L_A represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2 'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

3 Sound Power Level

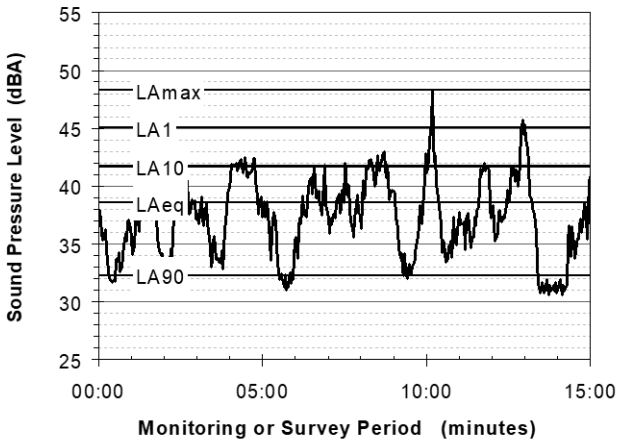
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or Lw, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels L_{AN}, where L_{AN} is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the L_{A1} is the noise level exceeded for 1% of the time, L_{A10} the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

L_{A1} The noise level exceeded for 1% of the 15 minute interval.

L_{A10} The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

L_{A90} The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

L_{Aeq} The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the 'repeatable minimum' L_{A90} noise level over the daytime and night-time measurement periods, as required by the EPA. In addition, the method produces mean or 'average' levels representative of the other descriptors (L_{Aeq}, L_{A10}, etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than 'broad band' noise.

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

7 Frequency Analysis

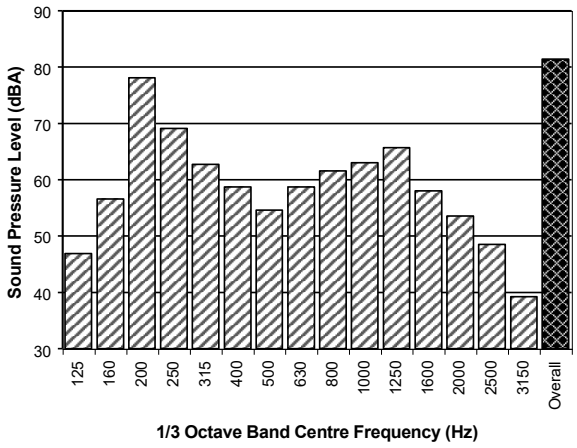
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V, expressed in mm/s can be converted to decibels by the formula 20 log (V/V_o), where V_o is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used by some organisations.

9 Human Perception of Vibration

People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

10 Over-Pressure

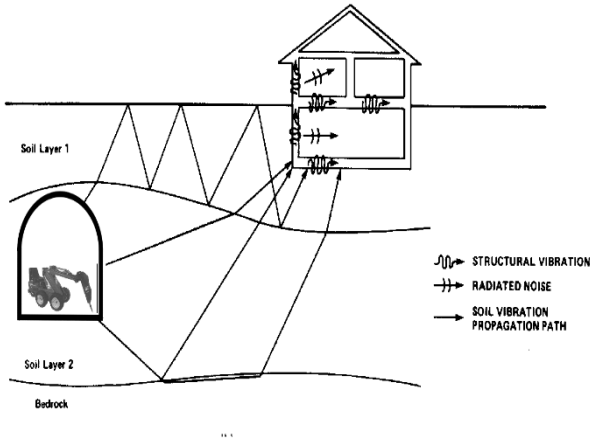
The term 'over-pressure' is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

11 Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise

APPENDIX B

Ambient Noise Monitoring Results

Noise Monitoring Location	L01	Map of Noise Monitoring Location
Noise Monitoring Address	**21 Mansfield Street, Rozelle**	

Logger Device Type: SVAN957, Logger Serial No: 20674
Sound Level Meter Device Type: Brüel and Kjær 2260, Sound Level Meter Serial No: 2487418

Ambient noise logger located at 21 Mansfield Street, Rozelle. Logger located with view of Mansfield Street to the west and the Western Distributor to the south.

Attended measurements indicate the ambient noise environment at this location is controlled by road traffic noise from Mansfield Street with some influence from industrial/commercial sources.

Recorded Noise Levels (L_{Amax}):
20/05/2019: Light-vehicle traffic Mansfield: 48-72 dBA, Industrial/Commercial operations: 45-76 dBA, Birds: 45-60 dBA, Aircraft: 48-52 dBA

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period (02/05/2019 – 20/05/2019)	Noise Level (dBA)			
	RBL	LAeq	L_{10}	L_1
Daytime	43	56	57	65
Evening	43	54	54	61
Night-time	35	47	42	50

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period (02/05/2019 – 20/05/2019)	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	58	61
Night-time (10pm-7am)	47	50

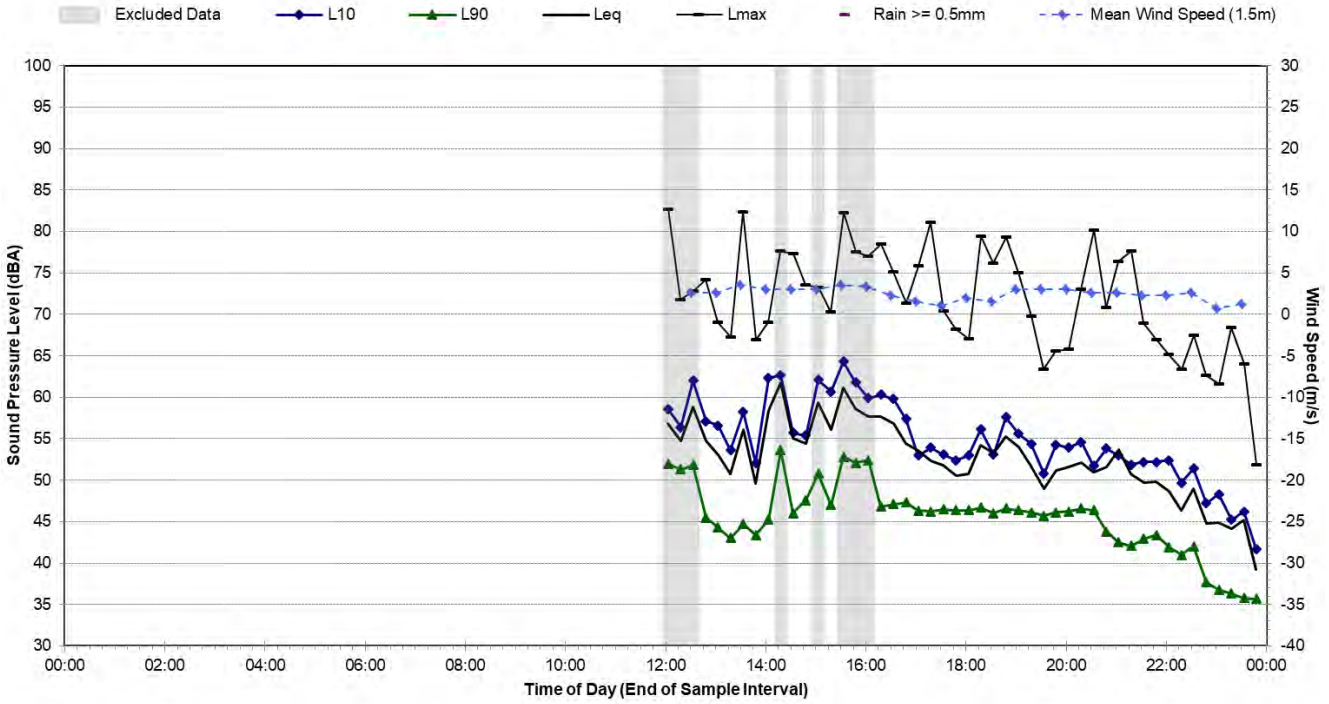
Attended Noise Measurement Results

Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
20/05/2019	13:07	43	52	76

Photo of Noise Monitoring Location

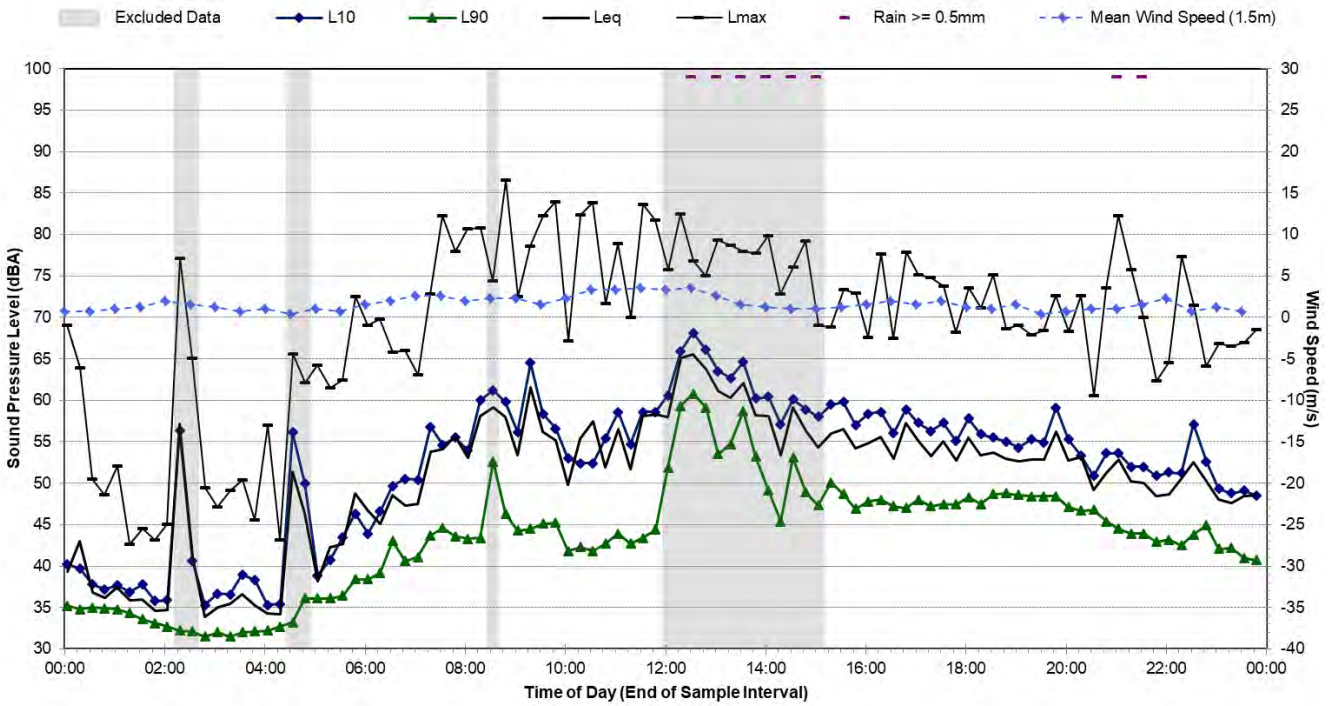
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Thursday, 2 May 2019



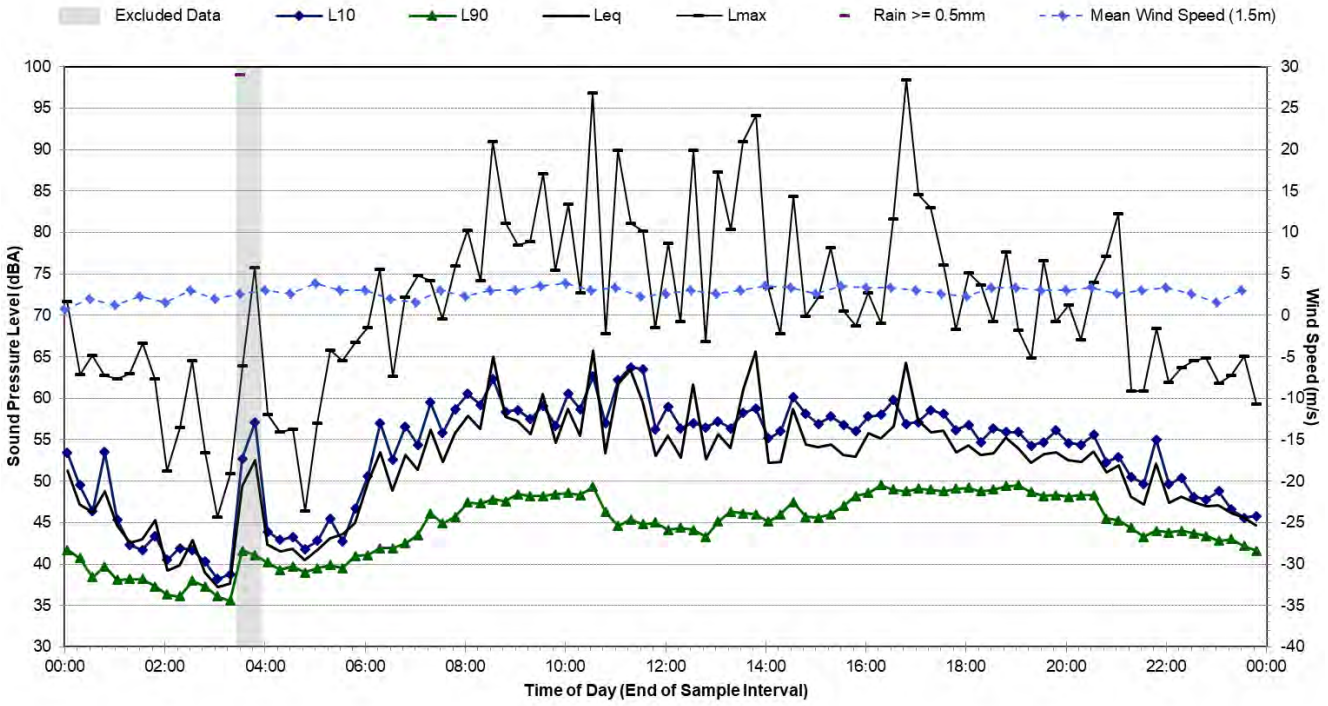
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Friday, 3 May 2019



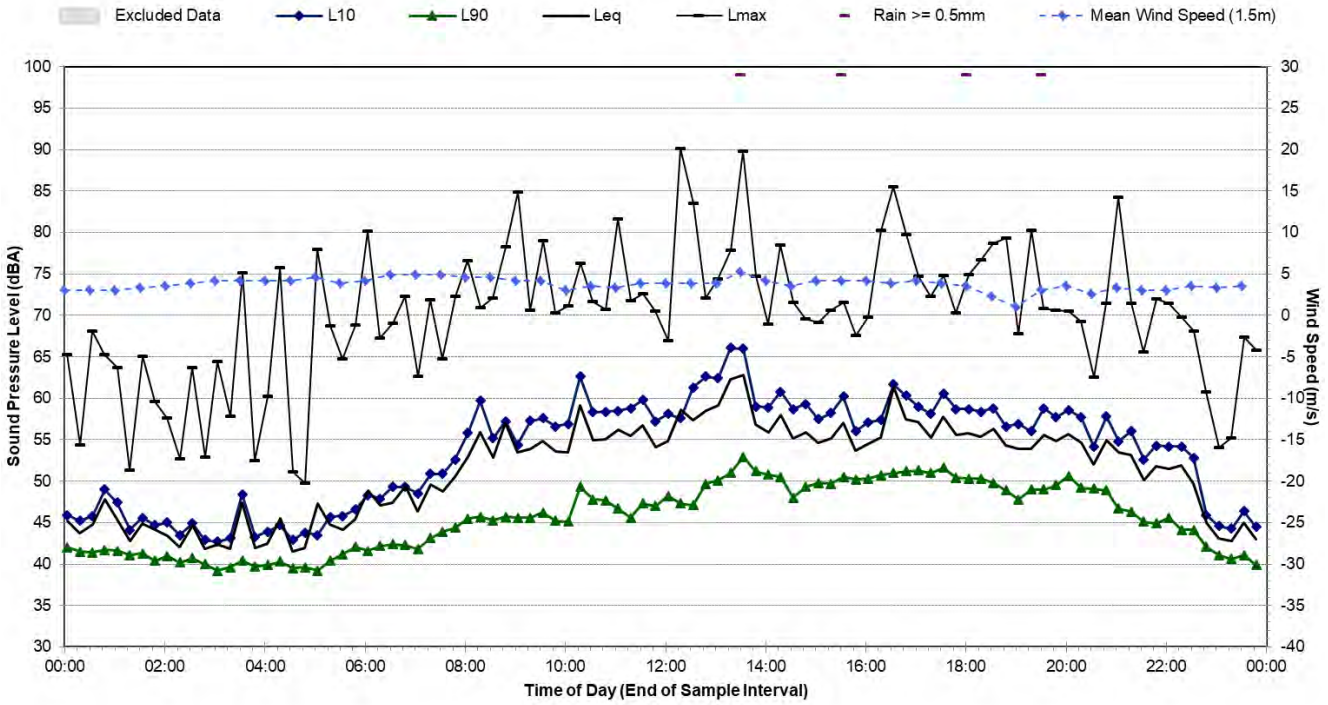
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Saturday, 4 May 2019



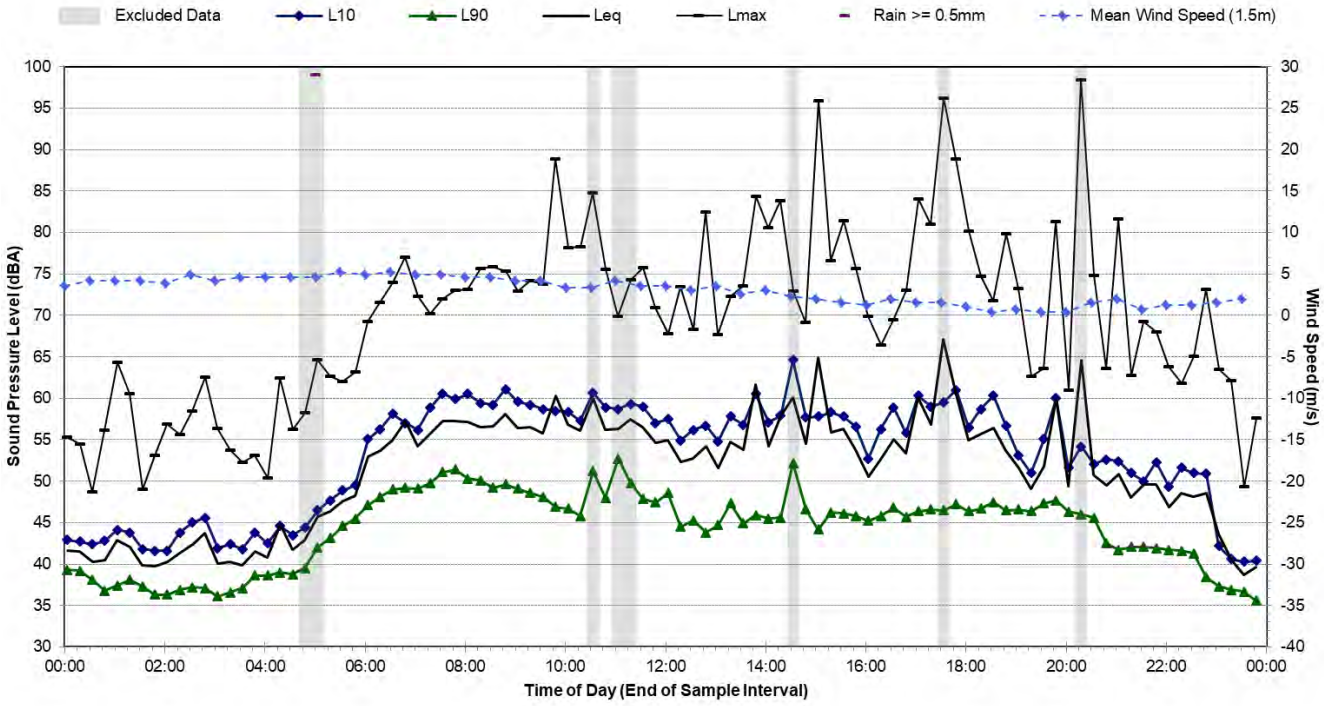
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Sunday, 5 May 2019



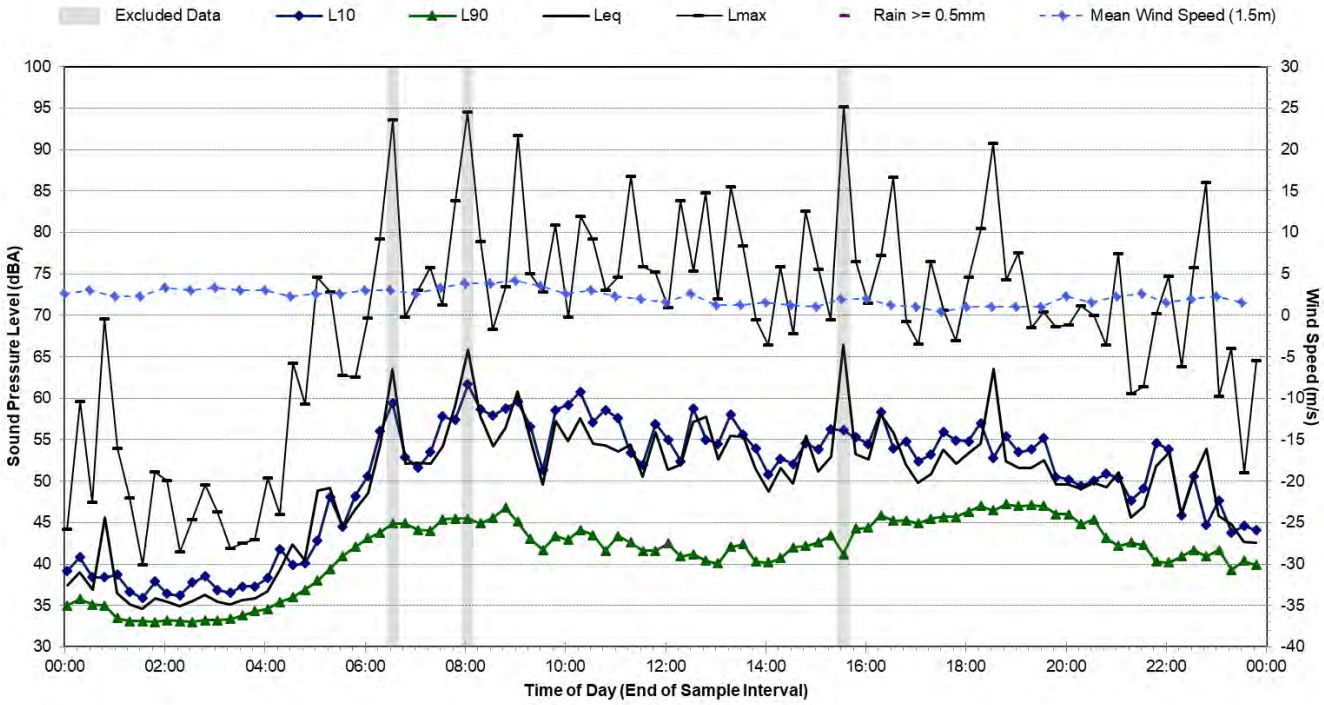
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Monday, 6 May 2019



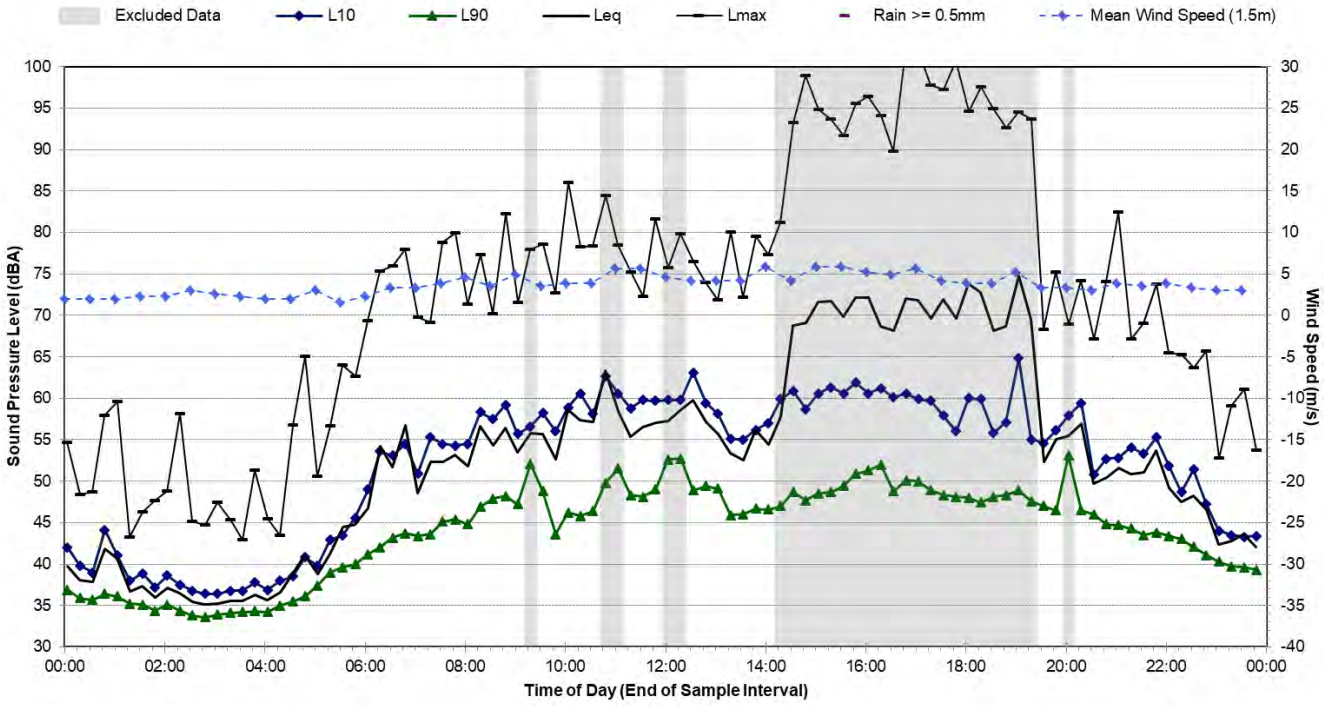
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Tuesday, 7 May 2019



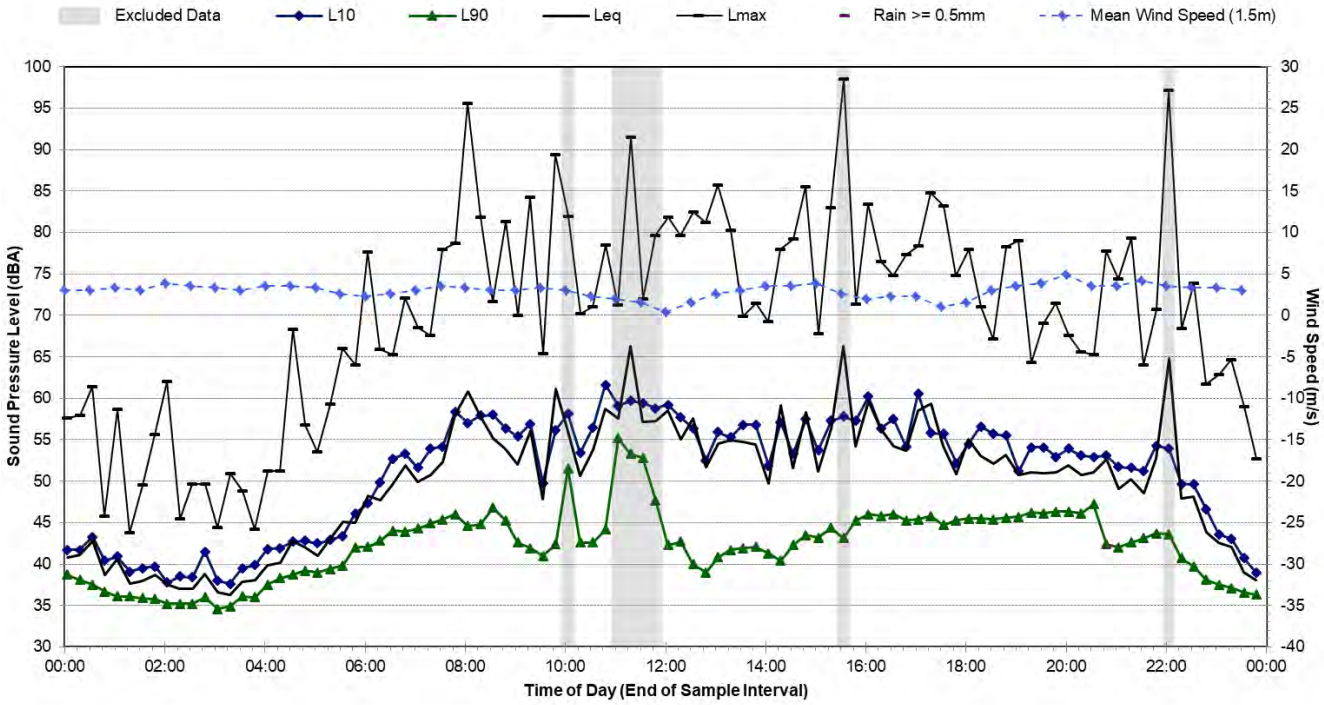
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Wednesday, 8 May 2019



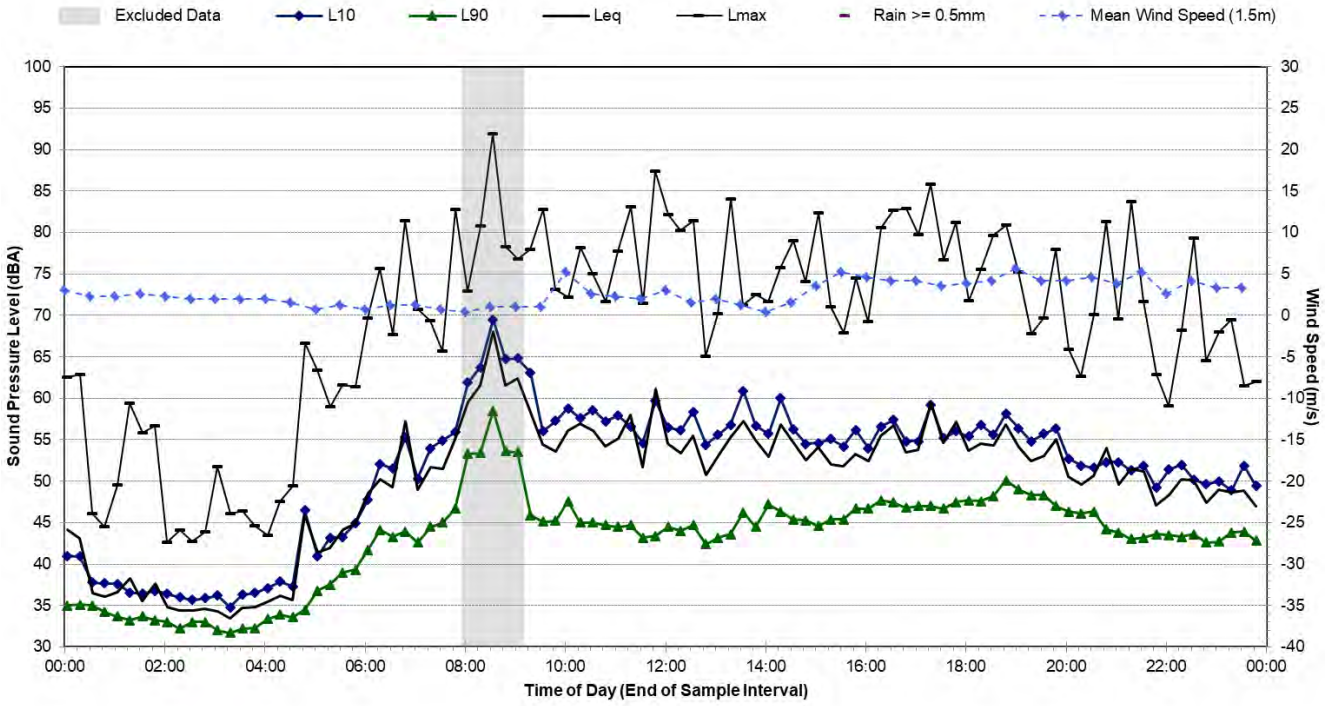
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Thursday, 9 May 2019



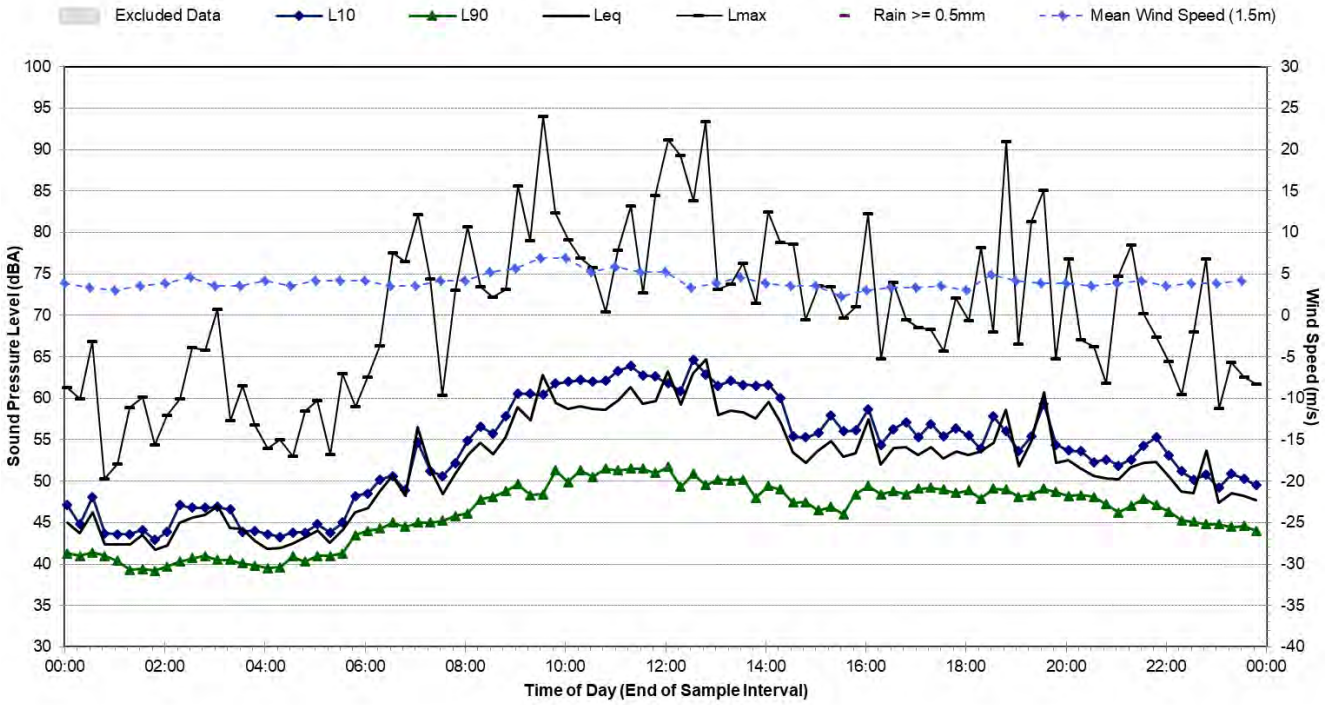
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Friday, 10 May 2019



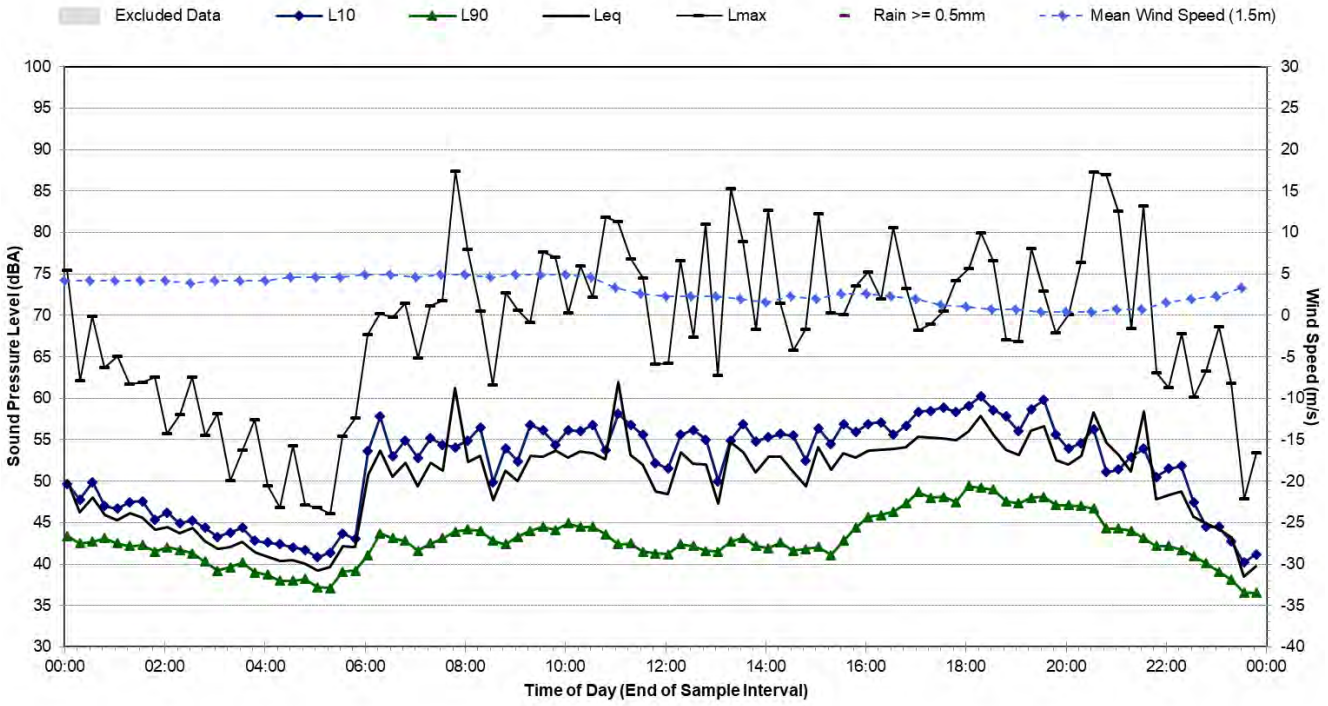
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Saturday, 11 May 2019



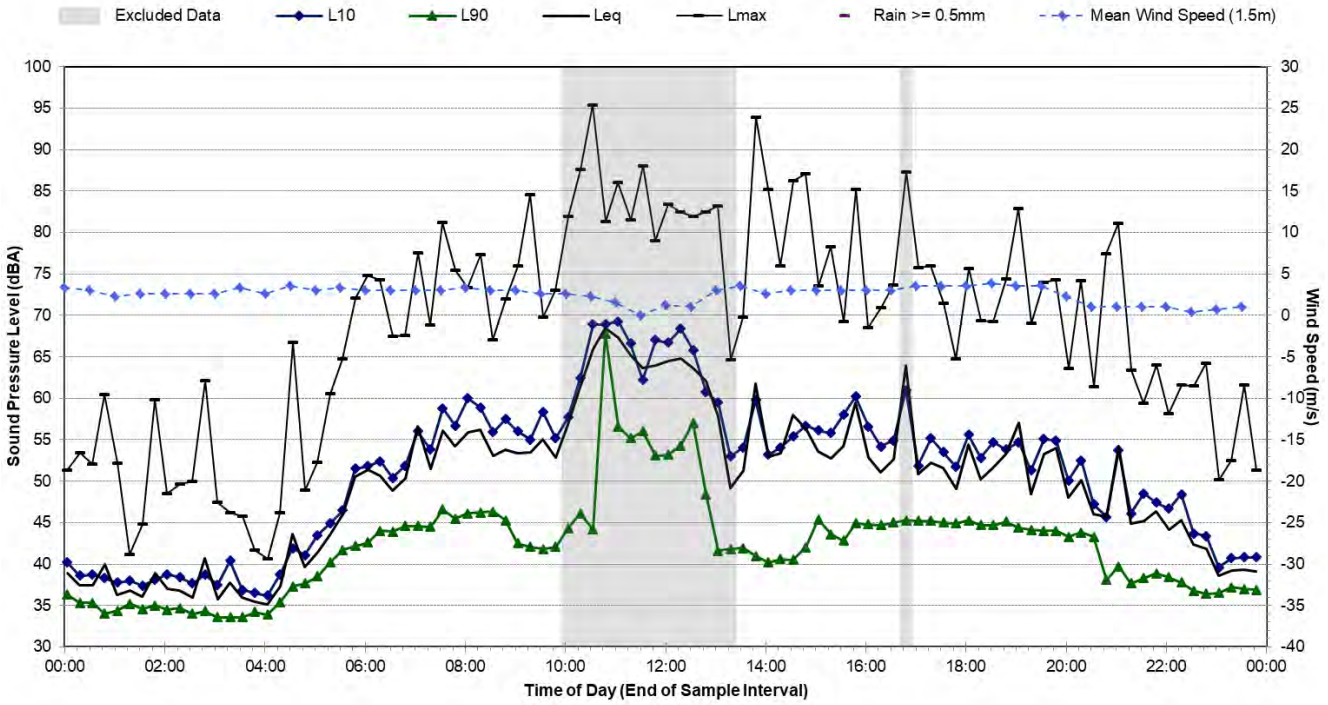
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Sunday, 12 May 2019



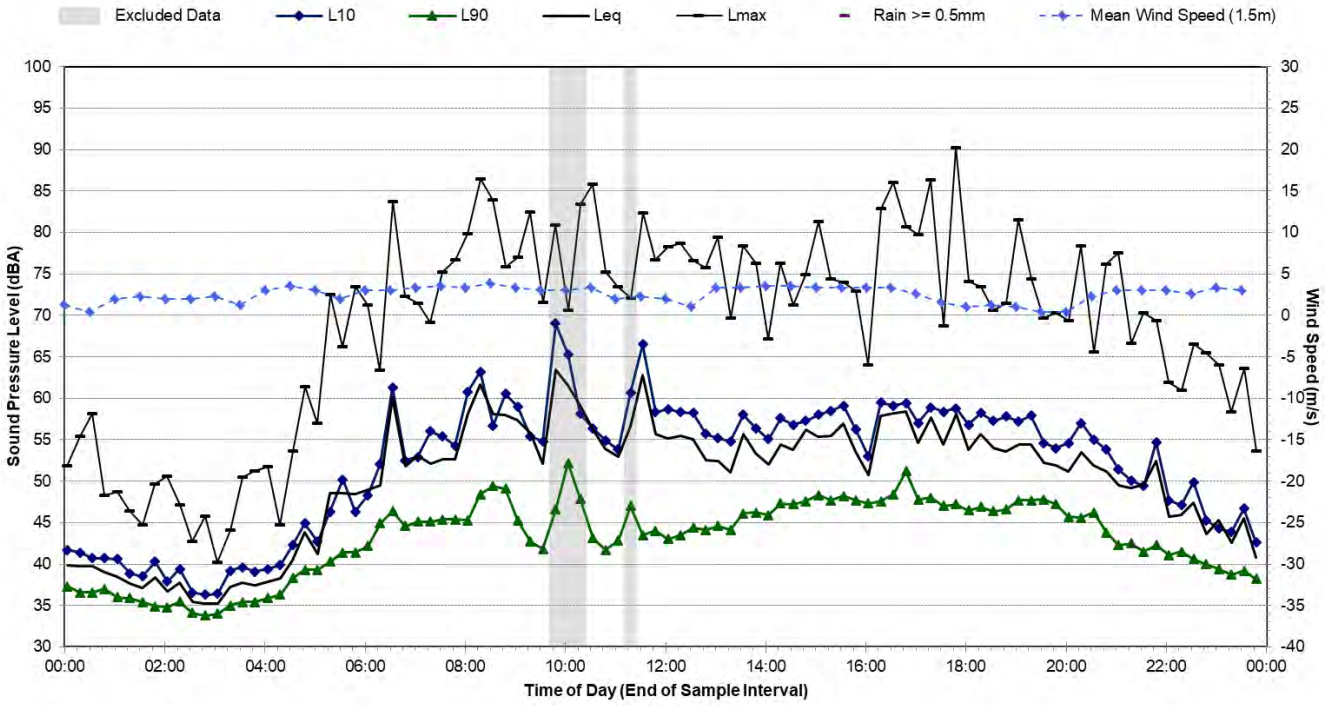
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Monday, 13 May 2019



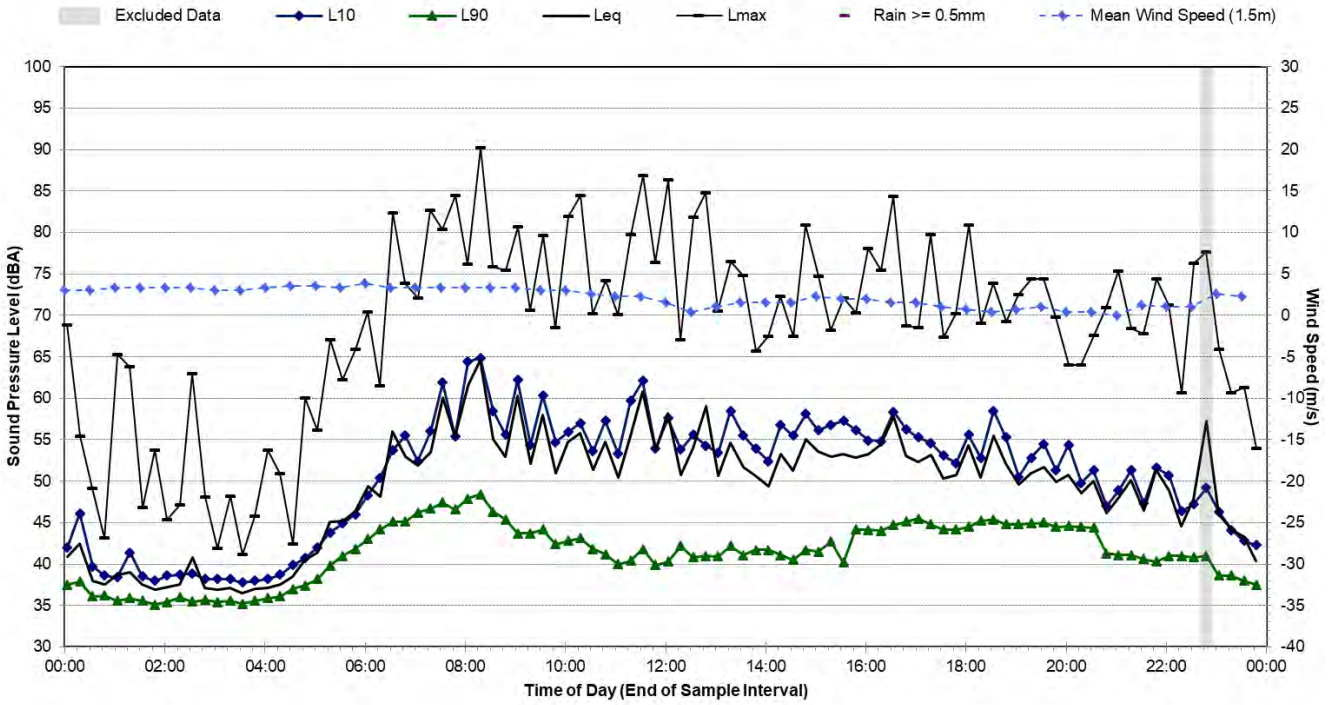
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Tuesday, 14 May 2019



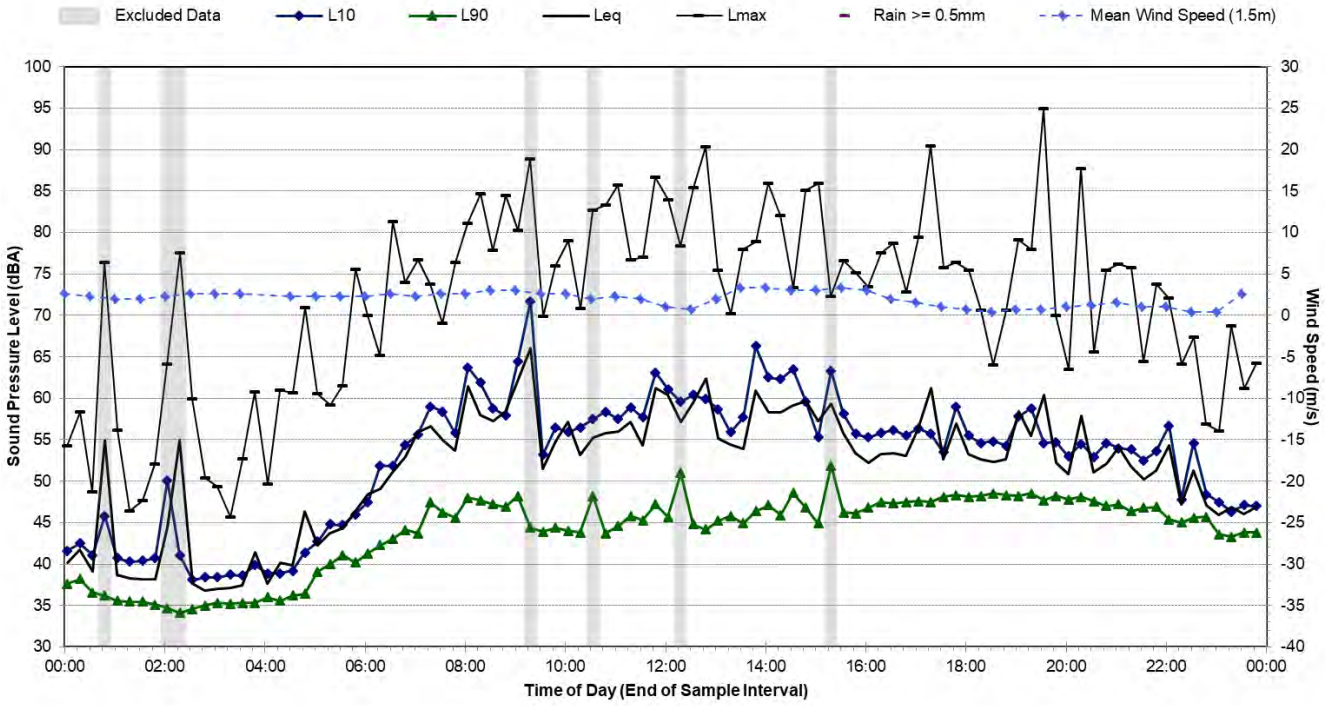
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Wednesday, 15 May 2019



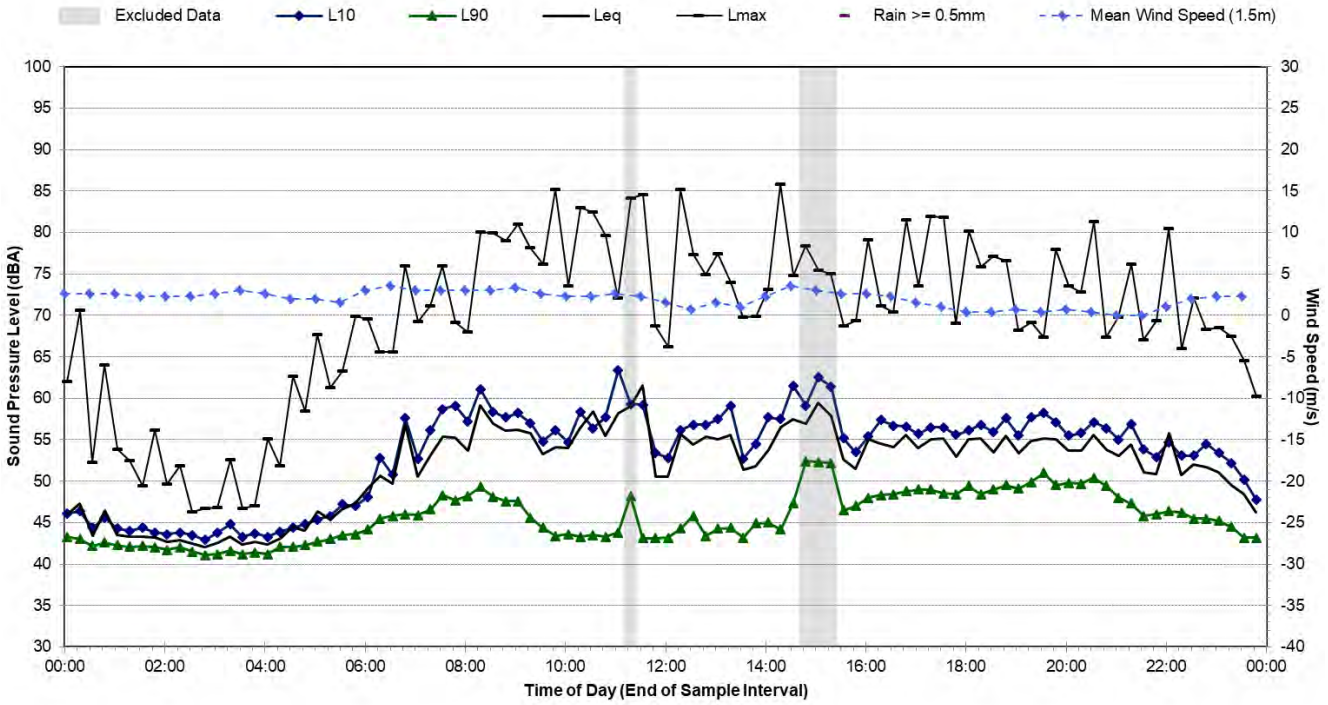
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Thursday, 16 May 2019



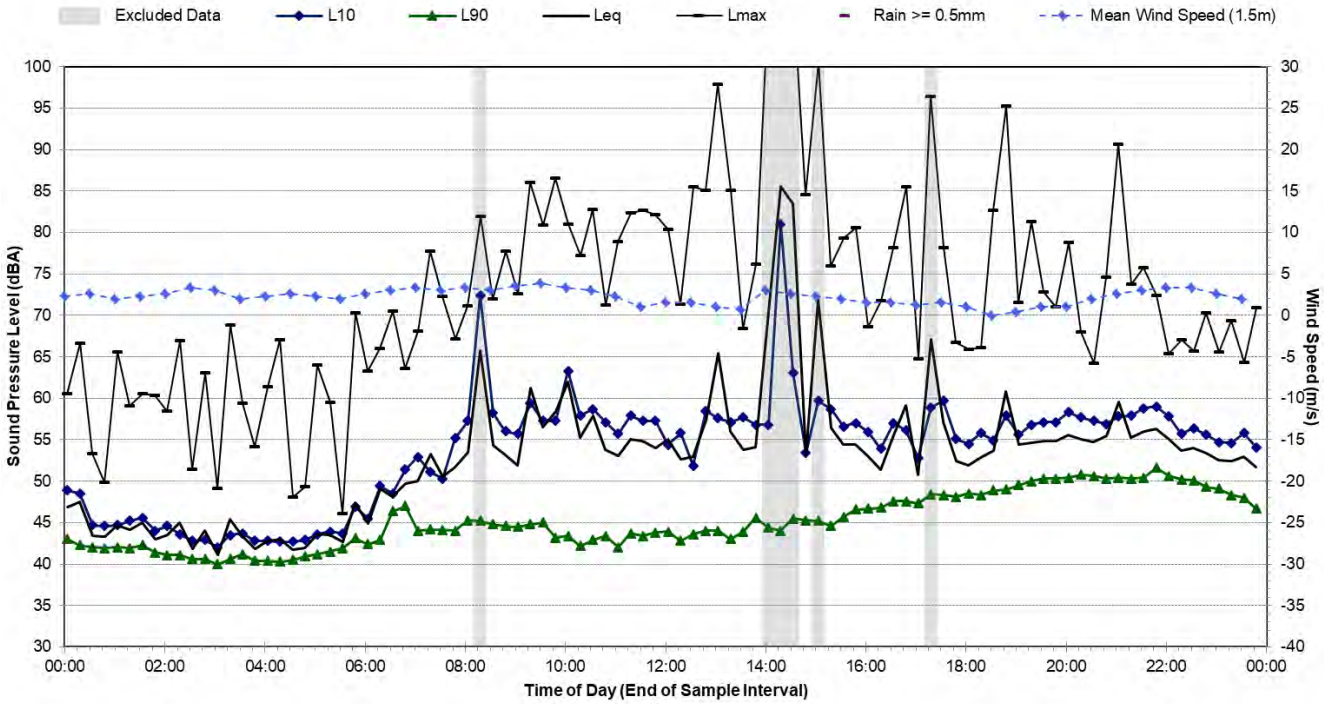
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Friday, 17 May 2019



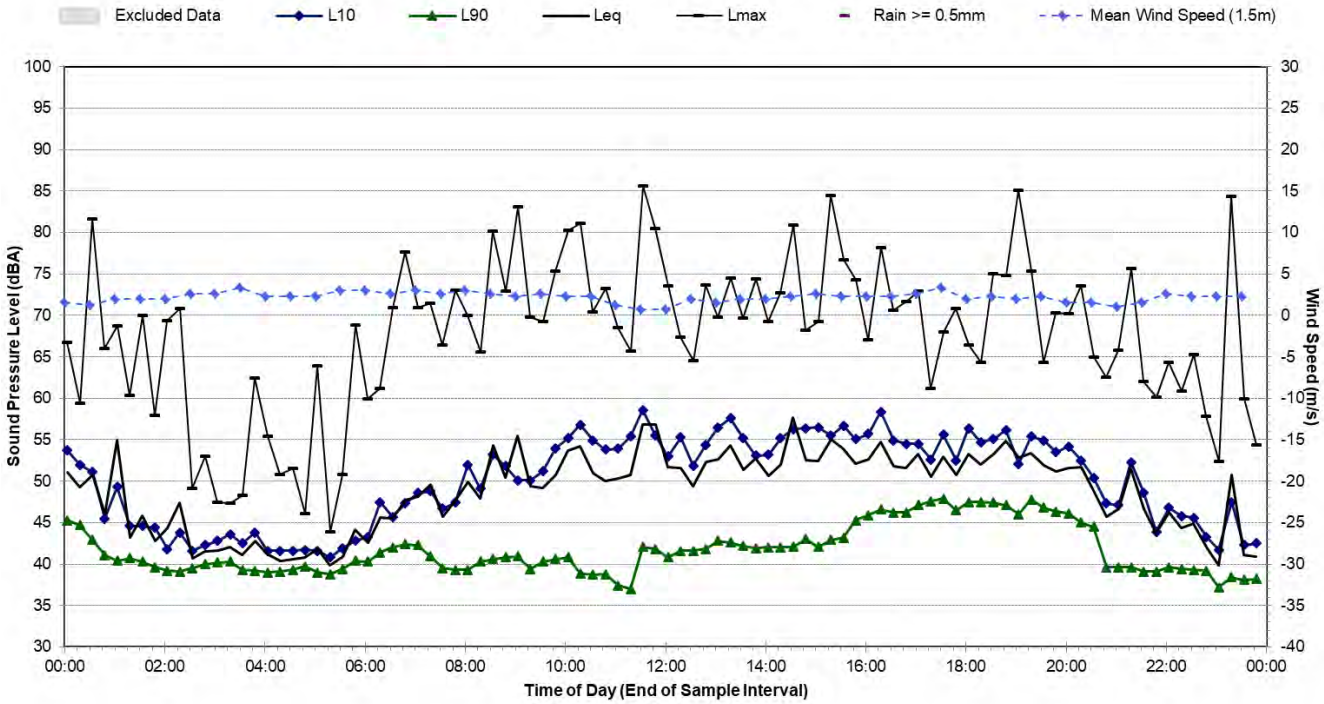
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Saturday, 18 May 2019



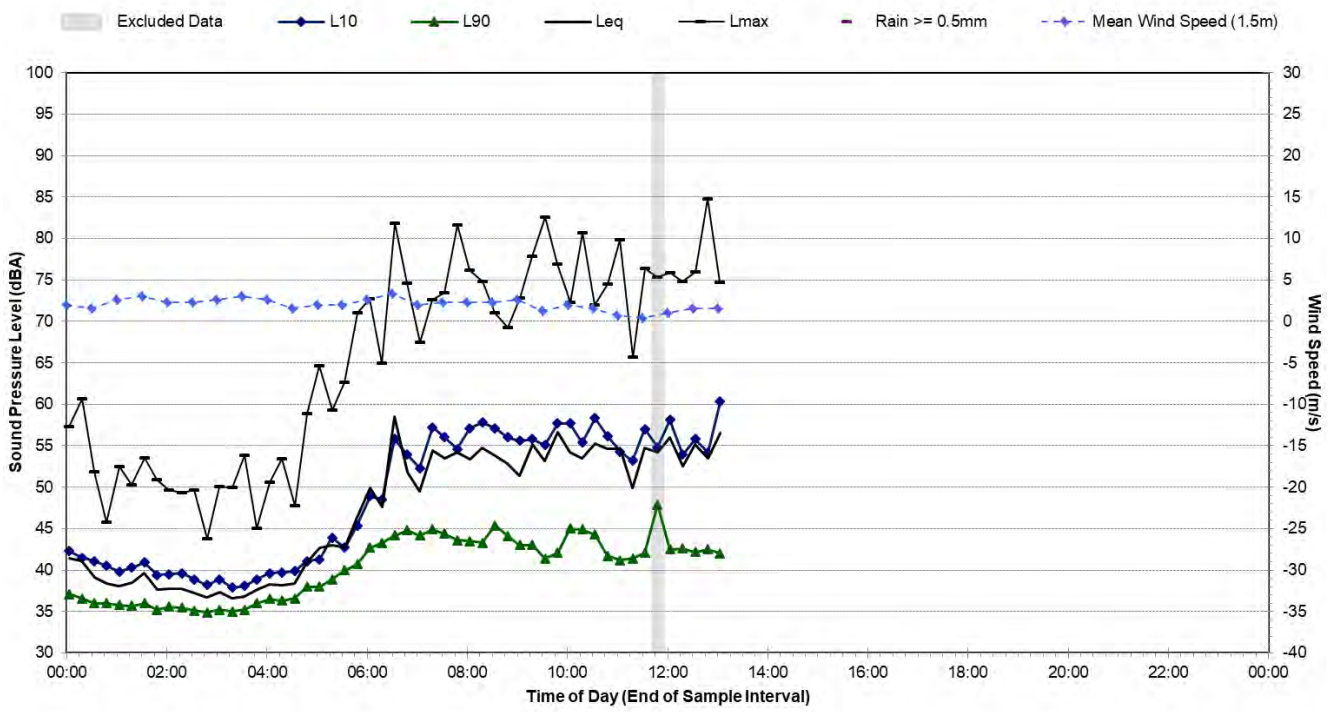
Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Sunday, 19 May 2019



Statistical Ambient Noise Levels

21 Mansfield St, Rozelle - Monday, 20 May 2019



Noise Monitoring Location	L02
Noise Monitoring Address	**22 Lilyfield Rd, Rozelle**

Logger Device Type: Svantek 957, Logger Serial No: 23293

Sound Level Meter Device Type: Brüel and Kjær 2260, Sound Level Meter Serial No: 2414604

Ambient noise data was measured as part of WestConnex M4-M5 Link. Ambient noise logger located in the rear yard of 22 Lilyfield Road, Rozelle.

Attended measurements indicate the ambient noise environment at this location is controlled by road traffic noise from Victoria Road to the east and City West Link to the south. Frequent aircraft noise also contributed to the existing levels. Maximum noise levels were from sources such as heavy vehicles and car horns which frequently occurred during the attended measurement.

Recorded Noise Levels: (L_{Amax}):

21/07/2016: Light-vehicle traffic Victoria Rd & City West Link: 55-68 dBA, Heavy-vehicle traffic Victoria Rd & City West Link: 60-84 dBA, Aeroplanes: 61-69 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period (21/07/2016 – 02/08/2016)	Noise Level (dBA)			
	RBL	LAeq	L_{10}	L_1
Daytime	51	57	59	63
Evening	51	57	59	62
Night-time	45	54	55	59

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period (21/07/2016 – 02/08/2016)	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	57	58
Night-time (10pm-7am)	54	59

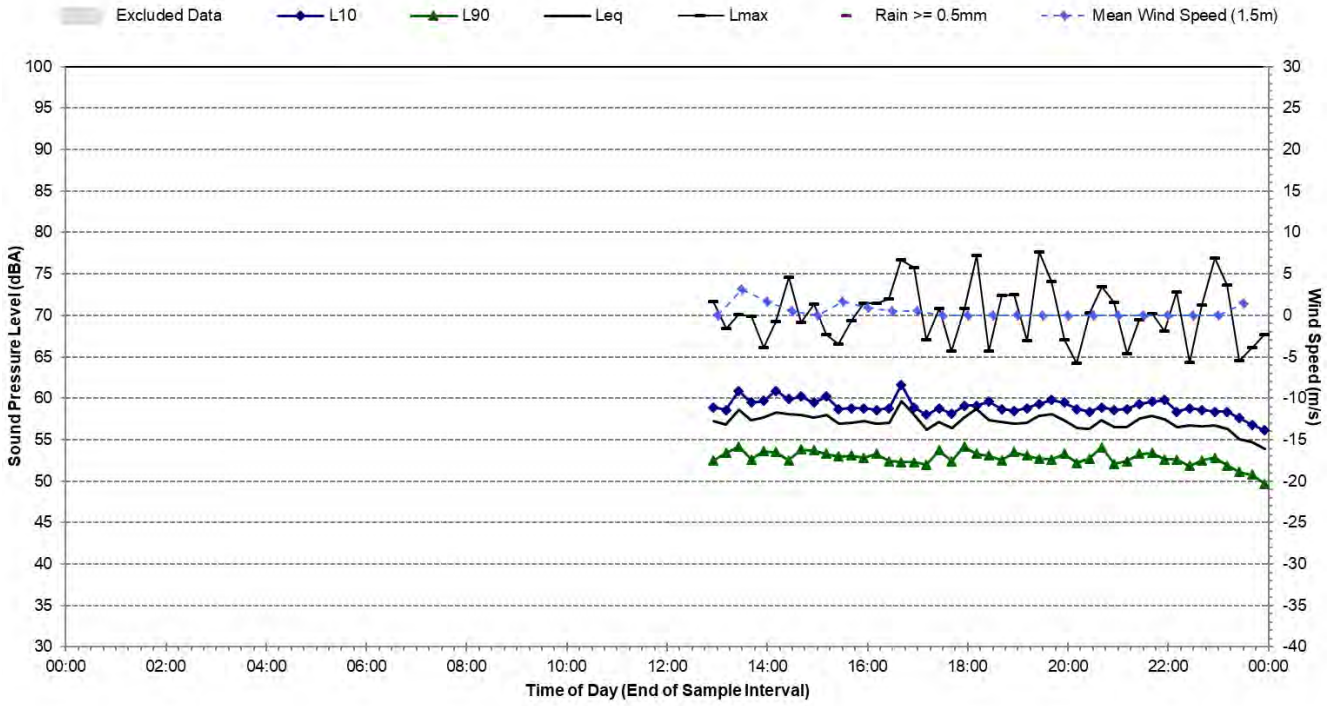
Attended Noise Measurement Results

Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
21/07/2016	12:05	54	59	84

Photo of Noise Monitoring Location

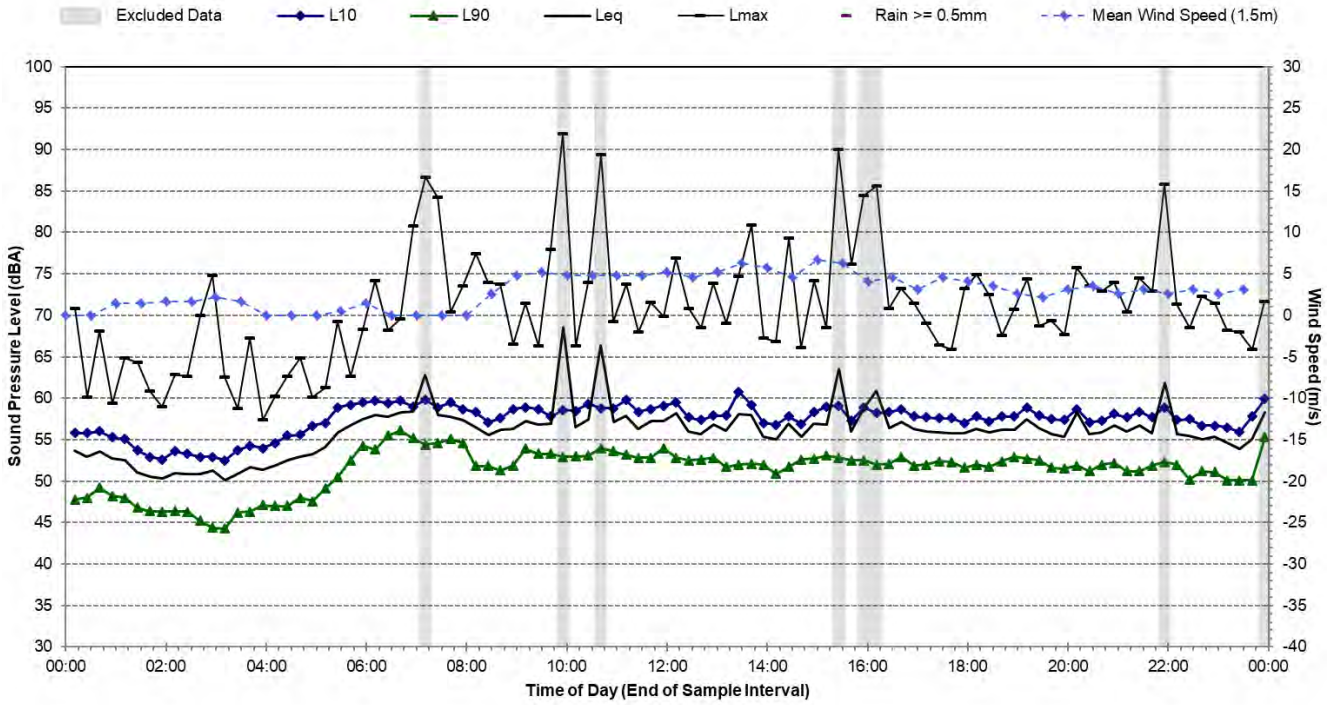
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Thursday, 21 July 2016



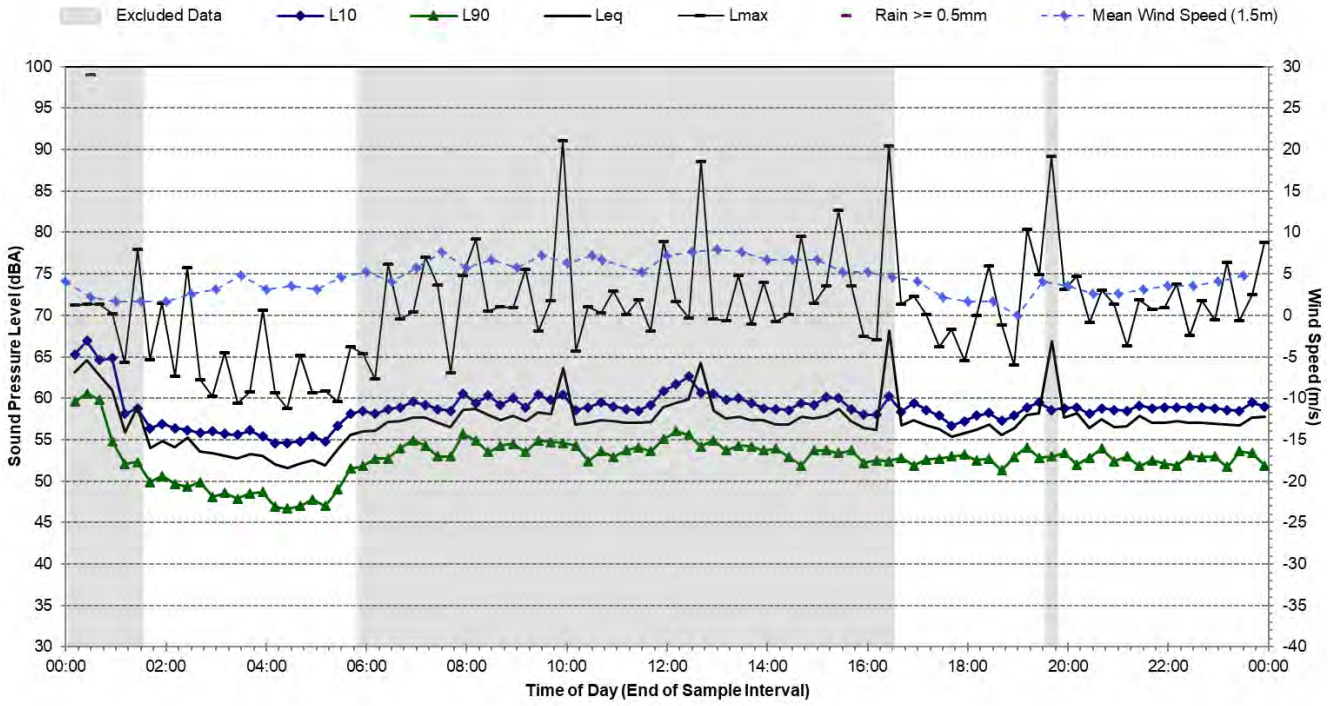
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Friday, 22 July 2016



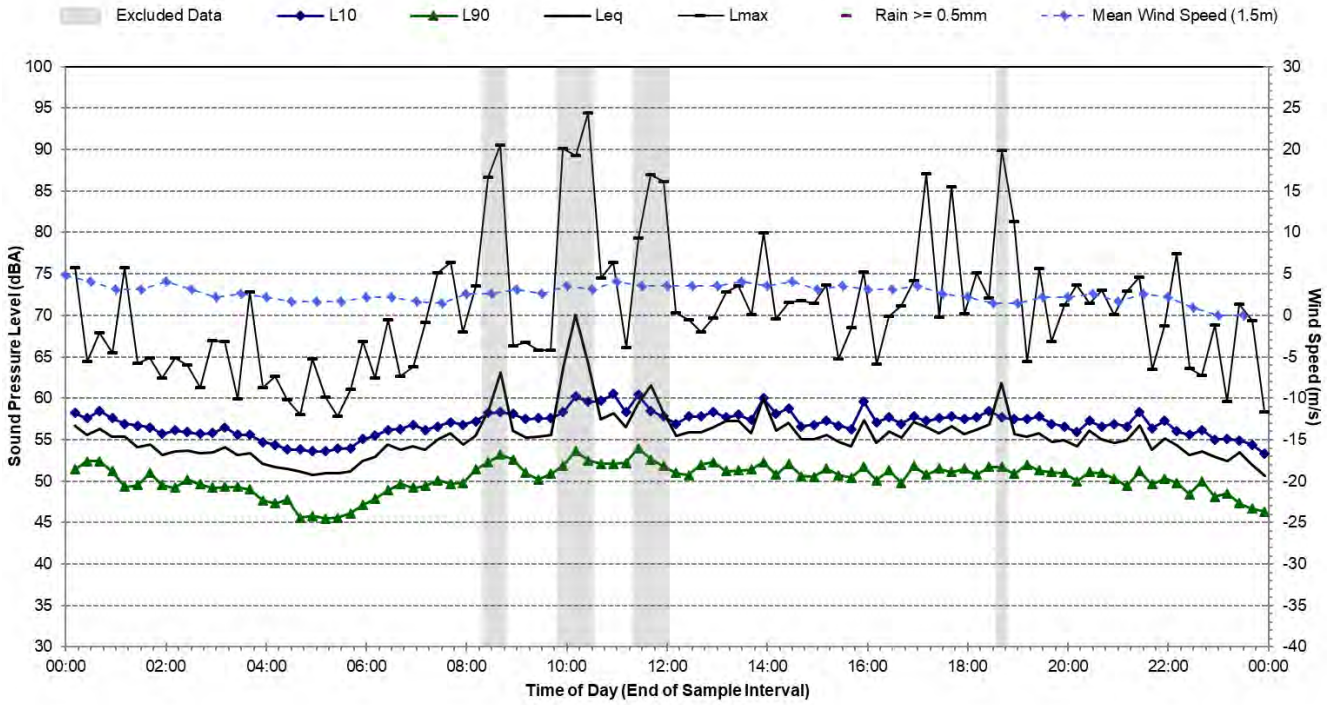
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Saturday, 23 July 2016



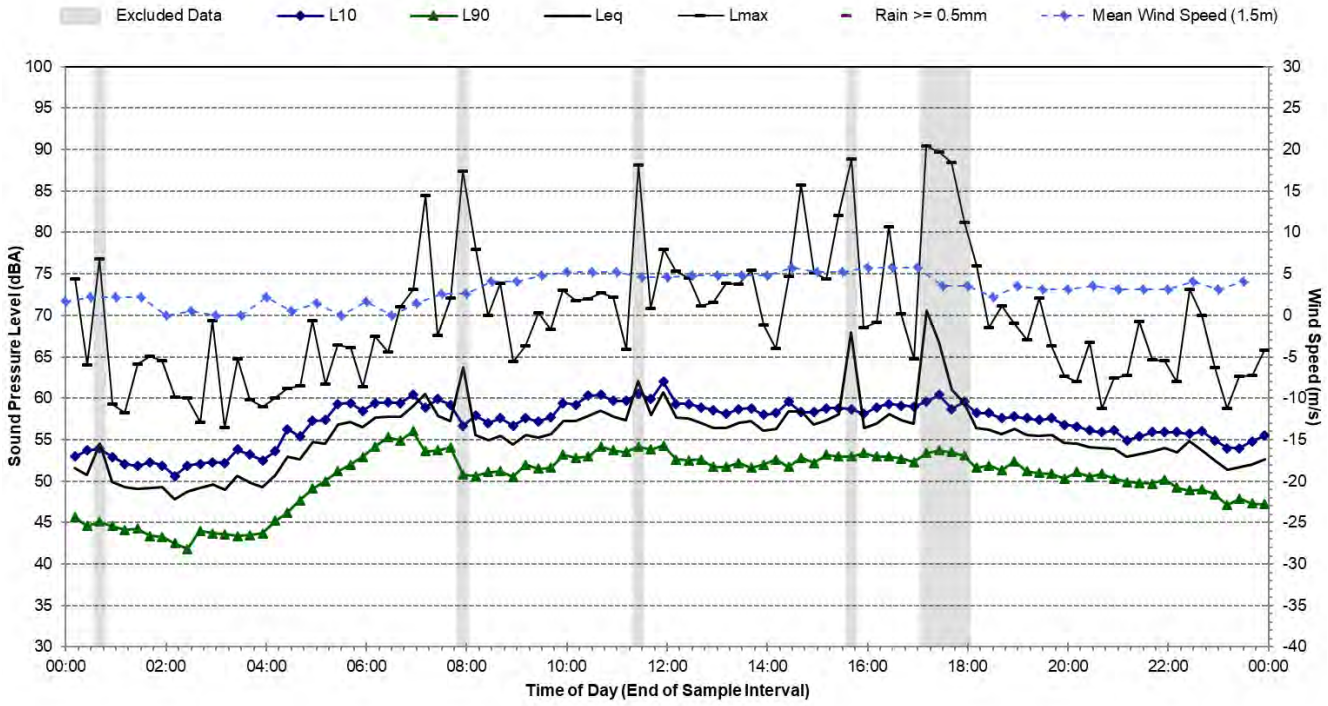
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Sunday, 24 July 2016



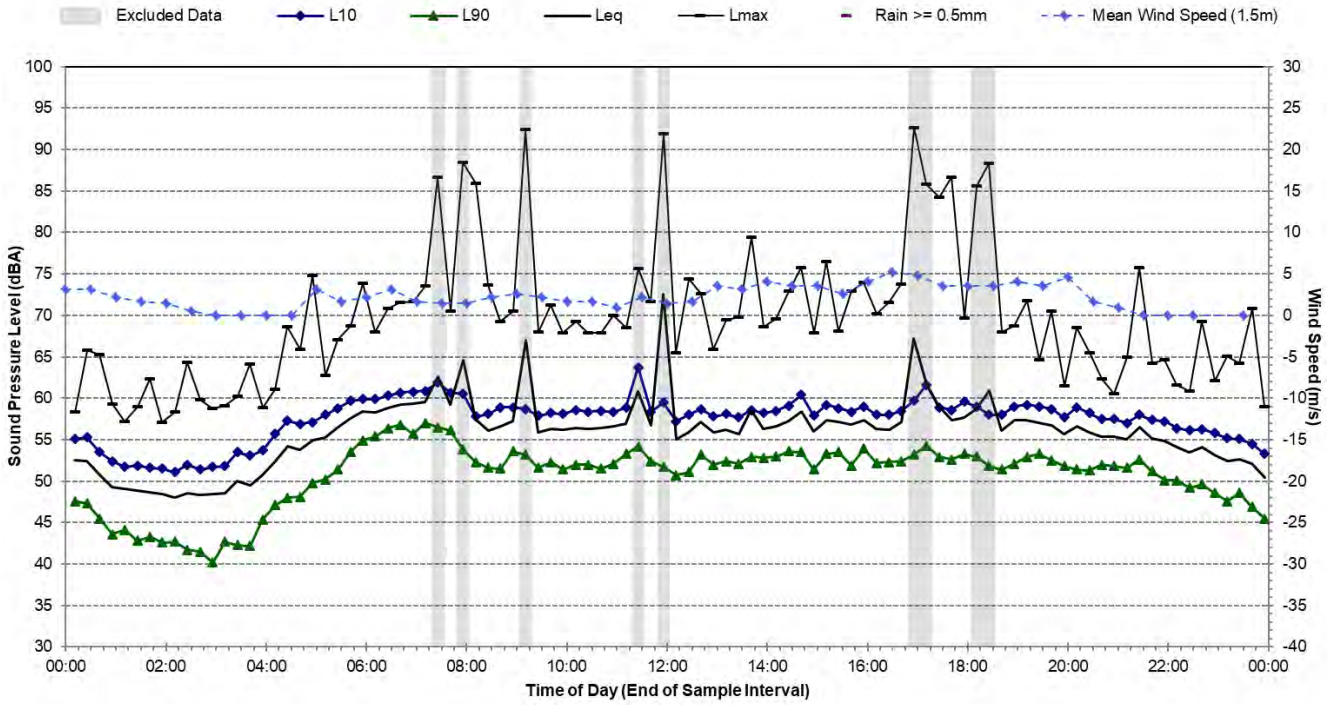
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Monday, 25 July 2016



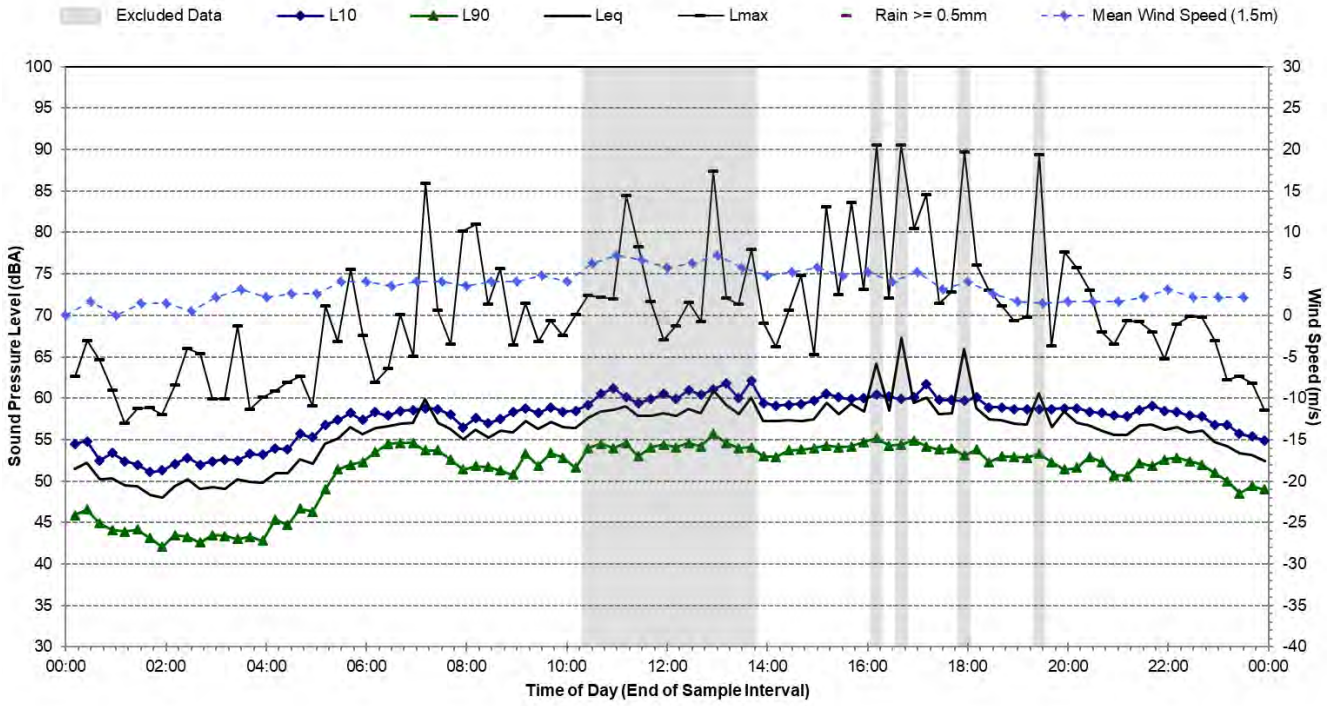
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Tuesday, 26 July 2016



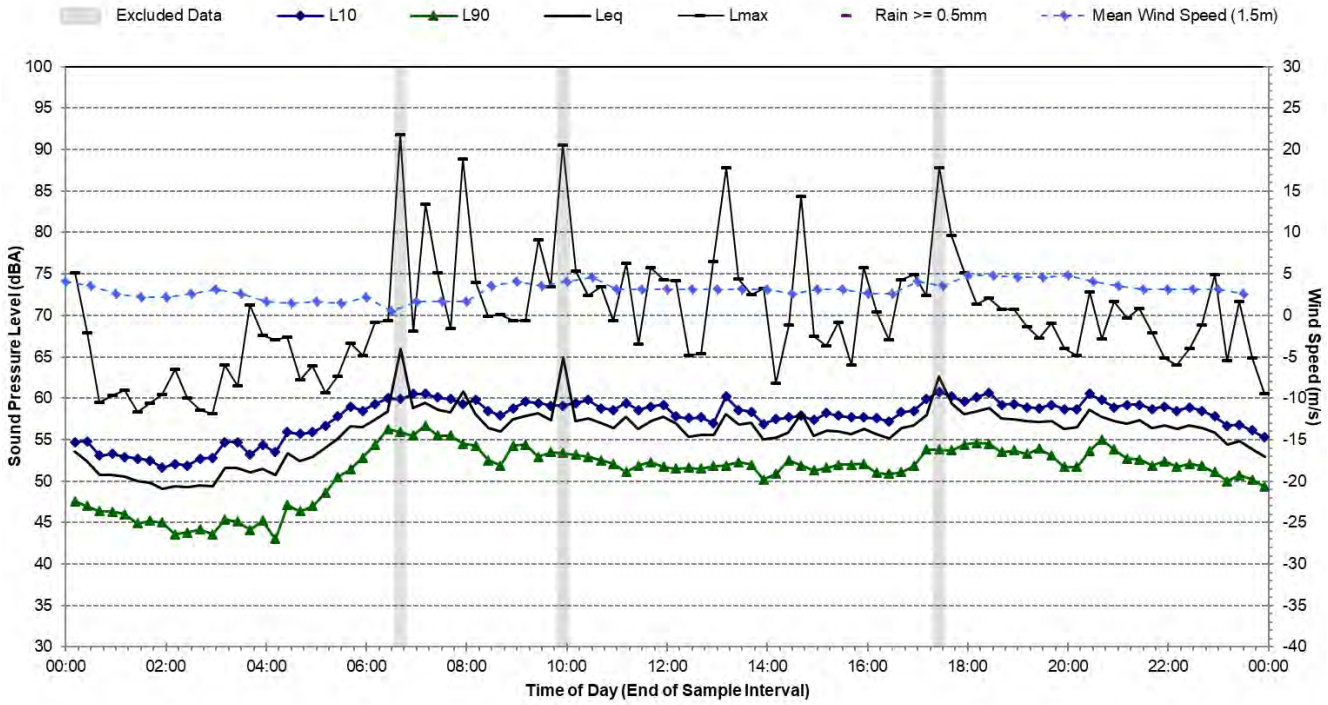
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Wednesday, 27 July 2016



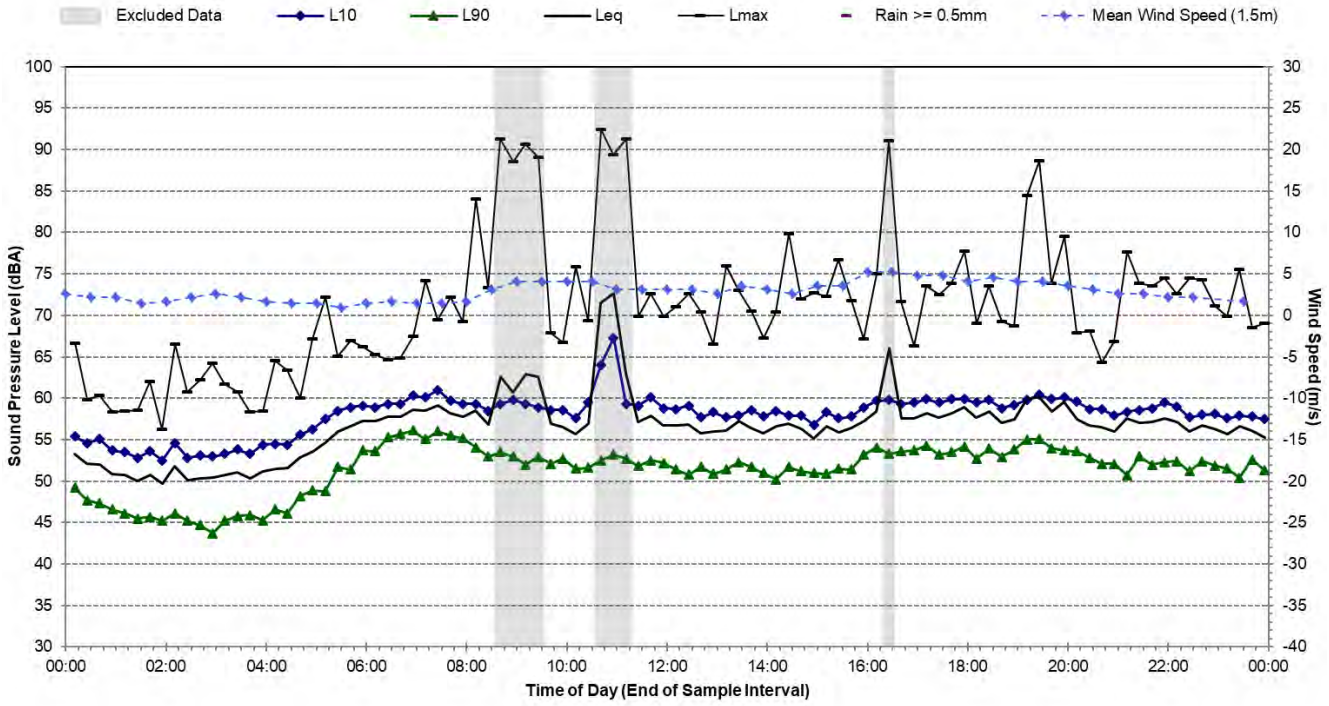
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Thursday, 28 July 2016



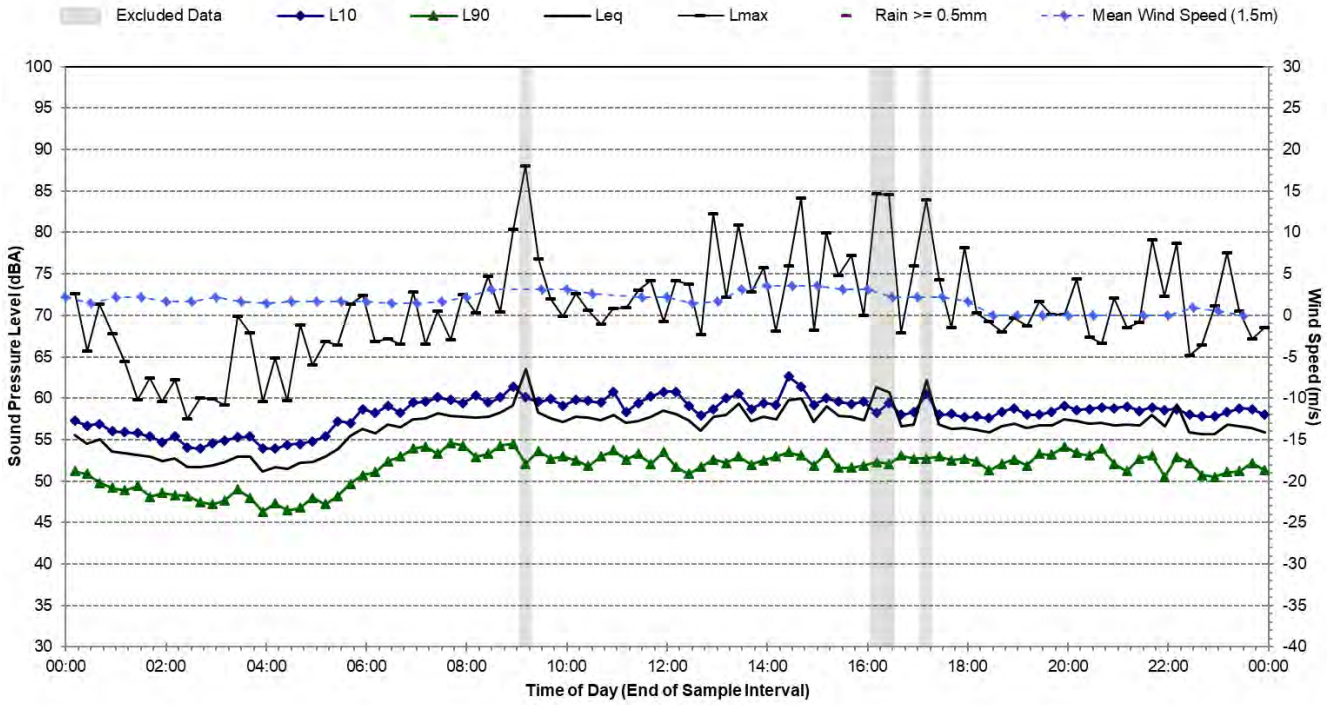
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Friday, 29 July 2016



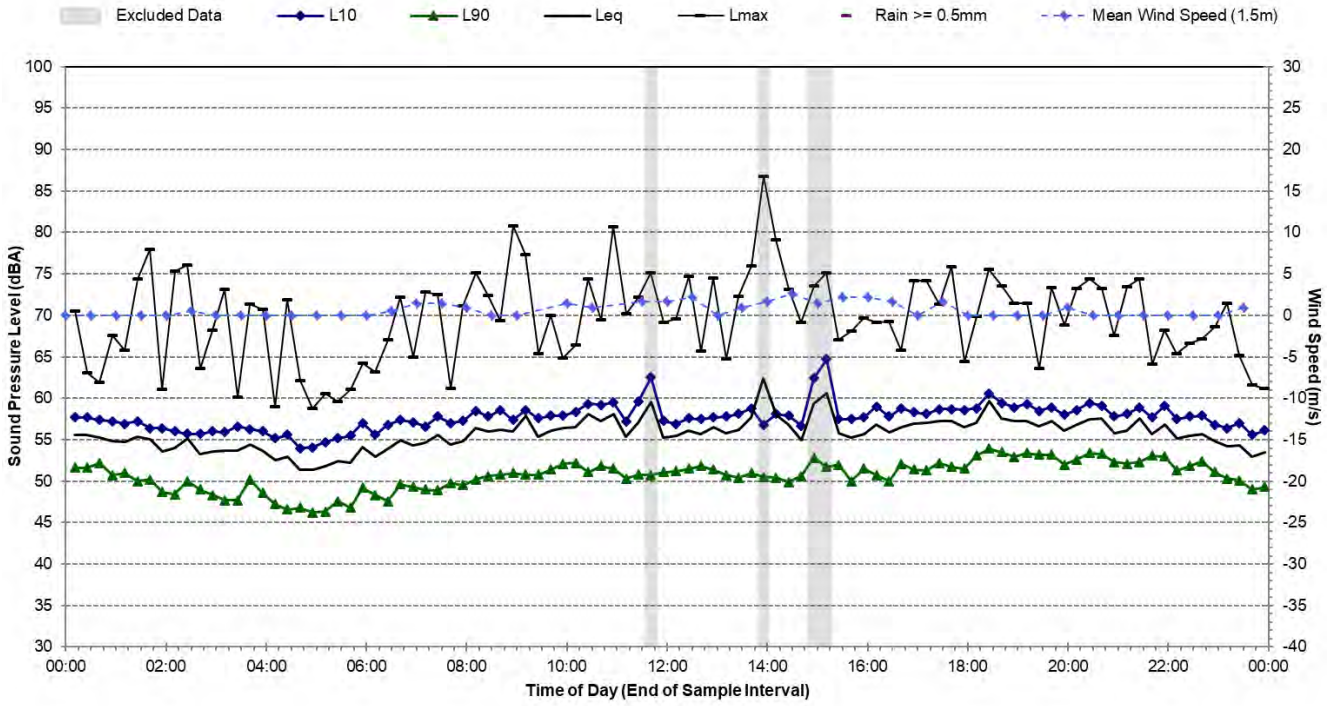
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Saturday, 30 July 2016



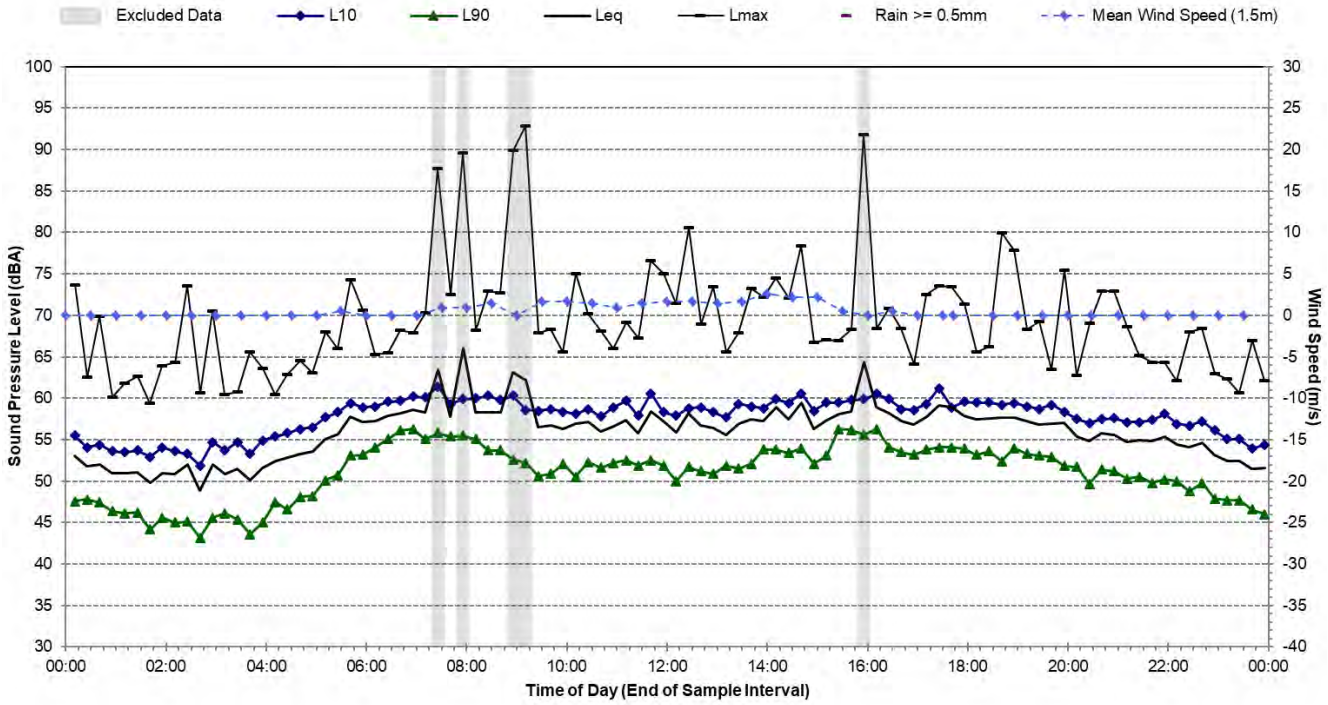
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Sunday, 31 July 2016



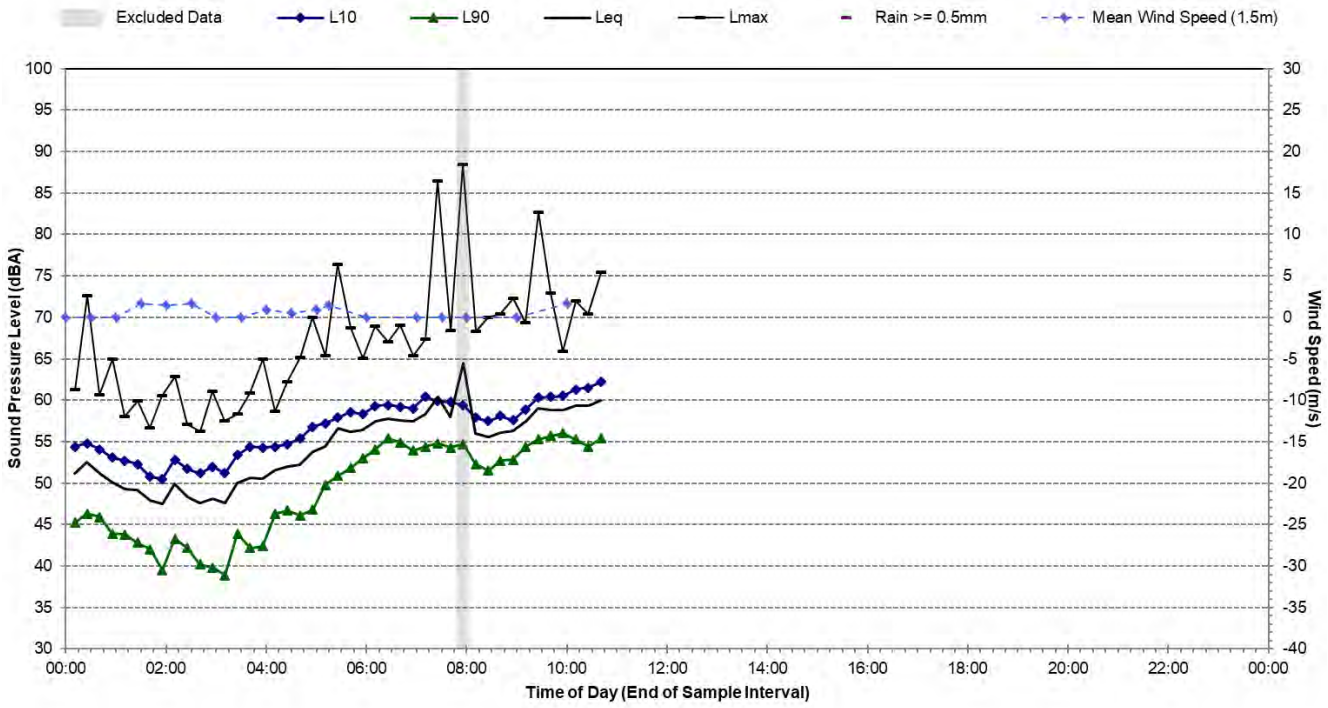
Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Monday, 1 August 2016



Statistical Ambient Noise Levels

22 Lilyfield Rd, Rozelle - Tuesday, 2 August 2016



Noise Monitoring Location	L03
Noise Monitoring Address	**308 Glebe Point Road, Glebe**

Logger Device Type: SVAN957, Logger Serial No: 20677
Sound Level Meter Device Type: Brüel and Kjær 2260, Sound Level Meter Serial No: 2414604

Ambient noise logger located at 308 Glebe Point Road, Glebe. Logger located with view of Glebe Point Road to the east and the Western Distributor to the north.

Attended noise measurements indicate the ambient noise environment at this location is controlled by road traffic noise from Glebe Point Road. Aircraft noise also contributed to the existing levels.

Recorded Noise Levels (LAmax):
21/02/2019: Light-vehicle traffic Glebe Point Rd: 58-67 dBA, Heavy-vehicle traffic Glebe Point Rd: 69-78 dBA, Birds: 50 dBA, Aircraft: 52-68 dBA, Distant traffic Western Distributor:45-50 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period (21/02/2019 – 08/03/2019)	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	48	59	60	69
Evening	47	58	59	68
Night-time	39	51	48	60

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period (21/02/2019 – 08/03/2019)	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	58	61
Night-time (10pm-7am)	52	61

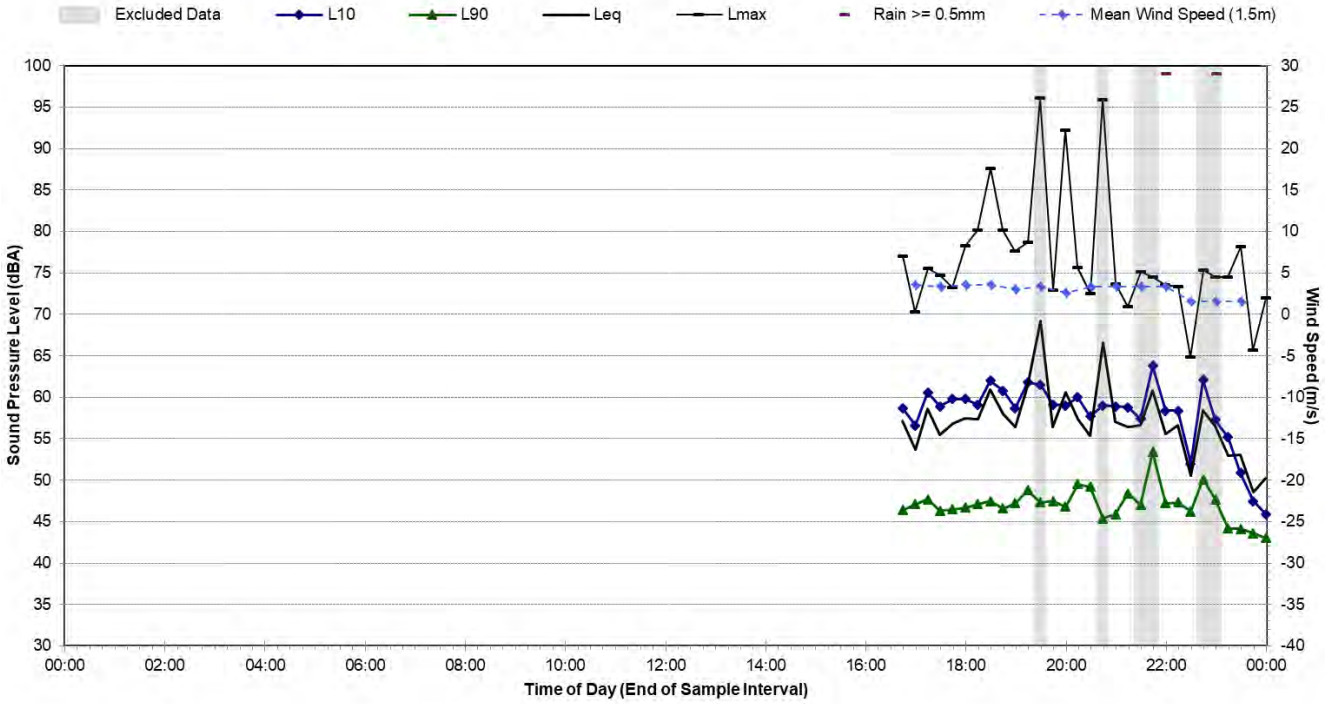
Attended Noise Measurement Results

Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
21/02/2019	15:20	47	57	78

Photo of Noise Monitoring Location

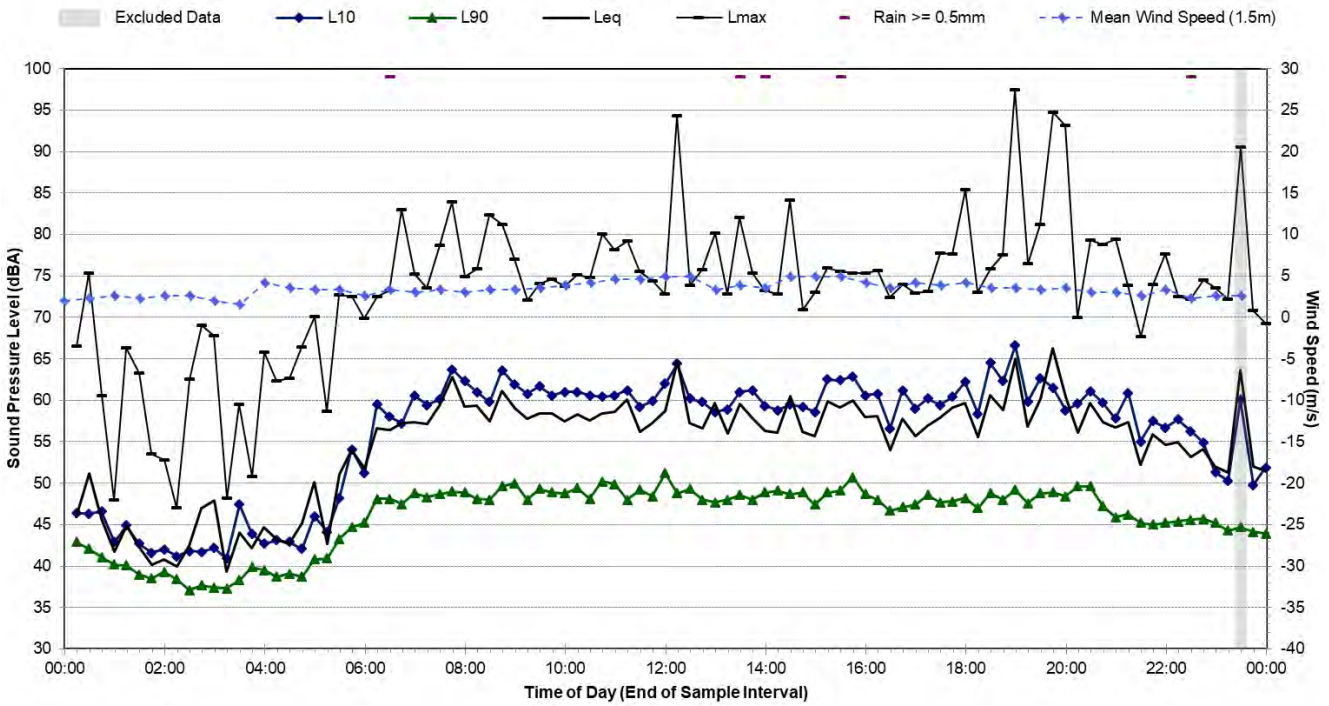
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Thursday, 21 February 2019



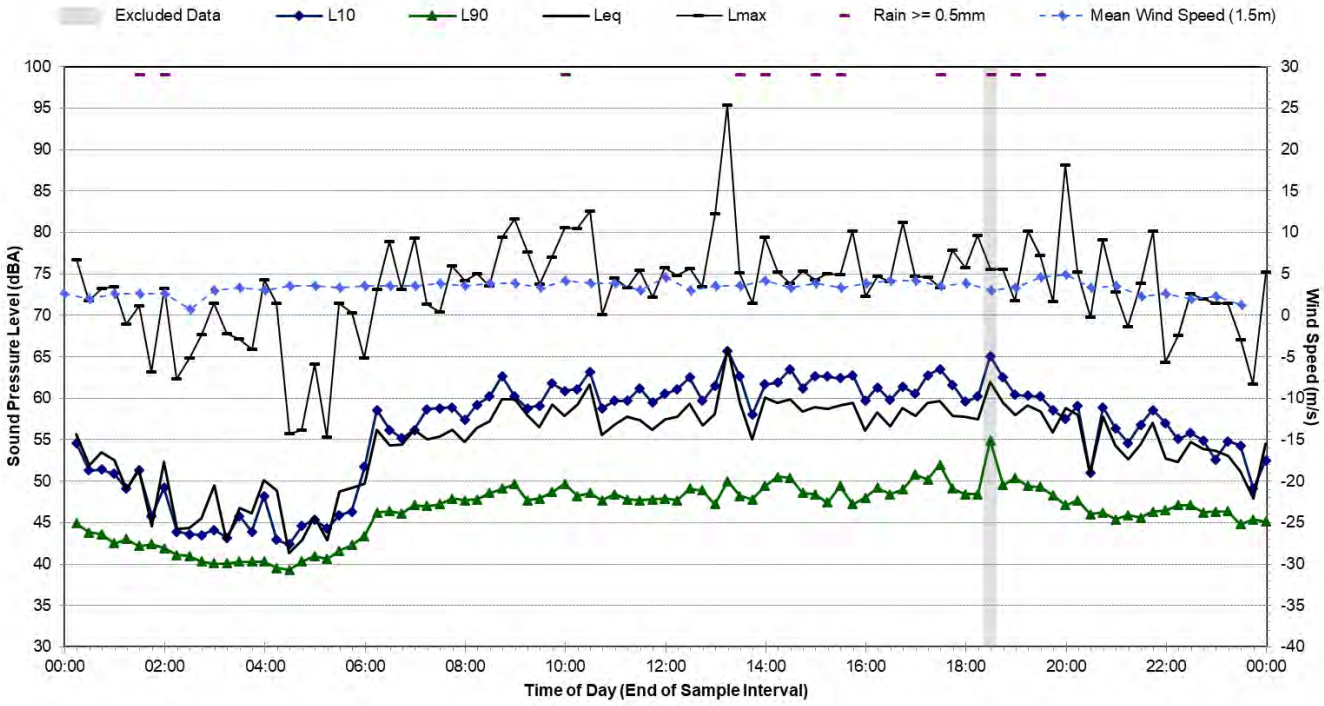
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Friday, 22 February 2019



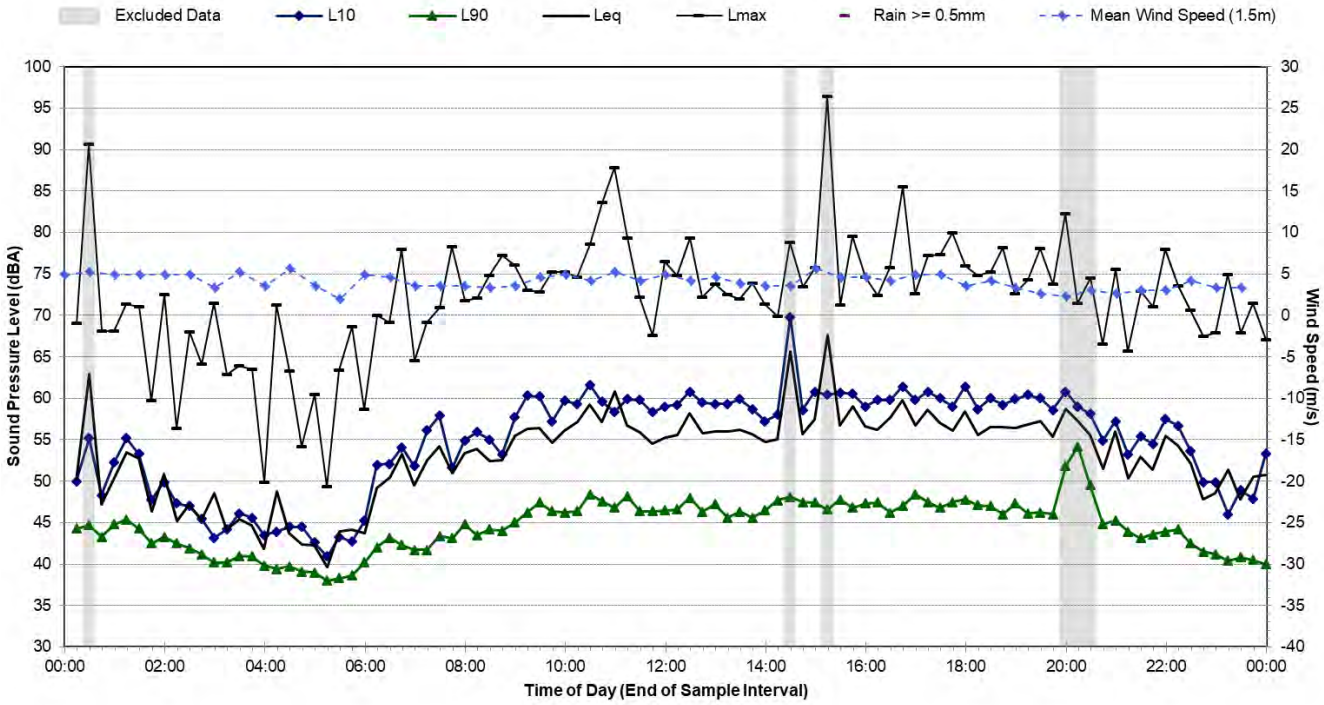
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Saturday, 23 February 2019



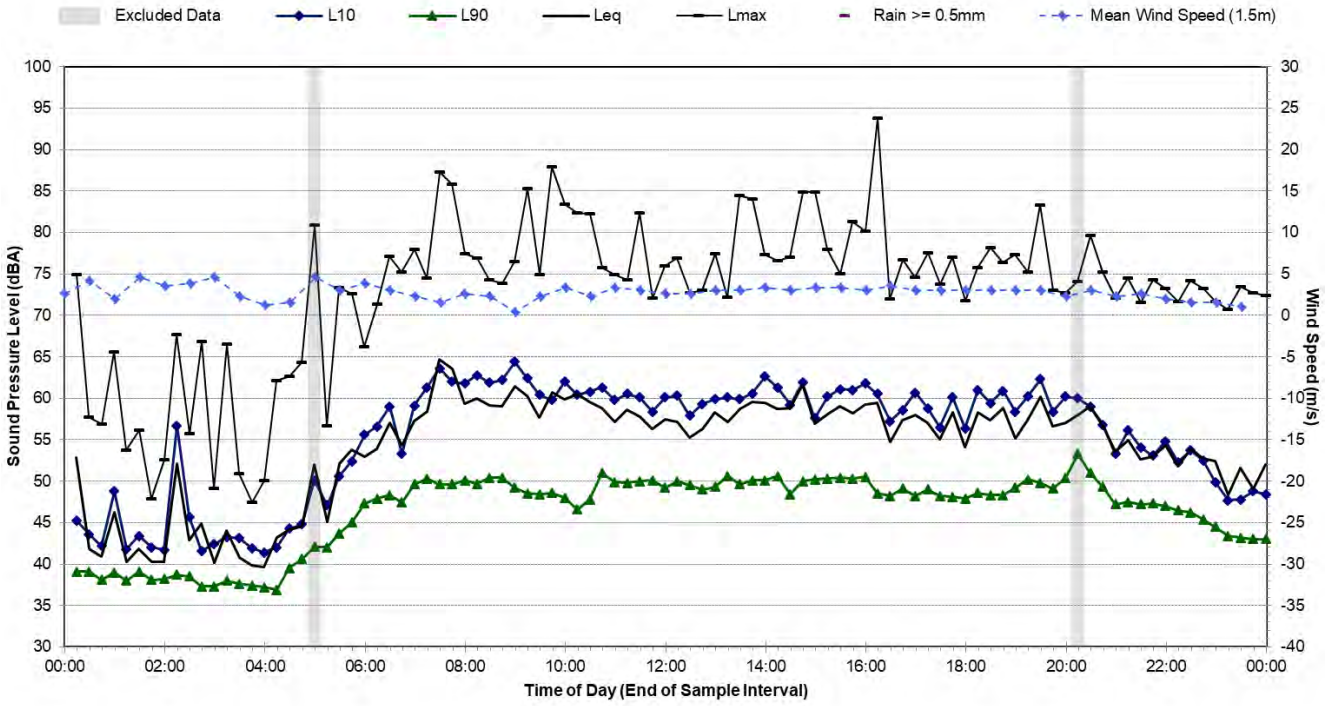
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Sunday, 24 February 2019



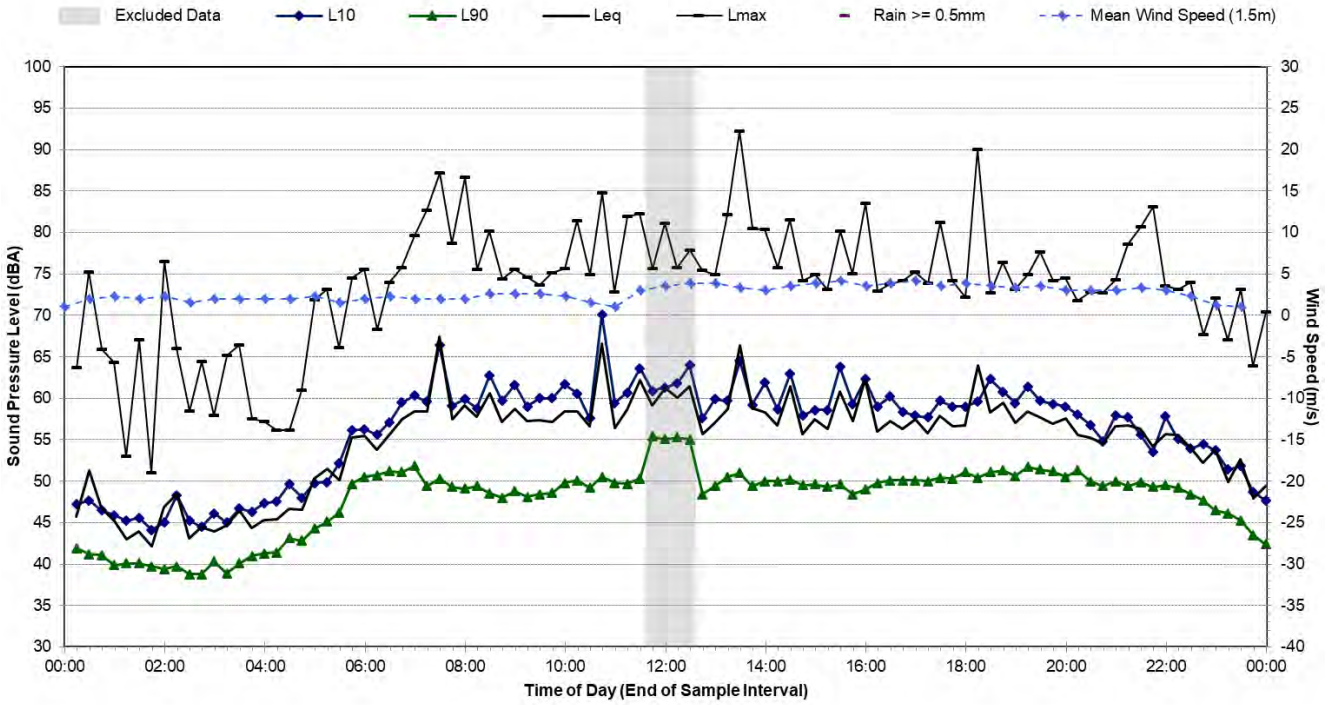
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Monday, 25 February 2019



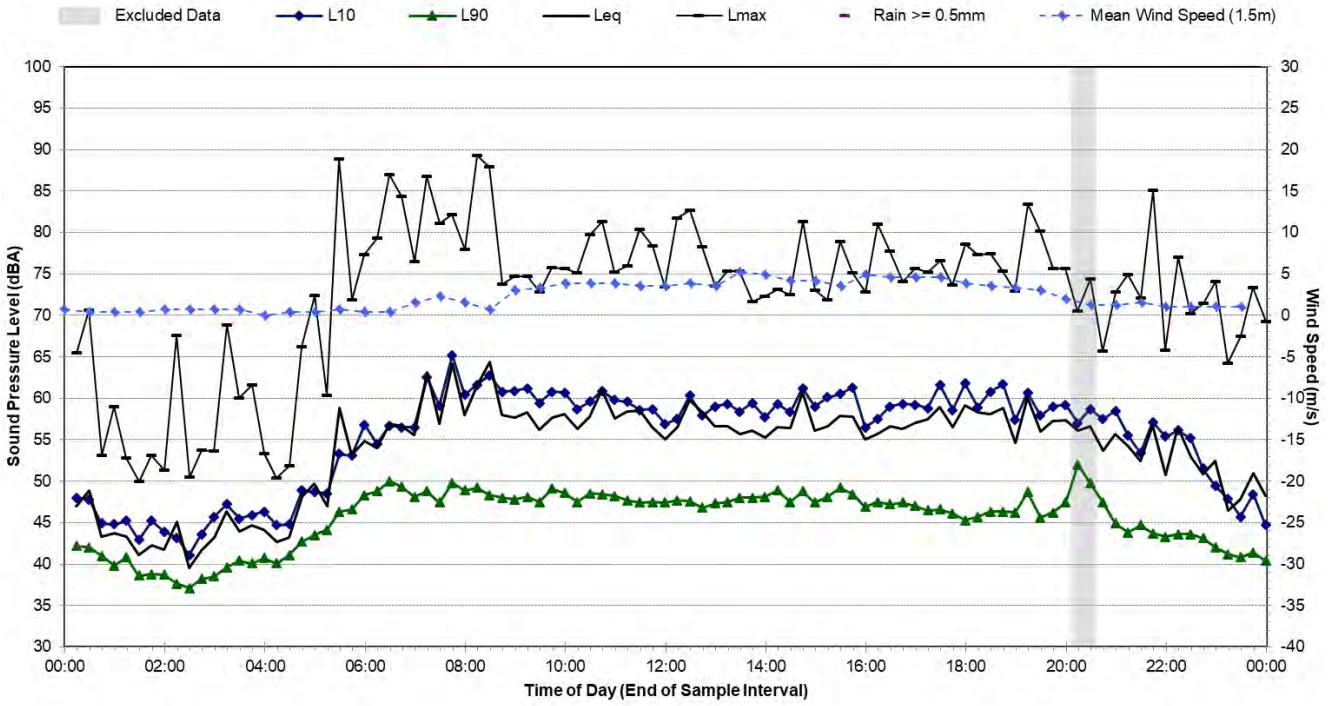
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Tuesday, 26 February 2019



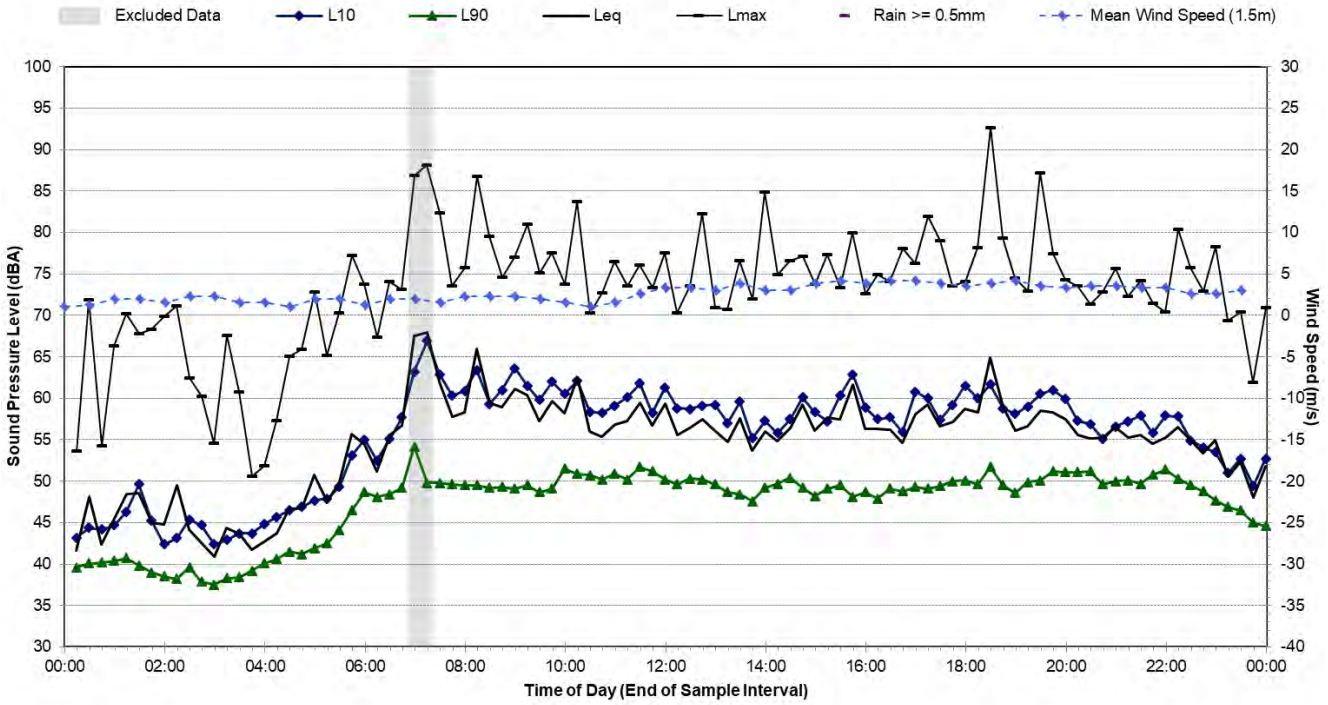
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Wednesday, 27 February 2019



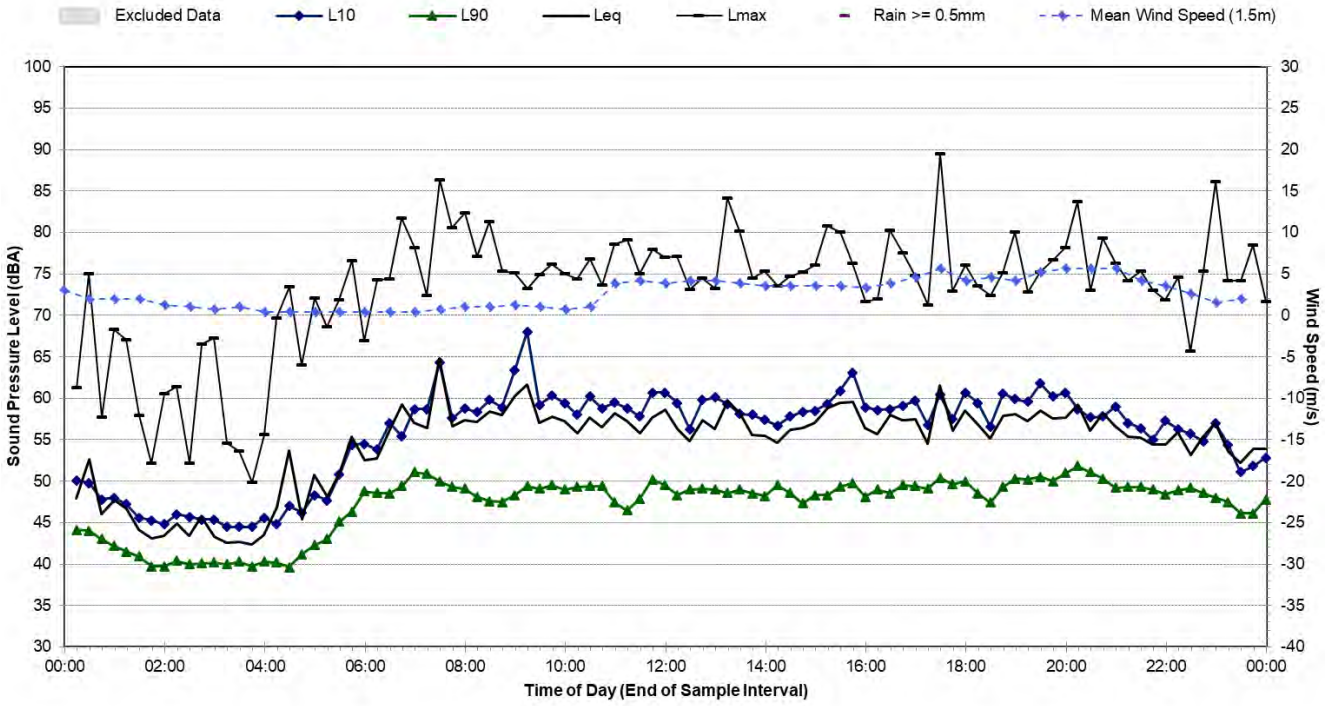
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Thursday, 28 February 2019



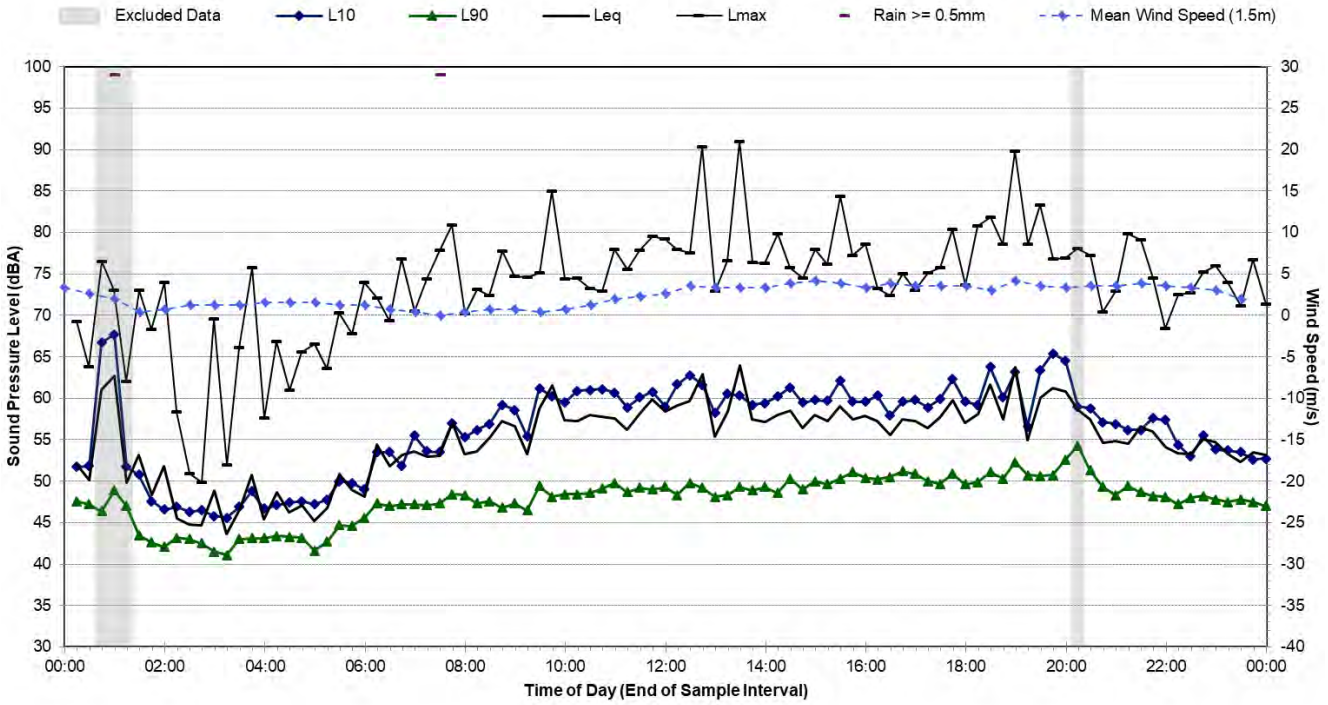
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Friday, 1 March 2019



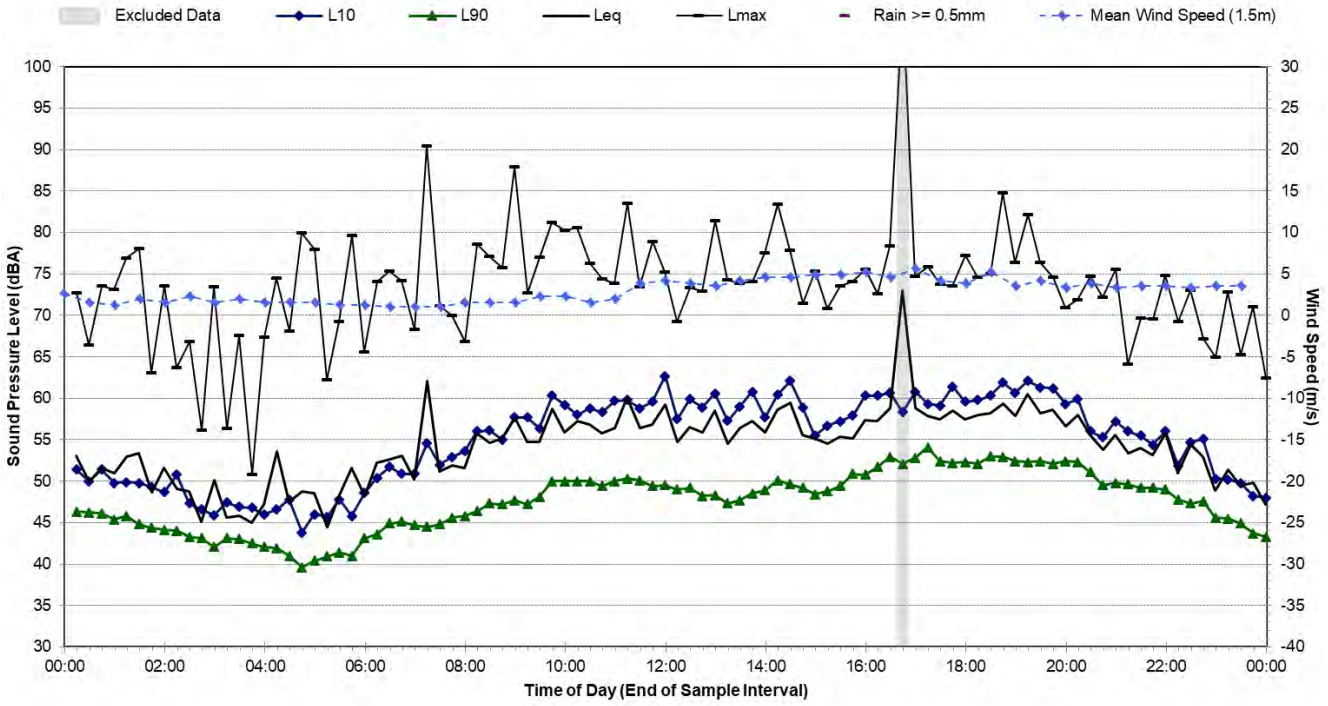
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Saturday, 2 March 2019



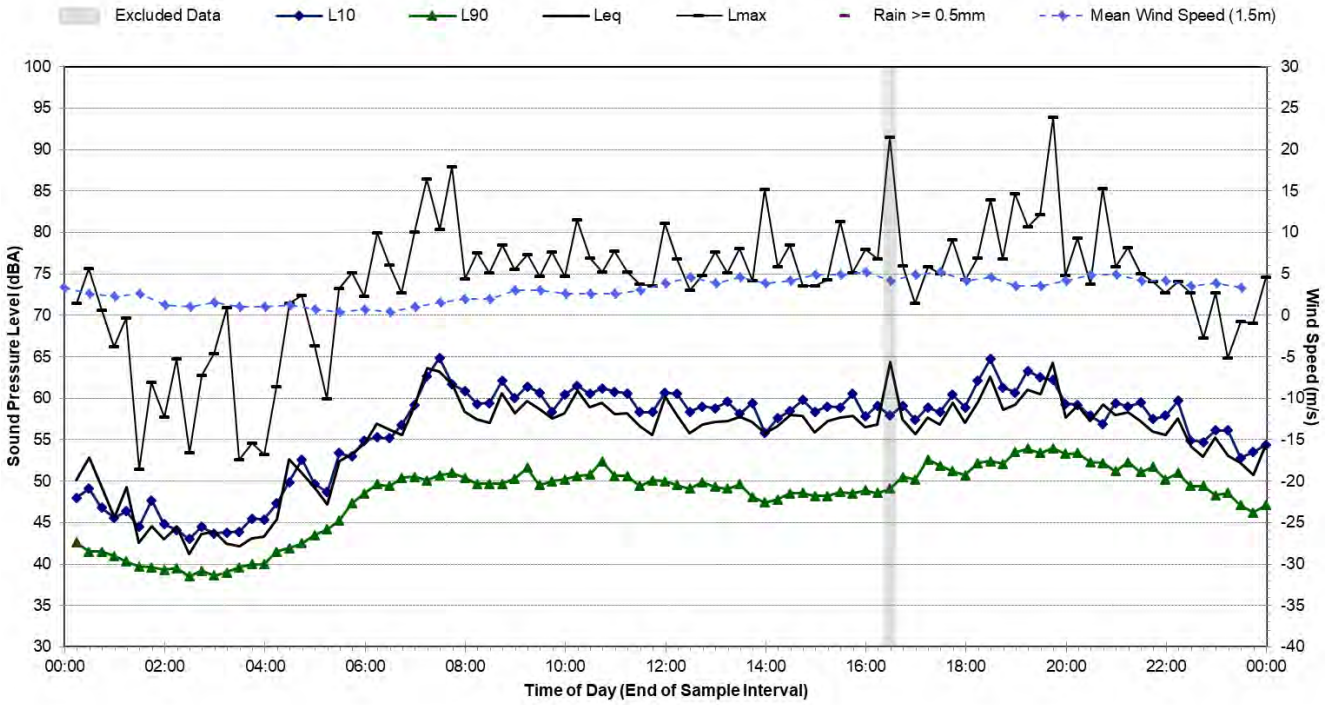
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Sunday, 3 March 2019



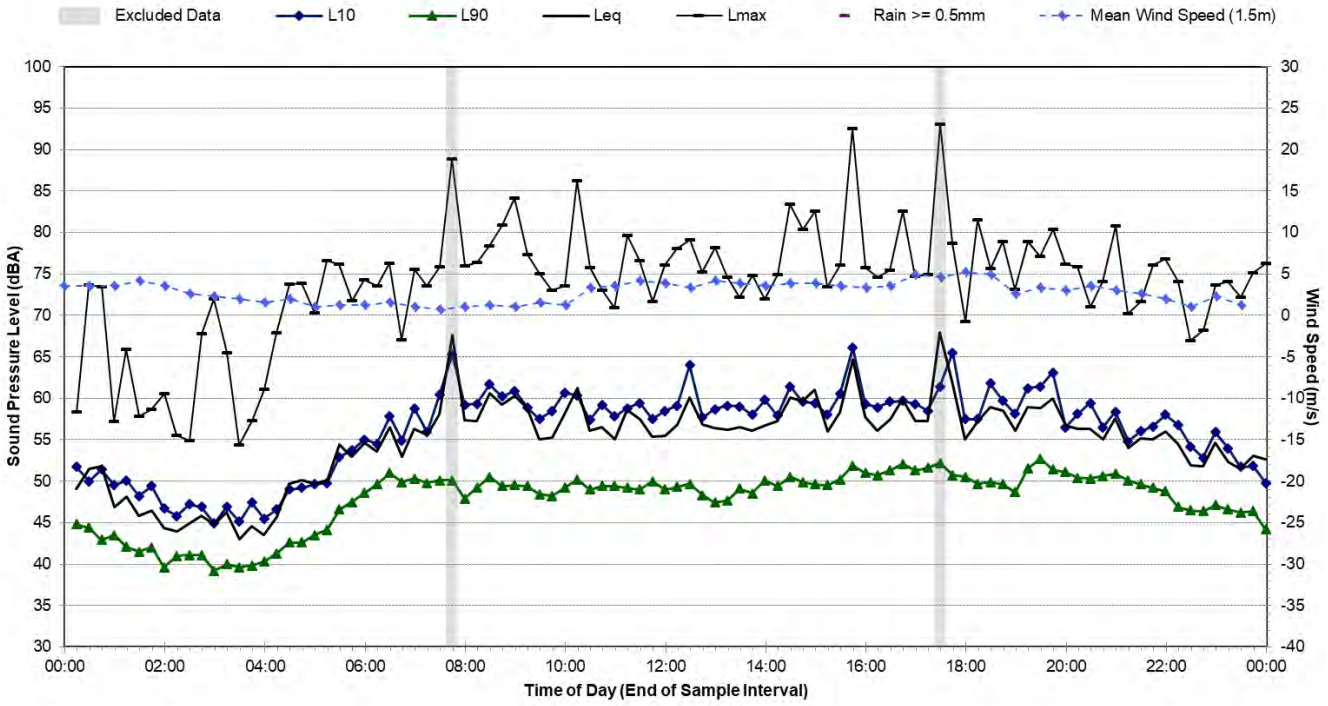
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Monday, 4 March 2019



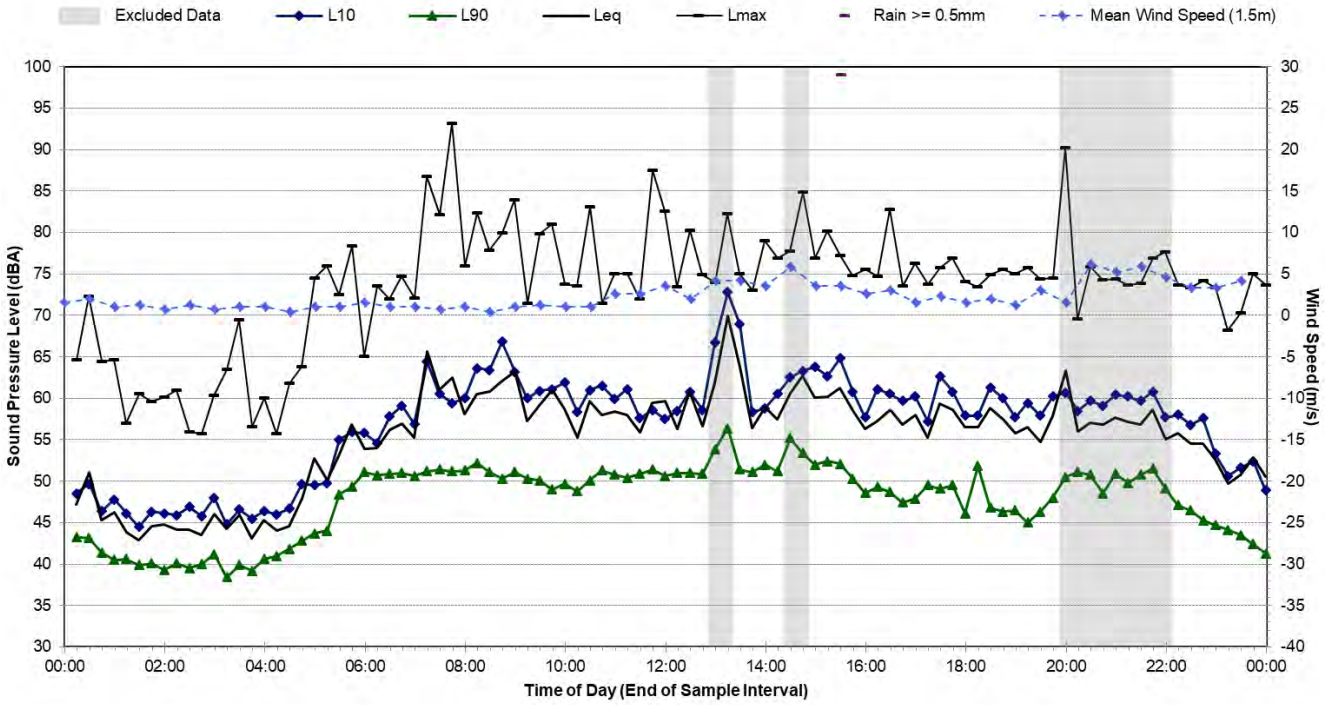
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Tuesday, 5 March 2019



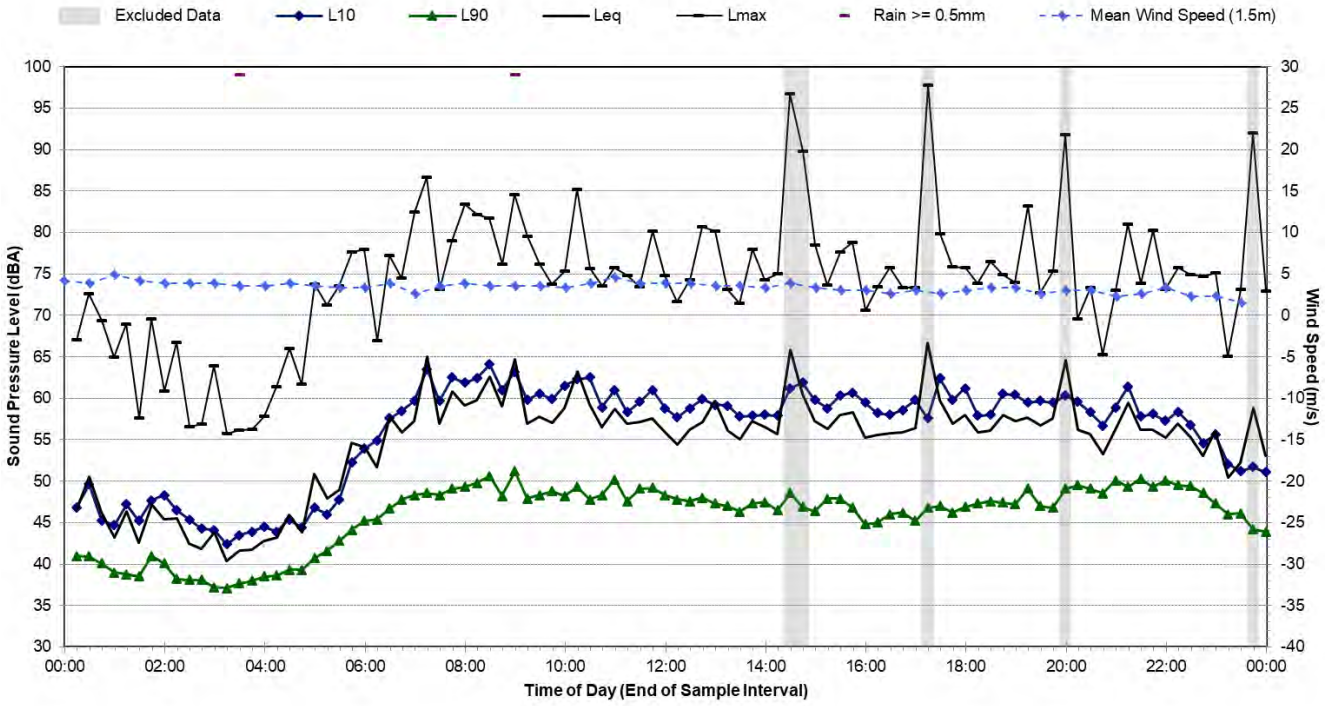
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Wednesday, 6 March 2019



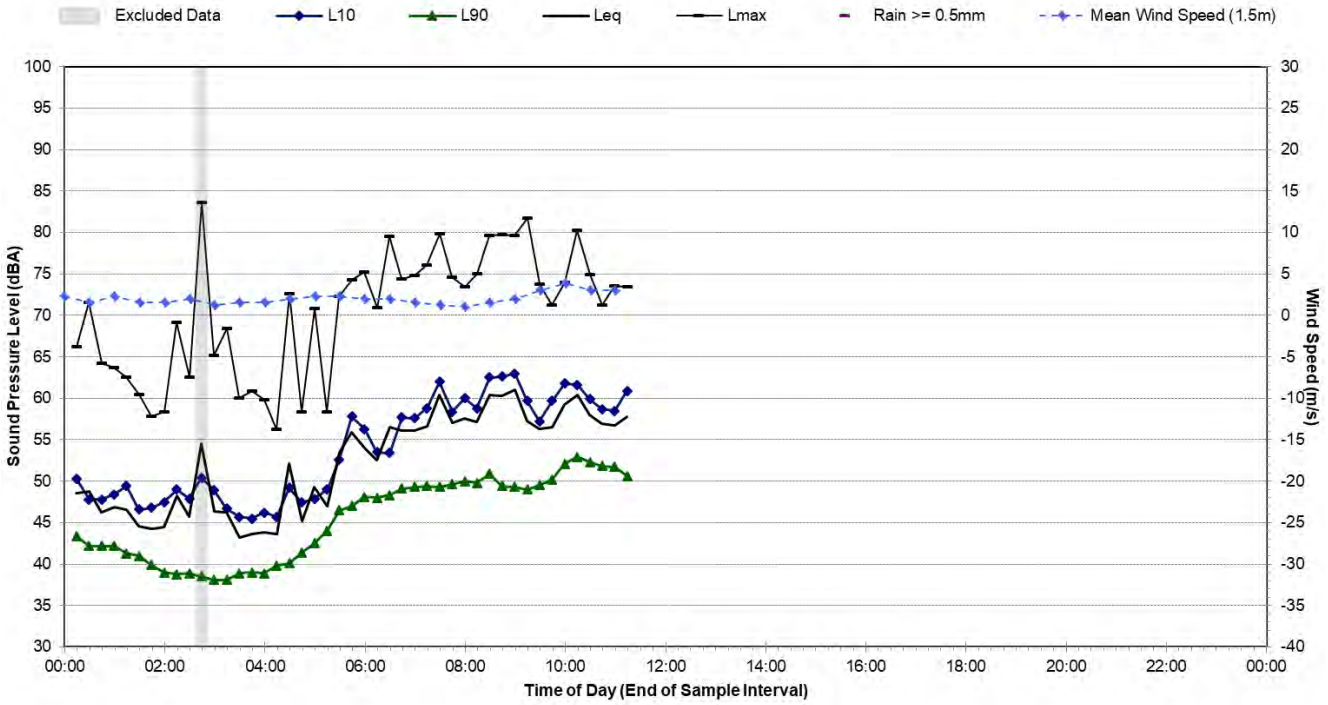
Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Thursday, 7 March 2019



Statistical Ambient Noise Levels

308 Glebe Point Rd, Glebe - Friday, 8 March 2019



APPENDIX C

Construction Scenarios and Equipment

Table 1 Equipment Lists and Sound Power Levels

Equipment		Bobcat	Chainsaw[1]	Chipper	Concrete Mixer Truck	Concrete Pump	Concrete Saw[1]	Concrete Vibrator	Dozer	Dumper	Excavator - Breaker[1]	Excavator	Front End Loader	Generator (small)	Grader	Hand Tools	Mobile Crane (100 tonne)	Paving Machine	Telehandler	Truck	Water Pump	Water Tanker
Sound Power Level[2]		104	114	120	103	106	119	102	112	95	121	100	110	93	108	94	100	105	92	108	83	98
Ref	**Scenario**																					
1a	Site clearing – De-vegetation		X	X						X		X				X						
1b	Site clearing – Demolition						X		X		X	X	X								X		
2a	Site establishment – Fencing & compounds													X		X	X		X	X		
2b	Site establishment – Land remediation											X	X							X		X
3a	Port Access Road reconfig.– Road base & paving	X													X			X		X		
3b	Port Access Road reconfig.– Concreting				X	X		X												X		
4a	Solomons Way reconfig.– Road base & paving	X													X			X		X		
4b	Solomons Way reconfig.– Concreting				X	X		X												X		
5a	Truck parking reconfig.– Road base & paving	X													X			X		X		
5b	Truck parking reconfig.– Concreting				X	X		X												X		

Note 1: Equipment classed as 'annoying' in the ICNG and requires an additional 5 dB correction.

Note 2: Sound power level data is based on the DEFRA Noise Database, RMS *Construction and Vibration Guideline* and TfNSW *Construction Noise and Vibration Strategy*.

APPENDIX D

Mitigation and Management Measures

The actions set out in the summary of the standard mitigation measures below must be implemented on all Sydney Metro construction projects.

Table 1 CNVS Summary of the Standard Mitigation and Management Measures

Action Required	Applies To	Details
Management measures		
Implementation of any project specific mitigation measures required	Airborne noise Ground-borne noise and vibration	In addition to the measures set out in this table, any project specific mitigation measures identified in the environmental assessment documentation (e.g. EA, REF, submissions or representations report) or approval or licence conditions must be implemented.
Implement community consultation measures	Airborne noise Ground-borne noise and vibration	Periodic Notification (monthly letterbox drop)1 Website Project information and construction response telephone line Email distribution list Place Managers
Register of Noise Sensitive Receivers	Airborne noise Ground-borne noise and vibration	A register of all noise and vibration sensitive receivers (NSRs) would be kept on site. The register would include the following details for • Address of receiver • Category of receiver (e.g. Residential, Commercial etc.) • Contact name and phone number
Site inductions	Airborne noise Ground-borne noise and vibration	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures
Behavioural practices	Airborne noise	No swearing or unnecessary shouting or loud stereos/radios; on site. No dropping of materials from height; throwing of metal items; and slamming of doors. No excessive revving of plant and vehicle engines Controlled release of compressed air.
Monitoring	Airborne noise Ground-borne noise and vibration	A noise monitoring program is to be carried out for the duration of the works in accordance with the Construction Noise and Vibration Management Plan and any approval and licence conditions.

[1] Detailing all upcoming construction activities at least 14 days prior to commencement of relevant works

Action Required	Applies To	Details
Attended vibration measurements	Ground-borne vibration	Attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity. Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the applicable safe-working distances.
Source controls		
Construction hours and scheduling	Airborne noise Ground-borne noise and vibration	Where feasible and reasonable, construction would be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels would be scheduled during less sensitive time periods.
Construction respite period	Ground-borne noise and vibration Airborne noise	High noise and vibration generating activities[2] may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block[3].
Equipment selection	Airborne noise Ground-borne noise and vibration	Use quieter and less vibration emitting construction methods where feasible and reasonable. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Similarly, diaphragm wall construction techniques, in lieu of sheet piling, will have significant noise and vibration benefits.
Maximum noise levels	Airborne-noise	The noise levels of plant and equipment must have operating Sound Power Levels compliant with the criteria in Table 11 of the CNVS.
Rental plant and equipment	Airborne-noise	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the criteria in Table 11 of the CNVS.
Plan worksites and activities to minimise noise and vibration	Airborne noise Ground-borne vibration	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.
Non-tonal reversing alarms	Airborne noise	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Minimise disturbance arising from delivery of goods to construction sites	Airborne noise	Loading and unloading of materials/deliveries is to occur as far as possible from NSRs Select site access points and roads as far as possible away from NSRs Dedicated loading/unloading areas to be shielded if close to NSRs Delivery vehicles to be fitted with straps rather than chains for unloading, wherever feasible and reasonable

[2] Includes jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling.

[3] "Continuous" includes any period during which there is less than a 60 minutes respite between ceasing and recommencing any of the work.

Action Required	Applies To	Details
Path controls		
Shield stationary noise sources such as pumps, compressors, fans etc.	Airborne noise	Stationary noise sources should be enclosed or shielded where feasible and reasonable whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.
Shield sensitive receivers from noisy activities.	Airborne noise	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.

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Appendix C

The Bays road relocation works – Transport and traffic assessment (Jacobs, 2020)

Memorandum

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Subject	**Appendix C: The Bays road relocation works – Transport and traffic assessment**	**Project Name**	The Bays road relocation works – Review of Environmental Factors
Authors	Richard Banzon and Phillip Truong	**Project No.**	IA199800
Date	14 April 2020		

1. Introduction

Sydney Metro is proposing to reconfigure the internal port road network at Rozelle in order to facilitate the urban renewal of the Bays West area, while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. This includes the initiatives to integrate necessary port and working harbour activities alongside long-term mixed use urban renewal and construction works for the proposed Sydney Metro West.

Port Access Road, Sommerville Road and Solomons Way currently provide access to the White Bay Cruise Terminal and other port operations located in the Glebe Island and White Bay destinations. The current arrangement of the internal port road network results in conflicts between the construction works proposed as part of the redevelopment of the Bays West area, and the need to support ongoing port and maritime uses.

To allow the internal port road network to remain operational, it is proposed to reconfigure the current arrangement of the Solomons Way, Sommerville Road and Port Access Road. The proposal would also include the relocation of the adjacent Cement Australia Truck Parking Licenced Area. The reconfiguration of the internal port road network also provides an opportunity to improve overall road safety by reducing conflicting movements.

This memorandum outlines the transport and traffic assessment of the proposal, and is structured as follows:

- Section 2 describes the proposal
- Section 3 describes the assessment methodology
- Section 4 describes the existing traffic and transport environment
- Section 5 outlines the traffic and transport impact assessment of the road relocation works during construction
- Section 6 outlines the traffic and transport impact assessment of the road relocation works during operation
- Section 7 outlines proposed traffic and transport safeguards and mitigation measures.

2. Proposal description

2.1 Overview

The proposal would generally be developed in two phases:

- Phase 1 (refer to Figure 2-1) would involve:
  - A reconfigured intersection at Port Access Road / Solomons Way / Sommerville Road, including an interim connection with the existing Port Access Road until it is relocated (as part of Phase 2)
  - Establishment of one-way traffic circulation along Solomons Way and Sommerville Road around the Glebe Island Silos
  - Relocation of the Cement Australia Truck Parking Licenced Area to the north, prior to the construction of the reconfigured intersection
- Phase 2 (refer to Figure 2-2) would involve:
  - Relocation of Port Access Road to the south-west. The relocated Port Access Road would be tied into the reconfigured intersection (established in Phase 1) and the existing Port Access Road to the north.

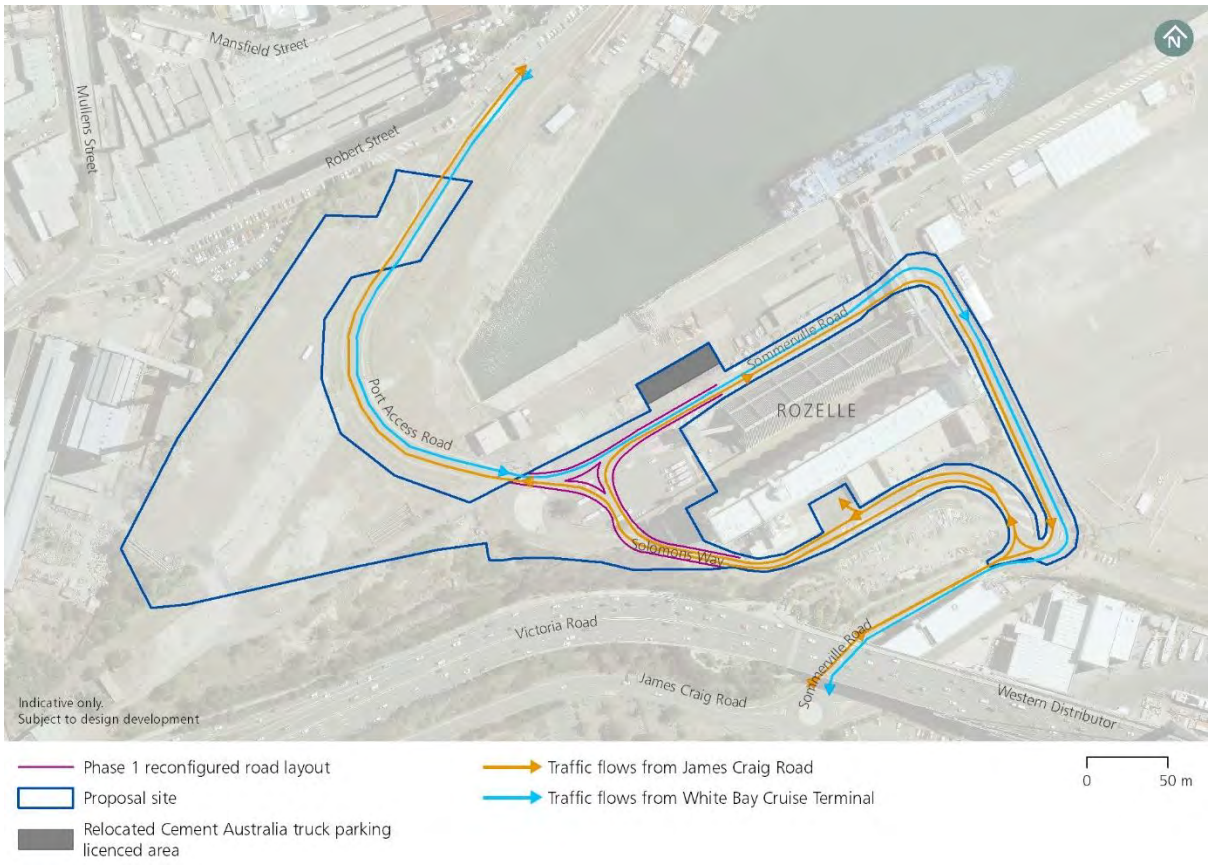

Figure 2-1: Overview of the proposal – Phase 1

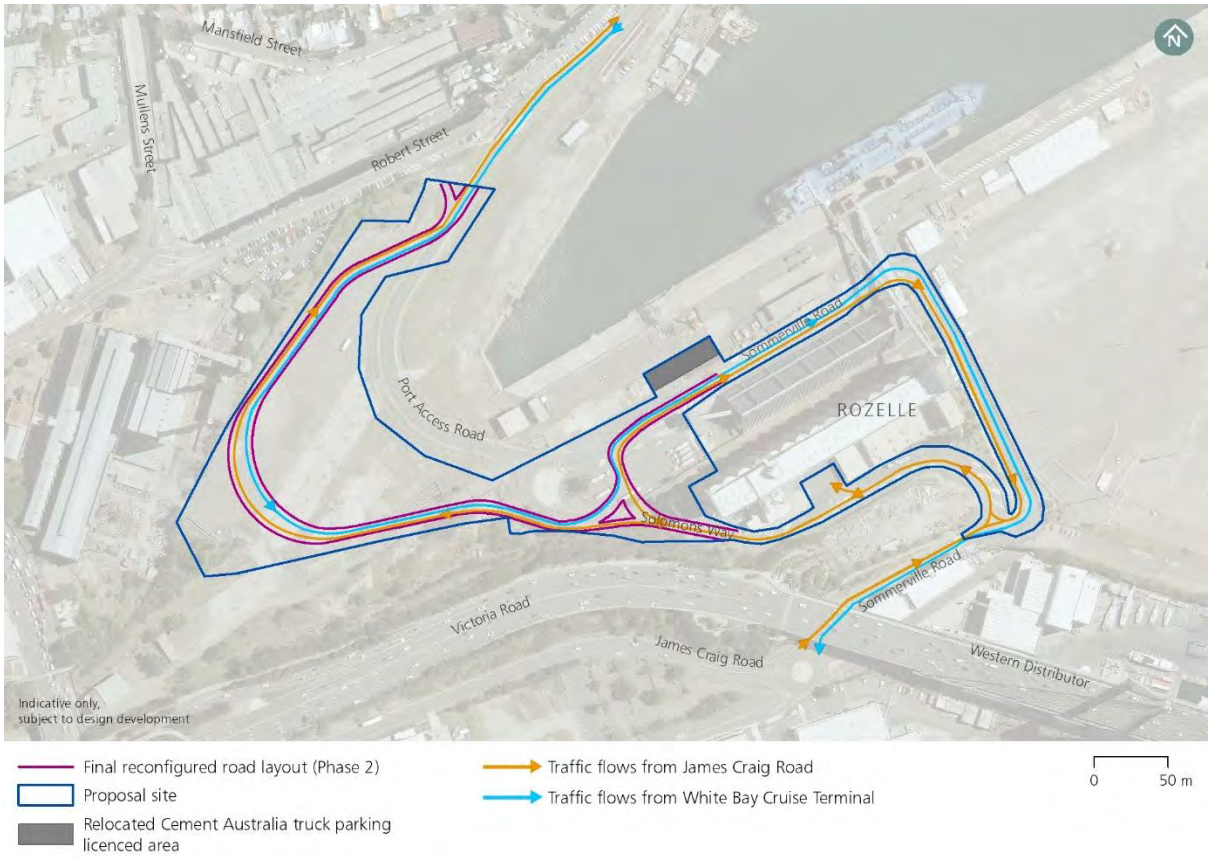

Figure 2-2: Overview of the proposal – Phase 2

Operation of the proposal would result in changed road network arrangements within the port area at Glebe Island and White Bay within The Bays West area, however it would not change the vehicle numbers or the time that vehicles operate on the network.

The changed road network is associated with the one-way circulation of Solomons Way and Sommerville Road around the Glebe Island Silos (operated by Cement Australia and Sugar Australia), the Gypsum Resources Australia buildings and the reconfigured intersection (Phase 1 of the proposal). This would provide road safety benefits by reducing conflicting movements.

The road network would further change in Phase 2 due to the relocation of Port Access Road. This would provide for ongoing access to the White Bay Cruise Terminal and port operators to the north.

To allow for these changes in road layout in Phase 1, the Cement Australia Truck Parking Licenced Area would be relocated to a location to the north-west of the Glebe Island Silos. Minor adjustments would be made to access driveways to maintain access to the revised road network.

2.2 Objectives of the proposal

The objectives of the proposal are to:

- Facilitate the urban renewal of Bays West, including the efficient delivery of construction works for the proposed Sydney Metro West and the integration of port and working harbour activities

- Maintain access to the White Bay Cruise Terminal and other port related businesses in Glebe Island and White Bay during the construction of various urban renewal and major infrastructure projects in The Bays
- Improve road safety by reducing conflicting traffic movements within the internal port road network.

2.3 Benefits of the proposal

The proposal would provide social and economic benefits by maintaining safe and reliable road access to the White Bay Cruise Terminal and other port operations in the Glebe Island and White Bay destinations during future construction works associated with the development of Bays West. This would minimise disruptions to cruise passengers, cruise operations and other port/commercial operations and allow for the efficient construction of various projects.

The proposal would also improve road safety outcomes for users of the internal port road network including customers accessing the cruise terminal by car and bus, as well as trucks accessing port and maritime operations.

3. Assessment methodology

3.1 Overall assessment approach

To assess the impact of The Bays – Road relocation works (the proposal) on the transport and traffic network, the following methodology has been used to identify and, where possible, quantify the following:

- Impacts on road network performance – assessed through the use of traffic modelling to determine the performance of the road network with and without construction vehicles associated with the proposal
- Impacts on parking, property access, public transport, pedestrians and cyclists – assessed through an analysis of existing provisions and a comparison with provisions during construction
- Cumulative impacts – assessed through the use of traffic modelling to determine the performance of the road network with construction vehicle movements associated with the proposal and with other major projects expected to be occurring at the same time as the proposal based on current publicly available information and in consultation with other sections of Transport for NSW.

3.2 Traffic modelling approach

To assess the impacts of the proposal on road network performance, traffic modelling has been undertaken of proposed construction vehicle routes between the construction site and the nearest arterial road inclusive of the arterial road interface. The approach to traffic modelling undertaken for this assessment aligns with the *Traffic Modelling Guidelines* (Roads and Maritime, 2013) and includes the following broad steps:

- Development of calibrated and validated base models to align with existing operational conditions along each construction vehicle route
- Development of future year base models to align with anticipated operational conditions in the year of peak construction activity for the proposal (2021)

- Application of anticipated construction traffic demands to the future year base models to enable the identification of potential impacts on road network performance.

Models were developed using the Vissim traffic modelling software package (version 11.0). Vissim was used to provide consistency with existing modelling undertaken for the other transport projects in The Bays / Rozelle area.

Vissim is a microsimulation traffic modelling software package that uses dynamic, stochastic, discrete time modelling techniques to simulate the movement of individual vehicles based on car-following, lane-changing and gap acceptance algorithms that are updated several times every second. These vehicle-to-vehicle interactions provide the basis for calculating delays. Its flexibility allows the modelling of complex traffic operations. The advantage of this type of modelling is that the build-up and dissipation of queues and their effect on surrounding congestion and travel times is sensitively modelled. This type of modelling can provide a better representation of queuing, congestion and delays in at-capacity urban networks compared to static traffic modelling software packages.

The traffic modelling was undertaken for the morning and evening peak periods only, which is consistent with the standard approach for this type of assessment. The peak traffic periods represent a worst-case scenario as during these periods the road network experiences the maximum background traffic demand and the available spare capacity of the road network is at its most limited. Construction vehicle volumes are anticipated to be higher outside the morning and evening weekday peak periods; however, the number of movements would remain relatively low and be within the range of daily variations in traffic volumes on the road network when compared to background traffic.

3.2.1 Performance indicators

The performance of a road network is largely dependent on the operating performance of intersections, which form critical capacity control points. The performance indicators that are reported for this assessment include:

- Intersection Level of Service – based on criteria outlined in Table 3-1 and defined in the *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002). The average delay assessed for signalised intersections is for all movements. The average delay assessed for priority (sign-controlled) intersections is for the worst movement and is expressed in seconds per vehicle
- Maximum queue length on each approach (in metres).

It is generally accepted that when intersection performance falls to Level of Service E, investigations should be initiated to determine if suitable remediation can be provided. However, limited road capacity and high demand mean that Level of Service F is regularly experienced by motorists, particularly during peak periods.

Table 3-1: Intersection Level of Service criteria

Level of Service	Average delay per vehicle (seconds/vehicle)	Traffic signals and roundabouts
A	Less than 15	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals, incidents will cause delays Roundabouts require other control mode
F	Over 70	Extra capacity required

Source: Guide to Traffic Generating Developments (Roads and Traffic Authority, 2002)

4. Existing transport and traffic environment

4.1 Road network overview

James Craig Road and Sommerville Road provide access to existing maritime-related land uses in Rozelle Bay, Glebe Island and White Bay (including the White Bay Cruise Terminal). These land uses are connected by a series of internal roads that also include Solomons Way and Port Access Road. Solomons Way currently operates as a one-way road between Sommerville Road and Port Access Road. At its northern end, operational port areas are also accessible from Robert Street, which is a collector road. There are planning approval restrictions on the use of Robert Street by certain vehicles.

The Crescent (between City West Link and Victoria Road) is a major arterial road and forms part of the A4 corridor that links Sydney CBD with the Inner West and the M4 Motorway corridor for travel to Sydney Olympic Park, Parramatta, Blacktown, Penrith and the Blue Mountains. The Crescent also provides access to Victoria Road, ANZAC Bridge, Western Distributor and the Sydney Harbour Bridge. In the context of the metropolitan road freight hierarchy, The Crescent (between City West Link and Victoria Road), City West Link and Victoria Road are classified as tertiary freight routes.

Tertiary freight routes provide connections from the general local road system and the lower order elements of the State Road system to the primary and secondary freight routes (Transport for NSW, 2011). Tertiary freight routes generally carry lower volumes of heavy vehicles (less than 2,000 heavy vehicles per day) and road freight volumes.

The intersection of James Craig Road and The Crescent is signalised with all movements permitted. On street parking is not permitted on James Craig Road, Sommerville Road and The Crescent (between City West Link and Victoria Road).

The future arterial road network within the vicinity of the proposal will be modified to accommodate the M4-M5 Link, which is part of the WestConnex program of works. These changes are anticipated to be complete by 2023.

Additional road network changes are proposed as part of the Western Harbour Tunnel within the vicinity of the portal on City West Link. This project is currently in its planning stages and if approved, would connect to WestConnex M4-M5 Link and the surface road network in Rozelle.

4.2 Traffic volumes and patterns

Traffic volumes are high on City West Link, The Crescent and Victoria Road in both directions. These are major arterial roads that carry volumes between 1,500 and 3,940 vehicles per hour in each direction. Eastbound volumes on City West Link and The Crescent are generally higher than the traffic volumes in the opposite direction during the morning peak hour. Traffic volumes are about the same in both directions on these roads during the evening peak hour. On Victoria Road, a distinct southbound peak direction is evident during the morning peak hour while a northbound peak direction is evident during the evening peak hour.

Substantially lower volumes of up to 330 vehicles per hour are experienced on James Craig Road.

Approximate peak hour midblock volumes on key access roads are shown in Table 4-1.

Table 4-1: Existing peak hour traffic volumes by direction (2016)

Road	Direction	Morning peak hour volume (vehicles)	Evening peak hour volume (vehicles)
The Crescent west of James Craig Road	Eastbound	2,630	2,990
	Westbound	2,240	2,990
City West Link west of The Crescent	Eastbound	1,830	2,260
	Westbound	1,500	2,250
James Craig Road east of The Crescent	Eastbound	330	130
	Westbound	160	210
Victoria Road north of The Crescent	Northbound	1,920	3,690
	Southbound	3,940	2,930

Source: Transport for NSW

4.3 Intersection performance

As detailed in Section 3, traffic modelling was completed to ascertain the performance of key intersections during the morning and evening peak hours in the vicinity of the proposal. The results are presented in Table 4-2, and represent the performance of the intersections in the absence of the proposal and other projects within and in the vicinity of The Bays.

Modelled intersection performance indicates that the following intersections perform poorly at Level of Service F:

- City West Link / The Crescent during the morning peak hour
- City West Link / Catherine Street during the morning peak hour.

Poor performance of these intersections is a result of high volumes of through traffic conflicting with right turning and cross-street traffic, in conjunction with substantial queuing along City West Link in the eastbound direction.

Table 4-2: Modelled peak hour existing intersection performance (2016)

Intersection and peak hour	Intersection throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
Victoria Road / Robert Street					
Morning	5,876	48	D	NB	-
				EB	250
				SB	240
				WB	160
Evening	6,721	39	C	NB	-
				EB	205
				SB	125
				WB	160
Victoria Road / The Crescent					
Morning	9,741	32	C	NB	-
				EB	155
				SB	270
				WB	260
Evening	11,551	36	C	NB	-
				EB	150
				SB	250
				WB	>500

Intersection and peak hour	Intersection throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of Service	Maximum queue length by directional approach (metres)	
The Crescent / James Craig Road					
Morning	5,190	29	C	NB	45
				EB	215
				SB	-
				WB	180
Evening	6,521	9	A	NB	40
				EB	165
				SB	-
				WB	175
City West Link / The Crescent					
Morning	5,076	>100	F	NB	265
				EB	>500
				SB	-
				WB	155
Evening	6,699	32	C	NB	205
				EB	255
				SB	-
				WB	200
City West Link / Catherine Street					
Morning	3,926	73	F	NB	65
				EB	390
				SB	105
				WB	255
Evening	5,174	32	C	NB	70
				EB	40
				SB	95
				WB	425

4.4 Public transport network

There are no train stations located in close proximity to the proposal. The light rail network is accessible at the Rozelle Bay light rail stop, located about 500 metres south of the site. The Rozelle Bay light rail stop is part of the L1 Dulwich Hill Line.

Victoria Road is a major bus corridor adjacent to the proposal. Short bus only lanes are provided at the Victoria Road / The Crescent intersection on the westbound approach and the northbound kerbside departure lane between The Crescent and Lilyfield Road. A morning peak period bus lane operates on Victoria Road in the southbound direction.

Two bus operators, Transit Systems and Sydney Buses, provide services via 23 bus routes that travel on Victoria Road and provide connections between the Sydney CBD, the Inner West, northern suburbs and western suburbs. Nearly all buses travel on the Western Distributor to and from Sydney CBD, with one bus route operating on collector and arterial roads through Glebe and via the Parramatta Road bus corridor to access the Sydney CBD. Transit Systems also operates two additional bus routes accessible from Darling Street, located about 900 metres north of the site, and another bus route is accessible from Glebe Point Road near the southern side of Rozelle Bay, about 1.2 kilometres south of the site.

School buses also service the area, with 20 school bus routes.

The public transport network surrounding the proposal is shown in Figure 4-1.

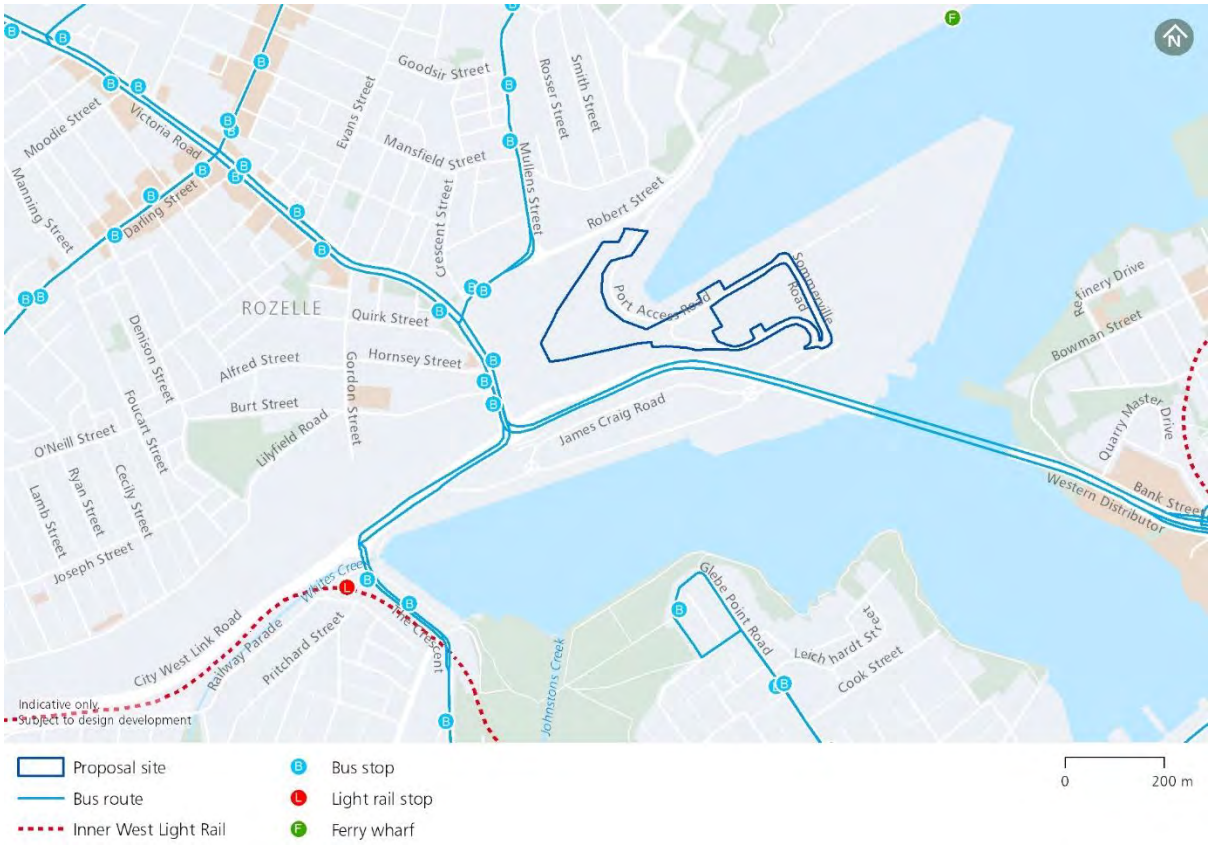

Figure 4-1: Public transport network surrounding the proposal

4.5 Other transport facilities

The White Bay Cruise Terminal and White Bay berth 4 are located about one kilometre to the north-east of the proposal site and serve cruise ships when the Overseas Passenger Terminal at Circular Quay is occupied. The White Bay Cruise Terminal and White Bay berth 4 also serve smaller cruise ships and cruise ships that use Australian ports only. When the White Bay Cruise Terminal and/or White Bay berth 4 are in operation, access is provided via Sommerville Road and Port Access Road. Captain Cook Cruises operates a ferry service between the White Bay Cruise Terminal and Barangaroo on days when cruise ships are berthed at the White Bay Cruise Terminal.

4.6 Active transport network

Footpaths are provided on both sides of Victoria Road, James Craig Road and Robert Street. Port Access Road, Solomons Way and sections of Sommerville Road are not open to the general public, however there are some formal footpaths on sections of one side of both roads. Surrounding the site, signalised pedestrian crossings are provided at the east approach of the Victoria Road / Robert Street intersection, the west approach of the Victoria Road / The Crescent intersection and the east approach of the James Craig Road / The Crescent intersection. Medians are provided at the roundabout on

James Craig Road east of The Crescent, allowing pedestrians to undertake a staged movement if required.

Pedestrian activity within the immediate vicinity of the proposal is low to non-existent given the marine and industrial land uses present. However, the predominately residential areas in surrounding suburbs such as Rozelle, Balmain, Glebe and Annandale have a well-developed pedestrian network.

The cycle network surrounding the proposal is shown in Figure 4-2 and is well established with provision of a number of off-road shared paths and on-road cycle routes. Off-road shared paths are provided at the following locations:

- Eastern side of Victoria Road
- Western side of Victoria Road north of Wellington Street
- Northern side of the ANZAC Bridge
- Northern side of James Craig Road
- Southern and eastern side of The Crescent
- Robert Street east of Buchanan Street
- Railway Parade near Rozelle Bay light rail stop
- Throughout Jubilee Park
- Western side of Whites Creek.

On-road cycle routes are generally on local and collector roads including Balmain Road, Darling Street, Lilyfield Road and Robert Street serving east-west trips. Local north-south cycle connections to these roads include Crescent Street, Gordon Street, Denison Street and Cecily Street. The area is well serviced by the regional cycle network, either in the east-west direction via ANZAC Bridge, Lilyfield Road or Balmain Road, or in the north-south direction via Victoria Road, The Crescent and Young Street.

A number of changes to the active transport network are proposed as part of the approved WestConnex M4-M5 Link project. These include the following:

- Removal of two existing pedestrian bridges, one near the east approach at the Victoria Road / The Crescent intersection and the other adjacent to Lilyfield Road. The bridge adjacent to Lilyfield Road would be replaced with an underpass below Victoria Road that would connect Lilyfield Road and the ANZAC Bridge shared path.
- Rozelle Rail Yards link: provision of an off-road active transport east-west connection between The Bay Run and Greenway in the west to ANZAC Bridge and Sydney CBD in the east
- Whites Creek link: provision of a link between Callan Park, Rozelle Rail Yards and Parramatta Road via a predominately off-road active transport link along Whites Creek to Easton Park
- Rozelle land bridge: provision of a link from Bicentennial Park and Glebe foreshore to Rozelle Rail Yards and Easton Park, providing north-south connectivity between Glebe, Annandale, Rozelle and Balmain.

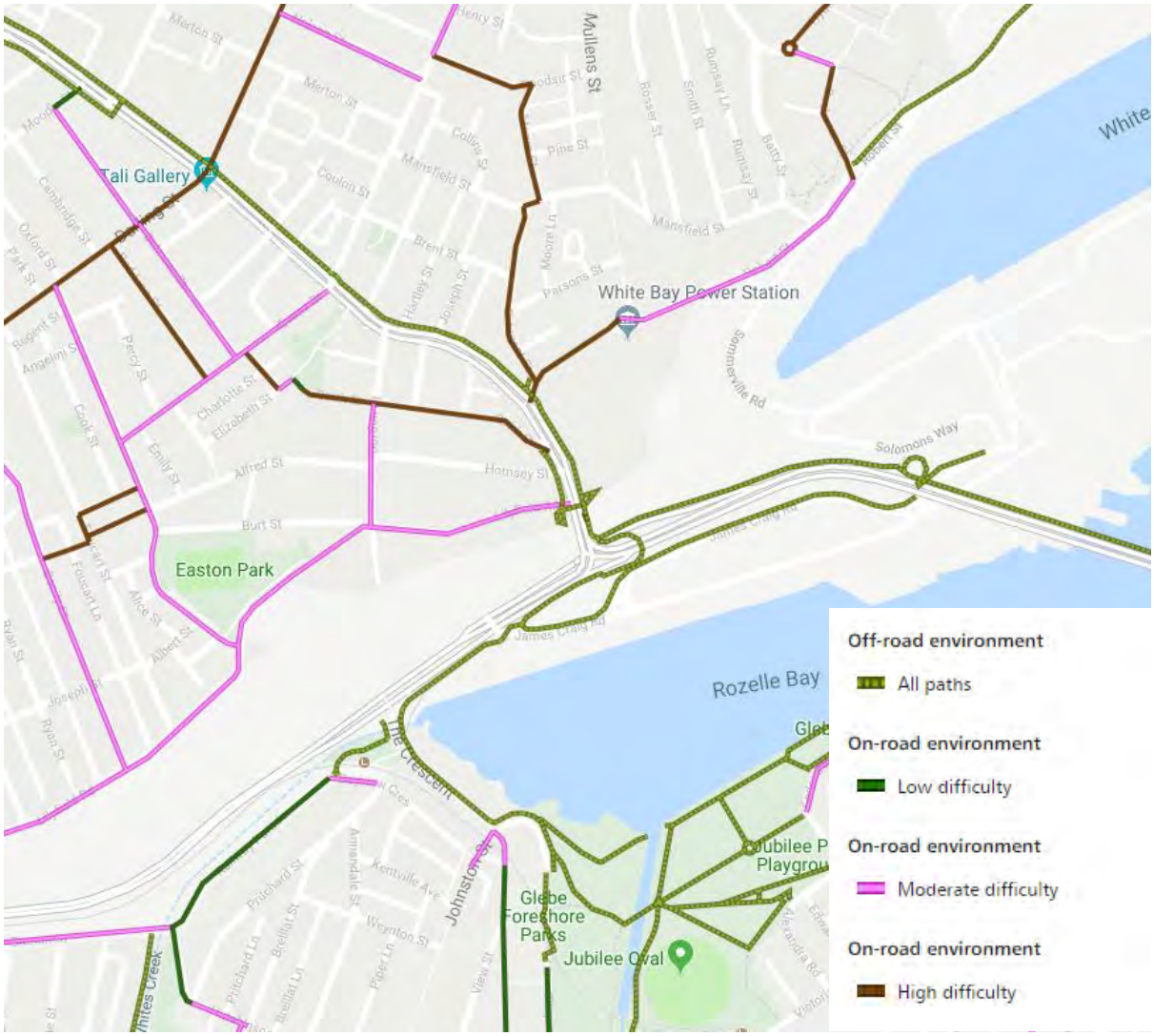

Figure 4-2: Cycle network surrounding the proposal

Source: Cycleway Finder (Roads and Maritime Services, 2019)

5. Construction

5.1 Key assumptions

5.1.1 Construction hours

Construction activities would generally be carried out during standard construction hours. These hours are:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- No works on Sundays or public holidays.

Works outside of standard construction hours would be required to allow for two traffic switches during intersection upgrades. To limit impacts to tenants within the port area, traffic switches would occur during weekends (on non-cruise ship days) and include 24 hour works. These works would be managed in accordance with principles and procedures included in the Sydney Metro Construction Traffic Management Framework (CTMF). This would include consideration of construction noise impacts associated with vehicle movements to/from the proposal site and potential increases in road traffic along haul routes.

Other activities which may be carried out activities that may be carried out outside of the standard daytime construction hours would include:

- Work determined to comply with the relevant noise management level at the nearest sensitive receiver
- The delivery of materials outside approved hours as required by the NSW Police or other authorities for safety reasons
- Emergency situations where it is required to avoid the loss of lives and properties and/or to prevent environmental harm
- Situations where agreement is reached with affected receivers.

No other out-of-hours works are anticipated as part of the proposal.

5.1.2 Construction worker parking

All staff parking would be accommodated on-site and not on surrounding local streets.

5.1.3 Construction phases

Construction of the proposal would comprise of the key activities outlined in Table 5-1 as part of each phase.

The construction methodology may vary from the indicative construction method provided in this section due to ongoing detailed design refinements, the identification of additional constraints, community and stakeholder feedback, and construction contractor requirements.

Table 5-1: Construction phases and indicative activities

Phase	Key construction activities
Phase 1	• Establishment of construction compound including for a site office and material storage • Installation of environmental controls such as erosion and sediment controls • Site clearing and any necessary contaminated land remediation works around Port Access Road, Sommerville Road and Solomons Way intersection • Establishment of relocated Cement Australia Truck Parking Licenced Area to the north including kerb and guttering, driveway crossover, drainage, lighting and line marking • Construction of reconfigured intersection at Port Access Road and Solomons Way, including a temporary interim connection with the existing Port Access Road until it is relocated (as part of Phase 2). This would require traffic switches which would be completed out-of-hours on a weekend. • Line marking and signage at Port Access Road, Sommerville Road and Solomons Way to establish one-way traffic circulation • Reinstatement of driveway access to Cement Australia facilities
Phase 2	• Site clearing and any necessary contaminated land remediation works around proposed relocated Port Access Road • Construction of relocated Port Access Road including concrete island and tie-ins at the southern end, signs and lines • Construction of tie-in between the northern section of the relocated Port Access Road and the existing Port Access Road • Demobilisation of site compounds

5.1.4 Construction program

Construction is proposed to commence in late 2020 and be completed in 2021. The total duration of construction is anticipated to be around 11 months. Therefore, the peak construction year that has been assessed is 2021.

A high-level construction program is provided in Table 5-2.

Table 5-2: Construction program

Activity	2020		2021								
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Phase 1											
Site establishment											
Site clearing											
Cement Australia Truck Parking relocation											
Port Access Road / Solomons Way / Sommerville Road intersection reconfiguration											
Phase 2											
Port Access Road relocation											

5.1.5 Construction site location and access

The construction site is bound by Victoria Road, Robert Street and White Bay. Roads forming part of the construction vehicle route include City West Link, The Crescent, James Craig Road, Solomons Way, Sommerville Road and Port Access Road. Figure 5-1 shows proposed access and egress routes to the construction site.

5.1.6 Construction vehicles

Construction vehicles would access and egress the construction site during standard construction hours. The number of construction vehicles to and from the site per hour are:

- Light vehicles: 10 vehicles per hour throughout the day
- Heavy vehicles: Four vehicles per hour during the morning and evening road network peak period (being 6am to 9am, and 4pm to 6pm), 10 vehicles per hour at all other times.

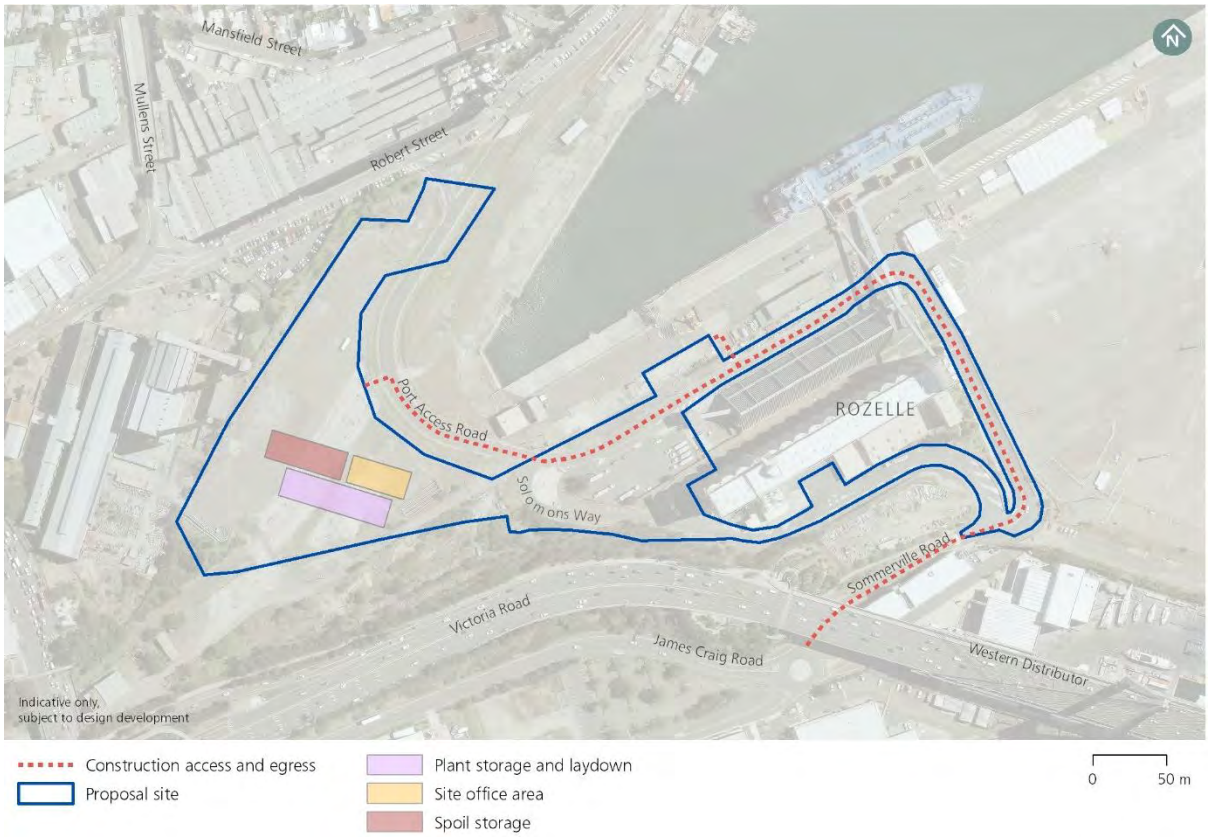

Figure 5-1: Ancillary facilities and site access

5.2 Impacts on road network performance

Intersection performance results under the '2021 without construction' (without construction vehicles associated with the proposal) and '2021 with construction' (with construction vehicles associated with the proposal) scenarios are summarised in Table 5-3 for the morning and evening peak hours.

Modelled intersection performance with construction traffic indicates that all intersections forming part of the construction vehicle access and egress route would perform at the same Level of Service compared to the scenario without construction traffic.

Analysis of modelled intersection performance results shows that at some locations, the addition of construction traffic would result in a small reduction in intersection throughput and / or maximum queue length due to the following factors:

- Additional 'latent' or 'unreleased' demand, which is traffic that is not able to be assigned in the model during the morning and/or evening peak period. These trips are assumed to still exist, however, these trips would be delayed and not completed until after the peak period, effectively increasing the duration of the peak period

- Fewer vehicles passing through an intersection due to the addition of construction-related heavy vehicles, which have a slower acceleration profile compared to light vehicles. This would likely result in an increase to average delay.

In reality, from an operational perspective, the performance of an intersection where the modelling results show a small reduction in intersection throughput and / or maximum queue length would remain very similar with and without construction traffic.

Table 5-3: Modelled peak hour intersection performance during construction

Intersection and peak hour	2021 without construction					2021 with construction				
	Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)		Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)	
Victoria Road / Robert Street										
Morning	6,323	36	C	NB	-	6,321	37	C	NB	-
				EB	250				EB	250
				SB	260				SB	260
				WB	100				WB	95
Evening	6,632	49	D	NB	-	6,605	49	D	NB	-
				EB	220				EB	220
				SB	195				SB	165
				WB	165				WB	165
Victoria Road / The Crescent										
Morning	10,953	21	B	NB	-	10,953	21	B	NB	-
				EB	155				EB	155
				SB	265				SB	265
				WB	305				WB	315
Evening	10,965	42	C	NB	-	10,951	43	C	NB	-
				EB	160				EB	145
				SB	255				SB	260
				WB	>500				WB	>500

Intersection and peak hour	2021 without construction					2021 with construction				
	Through put (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)		Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)	
The Crescent / James Craig Road										
Morning	6,075	12	A	NB	35	6,091	12	A	NB	40
				EB	210				EB	215
				SB	-				SB	-
				WB	185				WB	180
Evening	6,104	12	A	NB	40	6,118	13	A	NB	45
				EB	160				EB	180
				SB	-				SB	-
				WB	180				WB	180
City West Link / The Crescent										
Morning	6128	26	B	NB	245	6,142	26	B	NB	250
				EB	>500				EB	465
				SB	-				SB	-
				WB	185				WB	170
Evening	6,261	34	C	NB	195	6,280	34	C	NB	185
				EB	255				EB	255
				SB	-				SB	-
				WB	210				WB	215
City West Link / Catherine Street										
Morning	4,945	36	C	NB	120	4,947	37	C	NB	125
				EB	350				EB	355
				SB	105				SB	105
				WB	295				WB	305
Evening	4,999	46	D	NB	75	5,018	46	D	NB	75
				EB	45				EB	45
				SB	95				SB	95
				WB	>500				WB	>500

5.3 Impacts on parking and property access

Port Access Road, Sommerville Road and Solomons Way provide access to the White Bay Cruise Terminal and to a number of port related operations and businesses, including at Glebe Island. Throughout all phases of construction, these roads would generally remain open to traffic. However, there would be temporary lane closures and occasional periods of access interruption, outside peak periods or peak periods for the White Bay Cruise Terminal, which would be managed in consultation with Port Authority of NSW and other port stakeholders.

During Phase 1, temporary traffic arrangements would be implemented to maintain existing road operations with Port Access Road. This would include the installation of temporary lines and signs and the construction of permanent and temporary link elements at the reconfigured Port Access Road / Sommerville Road / Solomons Way intersection, as well as the implementation of the one way circuit on Sommerville Road and Solomons Way (refer to Figure 2-1). While this would alter the manner in which traffic circulates on the internal port road network, the impact of traffic arrangements during Phase 1 on travel distance and travel time is considered minimal.

During construction of the relocated Cement Australia Truck Parking Licenced Area, access to the existing truck parking facilities would be maintained. The relocated Cement Australia Truck Parking Licenced Area would be completed prior to the commencement of roadworks that directly impact the current parking location.

5.4 Impacts on the public transport network

The Crescent is used by buses and also forms part of the proposed construction vehicle route. Minimal impacts to buses are expected and would be limited to a potential minor increase in travel time due to the additional construction vehicles on the road network. There would be no impacts to bus stops.

No impacts to the light rail network or the White Bay Cruise Terminal are anticipated during construction.

5.5 Impacts on the active transport network

No impacts to pedestrians and cyclists would occur given that shared paths adjacent to James Craig Road and The Crescent would remain open during construction.

5.6 Cumulative construction impacts

Projects which have been considered for the cumulative construction assessment are those which fall within the construction footprint of the proposal, as well as construction vehicle routes that use roads near the proposal within the assessed peak year of construction (2021). Projects deemed relevant for the cumulative construction assessment and considered in this section are:

- WestConnex M4-M5 Link
- Western Harbour Tunnel.

The White Bay truck marshalling yard for Sydney Metro City & Southwest would fall directly within the construction footprint of the proposal. However, the use of the truck marshalling area would conclude prior to the commencement of proposal. As such, this activity has not been included in the cumulative construction assessment.

The Glebe Island Multi-User Facility is expected to be under construction in 2021. If construction were to overlap with the proposal, the expected volumes during peak periods would be low and would unlikely alter the outcomes of this assessment.

5.6.1 Cumulative construction vehicles

The number of construction vehicles generated by the proposal, WestConnex M4-M5 Link and Western Harbour Tunnel during the morning and evening peak hour is provided in Table 5-4.

Table 5-4: Number of cumulative construction vehicles

Project	Construction site	Morning peak hour		Evening peak hour	
		Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
The Bays – Road relocation works	The Bays – Road relocation works	10	4	10	4
WestConnex M4-M5 Link	Rozelle civil and tunnel site	100	23	350	23
	Victoria Road civil site	0	2	0	2
	Iron Cove Link civil site	15	2	140	2
Western Harbour Tunnel	Rozelle Rail Yards construction support site	45	14	30	14
	Victoria Road construction support site	41	37	71	37
	White Bay construction support site	40	63	140	63

5.6.2 Impacts on road network performance

Intersection performance results under the '2021 with proposal construction only' (with construction vehicles generated by the proposal only) and '2021 with cumulative construction' (with construction vehicles generated by the proposal and construction vehicles generated by other projects identified above) scenarios are summarised in Table 5-3 for the morning and evening peak hours.

Modelled intersection performance with cumulative construction traffic indicates that the following intersections would experience a deterioration in Level of Service:

- Victoria Road / The Crescent during the evening peak hour – from Level of Service C to F
- The Crescent / James Craig Road during the evening peak hour – from Level of Service A to B
- City West Link / The Crescent during the evening peak hour – from Level of Service C to D
- City West Link / Catherine Street during the evening peak hour – from Level of Service D to E.

Analysis of modelled intersection performance results shows that at some locations, the addition of cumulative construction traffic would result in a large reduction in intersection throughput in the PM peak due to:

- Reductions in green time for vehicles on major movements (e.g. City West Link eastbound and westbound) to accommodate the movement of construction vehicles
- Additional 'latent' or 'unreleased' demand, which is traffic that is not able to be assigned in the model during the morning and/or evening peak period. These trips are assumed to still exist, however, these trips would be delayed and not completed until after the peak period, effectively increasing the duration of the peak period
- Fewer vehicles passing through an intersection due to the addition of construction-related heavy vehicles, which have a slower acceleration profile compared to light vehicles. This would likely result in an increase to average delay.

In reality, from an operational perspective, this means that in the PM peak the road network is already operating at capacity and the cumulative impact of construction vehicles would result in increased intersection delays and queue lengths. Consultation would be carried out with Transport Coordination and other relevant sections of Transport for NSW to manage the potential road network impacts as described in Section 7.

Table 5-5: Modelled peak hour intersection performance during cumulative construction

Intersection and peak hour	2021 with proposal construction only					2021 with cumulative construction				
	Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)		Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)	
Victoria Road / Robert Street										
Morning	6,321	37	C	NB	-	6,387	37	C	NB	-
				EB	250				EB	250
				SB	260				SB	260
				WB	95				WB	105
Evening	6,605	49	D	NB	-	6,171	51	D	NB	-
				EB	220				EB	220
				SB	165				SB	250
				WB	165				WB	160

Intersection and peak hour	2021 with proposal construction only					2021 with cumulative construction				
	Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)		Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)	
Victoria Road / The Crescent										
Morning	10,953	21	B	NB	-	10,991	21	B	NB	-
				EB	155				EB	125
				SB	265				SB	265
				WB	315				WB	325
Evening	10,951	43	C	NB	-	9,884	71	F	NB	-
				EB	145				EB	130
				SB	260				SB	260
				WB	>500				WB	>500
The Crescent / James Craig Road										
Morning	6,091	12	A	NB	40	6,145	12	A	NB	55
				EB	215				EB	205
				SB	-				SB	-
				WB	180				WB	180
Evening	6,118	13	A	NB	45	5,595	22	B	NB	65
				EB	180				EB	160
				SB	-				SB	-
				WB	180				WB	180
City West Link / The Crescent										
Morning	6,142	26	B	NB	250	6,245	25	B	NB	215
				EB	465				EB	315
				SB	-				SB	25
				WB	170				WB	200
Evening	6,280	34	C	NB	185	6,004	48	D	NB	195
				EB	255				EB	225
				SB	-				SB	55
				WB	215				WB	215

Intersection and peak hour	2021 with proposal construction only					2021 with cumulative construction				
	Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)		Throughput (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approach (metres)	
City West Link / Catherine Street										
Morning	4,947	37	C	NB	125	4,973	35	C	NB	120
				EB	355				EB	345
				SB	105				SB	105
				WB	305				WB	310
Evening	5,018	46	D	NB	75	4,987	61	E	NB	75
				EB	45				EB	40
				SB	95				SB	95
				WB	>500				WB	>500

5.6.3 Other impacts

Construction activities due to WestConnex M4-M5 Link and Western Harbour Tunnel primarily impact the road network. Impacts on parking, access, public transport and active transport due to these projects do not directly interface with this proposal, and as such, no cumulative impacts are not expected to occur.

6. Operation

The final road network arrangement (see Figure 2-2) may lead to a minor travel time impact for vehicles using the internal port road network as traffic would be diverted onto the new, relocated Port Access Road which may result in an additional travel distance of about 200 metres.

Vehicles that currently access land uses to the east of The Bays via James Craig Road south of Sommerville Road would not be impacted by the proposal. The proposal would not change public access arrangements for the White Bay Cruise Terminal. That is, vehicles would continue to access and depart the terminal via James Craig Road.

The new one-way circuit would improve road safety by reducing the number of conflicting movements at the Solomons Way / Port Access Road intersection and the Sommerville Road / Port Access Road intersection.

The new Cement Australia Truck Parking Licenced Area would not result in a loss of parking spaces compared to the current parking area, however it would result in a slightly longer travel for vehicles using the facility. Overall no negative parking impacts are anticipated during operation of the proposal.

Overall operational impacts are anticipated to be minimal given the potential minor increase in travel time. Therefore, no mitigation measures are required for operation.

7. Management and mitigation measures

The Sydney Metro Construction Traffic Management Framework (CTMF) would be applied to the proposal. The framework provides an overall strategy and approach for construction traffic management, an outline of the traffic management requirements and processes that would be applied, and interactions with relevant stakeholders (including working collaboratively with other stakeholders to manage cumulative impacts). It establishes the traffic management processes and acceptable criteria to be considered and followed when managing impacts to the road network.

A summary of mitigation measures is included in Table 7-1.

Table 7-1: Mitigation measures

Impact	Safeguard	Phase
Traffic (wayfinding)	Clear wayfinding and safety signage would be provided to direct and guide vehicles not related to the proposal during road construction works. This would be supplemented by Variable Message Signs to advise drivers of traffic diversions, speed restrictions or alternative routes.	Phase 1 Phase 2
Adjacent property access	Access to Cement Australia and other leased areas would be maintained during construction in consultation with Port Authority of NSW and lease holders.	Phase 1 Phase 2
Changes to the network	Port Authority of NSW and lease holders would be notified in advance of any proposed road changes within the port area, and the potential for short term delays.	Phase 1 Phase 2
Congestion	Construction site traffic would be managed to minimise movements during peak periods.	Phase 1 Phase 2
Parking	All staff parking would be provided on-site and not on surrounding local streets.	Phase 1 Phase 2

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Appendix D

The Bays road relocation works – Statement of heritage impact (Artefact, 2020)

The Bays - Road relocation works

Statement of Heritage Impact

Report to Sydney Metro

April 2020

artefact

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EXECUTIVE SUMMARY

Background

Sydney Metro is proposing to reconfigure the internal port road network at Rozelle in order to facilitate the urban renewal of the Bays West area, while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. This includes the initiatives to integrate necessary port and working harbour activities alongside long-term mixed use urban renewal and construction works for the proposed Sydney Metro West.

Port Access Road, Sommerville Road and Solomons Way currently provide access to the White Bay Cruise Terminal and other port operations located in the Glebe Island and White Bay destinations. The current arrangement of the internal port road network results in conflicts between the construction works proposed as part of the redevelopment of Bays West, and the need to support maritime uses.

To allow the internal port road network to remain operational, it is proposed to reconfigure the current arrangement of the Solomons Way, Sommerville Road and Port Access Road. The proposal would also include the relocation of the adjacent Cement Australia Truck Parking Licenced Area. The reconfiguration of the internal port road network also provides an opportunity to improve overall road safety by reducing conflicting movements.

This assessment has been prepared to support the Review of Environmental Factors (REF) for the proposal and assesses the potential impact to Non-Aboriginal heritage. Sydney Metro, a NSW Government agency, is the proponent and determining authority for this proposal under Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Conclusions

There is one State Heritage Register (SHR) listed item and three Section 170 (S170) registered heritage item located within the study area:

- White Bay Power Station (SHR 01015)
- Glebe Island Silos (SHI 4560016)
- White Bay Power Station (Inlet) Canal (SHI 4560062)
- Glebe Island Dyke Exposures (SHI 4560056)

The proposed works are expected to have a minor direct, minor indirect and potential indirect impact on the State significant White Bay Power Station and a minor direct, minor potential direct and indirect impact on the White Bay Power Station (Inlet) Canal; whilst having a neutral impact on the locally significant Glebe Island Silos and Glebe Island Dyke Exposures.

The direct impacts to the White Bay Power Station are a result of proposed works inside the curtilage of the heritage item. The proposed works are not considered likely to directly impact structural remains. Indirect impacts are relating to the visual impact and setting of the heritage item, and potential indirect impact relate to potential vibration levels when activities are close to the heritage item. The potential for direct impacts to the White Bay Power Station (Inlet) Canal would be confirmed once further detail is available on the relative depth of the heritage item to the proposed excavation works.

It is likely that impact to buried former rail infrastructure and reclamation fill which may be of local significance would occur as a result of excavation associated with road construction. Impacts to archaeological relics are unlikely.

Recommendations

Heritage Act **requirements**

As proposed works within the study area include minor direct impacts on SHR listed curtilage (White Bay Power Station SHR Listing No. 01015) including construction of a road partially within the curtilage, approval or an exemption from approval for the proposed works must first be gained from the Heritage Council of NSW (Heritage Council) or delegate (Heritage DPC). The proposal has been assessed as having an overall minor impact on the heritage significance of the White Bay Power Station. The proposed works may be consistent with the standard exemptions under Section 57(2) of the *Heritage Act 1977*. It is therefore necessary to obtain a Section (s) 60 permit or a Section 57 exemption from approval from the Heritage Council (or delegate) prior to works commencing within the State heritage curtilage.

Archaeological management

It is unlikely that archaeological relics would be impacted by the works, therefore a Section 139 exception or Section 140 permit are not required for the portion of the study area outside the SHR curtilage (White Bay Power Station SHR Listing No. 01015). As archaeological remains (works) of potential local significance may be impacted, a limited program of archaeological monitoring and recording would be undertaken in order to manage these archaeological remains to their significance. An Archaeological Work Method Statement would be prepared to outline the requirements of archaeological monitoring and recording. In locations where archaeological monitoring is not undertaken subsurface works would be progressed under the Sydney Metro Unexpected Heritage Finds Procedure.

Photographic Archival Recording

A program of photographic archival recording would be required within the SHR curtilage of those areas to be affected by the proposal, including views and vistas, in accordance with NSW Heritage Office's *How to Prepare Archival Records of Heritage Items (1998)* and *Photographic Recording of Heritage Items Using Film or Digital Capture (2006)*.

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FIGURES

TABLES

1.0 INTRODUCTION

1.1 Background

Sydney Metro is proposing to reconfigure the internal port road network at Rozelle in order to facilitate the urban renewal of Bays West while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. This includes long-term urban renewal initiatives for the Bays West area and works for various future developments within the locality, including critical works for the proposed Sydney Metro West.

Port Access Road, Sommerville Road and Solomons Way currently provide access to the White Bay Cruise Terminal and other port operations located in the Glebe Island and White Bay destinations. The current arrangement of the internal port road network results in conflicts between the construction works proposed as part of the redevelopment of The Bays, and the need to support ongoing port and maritime uses.

To allow the internal port road network to remain operational, it is proposed to reconfigure the current arrangement of the Solomons Way, Sommerville Road and Port Access Road. The proposal would also include the relocation of the adjacent Cement Australia Truck Parking Licenced Area. The reconfiguration of the internal ports road network also provides an opportunity to improve overall road safety by reducing conflicting movements.

This assessment has been prepared to support the Review of Environmental Factors (REF) for the proposal and assesses the potential impact to non-Aboriginal heritage. Sydney Metro is the proponent and determining authority for this proposal under Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 Proposal Location

The proposal site (referred to as the study area) is generally bound by Robert Street and nearby warehouse development to the north, Johnston Bay to the north-east, the Glebe Island Silos to the east, the Anzac Bridge to the south-east, A4 Western Distributor Freeway to the south, Victoria Road to the south-west, and the landmark White Bay Power Station to the west. The study area is situated between and partially within the curtilage of White Bay Power Station and Glebe Island Silos which are listed on the State Heritage Register (SHR) and Port Authority of New South Wales s170 register respectively. Both items are also listed as a heritage item on the Sydney Regional Environmental Plan No. 26.

The study area is shown in Figure 1.

1.3 Methodology and Limitations

This Statement of Heritage Impacts (SoHI) has been prepared with reference to the following:

- *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* 2013 (the Burra Charter)
- *Assessing Heritage Significance* 2001, NSW Heritage Manual (NSW Heritage Office)
- *Statements of Heritage Impact* 2002, NSW Heritage Manual (NSW Heritage Office)
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* 2009 (NSW Heritage Office, Department of Planning)

- *Design in Context: Guidelines for Infill Development in the Historic Environment* 2005 (NSW Heritage Office).

This report provides an assessment of non-Aboriginal (historical) heritage values only.

1.4 Authorship and Acknowledgements

This report was prepared by Jessica Horton (Heritage Consultant, Artefact Heritage). Sandra Wallace (Director, Artefact Heritage) provided management input and review.

Figure 1: Location of the study area

2.0 PROPOSED WORKS

The proposal would generally be developed in two phases and would involve the following key activities:

- Phase 1 (Figure 2) would involve:
  - A reconfigured intersection at Port Access Road / Solomons Way / Sommerville Road, including an interim connection with the existing Port Access Road until it is relocated (as part of Phase 2)
  - Establishment of one-way traffic circulation along Solomons Way and Sommerville Road around the Glebe Island Silos
  - Relocation of the Cement Australia Truck Parking Licenced Area to the north, prior to the construction of the reconfigured intersection
- Phase 2 (Figure 3) would involve:
  - Relocation of the Port Access Road to the southwest. The relocated Port Access road would be tied into the reconfigured intersection (established in Phase 1) and the existing Port Access Road to the north.

Operation of the proposal would result in changed road network arrangements within the port area at The Bays, however it would not change the vehicle numbers or the time that vehicles operate on the network.

2.1.1 Construction phases

Construction of the proposal would comprise of the key activities outlined in Table 1 as part of each phase.

Table 1: Construction phases and indicative activities

Phase	Description
Phase 1	• Establishment of construction compound including for a site office and material storage • Installation of environmental controls such as erosion and sediment controls • Site clearing and any necessary contaminated land remediation works around Port Access Road, Sommerville Road and Solomons Way intersection • Establishment of relocated Cement Australia Truck Parking Licenced Area to the north including kerb and guttering, driveway crossover, drainage, lighting and line marking • Construction of reconfigured intersection at Port Access Road and Solomons Way, including a temporary interim connection with the existing Port Access Road until it is relocated (as part of Phase 2). This would require traffic switches which would be completed out-of-hours on a weekend. • Line marking and signage at Port Access Road, Sommerville Road and Solomons Way to establish one-way traffic circulation • Reinstatement of driveway access to Cement Australia facilities
Phase 2	• Site clearing and any necessary contaminated land remediation works around proposed relocated Port Access Road • Construction of relocated Port Access Road including concrete island and tie-ins at the southern end, signs and lines • Construction of tie-in between the northern section of the relocated Port Access Road and the existing Port Access Road • Demobilisation of site compounds

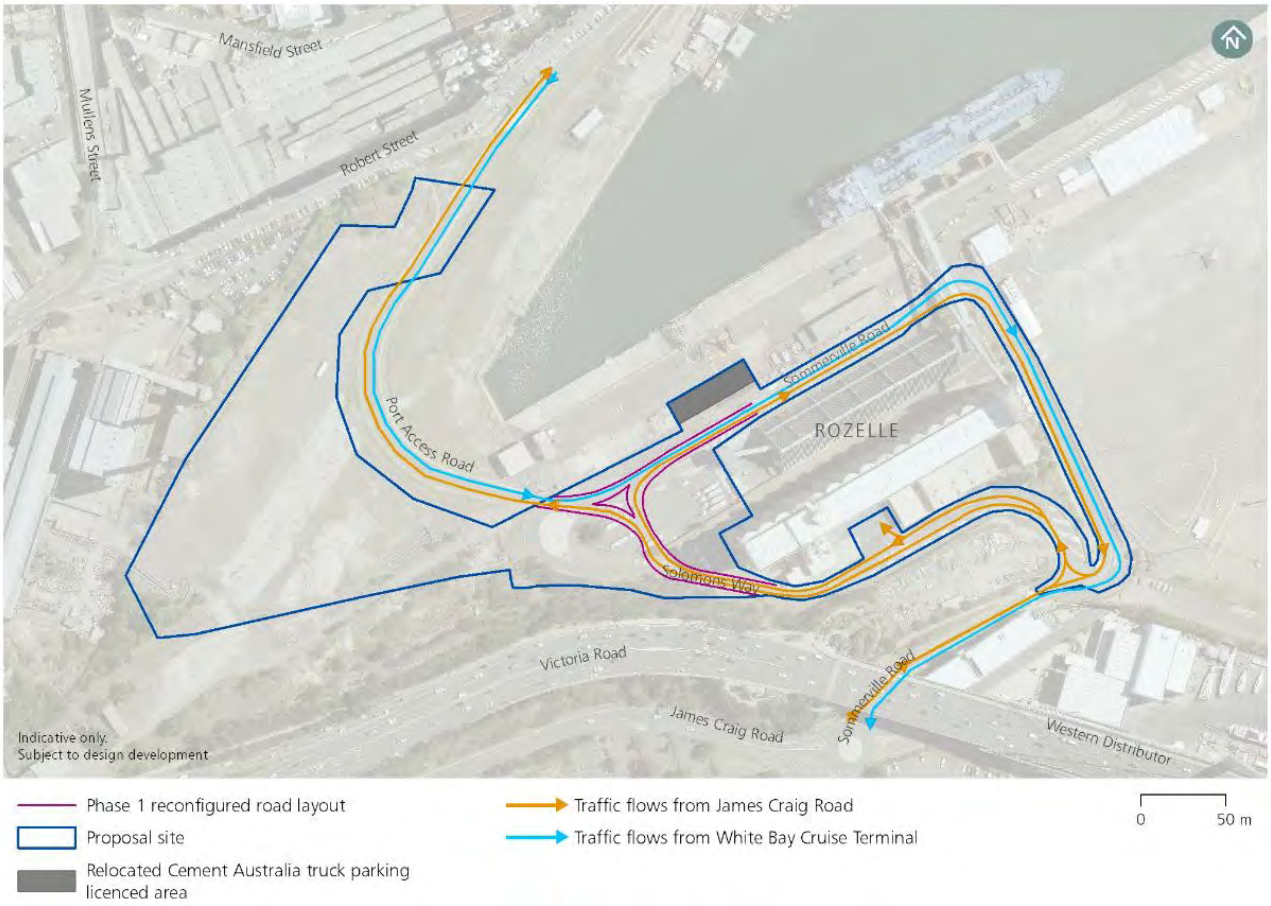


Figure 2: Overview of the proposal – Phase 1

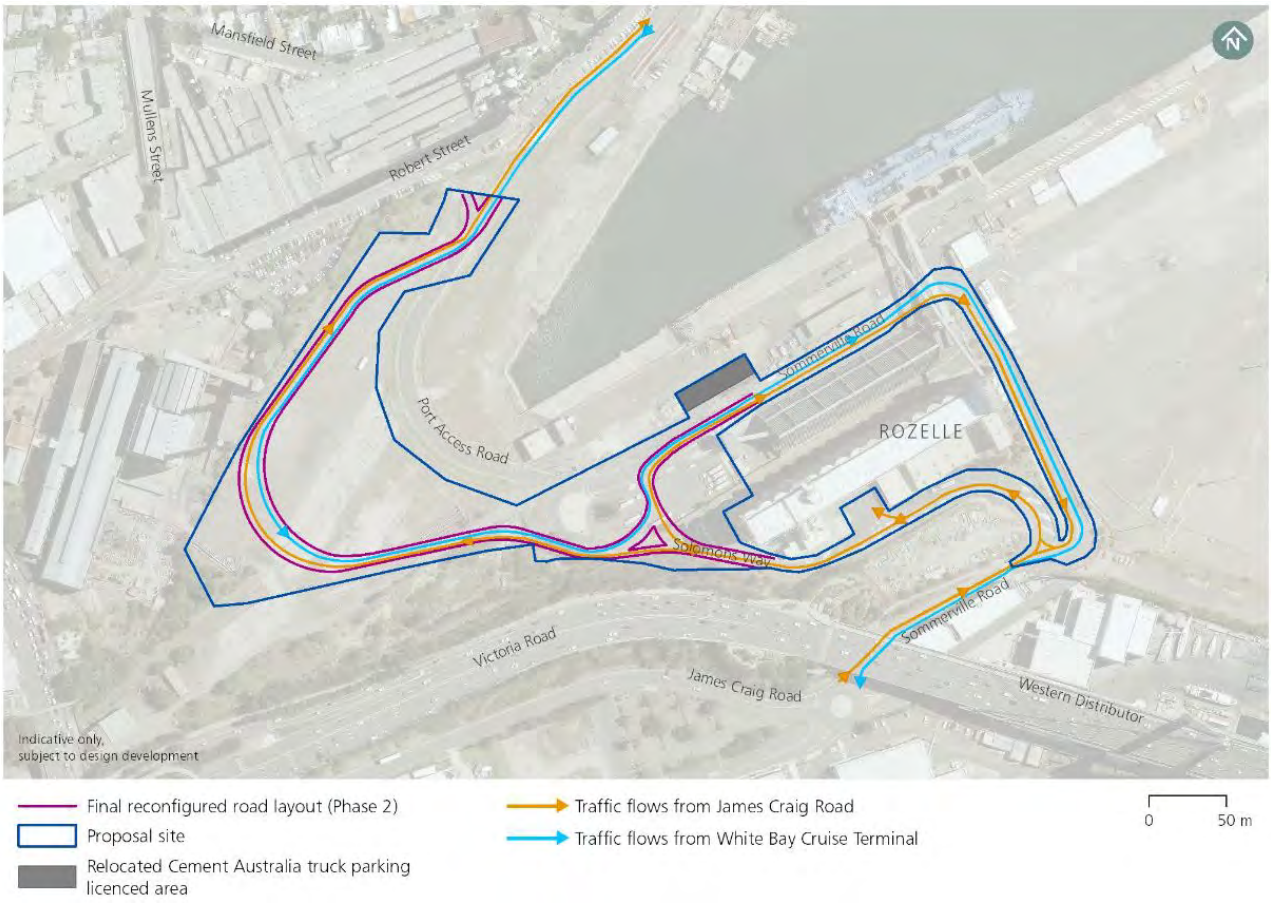


Figure 3: Overview of the proposal – Phase 2

2.1.2 Objectives of the proposal

The objectives of the proposal are to:

- Facilitate the urban renewal of the Bays West area, including the efficient delivery of construction works for the proposed Sydney Metro West and the integration of port and working harbour activities
- Maintain access to the White Bay Cruise Terminal and other port related businesses in Glebe Island and White Bay during the construction of various urban renewal and major infrastructure projects
- Improve road safety by reducing conflicting traffic movements within the internal port road network.

2.1.3 Benefits of the proposal

The proposal would provide social and economic benefits by maintaining safe and reliable road access to the White Bay Cruise Terminal and other port operations in the Glebe Island and White Bay destinations during future construction works associated with the development of Bays West. This would minimise disruptions to cruise passengers, cruise operations and other port/commercial operations and allow for the efficient construction of various projects.

The proposal would also improve road safety outcomes for users of the internal ports road network including customers accessing the cruise terminal by car and bus, and trucks accessing port and maritime operations.

3.0 LEGISLATIVE CONTEXT

3.1 Introduction

A number of planning and legislative documents govern how heritage is managed in NSW and Australia. The following section provides an overview of the requirements under each as they apply to the proposal.

3.2 The World Heritage Convention

The Convention Concerning the Protection of World Cultural and National Heritage (the World Heritage Convention) was adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) on 16 November 1972, and came into force on 17 December 1975.

The World Heritage Convention aims to promote international cooperation to protect heritage that is of such outstanding universal value that its conservation is important for current and future generations. It sets out the criteria that a site must meet to be inscribed on the World Heritage List (WHL) and the role of State Parties in the protection and preservation of world and their own national heritage.

No sites within or near the study area are included on the WHL.

3.3 National and Commonwealth Legislation

3.3.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. These are defined in the EPBC Act 1999 as matters of national environmental significance. Under the EPBC Act 1999, nationally significant heritage items are protected through listing on the Commonwealth Heritage List (CHL) or the National Heritage List (NHL).

3.3.1.1 Commonwealth Heritage List

The CHL has been established to list heritage places that are either entirely within a Commonwealth area, or outside the Australian jurisdiction and owned or leased by the Commonwealth or a Commonwealth Authority. The CHL includes natural, Indigenous and historic heritage places which the Minister for Sustainability, Environment, Water, Population and Communities is satisfied have one or more Commonwealth Heritage values.

No sites within or near the study area are included on the CHL.

3.3.1.2 National Heritage List

The NHL was established under the EPBC Act, which provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places.

No sites within or near the study area are included on the NHL.

3.4 State Legislation

3.4.1 Heritage Act 1977

The *NSW Heritage Act 1977* (Heritage Act) is the primary piece of State legislation affording protection to heritage items (natural and cultural) in New South Wales (NSW). Under the Heritage Act, 'items of environmental heritage' include places, buildings, works, relics, moveable objects and precincts identified as significant based on historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. State significant items can be listed on the NSW State Heritage Register (SHR) and are given automatic protection under the Heritage Act against any activities that may damage an item or affect its heritage significance. The Heritage Act also protects 'relics', which can include archaeological material, features and deposits.

The Heritage Act also provides protection for 'relics', which includes archaeological material or deposits. The protection of 'relics' under the Heritage Act is further explained in Section 3.4.1.2.

3.4.1.1 State Heritage Register

The SHR was established under Section 22 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. The SHR is administered by the Department of Premier and Cabinet – Heritage. This includes a diverse range of over 1,500 items, in both private and public ownership. To be listed, an item must be deemed to be of heritage significance for the whole of NSW.

A search was undertaken in relation to the study area. There is one SHR listed item partially within the study area:

- White Bay Power Station (SHR Listing No. 01015)[1]

3.4.1.2 Relics Provisions

The Heritage Act also provides protection for 'relics', which includes archaeological material or deposits. According to Section 139 (Division 9: Section 139, 140-146):

(1) A person must not disturb or excavate any land knowingly or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, damaged or destroyed unless the disturbance is carried out in accordance with an excavation permit.

(2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

(3) This section does not apply to a relic that is subject to an interim heritage order made by the Minister or a listing on the State Heritage Register.

(4) The Heritage Council may by order published in the Gazette create exceptions to this section, either unconditionally or subject to conditions, in respect of any of the following:

a. Any relic of a specified kind or description,

b. Any disturbance of excavation of a specified kind or description,

c. Any disturbance or excavation of land in a specified location or having specified features or attributes,

[1] Note: the curtilage of White Bay Power Station enters the study area; however no significant structures fall within the study area.

d. Any disturbance or excavation of land in respect of which an archaeological assessment approved by the Heritage Council indicates that there is little likelihood of there being any relics in the land.

Section 4 (1) of the Heritage Act (as amended in 2009) defines a relic as:

> *...any deposit, artefact, object or material evidence that:*
>
> *relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and is of State or local heritage significance*

A relic has been further defined as:

> *Relevant case law and the general principles of statutory interpretation strongly indicate that a 'relic' is properly regarded as an object or chattel. A relic can, in some circumstances, become part of the land be regarded as a fixture (a chattel that becomes permanently affixed to land).*[2]

Excavation permits are issued by the Heritage Council of NSW, or its delegate, under Section 140 of the Heritage Act for relics not listed on the SHR or under Section 60 for relics listed on the SHR. An application for an excavation permit must be supported by an Archaeological Research Design and Archaeological Assessment prepared in accordance with the NSW Heritage Council archaeological guidelines. Minor works that will have a minimal impact on archaeological relics may be granted an exception under Section 139 (4) or an exemption under Section 57 (2) of the Heritage Act.

3.4.1.3 Works

The Heritage Act defines 'works' as being in a separate category to archaeological 'relics'. 'Works' refer to remnants of historical structures which are not associated with artefactual material that may possess research value. 'Works' may be buried, and therefore archaeological in nature, however, exposure of a 'work' does not require approved archaeological excavation permits under the Heritage Act.

The following examples of remnant structures have been considered to be 'works' by the NSW Heritage Council:

- Former road surfaces or pavement and kerbing.
- Evidence of former drainage infrastructure, where there are no historical artefacts in association with the item.
- Building footings associated with former infrastructure facilities, where there are no historical artefacts in association with the item.
- Evidence of former rail track, sleepers or ballast.

Where buried remnants of historical structures are located in association with historical artefacts in controlled stratigraphic contexts (such as intact historic glass, ceramic or bone artefacts), which have the potential to inform research questions regarding the history of a site, the above items may not be characterised as 'works' and may be considered to be 'relics'. The classification of archaeological remains as a 'work' therefore is contingent on the predicted remains being associated with historical

[2] *Assessing Significance for Archaeological Sites and 'Relics'*, Heritage Branch, Department of Planning, 2009:7.

structures as well as there being no prediction of the recovery of intact artefactual deposits which may be of research interest.

3.4.1.4 Section 170 registers

Under the Heritage Act all government agencies are required to identify, conserve and manage heritage items in their ownership or control. Section 170 (s170) requires all government agencies to maintain a Heritage and Conservation Register that lists certain classes of heritage assets identified in Section 22(1) of the Heritage Regulation 2012. They must ensure that these assets are maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the Government on advice of the NSW Heritage Council. These principles serve to protect and conserve the heritage significance of items and are based on NSW heritage legislation and guidelines.

A search of all NSW agency section 170 registers was undertaken. There are four s170 listed items partially within or near the study area:

- White Bay Power Station Complex (Sydney Harbour Foreshore Authority s170 4500460)
- Glebe Island Silos (Port Authority of New South Wales s170 4560016)
- White Bay Power Station (Inlet) Canal (Port Authority of New South Wales s170 4560062)
- Glebe Island Dyke Exposures (Port Authority of New South Wales s170 4560056)

3.4.2 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits.

The EP&A Act also requires that local governments prepare planning instruments (such as Local Environmental Plans [LEPs]) in accordance with the EP&A Act to provide guidance on the level of environmental assessment required.

The study area is covered by the Inner West Local Government Area (LGA) and would typically be subject to the Leichhardt LEP 2013, however the study area falls entirely within the Sydney Regional Environmental Plan No.26 – City West Link, discussed below, which excludes the application of the LEP to the study area.

3.4.3 Sydney Regional Environmental Plan No 26 – City West

The study area falls within boundaries of The Bays Precinct which is administered by the Sydney Environmental Plan No 26 – City West. The plan outlines considerations in relation to heritage under Division 6. The plan identifies heritage conservation areas under Division 6, heritage items under Schedule 4, and potential historical archaeological sites under Division 6.

A search was undertaken of the Sydney Regional Environmental Plan No 26 – City West. There are two items listed on the plan within or near the study area

- Glebe Island wheat silos (components A, B and C) (SREP No 26 – City West Part 3 Item No. 1)
- White Bay Power Station (SREP No 26 – City West Part 3 Item No. 11).

3.5 Non-Statutory Considerations

3.5.1 Register of the National Estate

The Register of the National Estate (RNE) is a list of natural, Aboriginal and historic heritage places throughout Australia. It was originally established under the *Australian Heritage Commission Act* 1975. Under that Act, the Australian Heritage Commission entered more than 13,000 places in the register. The Register of the National Estate (RNE) is no longer a statutory list; however, it remains available as an archive.

The White Bay Power Station and Glebe Island Dyke Exposures have been listed as 'indicative places' on the RNE.

3.5.2 National Trust of Australia (NSW)

The National Trust of Australia is a community-based, non-government organisation committed to promoting and conserving Australia's Indigenous, natural and historic heritage. The National Trust Register (NTR) was established in 1949. It is a non-statutory register.

The White Bay Power Station is listed as a 'classified item' on the NTR.

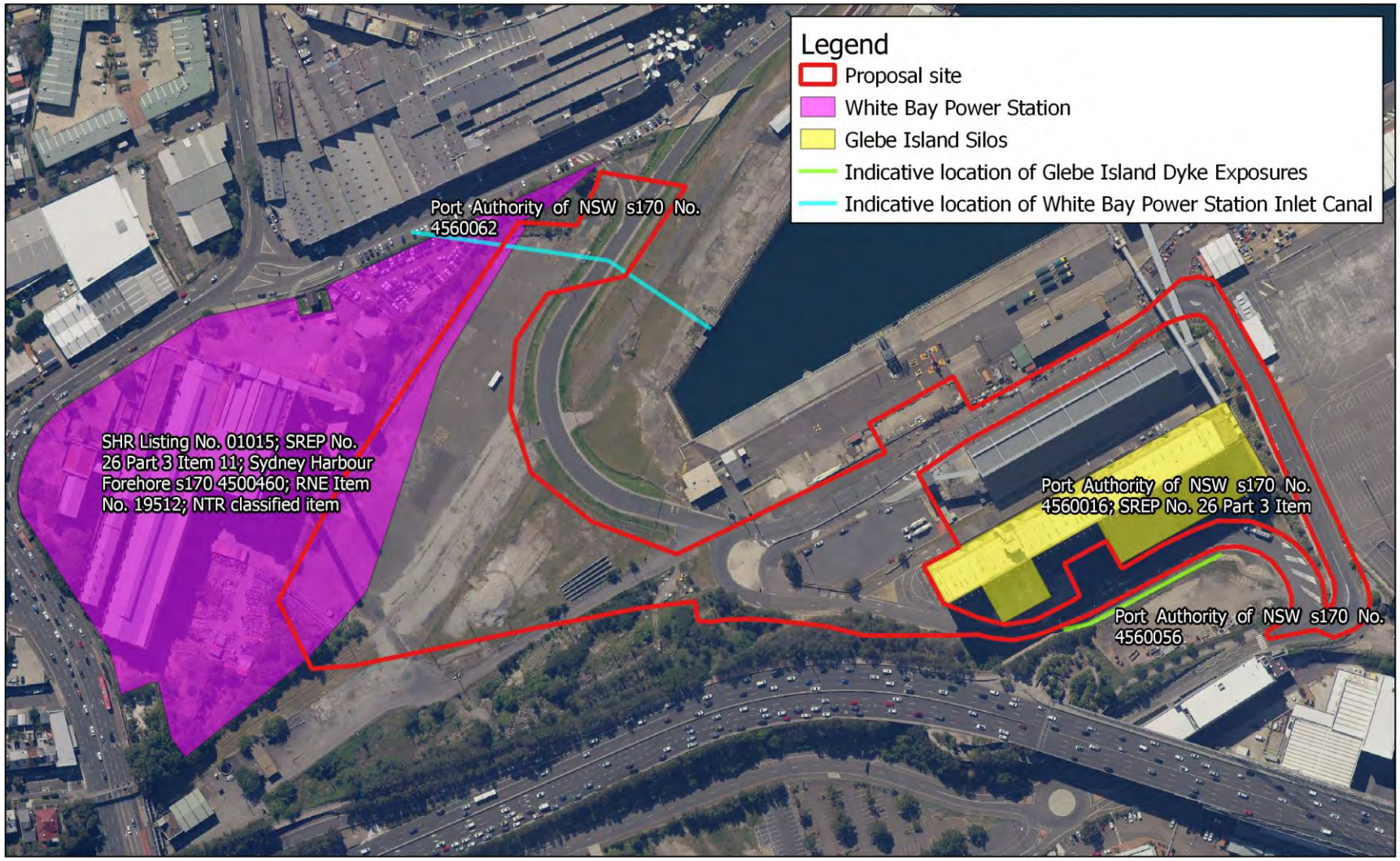
3.6 Summary of Heritage Listings

Table 2 and Figure 4 provide a summary of heritage listed items within and in the vicinity of the study area.

Table 2: Details of listed heritage items within and in the vicinity of the study area.

Heritage item	Register listings	Address	Significance	Relationship to study area
White Bay Power Station (SHR Listing No. 01015)	SHR Listing No. 01015; Sydney Harbour Foreshore s170 4500460; SREP No 26 – City West Part 3 Item No. 11; RNE Item No. 19512; NTR classified item	Victoria Road, Rozelle, NSW 2039	State	Partially within study area
Glebe Island Silos	Port Authority of New South Wales s170 4560016; SREP No 26 – City West Part 3 Item No. 1	Victoria Road, Glebe Island, NSW 2040	Local	Directly adjacent to study area
White Bay Power Station (Inlet) Canal	Port Authority of New South Wales s170 4560062	Robert Street, White Bay, NSW 2041	Local	Partially within study area
Glebe Island Dyke Exposures	Port Authority of New South Wales s170 4560056; RNE Item No. 101882	Glebe Island, NSW 2040	Local	Directly adjacent to study area

Figure 4: Heritage items within the study area



4.0 HISTORICAL CONTEXT

4.1 Introduction

The following section provides the historical context of the study area based on a desktop assessment of existing historical studies and archival material.

4.2 White Bay (The Bays)

White Bay was named after a naval surgeon and botanical collector, John White, who came to Australia aboard the convict transport ship, Charlotte, with the First Fleet in 1788.[3] The first grant encompassing White Bay was made to George Johnston in 1799. The study area straddles this grant; another made to William Balmain in 1800, a grant to John Piper in 1811 and a 50-acre grant made to Francis Lloyd in 1819 (Figure 5).[4] The bay originally extended much further southwest to current-day Victoria Road, almost joining with Rozelle Bay. However, the Harbour Trust reclaimed the headwaters during the early twentieth century. The approaches to the Anzac Bridge are built on the built-up causeway to Glebe Island which now separate White Bay and Rozelle Bay.[5]

The geographical relationship between White Bay, its long water frontage and its close proximity to Sydney CBD was paramount in its development. Roads and available transport to Sydney was often uncertain, expensive and time consuming, while water travel offered quick, reliable and relatively cheap transportation to carry both passengers and merchandise to and from the area.[6]

Subdivisions occurred throughout the late-1820s with wealthy and prominent members of Sydney society buying up property along the Johnston's Bay foreshore. These subdivisions, and the utilisation of the waterfront, led to the establishment of a number of industries within the bay during the 1830s. By the early 1840s, a boiling down works run by W. Bell Allen was constructed at Blackwattle Bay and Bensusan and Musson established a copper smelting works on Johnston's Bay at Annandale and at Glebe Island. Abattoirs were constructed during the 1850s. During the 1860s, the future site of White Bay Power station was subdivided for housing; this remained until the power station development during the early twentieth century. In 1861, a causeway near White Bay, connecting Glebe Island with Victoria Road was proposed.

The close of the nineteenth century saw extensive land reclamation programs at Glebe Island which significantly altered the natural landscape. In 1889, the tidal swamp along the boundaries of Glebe and Annandale were reclaimed; the 1890s saw Blackwattle Swamp filled in; and Johnsons Creek was channelled underground.

[3] NSW Government Geographical Names Board, date unknown. 'White Bay'. Accessed online: http://www.gnb.nsw.gov.au/place_naming/placename_search/extract?id=SXckoeWAan
[4] Wendy Thorp, 1990. *Draft Report: Thematic History of White Bay and Glebe Island - Central Railway to Eveleigh Heritage Study.* Department of Planning, Sydney: p. 9.
[5] Graham Spindler, 2011. 'historical Notes and Background'. Accessed 4 April 2019, http://www.walkingcoastalsydney.com.au/brochures/documents/HC2011Day4HistoricalNotesApril2011.pdf
[6] Wendy Thorp, 1990. *Thematic History: White Bay, Glebe Island Heritage Study.* Department of Planning, Sydney, p. 9.

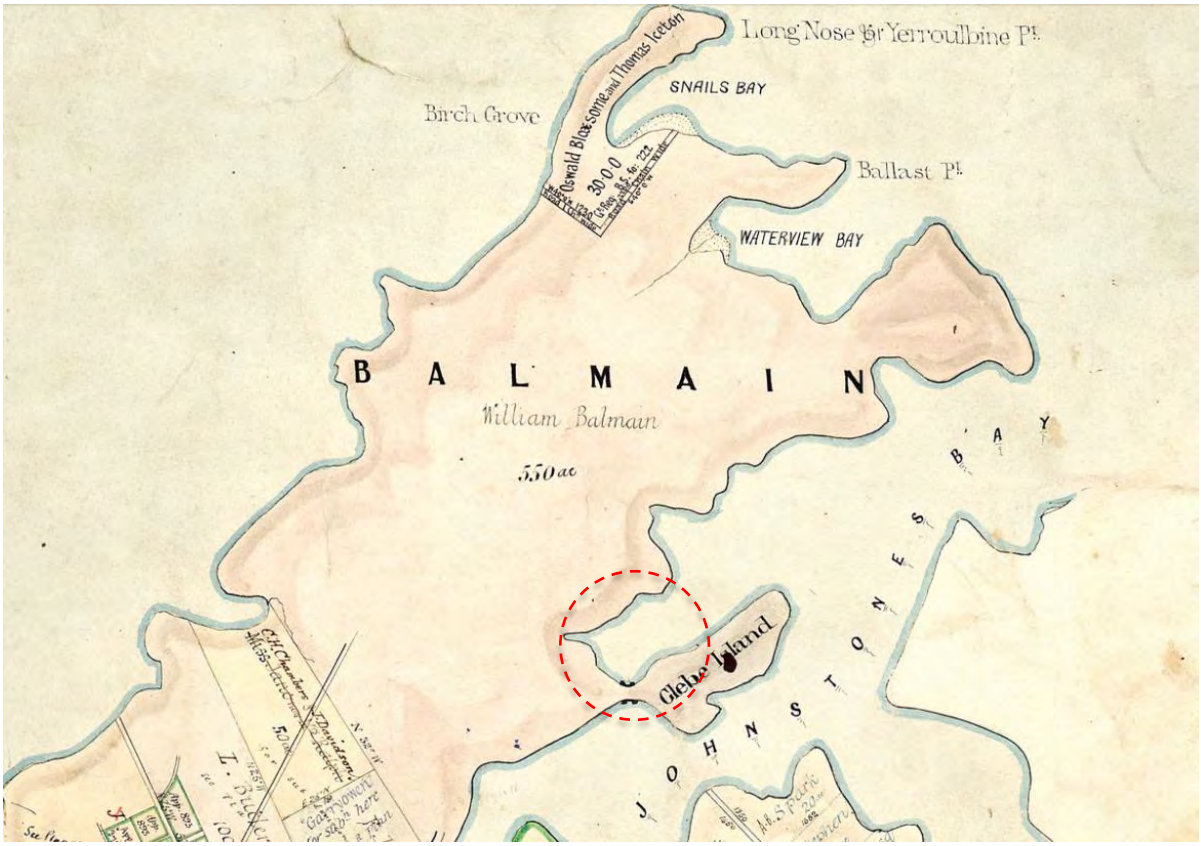


Figure 5: Detail of Parish of Petersham map, date unknown (study area circled in red). Showing George Johnston's 1799 land grant (290 acres), William Balmain's 1800 grant (550 acres), John Piper's 1811 grant (165 acres) and Francis Lloyd's 1819 grant (50 acres)[7]

4.3 Australian Gas Light Company

The Australian Gas Light Company (AGL) was formed in 1837. The company manufactured gas, distributing it for town gas street lighting from 1841. In 1875, a gasworks was constructed along the White Bay waterfront, approximately at the corner of Robert Street and Mansfield Street, to reticulate gas for street lighting up until electric street lighting superseded gas lighting in Balmain in 1909.[8]

4.4 Glebe Island Abattoir

In 1850, the government resumed land at Glebe Island for the construction of an abattoir by an Act of Parliament. Work began in 1853 with the abattoir commencing operation in 1860. The first structures to open were designed by Colonial Architect Edmund Blacket. Meat was transported from the abattoir to Sydney via a punt to Pyrmont, where butchers waited to collect via carts. During the c1860s, a low level timber framed bridge named 'Blackbutt' was constructed by the Pyrmont Bridge Company, connecting the island to Pyrmont. The bridge operated as a toll bridge and drawbridge and replaced the earlier punt. By this point, tanners, tripe makers and soap and candle manufacturers were all working within close proximity to the abattoir.[9]

[7] Land Registry Services, date unknown. 'Parish of Petersham Map'. Accessed online: http://hlrv.nswlrs.com.au/pixel.htm#
[8] Peter Reynolds, 2008. 'White Bay'. Accessed April 4, 2019, https://dictionaryofsydney.org/entry/white_bay
[9] Glebe Society Bulletin, 2006. 'Glebe's Industrial History'. Accessed online 8 July 2019, https://www.glebesociety.org.au/wp-content/uploads/bulletins/2006_03.pdf

Shortly after establishment, there were calls from Balmain and Glebe residents for the closure of the abattoir due to poor management, unsanitary conditions and an unbearable smell which lead to the 1883 Royal Commission into noxious and offensive trades. The Commission revealed that at the facility, blood was converted into fertilizer, waste materials were boiled down, blood and offal were dumped into the harbour and cattle, sheep and pigs were driven through the surrounding suburban streets. Despite the severe conditions and push for closure, the Commission recommended improvements rather than closure.[10]

By 1903, it was revealed that secret overflows were still being dumped into Blackwattle Bay which was at times descried as 'blood red'. Construction of a new abattoir at Homebush was authorised in 1906 and by 1916, the Glebe Island Abattoir, which was described as 'a noxious nuisance…a source of serious loss to the government… and hopelessly out of repair', had closed.[11]

Figure 6: Glebe Island Abattoir, 1896[12]

[10] Ibid.
[11] Ibid.
[12] Sydney Mail, 22 February 1896 cited in Glebe Society Bulletin, 2006. 'Glebe's Industrial History'. Accessed online 8 July 2019, https://www.glebesociety.org.au/wp-content/uploads/bulletins/2006_03.pdf

Figure 7: Glebe Island swing bridge with Glebe Island Abattoir in the background, c1903-1915[13]

4.5 White Bay Power Station

The Sydney tramway system had expanded throughout the nineteenth century from horse power, to steam, to cable and finally to electrical traction. To facilitate this, a number of power stations were constructed within Sydney at Ultimo, Pyrmont and Balmain.[14]

The White Bay Power Station was constructed by the NSW Railway Commissioners in order to support the ever-expanding tramway network; to facilitate the anticipated electrification of the railway system and the proposed underground railway system within the CBD (Figure 8).[15] In addition, the tramway network within Sydney was much more extensive than in Melbourne at this time, and was challenged by much steeper topography. As such, a newer, larger and more flexible power station was required to fulfil Sydney's needs.[16]

Construction of the facility began from 1912-1917 during which time, the turbine hall, switch house and one boiler house were built. At this stage, the buildings had been completed but most of the plant had yet to be installed, as such, the power station commenced operation with one 7500kw, 6600-volt, 25 cycle turbo alternator and associated boiler equipment on temporary foundations. From 1916-1919, two new turbo alternators and the No. 9 alternator were installed at White Bay.[17] From 1923-1928 White Bay was extended utilising steel framing and reinforced concrete, rather than

[13] Author unknown, c1903-1915. 'Glass plate negative of Sydney's Glebe Island swing bridge with Glebe Island abattoir in the background'. Accessed online 8 July 2019, https://collection.maas.museum/object/495200
[14] Office of Environment and Heritage, 2000. 'White Bay Power Station'. Accessed 4 April 2019, https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4500460
[15] Lisa Murray, 2016. 'White Bay Power Station'. Accessed 4 April 2019, http://home.dictionaryofsydney.org/white-bay-power-station-2/
[16] OEH, 2000. 'White Bay Power Station'.
[17] OEH, 2000. 'White Bay Power Station'.

brickwork.[18] In addition, three 22,000kW, 11,000-volt, 50 cycle turbo alternators and two 18,750kw 6600 volt, 25 cycle Turbo Alternators were installed.

By the 1930s, White Bay had grown substantially and the 7,500kw turbo alternator was transferred to the Zarra Street Power Station. In 1930, a 25,000kva frequency charger was installed, tying the 25 and 50 cycle systems together, increasing the effective capacity of both systems and reducing the amount of stand-by equipment.[19] During World War II, funding required for the upkeep and modernisation of the facility was diverted to the war effort. As such, in 1948, two battery boilers and the two 18,750kw turbo alternators were replaced with a 50,000kw 50 cycle Parsons turbo alternator.

In 1953, the power station was transferred to the Electricity Commission of NSW. At this time, the c1920s boiler house was replaced with a new steel framed structure. During the 1970s, a number of buildings and features were removed due to the drop in demand. The station remained in use up until Christmas Day in 1983 and was finally decommissioned the following year.[20]

Figure 8: White Bay Power Station and the White Bay Hotel, c1930 (City of Sydney Archives SRC352)

[18] OEH, 2000. 'White Bay Power Station'.
[19] OEH, 2000. 'White Bay Power Station'.
[20] OEH, 2000. 'White Bay Power Station'.

4.6 White Bay Hotel

The White Bay Hotel was originally opened by Robert Symonds at the corner of the Victoria and Lilyfield Road (previously Weston and Abattoir Road) in Rozelle. In 1910, the hotel was resumed for the development of rail lines to service the White Bay Power Station and demolished in 1915. To compensate, a parcel of land off Victoria Road was provided for the reconstruction of the hotel.[21]

The second White Bay Hotel was constructed in 1916 by Tooth and Co. Brewers. The decline of the hotel coincided with the closure of the White Bay Power Station during the 1980s and the development of surrounding roads including the City West Link and Victoria Road. The hotel closed in 1992, following which point, it became home to squatters. Redevelopment proposals were put forth in 2008, however the hotel was destroyed by fire within the same year under suspicious circumstances and the debris was cleared in 2010.[22]

Figure 9: White Bay Hotel, 1992.[23]

[21] The Sydney Harbour Foreshore Authority, 2011. 'White Bay Power Station CMP'. Accessed online 8 July 2019, https://thebayssydney.nsw.gov.au/assets/Document-Library/White-Bay-Power-Station-resources-2004-2011/2011-WBPS-Conservation-Management-Plan.pdf
[22] Ibid.
[23] Author unknown, 1992. 'White Bay Hotel'. Accessed online 8 July 2019, https://timegents.com/2015/11/29/publican-bookmakers/

Figure 10: White Bay Hotel under demolition, 2010.[24]

4.7 White Bay redevelopment

In 1966, the Maritime Services Board drew up a ten-year plan for the development of White Bay for shipping containerisation to include new container berths. It was at this point that blasting activities took place, removing the Bald Rock and other natural features, damaging many homes in the process. The new facility including new container berths opened in 1969, however, the wharves lacked back-up space for truck movements and a larger facility was eventually opened at Botany Bay.[25]

During the 1980s, Leichhardt Council developed a landscaped park between Donnelly Street and the container facility to provide a visual and sound buffer against the new container facility. The park, named White Bay Park, opened in 1982, later being renamed Birrung Park.[26] The Bays has b een subject to other recent redevelopments including establishment of the White Bay Cruise Terminal in 2013. In 2013, construction also began on the interim Sydney Exhibition Centre at Glebe Island, which opened in February 2014 and was decommissioned and removed in 2017 after the redevelopment of the Sydney Convention and Exhibition Centre was completed.

The Bays (referred to the Bays West area) has been identified by the NSW Government a key long term mixed-use urban renewal area for the next 20 years, which will also continue to support the existing port and working harbour functions at Glebe Island and White Bay.

4.7.1 The study area

The study area lies within the curtilage of William Balmain's 1800 land grant (Figure 5). The site is not known to have been developed up until the 1850s, during which point, the Glebe Island Abattoir was developed, and the White Bay Hotel was introduced to the area. From the mid-nineteenth century, Rozelle and Balmain were subdivided, which lead to the development of maritime and noxious industries in the area and the greater White Bay foreshore. At this time, White Bay remained

[24] Author unknown, 2010. 'White Bay Hotel'. Accessed online 8 July 2019, https://www.flickr.com/photos/29029178@N03/3231114060/
[25] Peter Reynolds, 2008. 'White Bay'.
[26] Peter Reynolds, 2008. 'White Bay'.

unreclaimed (Figure 11 – Figure 14), however, a number of rear yard structures were built above the high tide line within the western most portion of the study area.

The White Bay shoreline underwent extensive reclamation during the 1890s. During this time, Mullens Street was extended which allowed for the construction of a number of properties within the western portion of the study area.

The turn of the twentieth century marked the closure of the Glebe Island Abattoirs and the introduction of the White Bay Power Station which was in operation up until 1983 and decommissioned in 1984. 1943 aerial imagery shows the White Bay Power Station during operation, with additional structures, which have since been demolished (Figure 17).

Figure 11: Overlay of the study area on subdivision plan of William Balmain's Estate in 1851 (study area outlined in red)

Figure 12: Overlay of the study area with Municipality of Balmain, 1883 (study area outlined in red)

Figure 13: Overlay of study area (outlined in red) on composite of Balmain Metropolitan Plans from 1890 and 1892

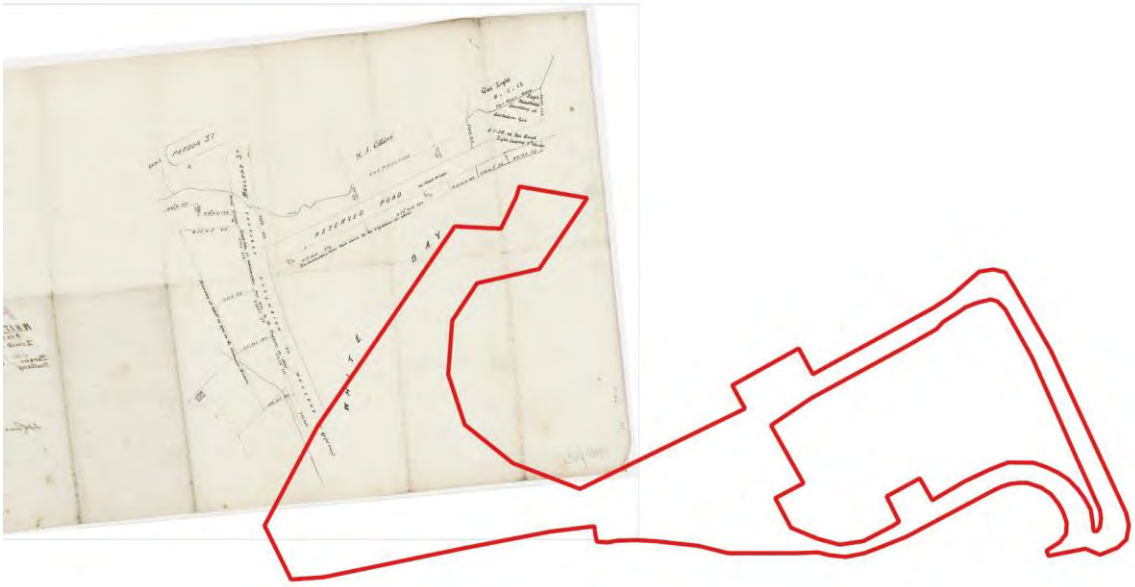


Figure 14: Overlay of the study area (outlined in red) on late nineteenth century subdivision plan of White Bay, showing proposed Mullens Street extension and dyke

Figure 15: Overlay of study area (outlined in red) on undated plan of Glebe Island showing Abattoir structures within the study area

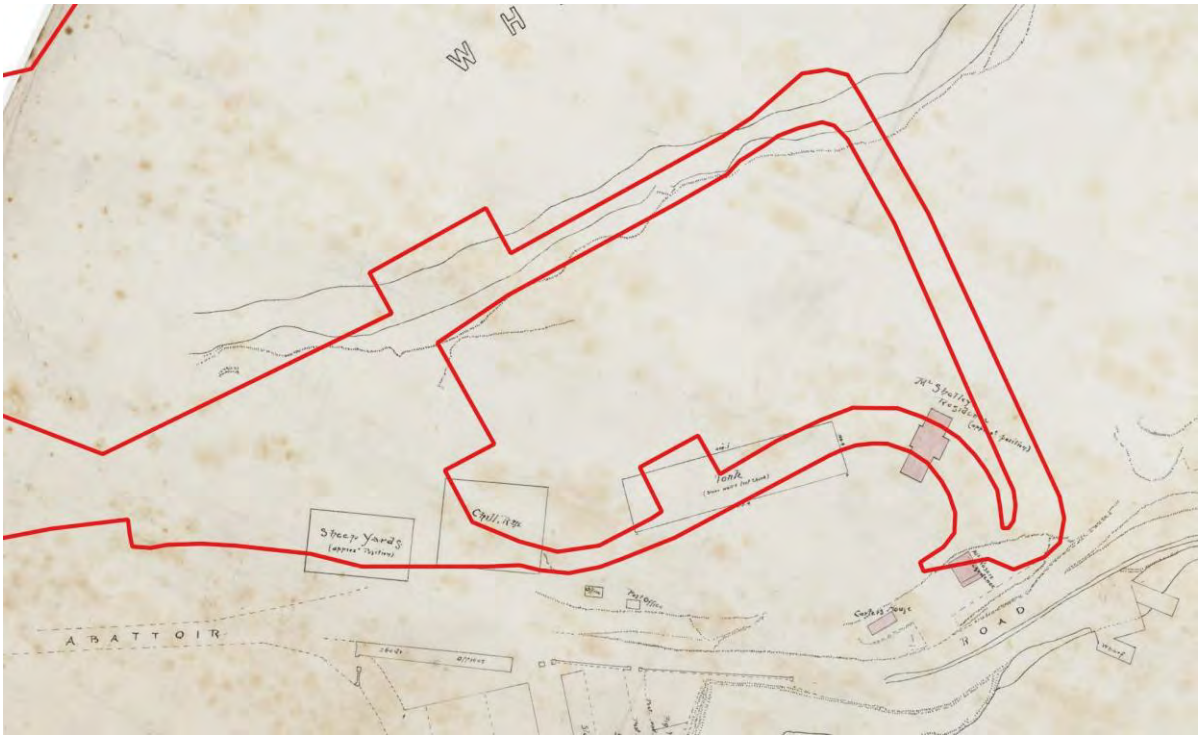


Figure 16: Overlay of study area (outlined in red) on undated detail plan of Glebe Island showing Abattoir structures within the study area

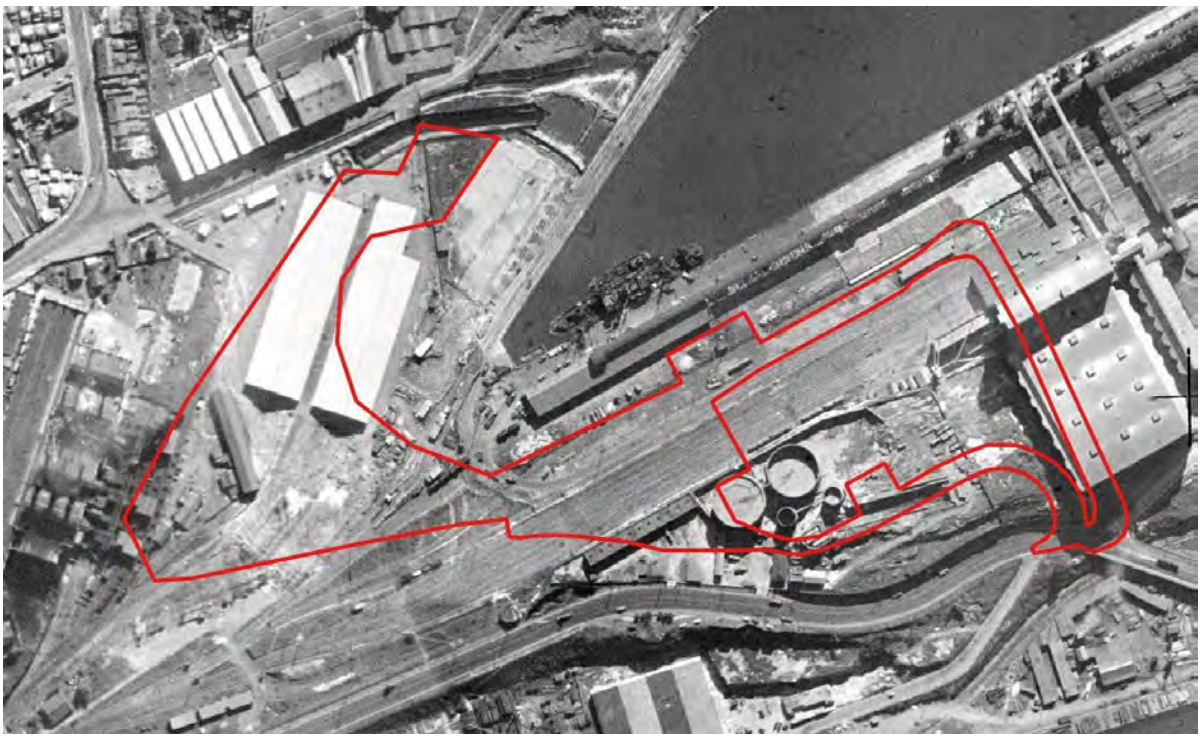


Figure 17: Overlay of study area (outlined in red) on 1943 historical aerial image

5.0 PREVIOUS STUDIES

Design 5 Architects Pty Ltd, 2013. *White Bay Power Station Conservation Management Plan.* Report to the Sydney Harbour Foreshore Authority.

Design 5 Architects Pty Ltd were engaged by the Sydney Harbour Foreshore Authority to prepare a conservation management plan for the White Bay Power Station, outlining the heritage significance of the place and conservation polices for its future management. In addition, the report provides a historical overview of the site and a fabric analysis of the condition of the structure.

Don Godden and Associates & Heritage Consultants, 1989. *The significance of White Bay and Balmain Power Stations to Sydney's Industrial Heritage.* Report to the Electricity Commission of NSW.

In 1988, Masterplan consultants were commissioned to investigate the Electricity Commission of NSW power stations at White Bay and Balmain. As part of this project, Don Godden and Associates & Heritage Consultants were engaged to prepare a conservation policy and significance assessment of the White Bay and Balmain Power Stations. The investigation found that White Bay Power Station and its equipment assemblage evidenced the development of power generation technology and processes throughout the twentieth century, and the political history of the supply of electricity in NSW. The structure is the longest serving power station within NSW whose machinery demonstrates the complete process of power generation and supply; and the structure is a prominent landmark displaying the industrial application of the Arts and Crafts design.

The report found that the turbine hall, boiler house and coal handling unit, and switch house were elements of significance which should be conserved; whilst nominated relics should remain in situ.

Casey & Lowe, 2012. *Archaeological Excavation: Barangaroo South, preliminary results.* Report to Lend Lease.

Archaeological excavations were undertaken between 2010-2012 for the development of Barangaroo South by Lend Lease. Despite being outside the study area and its vicinity, these excavations reveal information regarding potential archaeological remains associated with land reclamation.

The Barangaroo South excavations revealed:

- Quarry marks within natural bedrock as part of later nineteenth-century modifications to the natural landscape
- Evidence of the reclamation process, including the deposition of rubble sandstone to form a platform to the high water level, compacted sands and clays to form a new ground about one metre above the high tide level
- The remains of a boat ramp or skid, consisting of sloping sandstone pavers at the high tide mark, sandstock brick piers and postholes further up the slope, indicating that a timber element had once been present for small vessels
- A thin, timber-rich silt surface with a high frequency of copper nails which overlaid the reclamations fills.

The excavation demonstrated that multiple phases of historical occupation are clearly identifiable and preserved below reclamation fills.

Futurepast Heritage Consulting Pty Ltd, 2013. *Railway Track Remnants, White Bay NSW Heritage Review and Assessment*. Report to Sydney Ports Corporation.

Futurepast Heritage Consulting Pty Ltd were engaged by Sydney Ports Corporation in December 2012 to prepare a Heritage Review and Assessment for railway track remnants at White Bay. The report provided a heritage significance assessment for the rail lines which indicated that the rail lines are not technically significant and are only historically significant in that they relate to the industrial uses of the precinct.

Roads and Maritime Services, *WestConnex M4-M5 Link Roads and Maritime Services Environmental Impact Statement – Non-Aboriginal heritage,* 2017*.*

The WestConnex M4-M5 Link Environmental Impact Statement identified associated subsurface elements of the White Bay Power Station cooling system as listed archaeological items. The site has archaeological potential (low-moderate) for:

- Early residential occupation on Weston Road and Abattoir Road
- Early road alignments off Weston Road and Barnes Street predating the 1960s upgrades to Victoria Road
- Alignment of Abattoir Road prior to construction of Rozelle Rail Yards and White Bay Power Station
- Subsurface structural remains and basement of White Bay Hotel
- Reclamation activities of the Rozelle foreshore prior to 1890, including early states of bridging Glebe Island and channelization of Whites Creek

A *Technical working paper: Non-Aboriginal Heritage* was undertaken by GML in 2017 for the project which highlighted that most of the sites and features in the area are likely to have been disturbed or destroyed by sandstone quarrying, late twentieth century developments and road infrastructure development. Remains of the White Bay Hotel have likely been extensively disturbed by the fire which destroyed the hotel, and subsequent demolition. In addition, the report found that five listed heritage items would be impacted by the project including the White Bay Power Station, as the project would temporarily encroach upon the southwestern boundary of the State heritage curtilage.

Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement – Non-Aboriginal heritage,* 2020*.

The Western Harbour Tunnel and Warringah Freeway Upgrade project includes the development of a new tolled motorway tunnel connection across Sydney Harbour, and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network connecting to the Beaches Link and Gore Hill Freeway Connection project. Construction activities would take place at the Rozelle Rail Yards and at White Bay.

A *Technical working paper: Non-Aboriginal Heritage* was undertaken by Jacobs Group (Australia) Pty Ltd in January 2020 for the project which highlighted that the project has the potential to result in direct and indirect impacts to the Glebe Island Bridge.

6.0 ASSESSMENT OF SIGNIFICANCE – BUILT HERITAGE

6.1 Introduction

An assessment of significance is undertaken to explain why a particular place is important and to enable the appropriate site management and curtilage to be determined. Cultural significance is defined in the Burra Charter (ICOMOS (Australia), 2013) as meaning "aesthetic, historic, scientific, social or spiritual value for past, present or future generations" (Article 1.2). Cultural significance may be derived from a place's fabric, association with a person or event, or for its research potential. The significance of a place is not fixed for all time, and what is of significance now may change as similar sites are located, more historical research is undertaken and community tastes change.

The guideline *Assessing Heritage Significance* (2001), part of the *NSW Heritage Manual* (NSW Heritage Office & NSW Department of Urban Affairs and Planning, 1996), establishes seven criteria (which reflect five categories of significance and whether a place is rare or representative) under which a place can be evaluated in the context of State or local historical themes.

A heritage site can be significant at a local level (i.e. to the people living in the vicinity of the site), at a State level (i.e. to all people living within NSW) or be significant to the country as a whole and be of National or Commonwealth significance. In accordance with in the guideline *Assessing Heritage Significance*, a site (item) will be considered to be of State or local heritage significance if it meets one or more of the criteria.

An assessment of the significance of the study area and heritage items in the vicinity of the study area, as well as a summation of the significance assessment in a succinct paragraph, known as a Statement of Significance, are required under the *Assessing Heritage Significance* (2001) guideline. The significance assessments and the resultant Statements of Significance are considered to be the foundation for future management and impact assessment. The significance assessments and Statements of Significance for the study area and heritage items in the vicinity of the study are covered below.

6.1.1 NSW Heritage Assessment Criteria

6.1.1.1 NSW heritage assessment criteria

Heritage significance for heritage items in New South Wales are assessed using the NSW Heritage Assessment Criteria, presented in Table 3.

Table 3: NSW heritage assessment criteria

Criteria	Description
A – Historical Significance	An item is important in the course or pattern of the local area's cultural or natural history.
B – Associative Significance	An item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area's cultural or natural history.
C – Aesthetic or Technical Significance	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area.
D – Social Significance	An item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons.

Criteria	Description
E – Research Potential	An item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history.
F – Rarity	An item possesses uncommon, rare or endangered aspects of the local area's cultural or natural history.
G – Representative	An item is important in demonstrating the principal characteristics of a class of NSWs (or the local area's): • cultural or natural places; or • cultural or natural environments.

Terminology contained in Table 4 and Table 5 have been referred to identify the heritage impact of the proposal.

Table 4: Definition of direct and indirect impacts

Impact	Definition
Direct	Direct impacts are those that arise as a primary consequence of proposed works within heritage curtilage or change of use. Direct impacts can include permanent physical loss of part or all of a heritage item or changes within heritage curtilage resulting in the diminishing of significance.
Potential direct	Potential direct impacts occur as a consequence of construction works including impacts caused by vibration.
Indirect	Indirect impacts occur as a secondary consequence of construction or operation of proposed works and can result in physical loss or changes to the setting and views of a heritage item resulting in a diminishing of aesthetic quality.

Table 5: Terminology for assessing the magnitude of heritage impact

Grading	Definition
Major	Actions that would have a long-term and substantial impact on the significance of a heritage item. Actions that would remove key historic building elements, key historic landscape features, or significant archaeological materials, thereby resulting in a change of historic character, or altering of a historical resource. These actions cannot be fully mitigated.
Moderate	Actions involving the modification of a heritage item, including altering the setting of a heritage item or landscape, partially removing archaeological resources, or the alteration of significant elements of fabric from historic structures. The impacts arising from such actions may be able to be partially mitigated.
Minor	Actions that would result in the slight alteration of heritage buildings, archaeological resources, or the setting of an historical item. The impacts arising from such actions can usually be mitigated.
Negligible	Actions that would result in very minor changes to heritage items.
Neutral	Actions that would have no heritage impact.

6.1.2 White Bay Power Station significance[27]

White Bay Power Station, developed between 1912 and 1948, is bound by Victoria Road and Robert Street on the Balmain Peninsula. The power station comprises two steel stacks; a coal handling unit serviced by a spur rail line; a turbine hall; building incorporating administration offices; the old laboratory and a workshop; a boiler house; a switch house and substation; and an ancillary structure including coal loading wharf and coal handling system. The White Bay Power Station is a local landmark and is visible from many vantage points in the surrounding urban and harbour setting.

The NSW State Heritage Inventory entry for State heritage listed item No. 01015, listed as *White Bay Power Station,* contains the following statement of significance:

> *"White Bay Power Station was the longest serving Sydney power station and is the only one to retain a representative set of machinery and items associated with the generation of electricity in the early and mid-twentieth century. It retains within its fabric, and in the body of associated pictorial, written archives and reports and oral history recordings, evidence for the development of technology and work practices for the generation of electrical power from coal and water. This development of power generation at White Bay contributed to the expansion of the economy of Sydney and NSW.*
>
> *As a result of its remarkably intact survival, it retains the unique ability to demonstrate, by its location, massing, design, machinery and associated archives, the influence and dominance that early power-generating technology exerted on the lives and urban fabric of inner cities in the first half of the twentieth century. The extant items within the surviving operation systems are of an impressive scale and exhibit a high degree of creative and technical achievement in their design and configuration. They encompass all aspects of the generation of electrical power and represent all phases from the inter-war period through to the more sophisticated technologies of the mid-twentieth century. They are of exceptional technical significance with research potential to yield information not available from any other source. Aesthetically, White Bay Power Station contains internal and external spaces of exceptional significance. These spaces include raw industrial spaces of a scale, quality and configuration which is becoming increasingly rare and which inspires visitors and users alike. Externally, it is a widely recognised and highly visible landmark, marking the head of White Bay and the southern entry to the Balmain Peninsula and its industrial waterfront. It retains a powerful physical presence and industrial aesthetic and is the most important surviving industrial building in the area.*
>
> *White Bay Power Station has strong and special associations and meanings for the local community, for former power station workers and for others who have used the site and is of high social significance. It is a potent symbol of the area's industrial origins and working traditions, aspects of community identity that are strongly valued today by both older and new residents. It is one of the few surviving features in the area that provide this symbolic connection. It is the only coal based industrial structure, dependent on a waterside location to survive adjacent to the harbour in the Sydney Region. It also forms part of a closely related group of large-scale industrial structures and spaces (White Bay Hotel, define a major entry point*

[27] OEH, 2004. 'White Bay Power Station'. Accessed 17 April 2019, https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5001335

to the city from the west. It is of exceptional structural significance to the State of NSW."

The NSW State Heritage Inventory entry for State heritage listed item No. 01015, listed as *White Bay Power Station,* contains the following significance assessment:

Table 6: Significance assessment for White Bay Power Station

Criterion	Description
A – Historical Significance	White Bay Power Station is important as part of the development of electrical power for industry and the growth of local and capital development across NSW in the first 70 years of the twentieth century. It is the only power station in NSW to retain, in situ, a full set of both structures and machinery from this period.
B – Associative significance	White Bay Power Station has a rare ability to demonstrate once common and standard work practices of the early to mid twentieth century, which are now almost entirely discontinued through changes in technology and occupational health and safety. It is a rare surviving element in an area of Sydney which was once almost entirely dependent on such industries for its livelihood.
C – Aesthetic or Technical Significance	White Bay Power Station retains a broad range of spaces and elements, including machinery, which are exceptional for their raw industrial aesthetic qualities. As an assemblage of structures, the White Bay Power Station retains exceptional aesthetic value as an icon of early to mid twentieth century industry, an important component of a rare group of harbour side industrial structures and a prominent marker in the cityscape signifying the entry point from the west. In particular, the two chimney stacks are visible from many parts of the inner west and are a constant point of reference. Its design and construction, while typical for its time, is now a rare surviving example of such industrial buildings and machinery complexes. It also demonstrates technological achievements of its time in the erection of the 1927 reinforced concrete structures and the 1958 boiler house, with its large area of steel framed and glazed curtain walling.
D – Social Significance	White Bay Power Station has strong and special associations and meanings for the local community, for former power station workers and for others who have used the site, and is of high social significance. It is a potent symbol of the area's industrial origins and working traditions, aspects of community identity that are strongly valued today by both older and new residents. It is one of few surviving features that provide this symbolic connection. For former employees at White Bay Power Station, this place provides a link to their past working lives and evokes memories of people and events that remain important to them today. It represents the post-war period of power station operation, and through the retention of technologies, systems and machinery it has the ability to evoke this period and demonstrate the production methods and working conditions of the time. White Bay Power Station is a widely recognised landmark, the most important surviving industrial signature building locally and the marker of the entry to the Balmain peninsula and its industrial harbour. It retains a powerful physical presence and industrial aesthetic.
E – Research potential	As a now rare and intact surviving early twentieth century industrial complex in the inner Sydney Harbour region and particularly in Balmain, White Bay Power Station contributes considerably to our understanding and appreciation of these areas and foreshores as formerly places of heavy industry and intense port activity. As an early power station for the early twentieth century tram and rail network, it was a vital component in the expansion and daily life of suburban Sydney. White Bay Power Station contains a complete and in situ assemblage of machinery, spaces and elements comprising all the systems and processes for the generation of coal-fired electricity from the early to mid twentieth century. This is the only surviving assemblage in NSW and it has the potential to yield information not found anywhere else in the State.
F - Rarity	As the only intact Power Station of its type left in NSW, with one complete power generating system retained in situ for conservation, its rarity is firmly established.

Criterion	Description
G – Representativeness	Retaining as it does a complete system of steam turbine generation of electricity from burning of fossil fuel, the White Bay Power Station is highly representative of this generation of power station. Other modern power stations use similar technology, albeit more modern and efficient. White Bay represents that type of early electricity generating technology which required the building of power stations close to the customer. As a complex of structures, buildings and machinery, it demonstrates the full configuration and processes of an early to mid twentieth century city power station.

6.1.3 Glebe Island Silos significance assessment

The Glebe Island Silos were progressively developed between 1917 and 1975. The current site contains 30 cylindrical concrete silos that were established on the site in 1975. The silos are 38.4 metres in height, and each have a 2,400 tonne capacity. In addition, there are 14 star shaped interspaced bind each with a capacity of 550 tonnes.

The NSW State Heritage Inventory entry for Port Authority of New South Wales s170 4560016, listed as *Glebe Island Silos,* contains the following statement of significance:

> *"The extant c1970s silos have local heritage significance for their historic, aesthetic and representative values and for their rarity. The site is significant historically for the development of the bulk wheat storage and export industry in Australia. The former 1917-1925 silo complex (demolished 1999) was the first of its kind in the country and purpose built for the industry. The site was a principal port terminal for the NSW wheat (and other bulk cargoes) trade throughout the twentieth century. The silos are of historical and representative significance for their previous and ongoing operational use. They form part of the larger industrial context of Glebe Island and the Bays Precinct. Although the silos comprise a standard typology and their c1970s fabric is of no significance, their impressive scale, coupled with the consistent rhythmic typology and their prominent location, establishes the site as a prominent Sydney landmark of aesthetic significance.*
>
> *The site makes a significant contribution to Glebe Island and the harbourscape and provides a strong visual link to the history of the site, as the industrial port and storage facilities for Sydney which are now rare. The silos are likely to be valued as a landmark which contributes particularly to the local community's sense of identity; however, this is not readily defined and should be further tested.*
>
> *The Olympic paint scheme murals are associated with a significant event. However, it is recognised that the relevance of retaining a historical advertisement when there are a number of structures built for the Olympics; which equally stand in memorial for the event, is not of such significance to warrant retention in perpetuity. The advertising billboard is considered intrusive to the overall heritage value of the silos and should be removed. It is also noted that the signage structure is not in good condition. The Silos do not reach the requisite threshold for State heritage listing on the NSW State Heritage Register."*

The NSW State Heritage Inventory entry for Port Authority of New South Wales s170 4560016, listed as *Glebe Island Silos,* contains the following significance assessment:

Table 7: Significance assessment for Glebe Island Silos

Criterion	Description
A – Historical Significance	The Glebe Island Grain Terminal has significant historical associations with the development of the grain (principally wheat) industry in NSW as well as the history of Commonwealth and State involvement in agriculture. The terminal's fabric can demonstrate important changes in the history of transportation and in technology as well demonstrating by its bulk and size, the size of the grain crop.
C – Aesthetic or Technical Significance	The Terminal was an important technical innovation in Australia being the first terminal constructed, also important as part of the first bulk handling system for grain built in Australia. As such the site is rare and retains enough integrity to demonstrate the industrial processes used in the running of the site.

6.1.4 White Bay Power Station (Inlet) Canal significance assessment

Construction of the White Bay Power Station (Inlet) Canal began in 1912 as part of Phase 1 of the construction of the White Bay Power Station Complex. The inlet canal is not currently visible above ground.

The NSW State Heritage Inventory entry for Port Authority of New South Wales s170 4560062, listed as *White Bay Power Station (Inlet) Canal,* contains the following statement of significance:

> *"The White Bay Power Station is listed on the State Heritage Inventory and is of State Significance, and the White Bay Power Station (Outlet) Canal running from the Power Station to Blackwattle Bay is listed on the Sydney Ports Corporation s170 register. Together with the White Bay Power Station (Inlet) Canal they form the critical components of the White Bay Power Station and its cooling system, as the choice of site for the power station depended on the supply of water for cooling of the steam condensers.*
>
> *The White Bay Power Station (Inlet) Canal has historical significance at a State level, and associational significance at a State level, as an integral element critical to the operation of the White Bay Power Station.*
>
> *The existence of the canal is rare, especially in the context of the intact qualities of the surviving white Bay Power Station and the White Bay Power Station (Outlet) Canal. Any potential aesthetic significance of the White Bay Power Station (Inlet) Canal is not known as the structure is not accessible or visible."*

The NSW State Heritage Inventory entry for Port Authority of New South Wales s170 4560062, listed as *White Bay Power Station (Inlet) Canal,* contains the following significance assessment:

Table 8: Significance assessment for White Bay Power Station (Inlet) Canal

Criterion	Description
A – Historical Significance	The White Bay Power Station (Inlet) Canal has historic significance at a State level as an integral element critical to the operation of the White Bay Power Station. The choice of site for the power station depended on the supply of water for cooling the steam condensers. White Bay Power Station was the longest serving Sydney power station and is the only extant steam driven power station in Sydney. It retains within its fabric, and in the body of associated pictorial, written archives and reports and oral history recordings, evidence for the development of technology and work practices for the generation of electrical power from coal and water.
B – Associative significance	The White Bay Power Station (Inlet) Canal has associational significance with the White Bay Power Station as an element that was critical to the operation of the power station. It also has associational significance with the surviving White Bay Power Station (Outlet) Canal running to Blackwattle Bay, as together they formed the basis of the critical cooling system for the Power Station. White Bay Power Station is a rare surviving element in an area of Sydney which was once almost entirely dependent on such industries for its livelihood.
E – Research potential	The actual technical significance of the White Bay Power Station (Inlet) Canal is not known as the structure is not accessible or visible. However, it is considered to have a high potential for technical significance as a major component of the infrastructure of the power station. It is likely to exhibit technological achievements of its time. The White Bay Power Station (Inlet) Canal is also likely to contain industrial archaeological artefacts.
F – Rarity	The existence of the canal is rare, especially in the context of the intact qualities of the surviving White Bay Power Station.

6.1.5 Glebe Island Dyke Exposures significance assessment

The Great Sydney Dyke has been traced discontinuously across the suburbs from the coast to Rozelle. The only exposure of the dyke not covered by urbanisation is at Glebe Island.

The NSW State Heritage Inventory entry for Port Authority of New South Wales s170 4560056, listed as *Glebe Island Dyke Exposures,* contains the following statement of significance:

> *"The Great Sydney Dyke, although extensive with a length exceeding 10 kilometres, has only been sampled in the subsurface part as a part of geotechnical investigations for engineering projects. The exposures at Glebe Island provides a rare opportunity to examine the dyke at surface."*

The NSW State Heritage Inventory entry for Port Authority of New South Wales s170 4560056, listed as *Glebe Island Dyke Exposures*, does not provide a significance assessment, however, it states that the section of the Great Sydney Dyke seen at Glebe Island is the only section remaining that has not been covered by urbanisation. This would indicate that the heritage item fills the heritage assessment criterion for Research Potential, Rarity and Representativeness at a local level.

7.0 NON-ABORIGINAL ARCHAEOLOGY

7.1 Archaeological Potential

This section discusses the study area's potential to contain historical archaeological resources. The potential for the survival of archaeological remains is significantly affected by activities which may have caused ground disturbance. This assessment is therefore based on consideration of current ground conditions, and analysis of the historical development of the study area.

'Archaeological potential' refers to the likelihood that an area contains physical remains associated with an earlier phase of occupation, activity or development of that area. This is distinct from 'archaeological significance' and 'archaeological research potential'. These designations refer to the cultural value of potential archaeological remains and are the primary basis of the recommended management actions included in this document.

7.2 Land use summary

The historical development of the study area has been divided into the following historical phases of activity for this assessment:

- Phase 1 (1800 – 1851): William Balmain Estate. The study area was located on the outer margin of the William Balmain Estate, granted in 1800 over the entirety of Balmain, Birchgrove and most of Rozelle. The study area during this time consisted of largely estuarine mudflats which were mostly inundated at high tide, with the rocky foreshore of Glebe Island on its southern margin
- Phase 2 (1851 – 1912): Rozelle Subdivisions and Waterfront Industries. The Rozelle and Balmain peninsula was subdivided over this period, with maritime and noxious industries developing along the White Bay and Glebe Island foreshores. No effort was made to reclaim the head of White Bay in the study area at this time; however, some rear yard buildings were constructed in the far western portion of the study area above the high tide line. In 1890, Mullens Street was extended south from the intersection of Parsons Street to (then) Abattoir Road over the head of White Bay, with new properties constructed facing off from Mullens Street in the western portion of the study area
- Phase 3 (1912 – 1984): White Bay Power Station and Port Facilities. The Mullens Street resumption area was resumed by the government, cleared and then the current White Bay foreshore jetty was constructed in this space. The White Bay Rail Line was connected through newly reclaimed land to the west of the study area. The White Bay area operated as a coal loading and goods loading port, with shifting configurations of rail infrastructure and buildings utilised over the course of 70 years
- Phase 4 (1984 – Present): Decommissioned Site. White Bay Power Station was decommissioned in 1984, with the rail line suspending operations to White Bay jetties in 1996. Former infrastructure in the area sequentially removed.[28]

[28] Note: structures and evidence associated with Phase 4 are existing and have therefore not been included within the archaeological potential assessment.

7.3 Previous impacts

The development of White Bay Power Station in 1912, and surrounding construction work to install the connecting rail lines and new jetties, involved considerable land and foreshore modification. Large portions of the sandstone headland on the northern side of Glebe Island were quarried and the ground levelled near to sea level across the site.

On the western side of the study area, successive phases of foreshore reclamation involved significant infilling of ground to construct a level surface over ground which was largely intertidal. Reclamation soil and fill deposits often act as a protective layer for archaeological remains and can aid in their preservation.

As such, while the southern margin of the study area is expected to be cut down (from the original rocky foreshore of Glebe Island), the western and northern parts of the study area are likely to demonstrate infilling events which may have preserved archaeological remains. Geotechnical information indicates that natural foreshore and marine sediments are likely to be preserved below fill layers of up to 2.8 metres.

The horizontal and vertical extent of infill deposits across site is not clearly understood. The construction of the rail line and multiple infrastructural remodelling events within the former rail corridor is likely to have required excavation into infilled soil deposits. The degree of disturbance is likely to be quite variable across the whole of the site.

7.4 Preliminary assessment of archaeological potential

A preliminary summary of archaeological potential within the study area is outlined in Table 9 and shown in Figure 18.

Table 9: Assessment of archaeological potential for the study area

Phase	Site Feature	Potential archaeological remains	Potential
Phase 1 (1800 – 1851)	Historic soil deposits	The study area was not known to have been developed by Europeans during this historical phase, although European settlement along the shores of Port Jackson was occurring at this time. Washed in artefactual material may have accrued on the former intertidal flat which could be buried by later infill. Soil samples may also have been sealed from early reclamation phases and could provide information on the environment of early Sydney.	**Nil to Low**
Phase 2 (1851 – 1912):	Out sheds, former structures in the western portion of the study area	The rear yard buildings for the original 1860 White Bay Hotel were located in the far western portion of the study area. These structures could have included accommodation and stable structures, as well as toilets, basements and wells. Archaeological remains associated with these former buildings could include brick and stone footings, timber boards and intact underfloor deposits, ceramic pipes, brick or stone lined drains, isolated ceramic, glass, bone, or metal deposits, lined cesspits or wells containing occupation or discarded artefactual (glass, ceramic, bone) material and soil deposits. While these buildings were removed during resumption for the White Bay Power Station development, their relative elevation would have involved infilling of the foreshore in the early 20th c. which would have likely preserved some portion of these remains.	**Low to Moderate**

Phase	Site Feature	Potential archaeological remains	Potential
	Former Abattoir buildings	The eastern portion of the study area overlaps a portion of the former Glebe Island Abattoir. One historical plan indicates that at least two large structures and four small structures were situated in this area during the late 19th c. However, the redevelopment of White Bay involved the removal of the former abattoir followed by extensive quarrying of the natural sandstone to reduce the raised elevation down to the current level of the White Bay foreshore, which was several metres higher than the ground surface is today. This should have removed all potential archaeological remains in this area.	**Nil to Low**
	Reclamation fills	Soils and sediments used to infill the foreshore at the head of White Bay would be expected to be found throughout the study area from this phase. Reclamation fills are likely to be artefact-rich although geographically dispersed. Archaeological remains relating to this deposit could include discrete stratigraphic historic soil deposits, artefactual (glass, ceramic, bone, timber, brick) materials and infill rubble, and timber retaining or infill structures such as piers, posts, beams or walls.	**Moderate**
Phase 3 (1912 – 1984)	Reclamation fill deposits	Reclamation fill used to extend the foreshore during the construction of the White Bay Power Station is likely to have been materially more robust than earlier phases of small-scale and informal reclamation. Archaeological remains relating to this infilling event could include brick, stone or concrete rubble, artefactual discard deposits (glass, ceramic, timber), timber retaining structures such as piers, posts or beams, and buried concrete structural elements.	**High**
	Rail infrastructure and former warehouses and structures	The study area had numerous rail lines and rail support facilities (including turntables, stabling facilities and roundhouses, switching and loading gears). While many of these facilities have been removed, there are surface remnants of some of this material and it is likely that buried remnants across the site remain. Archaeological remains relating to rail infrastructure from this phase could include rail beams, ballast and timber or concrete sleepers, rail switches, levers and points, concrete, steel and brick building footings, discarded industrial equipment, artefactual refuse deposits (plastic, metal, glass, ceramic). Historical aerial imagery indicates that several ancillary buildings were situated within the study area. Subsurface remains could include concrete and brick footings, tile and brick rubble, discarded industrial equipment, artefact refuse deposits (plastic, metal, glass, ceramic).	**High**

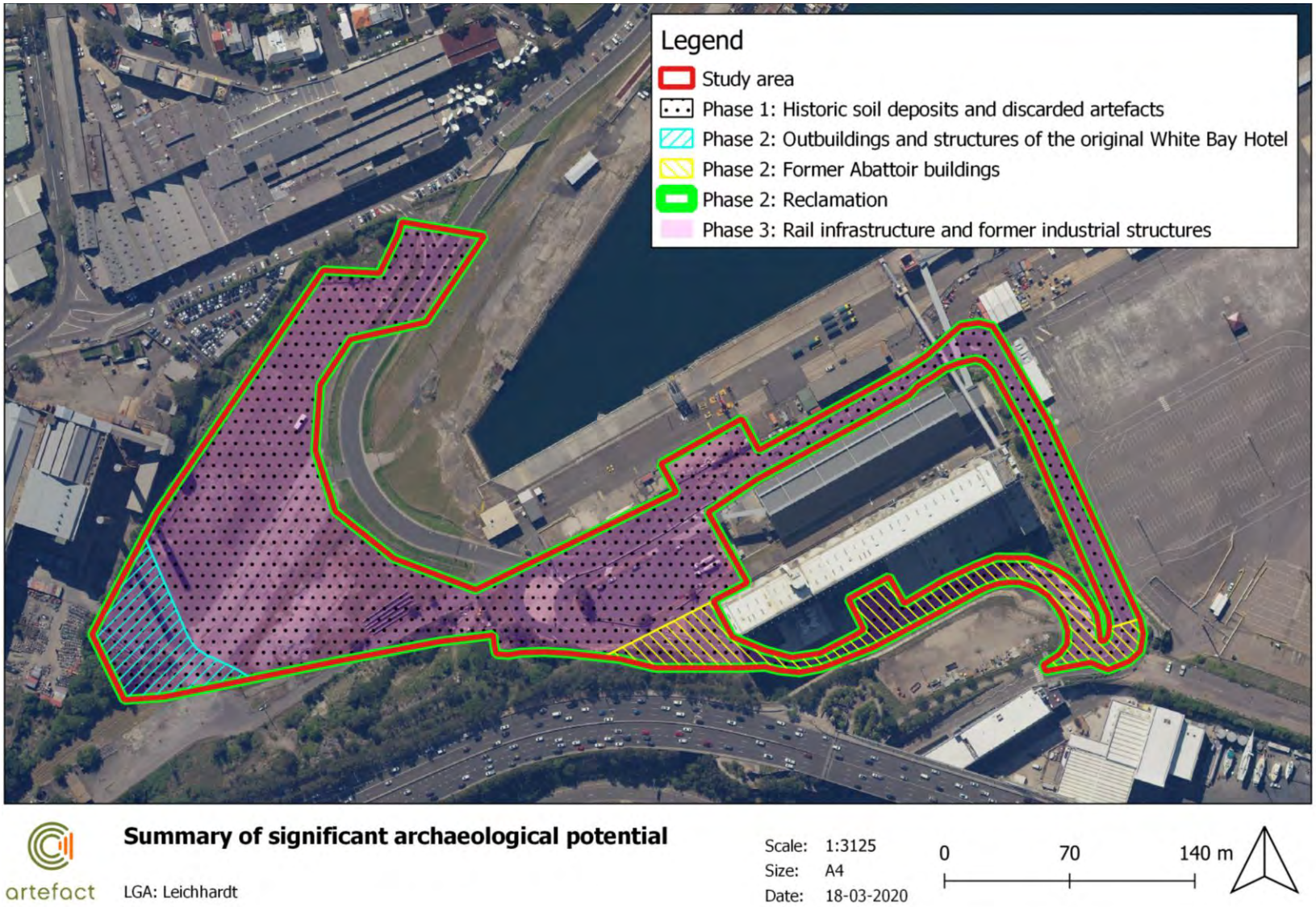


Figure 18: Summary of significant archaeology

7.5 Archaeological significance

In 2009, the NSW Heritage Division of the Office of Environment and Heritage (OEH), now Department of Premier and Cabinet – Heritage, issued a set of guidelines titled *Assessing the Significance for Historical Archaeological Sites and 'Relics'.* These guidelines call for broader consideration of multiple values of archaeological sites beyond their research potential. Under the guidelines, the significance of a potential archaeological site can then be assessed as being of Local or State significance. If a potential relic is not considered to reach the Local or State Significance threshold, then it is not a relic under the Heritage Act.

'State heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item. 'Local heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item. The overall aim of assessing archaeological significance is to identify whether an archaeological resource, deposit, site or feature is of cultural value. The assessment will result in a succinct statement of heritage significance that summarises the values of the place, site, resource, deposit or feature.

7.5.1 Significance of predicted archaeological remains for Phase 1 (1800-1851)

Table 10 provides a discussion of the potential significance of archaeological remains that may be located within the study area for Phase 1 of the European history of the site, including an assessment against the NSW Heritage Criteria and a Statement of Significance.

Table 10: Assessment of significance for Phase 1 (1800 – 1851) archaeological remains at the study area

Criteria	Discussion
Research potential	Buried historical soil samples, if stratigraphically controlled, would have the potential to provide unique scientific data on the marine and ecological conditions of the Port Jackson area during the early years of the Sydney colony.
Association with individuals, events or groups of historical importance	Isolated artefact samples and buried historic soils are not materially associated with any group, person or event of historic note.
Aesthetic or technical significance	Isolated artefact samples and buried historic soils are unlikely to demonstrate any aesthetic or technical significance.
Ability to demonstrate the past through archaeological remains	Substantial buried soil deposits may be able to broadly demonstrate the environmental past from the time of the early founding of the colony.
Statement of Significance	Isolated artefact deposits and stratigraphically-intact buried historic soils from this phase would be of local heritage significance for their ability to provide ecological information relating to the environment at the time of the early founding of the British colony around Port Jackson.

7.5.2 Significance of predicted archaeological remains for Phase 2 (1851 – 1912)

Table 11 provides a discussion of the potential significance of archaeological remains that may be located within the study area for Phase 2 of the European history of the site, including an assessment against the NSW Heritage Criteria and a Statement of Significance.

Table 11: Assessment of significance for Phase 2 (1851 – 1912) archaeological remains at the study area

Criteria	Discussion
Research potential	Archaeological materials related to reclamation fills at White Bay, as well as potential privy or well deposits associated with the original White Bay Hotel, could provide a deposit of artefactual material that would be chronologically stratified. This would be a unique material resource into understanding the domestic practices of the working population of Glebe Island and White Bay.
Association with individuals, events or groups of historical importance	Material remains associated with the original White Bay Hotel are associated with the Glebe Island Abattoirs, as the venue for which many of the workers of that facility were known to have congregated at.
Aesthetic or technical significance	Archaeological remains relating to the original White Bay Hotel may include significant recreational artefactual collections, although it is not likely that these collections would be considered aesthetically or technically significant in their own right.
Ability to demonstrate the past through archaeological remains	Archaeological remains related to the original White Bay Hotel could be demonstrative of recreational and domestic working class practices and activities from the mid-19th century. Reclamation fills are also likely to have accrued significant artefactual materials from the period of their deposition would broadly demonstrate material industrial practices in the White Bay area.
Statement of Significance	Archaeological remains associated with the original White Bay Hotel and reclamation fills from this historic phase would be of local significance for their potential to inform research questions on the domestic life of working people of the area, their association with the Glebe Island Abattoirs, and for being demonstrative of the past lifeways and industrial practices of working people in the mid-19th century.

7.5.3 Significance of predicted archaeological remains for Phase 3 (1912 – 1984)

Table 12 provides a discussion of the potential significance of archaeological remains that may be located within the study area for Phase 3 of the European history of the site, including an assessment against the NSW Heritage Criteria and a Statement of Significance.

Table 12: Assessment of significance for Phase 3 (1912 – 1984) archaeological remains at the study area

Criteria	Discussion
Research potential	Information on the former rail infrastructure and surface structures in the study area is archivally available and archaeological remains would not likely respond to specific research agenda if they were investigated. Reclamation fills used for the 1912 White Bay reclamation are more likely to utilise modern infill materials in bulk (concrete, stone) and would have a reduced artefactual signature compared to 19th c. informal and accreted reclamation events. It is unlikely that reclamation fills from this phase would respond to research questions.
Association with individuals, events or groups of historical importance	Evidence of former rail infrastructure and working buildings would be associated with the operation of the White Bay Power Station and the working population who toiled there. Rail infrastructure would be associated with the use of White Bay during the war-time industrial and shipping efforts of that period. These remains would also be associated with organised labour movements and labour organisational efforts. Archaeological remains of reclamation fills from post-1912 would not be strongly associated with any specific individuals, groups or events of historic note.
Aesthetic or technical significance	The scale of the rail and port facilities at White Bay was considerable in size and technically complex, and the archaeological remains of a working industrial centre of this kind would be of high aesthetic and technical significance. Archaeological remains of reclamation fills from post-1912 would likely be modern bulk material fill materials and would not likely be of aesthetic or technical significance.
Ability to demonstrate the past through archaeological remains	Archaeological remains associated with former rail infrastructure and industrial buildings are strongly demonstrative of large-scale 20th c. industrial practices. Archaeological remains of reclamation fills from post-1912 contexts would likely be modern bulk material fill materials and structural elements and would be unlikely to be demonstrative of past events or practices.
Statement of Significance	Remnants of rail infrastructure, particularly larger items such as turntables and roundhouses, as well as former industrial structures, would be locally significant for their association with the State significant White Bay Power Station. These remains would be aesthetically and technically significant, and they would be demonstrative of large-scale industrial and organisational practices of the 20th c. Under the Department of Premier and Cabinet – Heritage, set of guidelines, *Assessing the Significance for Historical Archaeological Sites and 'Relics*', archaeological remains of reclamation fills from post-1912 would be unlikely to reach local or State significance.

7.6 Summary of archaeological potential and significance

A summary of significant potential archaeological deposits that may remain within the study area is provided in Table 13.

Table 13: Summary of significant potential archaeological deposits in the study area

Phase	Site feature and potential archaeological remains	Potential	Significance
Phase 1 (1800 – 1851)	**Historic soil deposits and discarded artefacts** – Archaeological remains associated with this would include stratigraphically-controlled and sealed soil deposits, *ex-situ* artefactual material from this period which may have washed into site or been discarded.	**Nil to Low**	**Local**
Phase 2 (1851 – 1912)	**Outbuildings and structures of the original White Bay Hotel** – Archaeological remains associated with these former buildings could include brick and stone footings, timber boards and intact underfloor deposits, ceramic pipes, brick or stone lined drains, isolated ceramic, glass, bone, or metal deposits. Lined cesspits or wells containing occupation or discarded artefactual (glass, ceramic, bone) material and soil deposits.	**Low to Moderate**	**Local**
	Former Abattoir buildings – Archaeological remains associated with the former abattoir buildings would likely include brick and stone footings, timber boards, services, demolition fills, discarded industrial material, soil deposits, and discarded artefactual material including glass, ceramic and bone.	**Nil to Low**	**Local**
	Reclamation fills – Archaeological remains relating to reclamation fills could include discrete stratigraphic historic soil deposits, artefactual (glass, ceramic, bone, timber, brick) materials and infill rubble, and timber retaining or infill structures such as piers, posts, beams or walls.	**Moderate**	**Local**
Phase 3 (1912 – 1984)	**Rail Infrastructure and former industrial structures** – Archaeological remains could include evidence of turntables, stabling facilities and roundhouses, loading equipment, rail beams, ballast and timber or concrete sleepers, rail switches, levers and points, concrete, steel and brick building footings, tile and brick rubble, discarded industrial equipment, artefactual refuse deposits (metal, glass, ceramic).	**High**	**Local**

7.6.1 Archaeological impact assessment

Impacts to significant archaeological resources are likely to occur during road realignment and associated works within the study area. It is assumed that impact could be up to one metre in areas where road construction would be undertaken. Subsurface impact associated with road construction would be outside the area assessed as having potential for outbuildings and remains of the former White Bay Hotel. Impact would be within areas assessed as having potential for reclamation fill, and former rail infrastructure which may have local significance. Former rail infrastructure and reclamation fill as a deposit would not be managed as relics under the NSW *Heritage Act 1977*.

Buried historic soil deposits are likely to be deeper than the proposed impacts, as they would occur beneath the reclamation fill. Therefore, impacts to relics are unlikely. It is likely that impacts to former rail infrastructure and reclamation fill which may be of local significance would occur as a result of excavation associated with road construction.

8.0 HERITAGE IMPACT ASSESSMENT

8.1 Introduction

The following sections provide an assessment of potential heritage and archaeological impacts as a result of the proposal. It provides a detailed heritage impact assessment for heritage items within or in the vicinity of the study area, an historic archaeological impact assessment, and statement of heritage impact.

8.1.1 Types of impact

An impact assessment is provided for direct, visual impact, and potential indirect impacts. Each type of impact is described in Table 14 below.

Table 14: Terminology for heritage impact types

Impact	Definition
Direct	Impacts resulting from works located within the curtilage boundaries of the heritage item.
Visual	Impact to views, vistas and setting of the heritage item resulting from proposed works inside or outside the curtilage boundaries of the heritage item.
Potential indirect	Impacts resulting from increased noise, vibration and construction works located outside the curtilage boundaries of the heritage item.

8.1.2 Grading of impacts

In order to consistently identify the potential impact of the proposed works, the terminology contained below has been referenced throughout this document. This terminology, and corresponding definitions, are based on those contained within guidelines produced by the International Council on Monuments and Sites (ICOMOS).[29]

Table 15: Terminology for assessing the magnitude of heritage impact

Grading	Definition
Major	Actions that would have a long-term and substantial impact on the significance of a heritage item. Actions that would remove key historic building elements, key historic landscape features, or significant archaeological materials, thereby resulting in a change of historic character, or altering of a historical resource. These actions cannot be fully mitigated.
Moderate	Actions involving the modification of a heritage item, including altering the setting of a heritage item or landscape, partially removing archaeological resources, or the alteration of significant elements of fabric from historic structures. The impacts arising from such actions may be able to be partially mitigated.

:[29] Including the document *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*, ICOMOS, January 2011.

Grading	Definition
Minor	Actions that would result in the slight alteration of heritage buildings, archaeological resources, or the setting of an historical item. The impacts arising from such actions can usually be mitigated.
Negligible	Actions that would result in very minor changes to heritage items.
Neutral	Actions that would have no heritage impact.

8.2 Built Heritage

8.2.1 White Bay Power Station (SHR 01015) impact assessment

8.2.1.1 Direct impact

Works within the study area would involve direct impacts within the SHR curtilage of the White Bay Power Station (Figure 19). The proposal would encroach upon around 0.54 hectares of the 3.9 hectare SHR curtilage of the White Bay Power Station, involving site clearance and any necessary surface remediation, site set up and other ancillary activities. In addition, the privately owned Port Access Road would be permanently relocated from its existing position and a portion of this road would be located within the SHR curtilage. No significant buildings or structures in the White Bay Power Station SHR curtilage are located within the study area, which mainly comprises open areas of hardstand and port infrastructure. The land impacted by the proposal is associated with the former coal yard. The former coal yard is not considered to be of exceptional or high significance and does not have designated policies within the White Bay Power Station Conservation Management Plan (CMP). However, section 5.1.12 of the CMP indicates that landscaping elements including yards (including the former coal yard) should be conserved and adapted. At present, the former coal yard remains undeveloped; the proposed works, including site clearance and any necessary surface remediation, site set up and other ancillary activities and the relocation of the Ports Access Road to within the SHR curtilage, would alter this. The proposal is considered to have a **minor** direct impact on the SHR listed White Bay Power Station.

8.2.1.2 Potential indirect impact assessment

The proposal would include works within the heritage curtilage of the White Bay Power Station. Vibration is predicted to exceed the cosmetic damage criterion at one structure within the heritage curtilage, the coal handling shed. A more detailed assessment of the structure and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure, prior to the commencement of works. The more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed. The proposal is considered to have a **minor** indirect impact on the SHR listed White Bay Power Station.

8.2.1.3 Visual impact

The proposal, including the relocation of the Ports Access Road within the SHR curtilage, would visually alter the presentation of the portion of the White Bay Power Station located within the study area. This would result in temporary and permanent visual changes within the heritage item curtilage and would alter industrial landscaping elements by changing the arrangement and configuration of the land surrounding the significant industrial structures. These landscaping elements and external spaces have been identified as having spatial significance for their contribution to the scale and

industrial quality of the item and its built components. However, no significant buildings or structures in the White Bay Power Station SHR curtilage are located within the study area, which mainly comprises open areas of hardstand and port infrastructure. Landscaping elements would remain industrial, in keeping with the current form. The proposal is considered to have a **minor** indirect (visual) impact on the SHR listed White Bay Power Station as the site would maintain its current industrial function and level of development; and the nature of works comprise of relocation of road infrastructure rather than intrusive new development.

Impact summary

The overall impact of the proposal on the heritage item would be **minor**. Within the SHR curtilage, the proposal would include site clearance and any necessary surface remediation, site set up and other ancillary activities. In addition, the privately owned Port Access Road would be relocated from its existing position, and a portion of this road would be located within the SHR curtilage. These works would result in temporary and permanent physical and visual impacts within the SHR curtilage of the heritage item, however there are no structures within the portion of the study area within SHR curtilage and the proposal would not have direct impacts on elements that are of moderate to exceptional significance. In addition, the proposal is not expected to diminish the historic, associative, aesthetic, or social significance, or the research potential, representativeness or rarity of the heritage item.

Assessment against conservation policies

The conservation policies provided in the Conservation Management Plan (CMP) 2011 prepared for the White Bay Power Station have been reviewed. Policies provided in the CMP relevant to assessing the impacts of the proposal have been extracted and provided below for reference.

Table 16: Assessment against relevant conservation policies – White Bay Power Station Conservation Management Plan[30]

Policy	Assessment of impacts against CMP Policies
1.1.1	*White Bay Power Station retains considerable cultural significance and must be retained and conserved. In order to ensure its long term maintenance and survival it must be adapted for an appropriate new use or uses. Such uses must retain and respect the significant elements and attributes of the place.*
	The proposal would not demolish structures that are considered to be significant. In addition, the nature of the site would be retained as no soft landscaping or similar elements would be introduced to diminish the traditional industrial landscape.
1.1.6	*White Bay Power Station must retain a use or uses, which allow reasonable public access to, and interpretation of, those significance spaces, elements and machinery that represent the component parts of the power generation process. Such access should not place significant fabric or qualities of these areas at risk of alteration, damage or removal.*
	The proposal would not involve the demolition of structures considered to be significant. In addition, the proposal would not change the level of public access, or require the need for interpretation.

[30] Design 5 Architects 2011. White Bay Power Station: Conservation Management Plan.

Policy	Assessment of impacts against CMP Policies
1.1.7	*The aesthetic (including the sensory aspects of visual, aural and tactile) qualities of the internal and external spaces and elements of exceptional and high significance must be retained and respected, viz. the visual and special qualities of the Turbine Hall.*
	No significant buildings or structures in the heritage curtilage are located within the proposal site area, which mainly comprises of vacant land. In addition, significant industrial landscaping elements would be retained and no new landscaping elements, including soft landscaping elements, would be introduced as part of the proposal.
1.2.1	*Any development being proposed in the vicinity of the White Bay Power Station must carefully consider its bulk, scale and placement in order to respect the visibility and prominence of the power station as a harbourside landmark.*
	The proposal would result in visual changes within the heritage item and changes to the arrangement and configuration of the land surrounding the significant industrial structures. These external spaces have been identified as having spatial significance for their contribution to the scale and industrial quality of the item and its built components, and redevelopment of this land would result in visual impact. The study area covers land beyond the White Bay Power Station curtilage and extends towards the White Bay foreshore, as such, works within the study area would result in changes to the context of the former power station. However, these changes have been considered minor due to the scale of the proposed works and the maintenance of views and vistas to and from the heritage item.
1.2.2	*Those views from major axial approaches such as Anzac Bridge, Glebe Point Road, Johnston Street Annandale, City West Link, Victoria Road (from north west), Mullens Street and Robert Street must be maintained as substantially unobstructed views. Any new structures in the vicinity of the White Bay Power Station must not substantially mask the visibility of the power station or threaten its landmark qualities as the major focal element in these views.*
	The proposal would not obstruct or alter views to and from the White Bay Power Station to major axial approaches as the proposal comprises the relocation of the existing Port Access Road rather than introducing an intrusive new development.
1.2.3	*General and changing views towards White Bay Power Station from the harbour, major parks and public areas of the southern edge of Balmain and Rozelle, Glebe Point, Pyrmont Point, Observatory Hill and Darling Harbour, as well as from the Harbour Bridge, Anzac Bridge, City West Link road, The Crescent and Victoria Road, should be retained substantially unobstructed by other large elements, existing or future. Such elements should be sited, so as to be seen as part of its industrial context, framing the power station and strengthening its maritime related industrial character.*
	The proposal would not obstruct or alter views to the White Bay Power Station from the harbour, major parks, public areas within surrounding suburbs, surrounding major landmarks and important approaches. The proposal would maintain the heritage item's current industrial function and level of development; and the proposal comprises of the relocation of an existing Port Access Road rather than introducing an intrusive new development.

8.2.2 Glebe Island Silos (s170 4560016) impact assessment

8.2.2.1 Direct impact

The study area is located directly adjacent to the s170 heritage-listed curtilage of the Glebe Island Silos (Figure 19). The proposal would not encroach upon the heritage curtilage of the item. The proposal would not have a direct impact to the heritage listed structures. The proposed works in close proximity to the item would include the relocation of the intersection at Port Access Road, Sommerville Road and Solomons Way, the introduction of road line marking and signage and temporary fencing and/or hoarding. The proposal is considered to have **neutral** direct impact on the s170 heritage listed Glebe Island Silos.

8.2.2.2 Potential indirect impact

The Glebe Island Silos are located directly adjacent to the study area and the new road alignment does not encroach upon the item's heritage curtilage. Vibration is predicted to be below the cosmetic damage screening criteria. Potential direct impacts associated with vibration are not anticipated. The proposal is considered to have a **neutral** potential indirect impact on the s170 heritage listed Glebe Island Silos.

8.2.2.3 Indirect impact

The proposed works in close proximity to the item would include the relocation of the intersection at Port Access Road, Sommerville Road and Solomons Way, changes to road line marking and signage and temporary fencing and/or hoarding. This would result in visual changes in the immediate vicinity of the heritage item, which maintains several view lines and view corridors west and south. The study area comprises predominantly of vacant land that is historically associated with industrial uses. The proposal would result in a minor change the wider setting of the heritage item, however views towards the heritage item from the streetscape would be maintained and the aesthetic significance of the item would not be diminished. The proposal is considered to have a **neutral** indirect (visual) impact on the locally listed Glebe Island Silos.

8.2.2.4 Impact summary

The overall impact of the proposal on the heritage item would be **neutral**. The proposal does not include works within the heritage curtilage of the item. The proposed works in close proximity to the item would include the relocation of the intersection at Port Access Road, Sommerville Road and Solomons Way, the introduction of road line marking and signage and temporary fencing and/or hoarding. The proposal would not have a permanent direct physical impact to structures within the heritage curtilage and visual impacts have been assessed as neutral as the site would maintain current use and level of development. Lastly, the proposal would not diminish the historical or aesthetic significance of the heritage item.

8.2.3 White Bay Power Station (Inlet) Canal (s170 4560062) impact assessment

8.2.3.1 Direct impact

An approximate 70-metre stretch of the s170 heritage-listed White Bay Power Station (Inlet) Canal is located directly within the study area. However, the inlet canal is located entirely underground, with its visible entry point into White Bay located outside the study area. The proposal would include site clearing and any necessary contaminated land remediation works around Port Access Road in addition to the relocation of the Ports Access Road which could include minor excavation. There is limited information available regarding the precise depth of the heritage item.

The proposal would disturb a maximum depth of one metre for excavation works along the road alignment and intersection works. Depending on final excavation methods and depths, this excavation

work has the potential to directly impact the subsurface heritage item. As such, the proposal is considered to have a **minor** direct impact on the s170 heritage listed White Bay Power Station (Inlet) Canal. Once the relative depth of the heritage item is confirmed, in addition to further excavation detail, the direct impact on the item may be reduced to neutral or increased to moderate.

8.2.3.2 Potential indirect impact

The White Bay Power Station (Inlet) Canal is partially located within the study area. Vibration is predicted to be above the cosmetic damage screening criteria. The item would experience vibration levels above the cosmetic damage screening criteria. Further assessment (including a structural assessment) and vibration monitoring (if required) would be completed in accordance with mitigation and management measures detailed in Appendix B of the Review of Environmental Factors. The proposal is considered to have a **minor** potential indirect impact on the s170 heritage listed White Bay Power Station (Inlet) Canal.

8.2.3.3 Indirect impact

The White Bay Power Station (Inlet) Canal is partially located within the study area. However, the heritage item is located entirely underground and the proposed works would not impact upon the item visually. The proposal is considered to have a **neutral** indirect (visual) impact on the locally listed White Bay Power Station (Inlet) Canal.

8.2.3.4 Impact summary

The overall impact of the proposal on the heritage item would be **minor**. The heritage item is partially located within the study area, although the item is entirely underground. The proposal would include site clearing and any necessary contaminated land remediation works around Port Access Road in addition to the relocation of the Ports Access Road which would include minor excavation which may directly impact the heritage item. Once the relative depth of the heritage item is confirmed, in addition to further excavation detail, the direct impact on the item may be reduced to neutral or increased to moderate. The proposal would also have a potential minor indirect impact due to construction vibration.

8.2.4 Glebe Island Dyke Exposures (s170 4560056) impact assessment

8.2.4.1 Direct impact

The study area is located directly adjacent to the s170 heritage-listed curtilage of the Glebe Island Dyke Exposures (Figure 19). The proposal would not encroach upon the heritage curtilage of the item. The proposal would not have a direct impact to the heritage listed item. The proposed works in close proximity to the item would include the relocation of the intersection at Port Access Road, Sommerville Road and Solomons Way, the introduction of road line marking and signage and temporary fencing and/or hoarding. The proposal is considered to have **neutral** direct impact on the s170 heritage listed Glebe Island Dyke Exposures.

8.2.4.2 Potential indirect impact

The Glebe Island Dyke Exposures are located directly adjacent to the study area and the new road alignment does not encroach upon the item's heritage curtilage. Vibration is predicted to be below the cosmetic damage screening criteria. Potential direct impacts associated with vibration are not anticipated. The proposal is considered to have a **neutral** potential indirect impact on the s170 heritage listed Glebe Island Dyke Exposures.

8.2.4.3 Indirect impact

The proposed works in close proximity to the item would include the relocation of the intersection at Port Access Road, Sommerville Road and Solomons Way, the introduction of road line marking and

signage and temporary fencing and/or hoarding. This would result in visual changes in the immediate vicinity of the heritage item, however, the majority of these changes are expected to be shielded by the adjacent Glebe Island Silos. The study area comprises predominantly of vacant land that is historically associated with industrial uses. The proposal would result in a minor change the wider setting of the heritage item, however views towards the heritage item would be maintained and the aesthetic significance of the item would not be diminished. The proposal is considered to have a **neutral** indirect (visual) impact on the locally listed Glebe Island Dyke Exposures.

8.2.4.4 Impact summary

The overall impact of the proposal on the heritage item would be **neutral**. The proposal does not include works within the heritage curtilage of the item. The proposed works in close proximity to the item would include the relocation of the intersection at Port Access Road, Sommerville Road and Solomons Way, the introduction of road line marking and signage and temporary fencing and/or hoarding. The proposal would not have a permanent direct physical impact within the heritage curtilage and visual impacts have been assessed as neutral as the site would maintain current use and level of development.

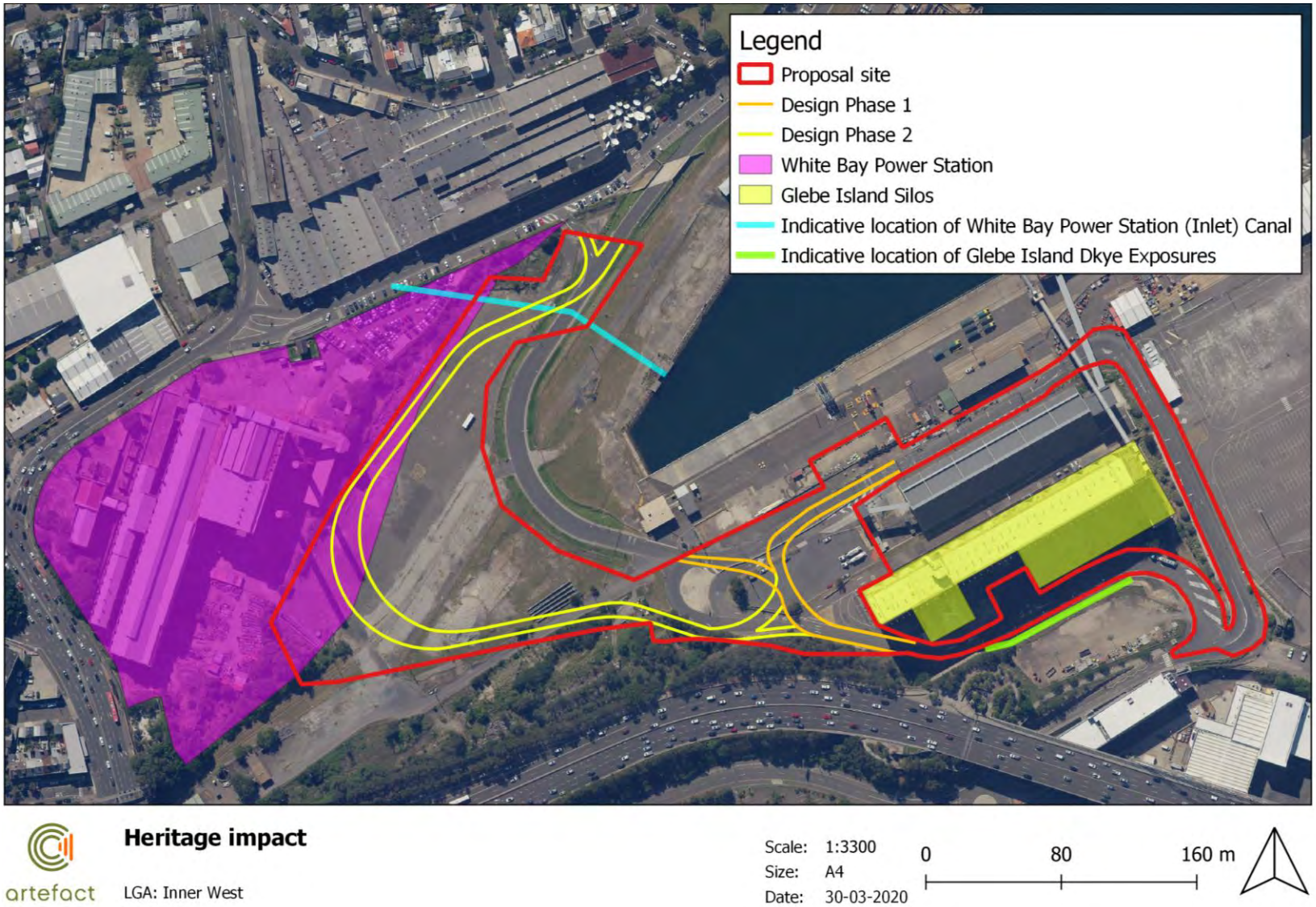


Figure 19: Heritage impact map

8.3 Archaeological Impact

Impacts to significant archaeological resources are likely to occur during road realignment and associated works within the study area. It is assumed that impact could be up to one metre in areas where road construction would be undertaken. Subsurface impact associated with road construction would be outside the area assessed as having potential for outbuildings and remains of the former White Bay Hotel. Subsurface impact (if required) would be within areas assessed as having potential for reclamation fill, and former rail infrastructure which may have local significance. Former rail infrastructure and reclamation fill as a deposit would not be managed as relics under the NSW Heritage Act.

Buried historic soil deposits are likely to be deeper than the proposed impacts, as they would occur beneath the reclamation fill. Therefore, impacts to relics are unlikely. It is likely that impacts to former rail infrastructure and reclamation fill which may be of local significance would occur as a result of excavation (if required) associated with road construction.

A summary of impacts to archaeology within the study area has been provided in Section 7.6.

8.4 Statement of Heritage Impact

8.4.1 Heritage Division guidelines response

The following table provides a summary of the heritage impacts in consideration of the *Statements of Heritage Impact* guidelines by the Office of Environment and Heritage (2002).

Table 17: Discussion of impact against Heritage Division guidelines

Impact on a heritage item	Discussion
Aspects that respect or enhance the heritage significance of the heritage items	• The proposed works are not considered to impact the industrial function and level of development within The Bays; and the nature of works comprise of relocation of road infrastructure rather than intrusive new development. • The proposal is not expected to diminish the historic, associative, aesthetic, or social significance, or the research potential, representativeness or rarity of the heritage items within the study area (White Bay Power Station, Glebe Island Silos White Bay Power Station (Inlet) Canal and Glebe Island Dyke Exposures).
Aspects that would detrimentally impact on the heritage significance of the heritage items	• The proposal would have a minor direct impact on the State significant White Bay Power Station (SHR 01015) heritage item, requiring intervention and localised impacts to state significant curtilage. However, the proposal would not include direct impact to heritage listed structures. • The proposal would have a minor visual impact on the White Bay Power Station, by way of relocating the Port Access Road within the State heritage curtilage of the item. • The proposal, which would include site clearing and any necessary contaminated land remediation works around Port Access Road and the relocation of the Ports Access Road, could have a minor direct impact on the White Bay Power Station (Inlet) Canal. This would be confirmed once further detail is available on the relative depth of the heritage item to the proposed excavation works. • The study area has been assessed as having low-high potential for locally significant non-Aboriginal archaeology. It is understood that ground disturbing works would take place as part of the proposed works, having the potential to impact locally significant archaeology.

Impact on a heritage item	Discussion
Justifications for impact	• The proposal avoids impacts to elements that provide structural stability to the White Bay Power Station • The proposal would facilitate the urban renewal of Bays West, including the transformation initiatives in the White Bay Power Station (and surrounds) destination and critical construction works for the proposed Sydney Metro West. • The proposal would minimise impacts to adjacent leaseholders Cement Australia by replacing the Truck Parking Licenced Area • The proposal would maintain access to existing port and commercial operations between White Bay and Glebe Island during future construction works • The proposed one-way circuit would improve road safety by reducing conflicting movements within the internal ports road network.

8.4.2 Statement of Heritage Impact

The proposal is located within the curtilage of the State significant White Bay Power Station and White Bay Power Station (Inlet) Canal and within proximity to the locally significant Glebe Island Silos and Glebe Island Dyke Exposures. The proposed works are expected to have a minor direct (physical) impact, a minor indirect (visual) impact and minor potential indirect impact to the White Bay Power Station. The proposed works are also expected to have a minor direct impact to the White Bay Power Station (Inlet) Canal and a minor potential indirect impact. Impacts to the White Bay Power Station (Inlet) Canal would be confirmed once further detail is available on the relative depth of the heritage item to the proposed excavation works. The proposal is expected to have a neutral impact to the Glebe Island Silos and Glebe Island Dyke Exposures, and a neutral indirect impact on the White Bay Power Station (Inlet) Canal. In addition, the works are not expected to diminish the historic, associative, aesthetic, or social significance, or the research potential, representativeness or rarity of the heritage items within the study area. The proposal would avoid impacts to elements that provide structural stability to the White Bay Power Station and minimise impacts to surrounding leaseholders; whilst maintaining safe road access to the area.

9.0 CONCLUSIONS AND RECOMMENDATIONS

There is one SHR listed item located partially within the study area and three S170 registered heritage items located immediately adjacent to the study area:

- White Bay Power Station (SHR 01015)
- Glebe Island Silos (SHI 4560016)
- White Bay Power Station (Inlet) Canal (SHI 4560062)
- Glebe Island Dyke Exposures (SHI 4560056)

The proposed works are expected to have a minor impact on the State significant White Bay Power Station; a minor direct, and minor potential direct and neutral indirect impact on the White Bay Power Station (Inlet) Canal, whilst having a neutral impact on the locally significant Glebe Island Silos and Glebe Island Dyke Exposures. The direct impacts to White Bay Power Station are a result of proposed works inside the curtilage of the item; however, the proposed works are not considered likely to directly impact the structural remains. Indirect impacts are relating to the visual impact and setting of the heritage item and potential indirect impact relate to potential vibration levels when activities are close to the heritage item. Impacts to the White Bay Power Station (Inlet) Canal would be confirmed once further detail is available on the relative depth of the heritage item to the proposed excavation works.

It is likely that impact to former rail infrastructure and reclamation fill which may be of local significance would occur as a result of excavation associated with road construction. Impacts to relics are unlikely.

9.1.1.1 Heritage Act requirements

As proposed works within the study area include minor direct impacts on SHR listed curtilage (White Bay Power Station SHR Listing No. 01015) including construction of a road partially within the curtilage, approval or an exemption from approval for the proposed works must first be gained from the Heritage Council of NSW (Heritage Council) or delegate (Department of Premier and Cabinet – Heritage). The proposal has been assessed as having an overall minor impact on the heritage significance of the White Bay Power Station. The proposed works may be consistent with the standard exemptions under Section 57(2) of the *Heritage Act 1977*. It is therefore necessary to obtain a Section (s) 60 permit from the Heritage Council (or delegate) or a section 57 exemption (standard exemption 7) from approval prior to works commencing within the State heritage curtilage.

9.1.1.2 Archaeological management

It is unlikely that archaeological relics would be impacted by the works, therefore a Section 139 exception or Section 140 permit are not required. As archaeological remains (works) of potential local significance may be impacted, a limited program of archaeological monitoring and recording would be undertaken in order to manage these archaeological remains to their significance. An Archaeological Work Method Statement would be prepared to outline the requirements of archaeological monitoring and recording. In locations where archaeological monitoring is not undertaken subsurface works would be progressed under the Sydney Metro Unexpected Heritage Finds Procedure.

9.1.1.3 Photographic Archival Recording

In order to maintain a record of the current condition and significance of the White Bay Power Station a program of photographic archival recording would be required within the SHR curtilage those areas to be affected by the proposal, including views and vistas, in accordance with NSW Heritage Office's *How to Prepare Archival Records of Heritage Items (1998)* and *Photographic Recording of Heritage*

Items Using Film or Digital Capture (2006). This photographic archival recording would also provide a record of change at the SHR listed item.

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Appendix E

The Bays road relocation works – Aboriginal heritage assessment (Artefact, 2020)

The Bays road relocation works

Aboriginal heritage assessment

Report to Sydney Metro

April 2020

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1.0 INTRODUCTION

1.1 Background

Sydney Metro is proposing to reconfigure the internal port road network at Rozelle in order to facilitate the urban renewal of the Bays West area, while maintaining access to the White Bay Cruise Terminal and other port operations at Glebe Island and White Bay. This includes the initiatives to integrate necessary port and working harbour activities alongside long-term mixed use urban renewal and construction works for the proposed Sydney Metro West.

Port Access Road, Sommerville Road and Solomons Way currently provide access to the White Bay Cruise Terminal and other port operations located in the Glebe Island and White Bay destinations. The current arrangement of the internal port road network results in conflicts between the construction works proposed as part of the redevelopment of Bays West, and the need to support ongoing port and maritime uses.

To allow the internal port road network to remain operational, it is proposed to reconfigure the current arrangement of Solomons Way, Sommerville Road and Port Access Road. The proposal would also include the relocation of the adjacent Cement Australia Truck Parking Licenced Area. The reconfiguration of the internal port road network also provides an opportunity to improve overall road safety by reducing conflicting movements.

This assessment has been prepared to support the Review of Environmental Factors (REF) for the proposal and assesses the potential impact to Aboriginal heritage. Sydney Metro is the proponent and determining authority for this proposal under Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 Study area

The study area is generally bound by Robert Street and nearby warehouse development to the north, Johnston Bay to the north-east, James Craig Road to the east, the Anzac Bridge to the south-east, A4 Western Distributor Freeway to the south, Victoria Road to the south-west, and the landmark White Bay Power Station to the west.

The study area is shown in Figure 1.

1.3 Limitations

This report outlines the results of a desktop Aboriginal heritage due diligence assessment prepared in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (the due diligence guidelines).[1] As the study area is within a disturbed land context, a site inspection was not required under the due diligence guidelines.

1.4 Authorship

This report was prepared by Alyce Haast (Senior Heritage Consultant, Artefact Heritage). Sandra Wallace (Director, Artefact Heritage) provided management input and review.

[1] Office of Environment and Heritage [OEH] 2010 *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*

1.5 Report methodology

This assessment consisted of the following stages, in line with the due diligence guidelines:

- Assess the nature of recorded Aboriginal sites in the surrounds of the study area
- Assess the environment and historical background of the study area
- Assess relevant archaeological reports in the surrounds of the study area
- Assess archaeological sensitivity of the study area
- Assess likely impact of the proposal on identified areas of archaeological sensitivity
- Provide recommendations.

Figure 1: The study area

2.0 LEGISLATIVE CONTEXT

2.1 National Parks and Wildlife Act 1974

The *National Parks & Wildlife Act 1974* (the NPW Act) provides statutory protection for all Aboriginal 'objects' (consisting of any material evidence of the Aboriginal occupation of NSW) and for 'Aboriginal Places' (areas of cultural significance to the Aboriginal community) under Section 86 of the NPW Act. Aboriginal objects are afforded automatic statutory protection in NSW whereby it is an offence to:

> *'damage, deface or destroy Aboriginal sites without the prior consent of the Director-General of the National Parks and Wildlife Service (now the Office of Environment and Heritage [OEH])'.*

The NPW Act defines an Aboriginal 'object' as:

> *'any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises New South Wales, being habitation before or concurrent with the occupation of that area by persons of non-Aboriginal European extraction and includes Aboriginal remains'.*

The due diligence guidelines were introduced in October 2010 by the Department of Planning, Industry and Environment (formerly OEH). The aim of the guidelines is to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for consent in the form of an Aboriginal Heritage Impact Permit (AHIP).

A due diligence assessment should take reasonable and practicable steps to ascertain whether there is a likelihood that Aboriginal sites will be disturbed or impacted during the proposed development. If it is assessed that sites exist or have a likelihood of existing within the development area and may be impacted by the proposed development, further archaeological investigations may be required along with an AHIP. If it is found to be unlikely that Aboriginal sites exist within the study area and the due diligence assessment has been conducted according to the due diligence guidelines, work may proceed without an AHIP.

This due diligence assessment seeks to comply with the NPW Act, by assisting the proponent in meeting their obligations under the NPW Act

2.2 Native Title Act 1994

The *Native Title Act 1994* was introduced to work in conjunction with the *Commonwealth Native Title Act 1993*. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act. No active Native Title claims were identified in the study area.

2.3 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits. The study area is covered by the Inner West Local Government Area (LGA).

2.3.1 Local Environmental Plans

Local Environmental Plans (LEPs) are prepared by councils in accordance with the EP&A Act to guide planning decisions for Local Government Areas (LGAs).

The aim of LEPs in relation to heritage is to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings, views and archaeological sites.

Schedule 5 of each LEP lists items of heritage significance within each LGA. If agreement is reached with the Aboriginal community, items or Aboriginal places of heritage significance are also listed within this schedule.

The Leichhardt LEP 2013 does not apply to the study area by virtue of Sydney Regional Environmental Plan No.26 – City West. Nonetheless, a review of Leichhardt LEP 2013 was completed. No Aboriginal places of heritage significance were listed within Schedule 5 of that instrument.

3.0 BACKGROUND

The purpose of this section is to assist in the prediction of:

- The potential of the landscape over time to have accumulated and preserved Aboriginal objects
- The ways Aboriginal people have used the landscape in the past with reference to the presence of resource areas, surfaces for art, other focal points for activities
- The likely distribution of the material traces of Aboriginal land-use strategies based on the above.

3.1 Environmental context

White Bay is located within the wider Sydney Basin, which formed between 300 and 250 million years ago. The formation was characterised by river deltas gradually replacing the ocean that once extended as far west as Lithgow.[2]

At the time of European colonisation, the study area was likely formed of estuarine mudflats which were mostly inundated at high tide. Maps from the 1850s and earlier describe much of the natural edge of White Bay as 'marsh covered at spring tide.' The southern portion of the study area, currently comprised of Glebe Island, had a rocky foreshore. The Balmain peninsula and Glebe Island are formed of Hawkesbury Sandstone and were typically characterised by stepped ridges of leading away from the foreshore.[3] Hawkesbury Sandstone areas, such as the Balmain Peninsula, are valuable resources for flaked stone artefacts, as conglomerate quartz pebbles are frequent. Silcrete and basalt, which are widely used for the construction of stone tools, are also frequently available in coastal areas.[4]

Marine resources formed an important part of the daily life and food sources of Aboriginal people living near the coast. In Port Jackson, fish was the primary source of food for Indigenous people, along with shellfish and crustaceans. When describing the lifestyles of the Indigenous people around Port Jackson, many early colonists stated that much of the day was spent fishing and that fish formed much of the food eaten.[5] The harbour was well stocked with estimates of almost 600 fish species, and rock platforms around Sydney provided natural habitats for large quantities and varieties of shellfish, making Port Jackson, including White Bay, an area rich in natural resources.[6]

From 1851, the Balmain peninsula was subdivided, and extensive development occurred. Prior to the subdivision much of the land would have been cleared. Simultaneously, maritime and noxious industries began along White Bay and Glebe Island. In 1912, the Mullens Street resumption area was resumed by the government, and White Bay foreshore was developed in the area. Extensive land reclaiming occurred, with the former White Bay Power Station, ports, and a rail line constructed primarily on reclaimed land. The foreshore outline was heavily modified during this time. Large portions of the sandstone headland of Glebe Island's northern side were quarried and the ground was levelled across the area to become only slightly above sea level. At the western side of the study area however, successive phases of foreshore reclamation involved significant infilling to create a level surface on top of largely intertidal land. Overlays of historical maps which show the natural foreshore line compared to the plan of the former White Bay Power Station and other portions of reclaimed land in the area show that much of the land within the study area has been entirely reclaimed. Minor portions of land located at the western extent of the study area, accounting for approximately seven per cent of the study area, were part of the natural shoreline however these areas would have also

[2] Pickett and Alder, 1997.
[3] Thorp, W. for Cultural Resources Management, 2003. *Historical Analysis: Clifton Villa 73 Ballast Point Road,* p.5.
[4] Attenbrow, 2010, p. 43-44.
[5] Attenbrow, 2010, p. 63.
[6] Ibid, p. 63-64

been heavily impacted by the land reclamation practices, with the marshy estuarine areas in the south-west infilled for the construction of the power station. Information from various sources including geotechnical investigations completed for Sydney Metro West, historical photographs of the site and recent excavations for other projects in the area have shown that when infilling has occurred, the natural foreshore soils can be preserved at considerable depths of up to 2.8 metres below current ground level.

Within areas of reclaimed land, the natural soil has typically been removed, buried, or greatly disturbed.[7] The geology is typically comprised of dredged estuarine sand and mud, demolition rubble, industrial and household waste, and rocks and local soils.[8] The dominant soils include a loose black sandy loam, followed by a compacted mottled clay, which overlies various fill layers. The lowest stratigraphic layer is typically dark dredged muds and sand subsoils, including sandy loams and silty clay loams.[9]

3.2 Aboriginal heritage background

3.2.1 Previous assessments

A number of previous studies have been undertaken within and in the vicinity of the study area. A selection of relevant studies consulted for this analysis is listed below.

Artefact Heritage, 2013. *Rozelle Rail Yard, Preliminary Aboriginal Heritage Assessment*. Prepared for NSW Department of Planning and Infrastructure.

Artefact Heritage was engaged in 2013 to complete a preliminary Aboriginal heritage assessment of the Rozelle Rail Yards (located south-west of the study area for this assessment). The assessment identified areas of remnant sandstone and elevated locations such as ridge lines, and the possibility of these being remnant intact landforms was discussed. Areas containing ridgelines or remnant sandstone were assessed as having moderate archaeological potential, however much of the study area had been extensively disturbed and had low archaeological potential. The elevated landforms in the area would have been a suitable area for occupation and would have been useful for identifying resources in the area.

While no geotechnical investigation occurred as part of the project, the underlying geology of the study area was Hawkesbury sandstone, and parts of the Rozelle/White Bay area have been subject to infill. The report recommended that if works were to impact the areas of remnant sandstone, further investigation should occur. Overall the assessment highlighted the importance of the sandstone ridge as an area of occupation based on the areas proximity to resources associated with surrounding bays, where it was a particularly suitable location for rock shelters.[10]

Artefact Heritage, 2014. *Bays Precinct; Preliminary Aboriginal Heritage Assessment*. Prepared for Urban Growth NSW

Artefact Heritage was engaged in 2014 to complete a preliminary Aboriginal heritage assessment of the Bays Precinct. The assessment included the Rozelle Rail Yards, Glebe Island and the land bordering White Bay, Rozelle Bay and Blackwattle Bay. The current study area was assessed as part of the White Bay Power Station and Glebe Island Assessment areas (refer to Figure 2). The majority of the White Bay Power Station area was identified as reclaimed land and introduced land. This

[7] NSW Department of Environment, n.d. 'Disturbed Terrain.' *eSpade.* Accessed online 8/5/2019 at: https://www.environment.nsw.gov.au/Salis5app/resources/spade/reports/9130xx.pdf
[8] *Op. Cit.*
[9] *Op. Cit.*
[10] Artefact Heritage, 2013. *Rozelle Rail Yard, Preliminary Aboriginal Heritage Assessment, NSW.* Prepared for NSW Department of Planning and Infrastructure.

portion of the White Bay Power Station was identified as containing no archaeological potential (refer to Figure 3). The south-western portion of the White Bay Power Station was identified as the location of the original shoreline (refer to Figure 3). This portion of the assessment area was considered unlikely to have been subject to deep subsurface disturbance and subsequently identified as containing moderate archaeological potential.

Comber Consultants, 2011. *Aboriginal Archaeological and Cultural Heritage Assessment – Johnstons Stormwater Canal: Shared Pathway Project.* Prepared for the City of Sydney.

Comber Consultants were engaged by the City of Sydney to complete a due diligence assessment of a proposed shared pathway located adjacent to Johnstons Stormwater Canal. The study area is located between Wigram Road and Blackwattle Bay, approximately 500 metres south of the study area. The northern portion of the study area consisted of tidal wetlands and the wider study area had been crossed by major roadways, a railway viaduct, sewer viaducts, and four footbridges. The landscape was highly disturbed and had been levelled for both industrial, infrastructure, and residential uses. The construction of the stormwater canal also realigned parts of the natural alignment of Johnstons Creek.

Comber confirmed that the study area was located within an area of reclaimed land .While there was no geotechnical testing carried out for their report, eSpade confirms that the study area is 'disturbed terrain' that was previously swamps and estuaries.[11] Comber suggested that the cut and fill and subsequent development would have destroyed any intact sites or subsurface deposits. No further archaeological investigation was recommended.

[11] NSW Department of Environment, n.d.. 'Disturbed Terrain,' *eSpade.* Accessed online 3/5/2019 at: https://www.environment.nsw.gov.au/Salis5app/resources/spade/reports/9130xx.pdf

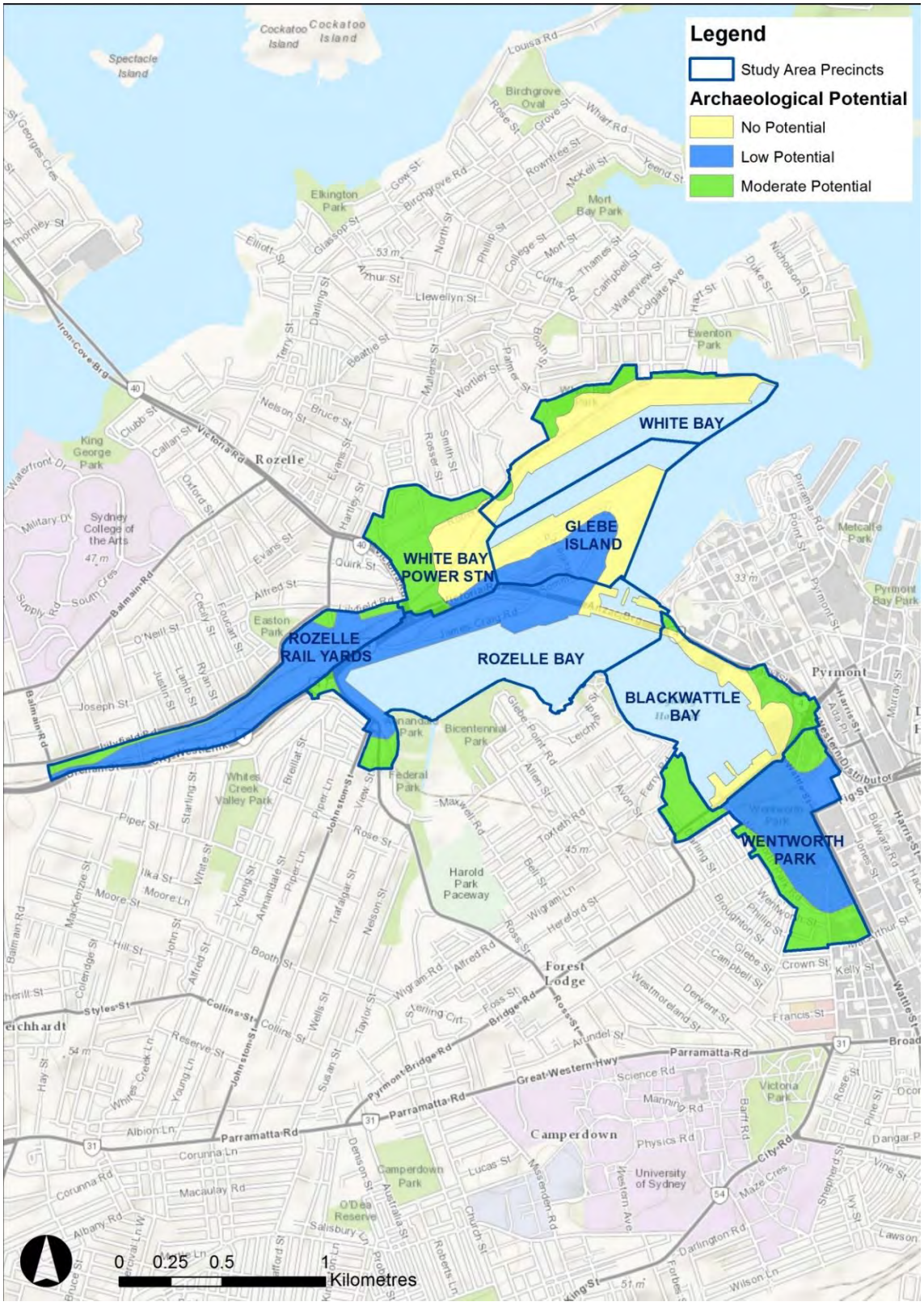

Figure 2: Aboriginal archaeological sensitivity as identified in The Bays Assessment (Source: Artefact 2014)

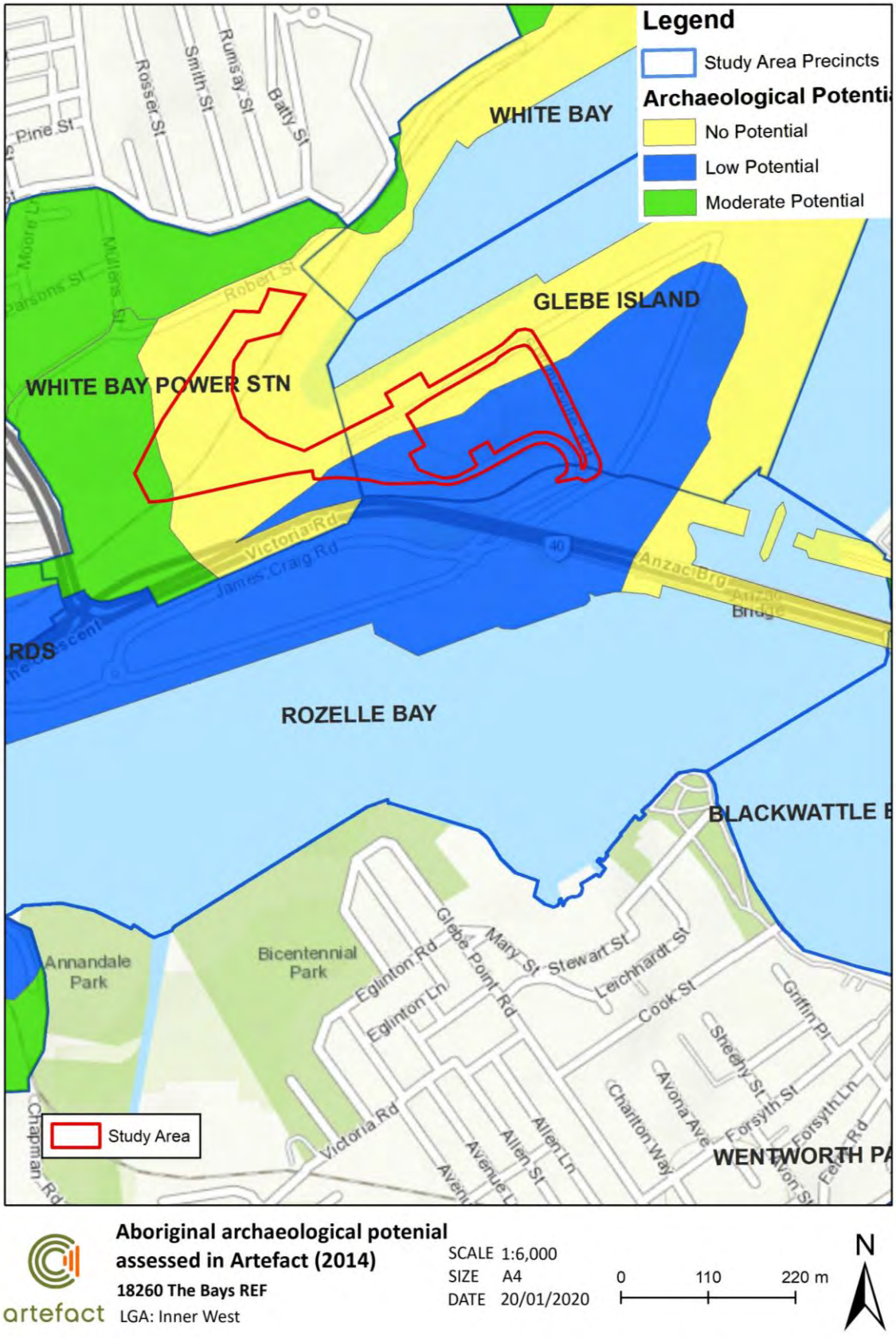

Figure 3: Overlay of current study area with Aboriginal archaeological sensitivity as identified within The Bays Assessment (Source: Artefact 2014)

3.2.2 Aboriginal Heritage Information Management System (AHIMS) Search

An extensive search of the OEH AHIMS database was undertaken on 17 October 2019. The search extended five kilometres (east-west) by four kilometres (north south) and was centred on the study area. The search was undertaken in order to gain information on the archaeological context of the study area, and to ascertain whether any previously recorded Aboriginal sites are located within the study area. The details of the AHIMS search parameters are as follows:

GDA 1994 MGA 56	[Coordinates removed for public display]
Number of sites	34
Client Service ID	457417

A total of 34 sites were identified by the extensive AHIMS search. The majority of recorded sites are Shell and Artefact sites (n=15) followed by Potential Archaeological Deposits (PADs) (n=7). The distribution of recorded sites within the AHIMS search area is shown in Figure 4 and Figure 5.

The nature and location of the registered sites reflects the past Aboriginal occupation from which they derive, but is also influenced by historical land-use, and the nature and extent of previous archaeological investigations. Although Aboriginal occupation covered the whole of the landscape, the availability of fresh water, and associated resources, was a significant factor in repeated and long-term occupation of specific areas within the landscape.

No registered Aboriginal sites area located within the study area with the closest site, AHIMS ID 45-6-3338 located 350 metres to the east of the study area.

A large number of AHIMS registered sites are located along adjacent foreshore areas including Iron Cove. The majority of these sites have been identified in foreshore areas subject to lower levels of modification than the surrounding residential areas where sites are not recorded. The sites along the foreshore are primarily associated with exposed sandstone outcrops. It is considered likely that Aboriginal objects will be identified within close proximity to foreshore areas which have not been subject to historic reclamation activities.

Based on the existing AHIMS data and previous assessment, it is predicted that the most likely site type to be featured within the study area is artefact deposits or sites utilising formerly exposed sandstone outcrops such as grinding grooves. Historic reclamation and landform modification is considered to have reduced the potential for these features to occur in the study area.

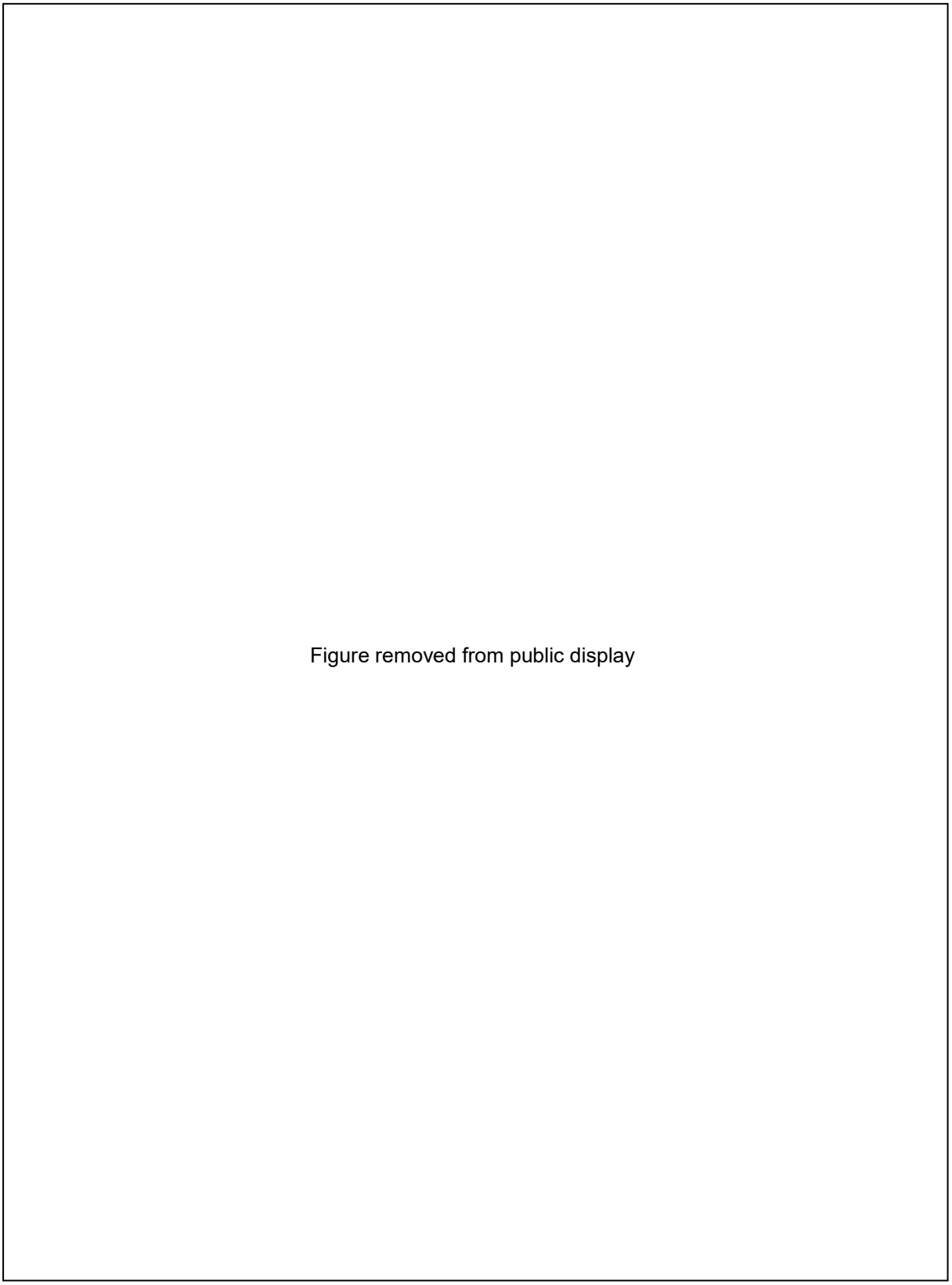

Figure 4: Extensive AHIMS search results

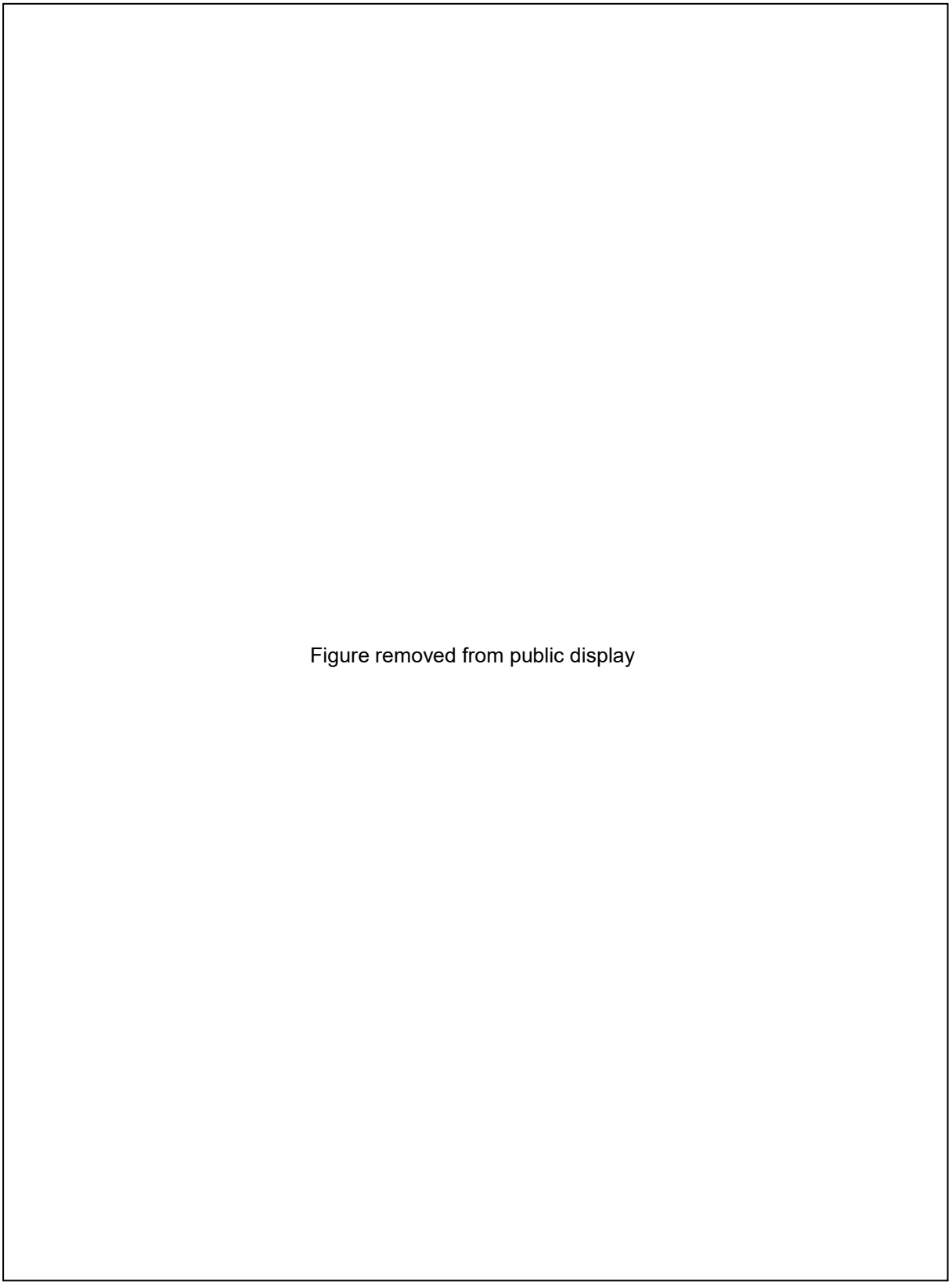

Figure 5: AHIMs sites within the vicinity of the study area

4.0 DISCUSSION

4.1 Aboriginal archaeological sensitivity

The White Bay area provided a range of subsistence resources that may have been utilised by Aboriginal people. These resources include valuable marine and plant resources, close to reliable water sources, near ridges and cliffs, and close to raw materials suitable for the construction of stone tools.

Despite these environmental landscape factors that could suggest high potential, the preservation of *in situ* artefactual deposits associated with Aboriginal occupation is dependent on the degree of ground disturbance in the area since European colonisation. Archaeological research has demonstrated that particular soils, particularly alluvial deposits and sand bodies are more likely to retain archaeological and artefactual deposits when found intact. While there is still potential for Aboriginal archaeological remains to be found out of context in disturbed areas and retain their cultural value, their scientific research potential is diminished.

Extensive historical occupation after European colonisation of Sydney has occurred in the study area. Phases of demolition, construction, and land clearance and modification in the post-colonisation period can have significant impacts for Aboriginal cultural heritage and archaeological remains.

Between 1800 and 1851 some land clearance may have occurred in this area. These land clearance activities may have impacted Aboriginal sites, however much of the foreshore area was tidally influenced and marshy. Whilst marshy wetlands were sources of abundant material resources utilised by Aboriginal people, the foreshore area above the tidal limit is more likely (than a regularly inundated tidal flat) to be the location of Aboriginal sites such as shell midden and/or stone artefacts.

The southern portion of the study area was originally comprised of the rocky sandstone shore of Glebe Island. The island has been subject to substantial landform modification associated with the former Abattoir Road and more recent works associated with the creation of the wharf and grain silos. While intact sandstone platforms are considered to be archaeologically sensitive, historical modification of Glebe Island is considered to have substantially cut into the original landform. It is considered unlikely that any intact sandstone features would remain below the existing ground surface.

The far western portion of the study area was above the tidal limit and was the site of the original White Bay Hotel constructed in 1860. The White Bay Hotel was constructed prior to known substantial land reclamation in the area and is likely to have been built on natural land. The rear yard structures may have included accommodation, stables, toilets, and wells. While these buildings were demolished during the resumption of White Bay, infill would have been placed on top of these remains, possibly preserving them and the associated foreshore context.

The construction of wells, cisterns and cesspits for the White Bay Hotel occurred on the natural foreshore just beyond the marshy areas. This area itself may have formed an important part of subsistence land-use strategies, as it would have been close to Sydney Harbour and various creeks, the ridge lines and cliff faces of the Balmain Peninsula and Glebe Island, the resource-rich wetland areas of White Bay, and the natural stone resources of the Balmain Peninsula. Certain activities associated with construction of the White Bay Hotel such as excavation required for cisterns, wells, and cesspits are likely to have resulted in discrete areas of impact to any Aboriginal sites in those areas. However, the infilling phases along the eastern foreshore in the early 20th century are likely to have preserved any intact archaeological deposits or Aboriginal artefacts and could preserve both pre-contact and contact era remains.

There is **low-moderate** archaeological potential for Aboriginal objects to be preserved in the western portion of the study area (illustrated in Figure **6**) below existing foreshore reclamation. This area has low-moderate sensitivity. The remainder of the study area is considered to have **low** archaeological sensitivity.

Figure 6: Aboriginal archaeological sensitivity

4.2 Proposed works

Sydney Metro is proposing to adjust the internal port road network at Rozelle. The proposal would generally be developed in two phases:

- Phase 1 (Figure 7) would involve:
  - A reconfigured intersection at Port Access Road / Solomons Way / Sommerville Road, including an interim connection with the existing Port Access Road until it is relocated (as part of Phase 2)
  - Establishment of one-way traffic circulation along Solomons Way and Sommerville Road around the Glebe Island Silos
  - Relocation of the Cement Australia Truck Parking Licenced Area to the north, prior to the construction of the reconfigured intersection
- Phase 2 (Figure 8) would involve:
  - Relocation of the Port Access Road to the south-west. The relocated Port Access road would be tied into the reconfigured intersection (established in Phase 1) and the existing Port Access Road to the north.

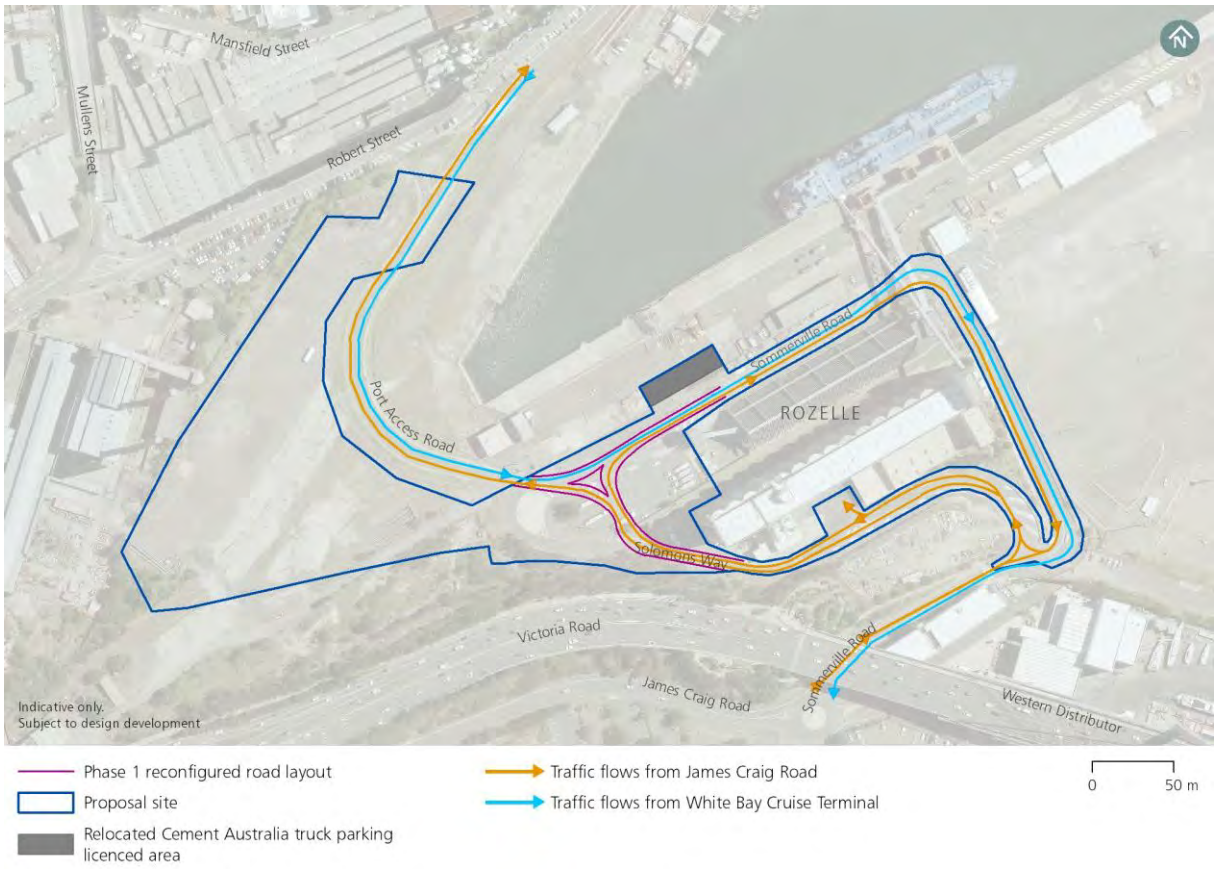

Figure 7: Overview of the proposal – Phase 1

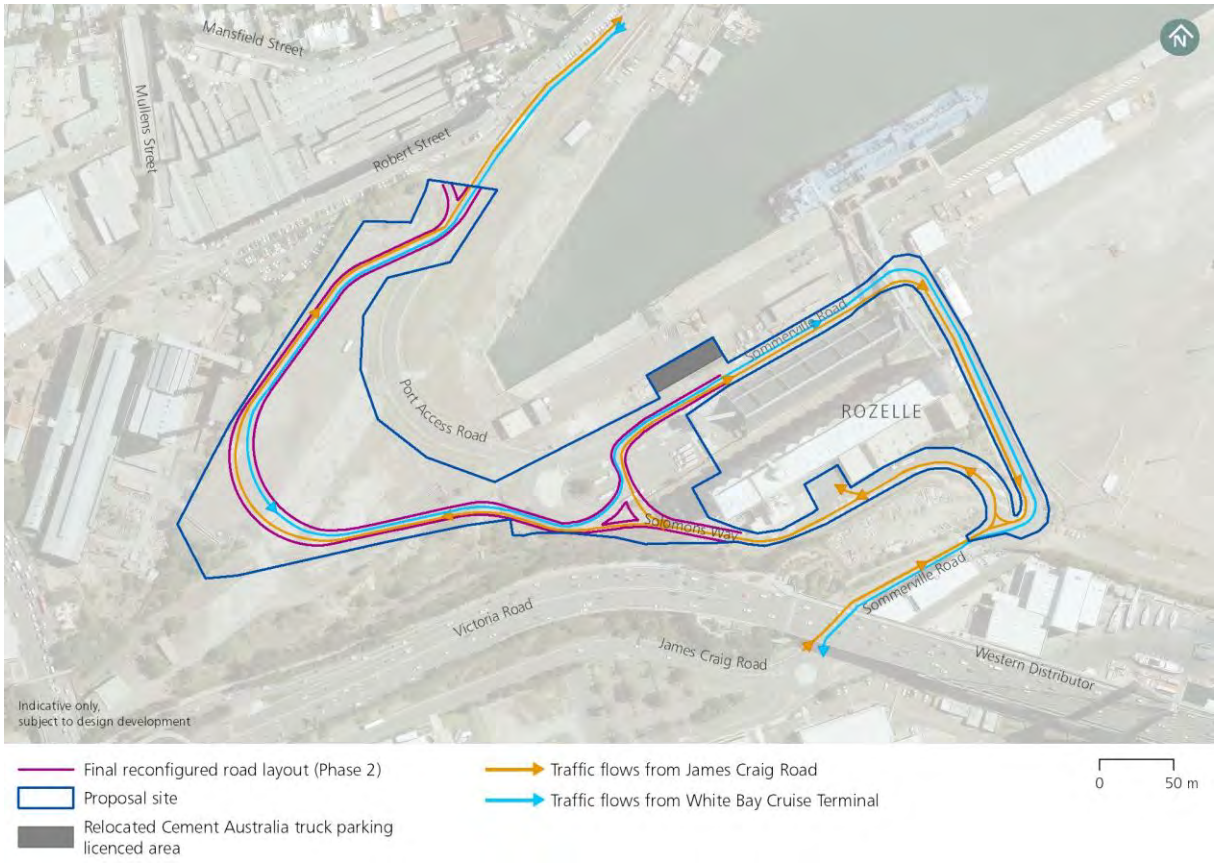

Figure 8: Overview of the proposal – Phase 2

4.2.1 Construction phases

Construction of the proposal would comprise of the key activities outlined in Table 1.

Table 1: Construction phases and indicative activities

Phase	Description
Phase 1	• Establishment of construction compound including for a site office and material storage • Installation of environmental controls such as erosion and sediment controls • Site clearing and any necessary contaminated land remediation works around Port Access Road, Sommerville Road and Solomons Way intersection • Establishment of relocated Cement Australia Truck Parking Licenced Area to the north including kerb and guttering, driveway crossover, drainage, lighting and line marking • Construction of reconfigured intersection at Port Access Road and Solomons Way, including a temporary interim connection with the existing Port Access Road until it is relocated (as part of Phase 2). This would require traffic switches which would be completed out-of-hours on a weekend. • Line marking and signage at Port Access Road, Sommerville Road and Solomons Way to establish one-way traffic circulation • Reinstatement of driveway access to Cement Australia facilities

Phase	Description
Phase 2	• Site clearing and any necessary contaminated land remediation works around proposed relocated Port Access Road • Construction of relocated Port Access Road including concrete island and tie-ins at the southern end, signs and lines • Construction of tie-in between the northern section of the relocated Port Access Road and the existing Port Access Road • Demobilisation of site compounds

4.3 Aboriginal heritage impact assessment

A portion of the Port Access Road would be relocated to within the area of sensitivity (Phase 2). Impacts associated with the relocation of the Port Access Road are likely to comprise of earthworks associated with the remediation of the existing area (if required) and road development (Figure 9).

Intact foreshore deposits associated within the area of archaeological sensitivity have been identified at a depth of 2.8 metres below the current surface within this area. While it is likely that the depth of intact soil varies to some degree across the area of sensitivity, it is unlikely that these soils will be located directly below the surface.

Excavation associated with the proposed works (if required) would be limited to one metre in depth, with only small sections of the proposed works potentially extending to that depth in the area of archaeological sensitivity. Therefore, it is considered unlikely that the proposed construction would result in impact to intact soils and therefore to Aboriginal objects.

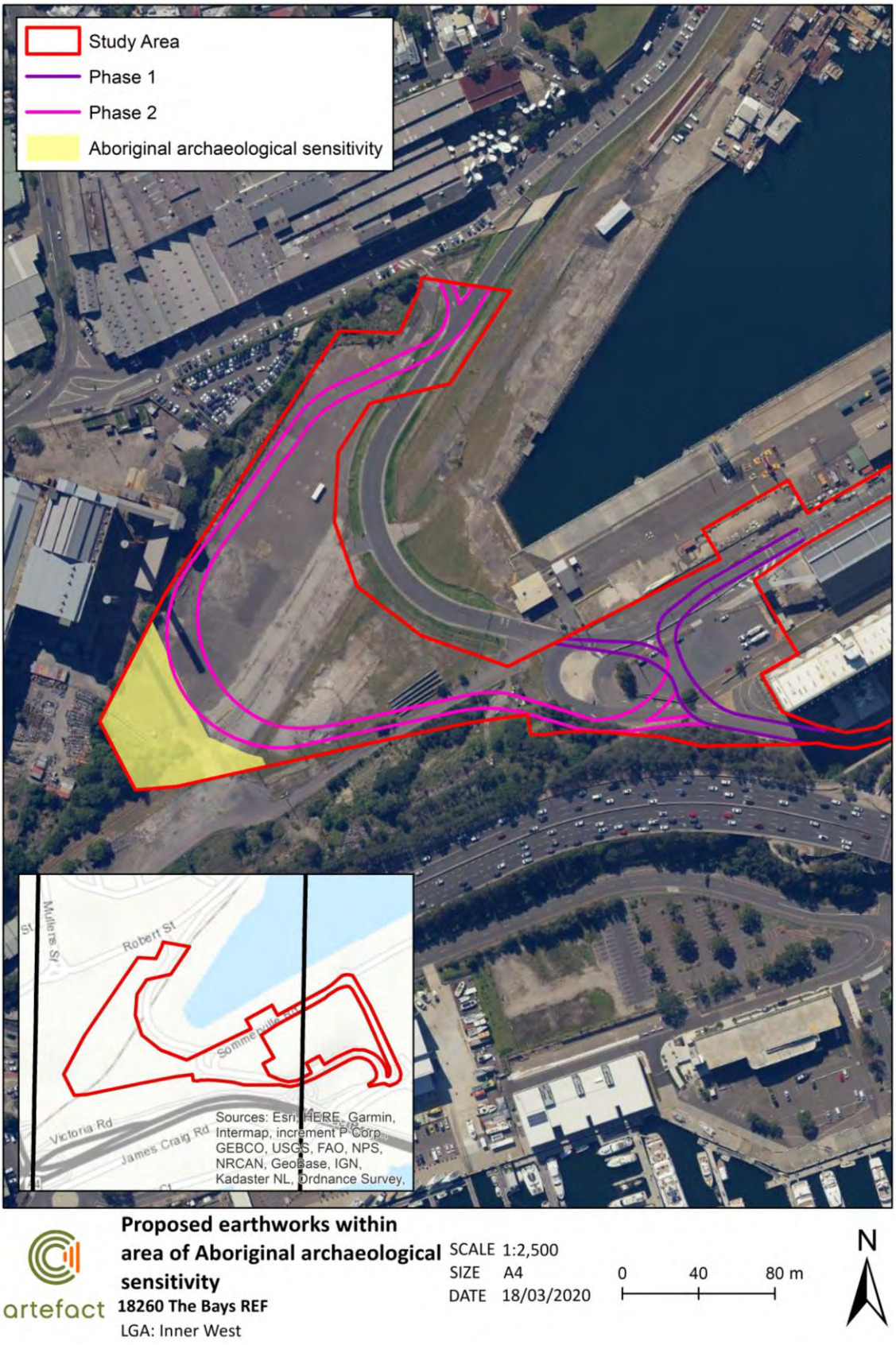

Figure 9: Proposed impacts within areas of Aboriginal archaeological sensitivity

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following recommendations regarding Aboriginal heritage are based on consideration of:

- Statutory requirements under the *National Parks and Wildlife Act 1974*
- The Due Diligence guidelines
- The results of background research and sensitivity assessment
- The likely impacts of the proposal.

It was found that:

- An area of archaeological sensitivity where Aboriginal objects may occur beneath the ground surface has been identified within the study area
- This area of archaeological sensitivity is associated with a potentially intact foreshore deposit identified as being located 2.8 metres below the current surface and is unlikely to be impacted by the proposed works
- The maximum excavation depth of the proposed works is one metre, and therefore it is unlikely that the proposed construction would result in impact to intact soils and to Aboriginal objects.

Aboriginal heritage would be managed in accordance with the Construction Environmental Management Framework. The framework includes heritage management objectives to maximise workers' awareness of heritage values such as site inductions and procedures for unexpected heritage impacts.

If intact foreshore deposits are identified during works, they would be managed under the Sydney Metro Unexpected Heritage Finds Procedure.

If design modifications are made which may result in impact to intact soils within the area of archaeological sensitivity, further assessment will be required, including archaeological test excavation and approvals may be required.

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