Executive summary

The proposal

NSW Roads and Maritime Services (Roads and Maritime) is undertaking an assessment under Part 5 of the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act) for a suite of site management works (the proposal) on part of the former Rozelle Rail Yards (the Site). The proposal would remove rail and rail related infrastructure from the Site and allow existing issues at the Site such as waste and noxious weeds to be appropriately managed.

Roads and Maritime is soon to be the sole owner of the Site and as such needs to appropriately manage the environmental and safety issues at the Site. Roads and Maritime propose to use the land in the future for the separate WestConnex M4-M5 Link project (M4-M5 Link project) if that project is approved by the NSW Minister for Planning (subject to separate assessment and determination as an environmental impact statement (EIS) under Part 5.1 of the EP&A Act). The site management works which comprise this proposal do not form part of the M4-M5 Link project. Should the M4-M5 Link project not proceed the proposal would enable other potential future developments at the Site.

The key features of the proposal are:

- Site establishment – including fencing, installing temporary site offices, arranging site access, erosion, sediment and drainage controls and defining lay down, stockpile and transfer areas
- Utility location and site investigations
- Removal of waste, existing stockpiles and vegetation
- Removal of existing above ground rail infrastructure, including gantries, railway lines, ballast, sleepers and buildings (but excluding the southern penstock\(^1\), the switching station\(^2\), the transformer\(^3\) and rail infrastructure to the east of Victoria Road bridge) and redundant services where intercepted when removing infrastructure (eg gantries and ballast) generally to a depth of 500 millimetres below ground level, except where drainage channels and sediment basins are required
- Site stabilisation comprising reshaping of the ground surface as a result of the site management works and installation of stormwater controls including the construction of drainage channels and sediment basins
- Site completion and handover – de-mobilise all temporary construction materials, plant and equipment installed for the works and leave the site secure.

It is anticipated that the proposal would be conducted over a period of up to 12 months. After completion of the proposal the ‘finished site’ would be managed and maintained to ensure that the surface cover and stormwater controls are operating effectively.

The Site is located on part of the former Rozelle Rail Yards and is generally bounded by:

- To the south - City West Link
- To the west - the Sydney Central Business District and South East Light Rail (CSELR) Rozelle maintenance depot facility (under construction)
- To the north - Lilyfield Road and a number of residential and industrial properties along the south side of Lilyfield Road
- To the east - a boundary located about 70 metres to the east of the Victoria Road bridge.

---

\(^1\) The southern penstock is an unlisted heritage item associated with the State heritage listed White Bay Power Station.

\(^2\) The switching station is a live electrical utility located in the southern portion of the Site.

\(^3\) The Ausgrid transformer is located in the south-eastern portion of the Site is a live electrical utility.
The former Rozelle Rail Yards includes a more extensive area which extends beyond the Site in a westerly direction towards Balmain Road and in an easterly direction beyond Victoria Road towards White Bay.

Need for the proposal

The Rozelle Rail Yards has remained largely disused for a number of years. The Site contains redundant rail infrastructure, waste and contamination. Various fast growing and noxious weeds have also grown over a large part of the Site. The presence of redundant infrastructure, waste, contamination and noxious weeds presents ongoing environmental management, maintenance and safety issues, and constraints at the Site.

The proposal is needed to manage the existing environmental and safety issues at the Site and would also improve access to surface conditions, which would allow for further investigation into the location of utilities and the presence of contamination and waste. The proposal would benefit future uses of the Site (including construction of the separate M4-M5 Link project if it is approved) because the works would remove material and redundant facilities associated with rail and rail related infrastructure from the Site.

Proposal objectives and development criteria

Roads and Maritime aims to:

- Remove a number of legacy issues from the Site, including existing stockpiles, wastes, redundant rail infrastructure and noxious weeds
- Confirm the presence, location and status of subsurface utilities
- Limit ground disturbance generally to a depth of 500 millimetres, except where drainage channels and sediment basins are required
- Install erosion, sediment and drainage controls on-site
- Achieve minimal change to the topography of the Site at the conclusion of the works
- Leave the Site in a state that reduces the potential impacts associated with the existing conditions and allows it to be effectively managed until it is developed in the future.

No specific development or urban design criteria apply to the proposal.

Options considered

The following alternatives for the proposal were considered:

- Option 1: do nothing
- Option 2: defer the works and incorporate them into a future project
- Option 3: complete the works now (the proposal).

The preferred option to achieve the proposal objectives is Option 3. This option would allow Roads and Maritime to manage the existing environmental and safety issues at the Site.

Statutory and planning framework

The proposal has been assessed as a review of environmental factors (REF) under Part 5 of the EP&A Act. The proposal is categorised as development for the purpose of railway or rail infrastructure facilities under Clause 79 of State Environmental Planning Policy (Infrastructure) 2007 (ISEPP), to allow the removal of rail and rail related infrastructure and is being carried out by or on behalf of a public authority. ISEPP provides that the proposal can be considered ‘development permissible without development consent’.

In addition to the ISEPP, the following NSW State environmental planning policies were reviewed as part of the REF (refer to section 4.1.1):
Other relevant NSW legislation that has been considered for the REF includes the following (refer to section 4.2):
- Protection of the Environment Operations Act 1997 (NSW) (PoEO Act)
- Heritage Act 1977 (NSW) (Heritage Act)
- Contaminated Land Management Act 1997 (NSW) (CLM Act)
- Threatened Species Conservation Act 1995 (NSW) (TSC Act)
- Fisheries Management Act 1994 (NSW) (FM Act)
- National Parks and Wildlife Act 1974 (NSW) (NP&W Act)
- Noxious Weeds Act 1993 (NSW)
- Water Management Act 2000 (NSW) (WM Act)
- Water Act 1912 (NSW).

The relevant matters of national environmental significance (MNES) under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) (EPBC Act) for the proposal include listed threatened species, namely the Grey-headed Flying-fox (*Pteropus poliocephalus*) and the Green and Golden Bell Frog (*Litoria aurea*). EPBC Assessments of Significance have been competed for these species (refer to Appendix F) and have concluded that the proposed works are not considered likely to have a significant impact. No other MNES are relevant to the proposal and the proposal is not located on or near to Commonwealth land.

An Assessment of Significance (7-Part test) under the TSC Act was carried out for the Grey-headed Flying-fox, Green and Golden Bell Frog, Long-nosed Bandicoot (*Perameles nasuta*), Eastern Bent-wing Bat (*Miniopterus schreibersii*), Eastern Freetail-bat (*Mormopterus norfolkensis*) and the Yellow-bellied Sheathtail bat (*Saccolaimus flaviventris*). These Assessments of Significance concluded that a significant impact is not likely to occur to the threatened fauna as a result of the proposal. No other threatened fauna species listed under the TSC Act were observed, or have previously been observed within the Site.

### Community and stakeholder consultation

Consultation has been carried out for the proposal and the relevant groups consulted include:
- Government – including local and State representatives and officers
- Local Aboriginal Land Council (LALC).

In addition, a letterbox drop was carried out during November 2016 advising the local community about the upcoming REF and the REF display period.

The REF would be publicly displayed and submissions would be invited and considered before Roads and Maritime determines whether or not to proceed with the proposal.

### Environmental impacts

An environmental assessment of the proposal was carried out. The following environmental aspects were assessed:
- Contamination, soil, fill and groundwater
- Surface water, drainage and flooding
- Resource use and waste management
- Non-Aboriginal heritage
- Aboriginal heritage
- Biodiversity
- Traffic and transport
- Noise and vibration
- Air quality
- Landscape character and visual impacts
• Property and land use.

For the purposes of these assessments impacts were assessed separately for completion of the site management works and the finished site.

In addition to these assessments, consideration of socio-economic issues, utilities and hazards and risk was completed. Cumulative impacts were also considered.

These investigations assessed the potential impacts of the proposal and identified safeguards and management measures. The following technical assessments were carried out to support this assessment:

- Contamination and waste classification assessments (Appendix C)
- Non-Aboriginal heritage impact assessment (Appendix D)
- Aboriginal heritage Stage 2 PACHCI Assessment (Appendix E)
- Biodiversity assessment (Appendix F)
- Traffic and transport assessment (Appendix G)
- Noise and vibration assessment (Appendix H)
- Air quality assessment (Appendix I).

Site management works

In developing the design for the proposal a number of design refinements were made and these are described in section 2.4. In addition an indicative work methodology was prepared for the site management works to avoid and minimise potential environmental impacts associated with the works. This indicative work methodology is detailed in section 3.2.1.

The majority of the potential impacts for the proposal relate to the completion of the site management works. Key potential impacts assessed for the proposal within this REF are listed in Table ES-1, and the relevant design features and appropriate management measures are discussed in this table. Management measures are discussed in more detail in Chapter 7 (Environmental management).
Table ES-1: Key potential impacts, design features and management measures

<table>
<thead>
<tr>
<th>Environmental aspect</th>
<th>Key potential impact</th>
<th>Summary of key design features and management measures</th>
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<tbody>
<tr>
<td>Contamination, soil, fill and groundwater (section 6.1)</td>
<td>• Impacts on site workers and the local community (eg residents, off-site workers) through contact with contaminants and asbestos released during demolition and ground disturbance works</td>
<td>• Completion of Hazardous material surveys and additional investigations&lt;br&gt;• Undertake works in accordance with Health and Safety Management Plan (HSMP)&lt;br&gt;• Training of staff and use of personal protective equipment (PPE)&lt;br&gt;• Undertake works in accordance with Asbestos Management Plan (AMP)&lt;br&gt;• Undertake regular asbestos fibre monitoring&lt;br&gt;• Wetting down exposed work areas and use of water sprays to minimise dust&lt;br&gt;• Securely cover loads being carried by trucks&lt;br&gt;• Progressive staging of works to limit the size of exposed areas&lt;br&gt;• Additional testing of exposed areas for soil contamination and Acid Sulfate Soils (ASS)&lt;br&gt;• Stabilisation of the ground surface with appropriate cover for the surface conditions&lt;br&gt;• Soil conservation consultant and contamination expert to advise on the preferred method of stabilisation&lt;br&gt;• Undertake works in accordance with a Soil and Water Management Plan (SWMP) and Acid Sulfate Soil Management Plan (ASSMP)&lt;br&gt;• Develop a post-completion management protocol to ensure that the integrity of the final ground surface is maintained</td>
</tr>
<tr>
<td>• Exposure of underlying ground surface following vegetation, ballast and stockpile removal resulting in the potential mobilisation of contamination that may be present within the Site</td>
<td>• Sediment basins to be located to avoid potential areas of contamination and ASS&lt;br&gt;• Lining of sediment basins&lt;br&gt;• Protect excavations where groundwater may be encountered from surface water flows&lt;br&gt;• Dewatering in accordance with Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (Roads and Traffic Authority (RTA), 2011)&lt;br&gt;• Contain, test and appropriately dispose of extracted groundwater</td>
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<td>Environmental aspect</td>
<td>Key potential impact</td>
<td>Summary of key design features and management measures</td>
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<td></td>
<td>Contamination resulting from potential leaks and spills from equipment and plant</td>
<td>Regular inspections to ensure that plant and equipment is in good condition</td>
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<td>Erosion and off-site transport of sediment and contamination via overland flow and stormwater runoff, affecting the water quality of Easton Park drain, Whites Creek and Rozelle Bay</td>
<td>Locate storage areas for fuels and chemicals in a secure and bunded area</td>
</tr>
<tr>
<td>Surface water, drainage and flooding (section 6.2)</td>
<td>Potential impact of flooding during construction activities</td>
<td>Locate vehicle and plant wash down areas in a bunded area and on an impervious surface</td>
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<td>Develop an emergency spill protocol as part of the SWMP</td>
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<td>Installation of temporary and permanent drainage channels and sediment basins</td>
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<td>Locate drainage channels and sediment basins away from areas of high contamination and ASS</td>
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<td>Design drainage channels to prevent scour and erosion and to limit velocity of water flows</td>
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<td>Use silt fences, sediment traps and absorbent booms to manage water quality entering drainage channels and sediment basins</td>
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<td>Regular monitoring of water quality in the sediment basins</td>
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<td>Regular testing, removal and disposal of sediments in the sediment basins</td>
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<td>Precautionary design of sediment basins to minimise overtopping</td>
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<td>In the event that sediment basins overtop during a high rainfall event, direct escaped water to a low point where it would be contained and managed</td>
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<td>Regular inspection and maintenance of the sediment and erosion controls during the works</td>
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<td>Develop a post completion management and maintenance protocol to ensure that the integrity of the final drainage controls are maintained</td>
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<td>Dewatering in accordance with Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (RTA, 2011)</td>
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<td>Undertake works in accordance with a SWMP</td>
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<td>Store equipment, and other potential obstructions to flood water, on higher ground</td>
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<td>Monitor weather conditions to identify potential flood conditions</td>
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<td>Put in place a Flood Evacuation Plan (FEP)</td>
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<tr>
<td>Environmental aspect</td>
<td>Key potential impact</td>
<td>Summary of key design features and management measures</td>
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</table>
| Resource use and waste management (section 6.3)          | • Adverse impacts to the environment as a result of the inappropriate management of waste generated by the proposal | • Undertake works in accordance with a Waste and Resource Management Plan (WMP)  
• Carry out measures to maximise resource efficiency and minimise waste  
• Waste to be classified in accordance with the Waste Classification Guidelines (NSW Environmental Protection Authority (EPA), 2014)  
• WMP and SWMP to include procedures for the handling, storage and disposal of contaminated waste  
• Waste stockpiles located having regard to environmental factors and location of waterways, drainage channels and sediment basins |
| Non-Aboriginal heritage (section 6.4)                     | • Impacts to items which are not heritage listed but have been identified as having heritage significance including:  
  • Removal or demolition of the lighting tower and the Port Authority building  
  • Impacts to the southern penstock which is associated with White Bay Power Station  
  • Impacts to the sandstone cutting as a result of vegetation removal | • Undertake works in accordance with a Heritage Management Plan (HMP)  
• Complete archival recording of the lighting tower and Port Authority building before removal or demolition  
• Maintain exclusion zone around the southern penstock  
• Adopt non-destructive techniques for the removal of vegetation from the sandstone cutting |
<p>|                                                          | • Impact on the heritage value of the Rozelle Rail Yards and the wider area          | • Consider potential opportunities for the storage and re-use of remnant rail infrastructure in a future development of the Site |
|                                                          | • Unexpected heritage items, archaeological remains or potential relics are encountered | • Follow the Unexpected Heritage Items Procedure (Roads and Maritime 2015) |</p>
<table>
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<tr>
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</tr>
</thead>
</table>
| **Biodiversity**     | • Indirect impacts such as traffic, noise and lighting on Microchiropteran Bats which may potentially be roosting in cavities under the Victoria Road bridge  
                       • Impacts associated with the spread of noxious weeds                                                       | • If night works are required, maintain an exclusion zone around the bridge and direct lighting away from the bridge  
                       • If practical, undertake works near the bridge during summer when the bats are less likely to be present  
                       • Tool box talk for staff working in the vicinity of the bridge                                                   |
|                      | • An increase in traffic volumes impacting on the capacity of the surrounding road network                    | • Undertake works in accordance with a Flora and Fauna Management Plan which would include measures to manage and prevent the spread of noxious weeds |
| **Traffic and transport** |                                                                                                               | • Implementation of a Traffic Control Plan (TCP) and a Traffic Management Plan (TMP)                                                           |
|                      | • Functionality and safety of access to/from the Site                                                          | • Use Gordon Street access for light vehicles                                                                                                 |
|                      |                                                                                                               | • Use City West Link and/or Port Authority access for heavy vehicles                                                                               |
|                      |                                                                                                               | • Co-ordinate heavy vehicle movements to/from the Site to ensure that disruptions to traffic on the surrounding road network are minimised       |
|                      |                                                                                                               | • Install signage and consider use of a dedicated person to assist heavy vehicles to exit the Site on to City West Link safely  
                       • Select preferred option for location of City West Link (west) access having regard to sight lines and traffic safety |
| **Noise and vibration** | • An increase in noise levels from construction equipment impacting sensitive receivers                          | • Notification of sensitive receivers before commencing work with potential noise and vibration impacts  
                       • Undertake works in accordance with a Noise and Vibration Management Plan (NVMP)                                         |
<p>|                      |                                                                                                               | • Induction and training of staff in relation to noise and vibration management                                                                     |
|                      |                                                                                                               | • Use of the mulcher/chipper limited to the southern area of the Site, next to City West Link                                                      |
|                      |                                                                                                               | • Highly affected receivers in NC04 (Lilyfield Road) may require additional mitigation including notification, verification noise monitoring and respite offers |</p>
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<th>Summary of key design features and management measures</th>
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<tbody>
<tr>
<td>Air quality</td>
<td>• Impact of vibration intensive equipment on heritage structures</td>
<td>• Building condition surveys of heritage structures within 50 metres of vibration intensive equipment</td>
</tr>
<tr>
<td>(section 6.9)</td>
<td>• Dust emissions from demolition, ground disturbance and track out impacting on sensitive receivers</td>
<td>• Employ standard measures to manage dust emissions (e.g., cover loads, use of water sprays, wheel wash system, wetting/covering of stockpiles)</td>
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<tr>
<td></td>
<td>• Exhaust emissions from plant and equipment impacting on sensitive receivers</td>
<td>• Employ various standard measures to manage exhaust emissions from plant and equipment</td>
</tr>
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<td>• Asbestos fibres becoming airborne during the works and impacting on site workers and/or sensitive receivers</td>
<td>• Undertake work in accordance with an Air Quality Management Plan (AQMP)</td>
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<td>• Undertake works in accordance with Asbestos Management Plan (AMP)</td>
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<td>• Undertake works in accordance with Health and Safety Management Plan (HSMP)</td>
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<td>• Training of staff and use of PPE</td>
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<td></td>
<td>• Undertake regular asbestos fibre monitoring</td>
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<td></td>
<td>• Refer to relevant management measures identified for section 6.1</td>
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<tr>
<td>Landscape character and visual impacts (section 6.10)</td>
<td>• Change to the landscape character of the area as a result of the removal of items associated with the previous use of the Site as a railway yard.</td>
<td>• Consider potential opportunities for the storage and re-use of remnant rail infrastructure in a future development of the Site</td>
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<td></td>
<td>• Refer to relevant management measures identified for section 6.4</td>
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<td></td>
<td>• Visual amenity impacts on nearby receivers</td>
<td>• Progressive stabilisation of exposed areas</td>
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<td>• Leave the site in a neat and tidy state at the end of each work day</td>
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<td>• Investigate screening options around the perimeter of the Site such as shade cloth and hoardings</td>
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<td>• Safeguard existing trees in the road corridors to maintain screening, except the vegetation identified for removal in association with City West Link access</td>
</tr>
</tbody>
</table>

Note: Other environmental aspects including Aboriginal heritage (section 6.5), property and land use (section 6.11), other impacts (section 6.12), and cumulative impacts (section 6.13) are not considered key issues and have therefore not been included in this table.
As documented within this REF the proposal has been designed to avoid and minimise impacts, and in many cases the impacts that could occur would be of limited duration. After application of appropriate management measures, many of which have been proven on similar projects, residual impacts are not considered to be significant.

**Finished site**

Once the works are complete activities at the Site would include security and ongoing maintenance. These activities would include vegetation management (including mowing any re-vegetated areas and weed control), general maintenance, environmental management and monitoring activities at the Site (including stormwater management). Environmental management activities at the Site would include regular inspection and testing of water and sediment collected within the sediment basins as well as regular inspection of the new surface cover at the Site to ensure that its integrity is maintained. No ground disturbance work is anticipated during this phase.

Potential impacts as a result of the finished site would be minimal and would only occur if the surface cover and erosion and sediment controls are not maintained. These potential impacts include sediment and contamination leaving the Site and entering the stormwater system. However, provided the site is maintained, overall the residual impacts of the finished site are not considered to be significant, particularly once appropriate management measures are put in place.

**Management measures**

Potential impacts would be managed and mitigated on-site by the contractor. Management measures would include the preparation and carrying out of an Environmental Management Plan (EMP), which would identify potential impacts, sensitive receivers and associated management measures. The EMP would include measures for soil and water, contamination, including asbestos, resource use and waste, non-Aboriginal heritage, fauna and flora, traffic, noise and vibration and air quality.

The EMP would include a number of sub-plans, as identified in **Chapter 6 (Environmental assessment)** of this REF:
- Acid Sulfate Soil Management Plan
- Air Quality Management Plan
- Asbestos Management Plan
- Communication Plan
- Flood Evacuation Plan
- Flora and Fauna Management Plan
- Hazard and Risk Management Plan
- Heritage Management Plan
- Noise and Vibration Management Plan
- Health and Safety Management Plan
- Soil and Water Management Plan
- Traffic Control Plan
- Traffic Management Plan

**Justification and conclusion**

This REF has been prepared to assess the potential environmental impact of carrying out of the proposal on part of the former Rozelle Rail Yards, in Rozelle and Lilyfield. The proposal would remove rail and rail related infrastructure from the Site and allow existing issues at the Site, such as waste and noxious weeds, to be appropriately managed.
The objectives of the proposal would be met by making more of the Site available for investigations, locating site utilities, carrying out further contamination investigations and removing waste items, materials and vegetation (including noxious weeds) from the Site. This would also be consistent with preparing the Site for potential future development.

The benefits of the proposal are expected to include improvement of the quality of the local environment by removal and appropriate disposal of waste including some contaminated material, demolition and removal of redundant infrastructure and removal of vegetation including noxious weeds, exotic species and regrowth.

If the proposal does not proceed, the Site would continue to have unmanaged environmental issues including lack of control of noxious weeds, dumped and stockpiled material including contaminated material would remain unsecured on-site, redundant infrastructure would continue to degrade and the Site would not be properly secured. The proposal is consistent with the need for Roads and Maritime to manage environmental issues on its property.

The assessment found that potential impacts from the proposal, including the finished site, would not be considered significant. Based on this, it is not considered necessary for an environmental impact statement (EIS) to be prepared or approval to be sought for the proposal from the NSW Minister for Planning under Part 5.1 of the EP&A Act. The proposal is unlikely to significantly affect threatened species, populations or ecological communities or their habitats, within the meaning of the TSC Act or the FM Act and therefore a Species Impact Statement is not required. The proposal is also unlikely to have a significant effect on the environment of Commonwealth land or have a significant effect on any MNES.
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   C2: Limited railway ballast assessment
   C3: Waste classification – soil drums
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Appendix D  Non-Aboriginal heritage impact assessment

Appendix E  Stage 2 PACHCI (Aboriginal heritage) assessment

Appendix F  Biodiversity assessment

Appendix G  Traffic and transport assessment

Appendix H  Noise and vibration assessment

Appendix I  Air quality assessment
1 Introduction

This chapter introduces the proposal and provides the context of the environmental assessment. In introducing the proposal, the objectives and project development history are detailed and the purpose of the report provided.

1.1 Proposal identification

NSW Roads and Maritime Services (Roads and Maritime) is proposing to carry out a limited suite of site management works (the proposal) on part of the former Rozelle Rail Yards (the Site) which is located at Lilyfield and Rozelle. The proposal would remove rail and rail related infrastructure from the Site and allow existing issues, such as waste and noxious weeds to be appropriately managed. The location of the Site is shown on Figure 1-1.

The key features of the proposal are:

- Site establishment for the site management works – including fencing, installing temporary site offices, arranging site access, erosion, sediment and drainage controls and defining lay down, stockpile and transfer areas
- Utility location and site investigations
- Removal of waste, existing stockpiles and vegetation
- Removal of existing above ground rail infrastructure, including gantries, railway lines, ballast, sleepers and buildings (but excluding the southern penstock, the switching station, the transformer and infrastructure to the east of Victoria road bridge) and redundant services where intercepted when removing infrastructure (eg gantries and ballast) generally to a depth of 500 millimetres below ground level, except where drainage channels and sediment basins are required
- Site stabilisation comprising reshaping of the ground surface as a result of the site management works and installation of final stormwater controls including the construction of drainage channels and sediment basins
- Site completion– de-mobilise all temporary construction materials, plant and equipment installed for the works and leave the Site secure.

The proposal would not include the remediation of the subsurface material (other than certain activities associated with the proposal specified above). Rail infrastructure, such as railway lines and sleepers, and redundant services would not be removed from the part of the Site beneath or to the east of the Victoria Road bridge. However other works such as the clearance of weeds and the demolition of the Port Authority building and warehouse would be carried out in this area as part of the proposed works.

After completion of the works, the ‘finished site’ would be managed and maintained to ensure that the surface cover and stormwater controls are operating effectively. It is anticipated that the works would be carried out over a period of up to 12 months. The proposal is described in further detail in Chapter 3 (Description of the proposal).

To help manage some of the legacy issues at the Site and to prepare for a future use, the NSW Government is in the process of consolidating ownership of the Site under a single government agency - Roads and Maritime. Roads and Maritime proposes to use the land in the future for the separate WestConnex M4-M5 Link project (M4-M5 Link project) if that project is approved by the NSW Minister for Planning. The proposal does not form part of the M4-M5 Link project and would be commenced before the determination of the environmental impact statement (EIS) for that project and irrespective of whether or not the M4-M5 Link project is approved.
The proposal is needed to manage the existing issues at the Site. It would also benefit future uses of the Site (including construction of the separate M4-M5 Link project if it is approved) because the works would remove material and redundant facilities associated with the rail and rail related infrastructure use from the Site. The proposal would improve access to surface conditions across the Site, which would allow for further investigation into the location of utilities and the presence of contamination and waste.

The proposal is subject to assessment under Part 5 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). This review of environmental factors (REF) has been prepared to assess the potential environmental impacts of the proposal. It would be publicly displayed for a period of 21 calendar days and submissions would be invited and considered before Roads and Maritime determines whether or not to proceed with the proposal.

### 1.2 Site context

The Site is located in the Inner West Local Government Area (LGA) (formerly Leichhardt LGA). The land is zoned under the *Sydney Regional Environmental Plan No. 26 – City West* (SREP 26) as Port and Employment. The Site is also within The Bays Precinct and is subject to The Transformation Plan: The Bays Precinct, Sydney (UrbanGrowth 2015).

The Site (for the purposes of this REF) is located on part of the former Rozelle Rail Yards and is shown on Figure 1-1. The Site is generally bounded by:

- To the south - City West Link
- To the west - the Sydney Central Business District and South East Light Rail (CSELR) Rozelle maintenance depot facility (under construction)
- To the north - Lilyfield Road and a number of residential and industrial properties along the south side of Lilyfield Road
- To the east - a boundary located approximately 70 metres to the east of the Victoria Road bridge.

The former Rozelle Rail Yards includes a more extensive area which extends beyond the Site in a westerly direction towards Balmain Road and in an easterly direction beyond Victoria Road towards White Bay. Rozelle Bay is located around 65 metres south of the Site. The access to the Site is available from City West Link, Gordon Street and also James Craig Road via Port Authority land to the east.

Various rail and industrial uses have occurred at the Site since the 1800s, including the storage of disused railway wagons and passenger carriages. These uses have resulted in a number of legacy issues. The area is highly disturbed and degraded and comprises mostly exotic species with some invasive native shrubs and scattered isolated trees. Much of the Site is reclaimed land however the source of fill used to build up ground levels is unknown. The Site has remained unused for many years and there is evidence of dumping of waste, materials (stockpiles and drums) and machinery from unknown sources.

Infrastructure at the Site includes rail infrastructure such as railway lines, ballast and sleepers, redundant and live utility services, and redundant and active structures and buildings. Given the previous land uses, existing wastes and the results of preliminary assessments, there are known areas of contamination within parts of the Site.
No items located on-site are heritage listed however the lighting tower, Victoria Road bridge, sandstone cutting and the Port Authority building have been identified in this REF as having local heritage significance. Notable heritage items surrounding the Site include, but are not limited to, the Lilyfield stormwater canal (also known as the Easton Park drain) and the State heritage listed White Bay Power Station. The southern penstock, located on the eastern part of the Site, is associated with the White Bay Power Station. The southern penstock is not part of the State heritage listing for the White Bay Power Station; however it has been identified by this REF (section 6.4), as containing heritage significance due to its association with this item.

An informal garden (located on top of the retaining wall in the north-eastern part of the Site), Sydney Trains switching station, Ausgrid transformer and live services, would be retained and protected during the works. Key site features are shown on Figure 1-2 and utilities at the Site are shown on Figure 1-3.
Figure 1-1: Site location

KEY
- Site boundary
- Light rail stop
- Local government area
- Light rail

Map produced by AECOM on behalf of Sydney Motorway Corporation. Map data copyright 2016 Sydney Motorway Corporation, NSW. Spatial data used under licence from Land and Property Management Authority, NSW © 2016. AECOM/SMC makes no representations or warranties of any kind, about the accuracy, reliability, completeness, suitability or fitness for purpose in relation to the map content.
Figure 1-3: Utilities infrastructure

KEY
- **Sydney Water**: Water main, Water structure
- **Sewer main**, **Sewer structure**
- **Council Utilities**: Stormwater main, **Stormwater structure**
- **Electrical - Ausgrid**: Electrical, **Electrical kiosk**, **Electricity pole**
- **Sydney Trains**: 1kV Line, 33kV Line
- **Switching station**
- **Other Utilities**: Communications, Jemena Gas, Surveyed Stormwater Pit (2016)
- **Open drainage channel**, **Site boundary**

Notes:
- Utilities data has been sourced through the Sydney Water Department.
- Location is indicative only with the exception of the surveyed data.
- Map produced by AECOM on behalf of Sydney Motorway Corporation.
- Map data copyright 2016 Sydney Motorway Corporation, NSW. Spatial data used under licence from Land and Property Management Authority, NSW © 2016.
- AECOM/SMC makes no representations or warranties of any kind, about the accuracy, reliability, completeness, suitability or fitness for purpose in relation to the map content.

Disclaimer
- Map and data have been compiled in good faith and to the best of AECOM's knowledge. AECOM accepts no liability for any errors or omissions or for any consequences arising from the use of this map.

Utilities:
- **Ausgrid**: Transformer #S61605
- **Sydney Water**: Water main, Water structure
- **Sewer main**, **Sewer structure**
- **Council Utilities**: Stormwater main, **Stormwater structure**
- **Electrical - Ausgrid**: Electrical, **Electrical kiosk**, **Electricity pole**
- **Sydney Trains**: 1kV Line, 33kV Line
- **Switching station**
- **Other Utilities**: Communications, Jemena Gas, Surveyed Stormwater Pit (2016)
- **Open drainage channel**, **Site boundary**
1.3 Purpose of the report

This REF has been prepared by AECOM Australia Pty Ltd (AECOM) on behalf of Roads and Maritime. For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Part 5 of the EP&A Act.

The purpose of the REF is to describe the proposal, document the likely impacts of the works on the environment and detail mitigation and management measures to be put in place before, during and after the works are carried out.

The description of the proposal and assessment of the associated environmental impacts have been carried out in the context of:

- Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (NSW)
- The *Threatened Species Conservation Act 1995* (NSW) (TSC Act)
- The *Fisheries Management Act 1994* (NSW) (FM Act)

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

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities or their habitats and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in section 5A of the EP&A Act and therefore triggering the requirement for a Species Impact Statement
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten the long-term survival of these matters and whether offsets are required and are able to be secured
- The potential for the proposal to have a significant impact on any other matters of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.
2 Need and options considered

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

2.1 Strategic need for the proposal

The Rozelle Rail Yards has remained largely disused for a number of years. Since the closure of the rail yards in 1996 the Site has been used occasionally with the last rail use vacating in 2007. Since 2007, the Site has been managed by four government landowners with a number of limited activities occasionally using parts of the Site (eg the crane storage area close to City West Link).

The Site contains redundant rail infrastructure and buildings, waste and contamination. The Site’s disused nature has also meant that various noxious weeds have grown over a large part of the Site. The presence of redundant infrastructure and buildings, waste, contamination and noxious weeds presents ongoing environmental management, maintenance and safety issues and constraints to a future use of the Site.

To help manage some of the legacy issues at the Site and to prepare for a future use, the NSW Government is in the process of consolidating ownership of the Site under a single government agency - Roads and Maritime. Roads and Maritime proposes to use the Site in the future for the separate M4-M5 Link project if that project is approved by the NSW Minister for Planning. The proposal does not form part of the M4-M5 Link project and would be commenced before the determination of the EIS for that project and irrespective of whether or not the M4-M5 Link project is approved.

The proposal is needed to manage the existing environmental and safety issues on-site. It would also benefit future uses of the Site (including construction of the separate M4-M5 Link project if it is approved) because the works would remove material and redundant facilities associated with rail and rail related infrastructure from the Site.

The benefits of the proposal are expected to also include improvement of the quality of the local environment by removal and appropriate disposal of waste including some contaminated material, demolition and removal of redundant infrastructure and removal of vegetation including noxious weeds.

If the proposal does not proceed, the Site would continue to have unmanaged environmental issues including lack of control of noxious weeds, dumped and stockpiled material including contaminated material would remain unsecured on-site, redundant infrastructure would continue to degrade and the Site would not be properly secured. The proposal is consistent with the need for Roads and Maritime to manage environmental issues on its property.

2.2 Proposal objectives and development criteria

The objectives of the proposal are consistent with the strategic need identified above and incorporate environmental, social and economic considerations.

Roads and Maritime aims to:
- Remove a number of legacy issues from the Site, including existing stockpiles, wastes, redundant rail infrastructure and noxious weeds
- Confirm the presence, location and status of subsurface utilities
- Limit ground disturbance generally to a depth of 500 millimetres, except where drainage channels and sediment basins are required
- Install erosion, sediment and drainage controls on-site
Achieve minimal change to the topography of the Site at the conclusion of the works
Leave the Site in a state that reduces the potential impacts associated with the existing site and allows it to be effectively managed until it is developed in the future.

No specific development or urban design criteria apply to the proposal.

2.3 Alternatives and options considered

2.3.1 Identified options

The following alternatives were considered:

- Option 1: do nothing
- Option 2: defer the works and incorporate them into a future project
- Option 3: complete the works now (the proposal).

2.3.2 Analysis of options

The method for the selection of the preferred option was based on a comparison of the potential impacts, risks and outcomes of each option as well as its ability to effectively meet the objectives of the proposal.

Option 1: do nothing

The do nothing option would involve leaving the Site in its current condition. This would mean that legacy issues at the Site would not be further investigated or managed.

If the do nothing option was adopted, existing environmental management, safety and maintenance issues at the Site would continue, including inappropriate in situ waste management and informal stormwater management. This could lead to a further spread of weeds, further deterioration of disused buildings and infrastructure on the Site, and potentially poor water quality of stormwater runoff from the Site.

The do nothing option would mean that there is no disturbance to the Site. This would mean that any temporary environmental impacts associated with the proposed works would be avoided. However, the do nothing option would not allow Roads and Maritime to improve their understanding and management of the existing legacy issues or further investigate the site conditions. Therefore, Option 1 is not considered a viable option.

Option 2: defer the works

The proposal could be deferred and instead be carried out as part of a future project at the Site, including potentially the M4-M5 Link project. If the proposal was carried out as part of a future project this project would still need to be assessed, determined, designed and contracted. The nature of the future project would determine how long the approval process would take, but for a large project this could be some time. As such there is no certainty at this point when the proposed works would take place in the future.

It is highly likely that a future project at the Site would need to complete many (if not all) of the works that are proposed. The option of deferring the works would further delay the investigation and management of legacy issues at the Site. If multiple projects were proposed for the Site this could further delay a holistic approach to managing the Site in the short to medium term.

Deferring the works to a future project would not allow Roads and Maritime to understand and manage the legacy issues at the Site in the short term. As a result, this option does not provide the best environmental outcome and does not meet the objectives of the proposal.
Option 3: complete the works now (the proposal)

Option 3 would involve progressing the proposal as described in this REF. This option would allow Roads and Maritime to understand and manage a number of legacy issues at the Site and gain a better understanding of the condition of the Site and its existing infrastructure in the short term.

Undertaking the proposal would allow for the removal of noxious weeds, waste, disused buildings and redundant infrastructure. The proposal would also allow for the establishment of erosion, sediment and drainage controls and would further secure the Site by installing new fencing and clearing the Site to provide better visibility. The proposal would improve access to surface conditions across the Site, which would allow for further investigation into the location of utilities and the presence of contamination and waste.

Undertaking these proposed activities would address some of the existing environmental, safety and maintenance issues at the Site and would allow Roads and Maritime to more effectively manage the Site. The removal of wastes and noxious weeds, the introduction of erosion, sediment and drainage controls and stabilisation of the ground surface would have benefits for the local environment.

Option 3 would best meet the objectives of the proposal. As such it is considered on balance a better option than Options 1 and 2 and is therefore the preferred option.

Preferred option

The preferred option to achieve the proposal objectives is Option 3. The preferred option has been selected as it would best meet the project objectives and allows Roads and Maritime to manage the existing environmental and safety issues. It would also benefit future development of the Site including construction of the separate M4-M5 Link project if it is approved.

2.4 Design refinements

Following selection of the preferred option, a number of design refinements were made to avoid or minimise potential environmental impacts:

- The relocation of live utilities as part of the proposal was removed due to potential disruption to local communities and businesses as well as the unknown scale of the earthworks needed. This has led to the live stormwater and electrical infrastructure at the Site being retained.
- The informal garden and the rock retaining wall below it, in the north of the Site would not be removed as part of the proposal.
- The hardstand areas on the Site would be retained to reduce waste and provide access tracks and laydown/preparation areas.
- The southern penstock, in the north-east of the Site, would be retained and excluded from any works.
- The majority of the trees outside, but immediately next to the site boundary would be protected and retained. The only exception to this is where certain trees along City West Link, as identified in this report, may need to be removed to provide adequate sight lines for vehicles exiting the Site.
3 Description of the proposal

This chapter provides a detailed description of the proposal including the proposed activities, indicative staging, program, likely plant and equipment and estimated workforce.

3.1 The proposal

3.1.1 Overview

The proposal would involve the following main activities:

1. Site establishment – including the installation of temporary Site offices and erosion, sediment and drainage controls, developing access arrangements across the Site, and defining lay down, stockpile and transfer areas.
2. Utility location and site investigations – to locate and identify all services across the Site and carry out additional investigations ahead of ground disturbance works commencing.
3. Site clearing – removal of all vegetation (excluding the informal garden), waste (including some potentially contaminated material) and stockpiles at the Site.
4. Infrastructure demolition and/or removal – of redundant rail infrastructure, including railway lines, ballast and sleepers, and buildings (excluding the southern penstock, the Sydney Trains switching station and the Ausgrid transformer).
5. Remove redundant services – where intercepted when removing infrastructure (eg gantries) and ballast generally to a depth of 500 millimetres below ground level.
6. Site stabilisation – reshaping and stabilisation of the ground surface and implementation of stormwater controls such as drainage channels and sediment basins, to ensure runoff volumes do not increase and runoff water quality is acceptable after works are complete.
7. Site completion – de-mobilise all temporary construction materials, plant and equipment and leave the Site secure.

Site clearing, infrastructure demolition and removal of redundant utility services would require excavation generally to depths of 500 millimetres below ground level. The construction of the sediment basin embankment walls may require excavation of up to two metres below ground level in targeted locations. The Site would be exposed and stabilised progressively in a staged manner depending on ground and weather conditions to minimise the mobilisation of soils, fill, contamination and dust. Stabilisation of the residual ground surface would be completed using a number of techniques (refer to section 3.2.1) dependent on the final ground conditions.

Rail infrastructure, such as railway lines and sleepers, and redundant services would not be removed from the part of the Site beneath or to the east of the Victoria Road bridge. However, other site management works such as the clearance of weeds and the demolition of the Port Authority building and warehouse would be carried out.

It is anticipated that the proposal would be conducted over a period of up to 12 months. The activities listed above are likely to be carried out in several stages; however, some activities may overlap as works progress across the Site. An indicative staging plan has been developed for the proposal and is discussed further in section 3.2.2.

Following completion of the works the ‘finished site’ would be managed and maintained to ensure that the surface cover and stormwater controls are operating effectively, that other management activities are completed and that the Site is secure. Temporary site security offices would also be situated within the Site.
3.1.2 Excluded activities

The following material/redundant infrastructure would not be removed as part of the proposal:

- The existing Sydney Trains switching station, Ausgrid transformer and associated live infrastructure next to the southern boundary of the Site
- The rock retaining wall and informal garden (on top of the rock retaining wall), within the northern portion of the Site (vegetation growing on the side of the rock retaining wall would be removed)
- Vegetation on top of the sandstone cutting and rock retaining wall
- The southern penstock structure and immediate surrounds in the north-eastern corner of the Site
- Existing access points, access tracks, slabs from under buildings and hardstand areas
- The majority of the vegetation within the road corridor along City West Link, situated immediately south of the Site. Some vegetation along City West Link may need to be removed to allow the construction of a new site access or to ensure safe sight lines for traffic
- Rail infrastructure and redundant services beneath and to the east of the Victoria Road bridge. However, the demolition of the Port Authority building and warehouse would be carried out.

3.2 Description of site management works

3.2.1 Work methodology

The description of the work methodology is preliminary and may change depending on the methodology adopted by the nominated contractor.

A work methodology for each of the seven key activities for the site management works is presented in Table 3-1.
Table 3-1: Proposed site management works methodology

<table>
<thead>
<tr>
<th>No.</th>
<th>Proposed activity</th>
<th>Summary of work required</th>
<th>Location of activity</th>
</tr>
</thead>
</table>
| 1   | Site establishment       | • Obtain relevant approvals from Roads and Maritime and the Transport Management Centre (TMC) before entering the Site  
• Develop and conduct inductions for all personnel  
• Governing documentation to be approved (ie method statements, management plans and emergency plans)  
• Secure the Site with fencing, gates, locks and signage  
• Install CCTV cameras as necessary  
• Construct access on to and across the Site (this would occur progressively as part of each stage)  
• Carry out the Traffic Management Plan (TMP)  
• Install signage  
• Install additional offices, crib, amenities and first aid facilities as needed  
• Delineate facility and work areas  
• Delineate designated car park for personnel  
• Install temporary erosion, sediment and drainage controls where necessary (this would occur progressively as part of each stage)  
• Setup exclusion zones as needed (including peripheral vegetation, neighbouring commercial properties (eg on Lilyfield Road), informal garden, cultural heritage sensitive areas)  
• Define work lay down area/s  
• Test and/or classify wastes that may be removed from Site, where they have not been previously sampled  
• Conduct a hazardous materials (HazMat) survey, including for asbestos  
• Install truck wheel wash at access points as needed  
• Mobilise plant and equipment. | This activity would occur across the whole Site; however certain activities would take place in discreet locations. |
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<th>No.</th>
<th>Proposed activity</th>
<th>Summary of work required</th>
<th>Location of activity</th>
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</table>
| 2   | Utility location  | • Conduct desktop assessment of known utility services  
• Conduct Ground Penetrating Radar (GPR) imaging across the Site to identify all known services  
• Conduct non-destructive excavation (NDE) and/or potholing as needed to positively identify the service  
• Tag/mark the identified service as required  
• Generate an updated utilities survey as-built with known positions, levels and heights of all redundant and live services  
• Notify Dial Before You Dig (DBYB) and utilities companies of any services that have not been previously identified  
• Reassess whether changes to the proposed work methodology are needed based on utility as-built results. | Live and redundant utilities are present throughout the Site and potentially include a range of services such as electrical, water, sewer, stormwater, gas and communications. Refer to Figure 1-3 for an indicative location of these services. |

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4 Potholing would be carried out along each utility at about ten metres intervals and vertically to the top of each utility, which are located at various depths.
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<th>No.</th>
<th>Proposed activity</th>
<th>Summary of work required</th>
<th>Location of activity</th>
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</table>
| 3   | Site clearing     | Install erosion, sediment and drainage controls as needed  
|     |                   | Conduct brush cutting work above the ground level/tracks to provide a clearer understanding of the existing ground surface  
|     |                   | Conduct Site walkover with soil conservation consultant, contamination expert and hygienist  
|     |                   | Complete in-situ testing of ballast, additional ground investigations and HazMat survey  
|     |                   | Remove easily identifiable hazardous materials (eg asbestos containing material (ACM) as recommended by the HazMat survey)  
|     |                   | Remove and/or move fauna as required  
|     |                   | Remove loose materials/items  
|     |                   | Remove existing soil drums, bins and waste  
|     |                   | Remove redundant machinery equipment  
|     |                   | Define sorting, stockpiling and transfer area/s  
|     |                   | Remove existing stockpiles as needed  
|     |                   | Remove trees  
|     |                   | Clear and grub vegetation  
|     |                   | Sort and stockpile materials to be transported off-site  
|     |                   | Conduct material sampling and testing before removing material  
|     |                   | Mulch suitable material that would remain on-site (eg vegetation not infested with noxious weeds)  
|     |                   | Remove any material not being reused, including vegetation, soil and other materials, to an appropriate off-site facility.  

Vegetation is located across most of the Site and makes up an area of about 78,000 metres squared. Vegetation across the Site is variable in density and condition (weeds, exotic species and re-growth) and includes grasses, shrubs and trees.

The location of known stockpiles and waste drums are shown on Figure 1-2. Other waste items may also be located on-site in various (currently unknown) areas.

Some vegetation in the road corridor on City West Link, in the western portion, would be removed in order to create a new access point (if required) and/or meet the appropriate sight line distance for heavy vehicles exiting the Site.
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</table>
| 4   | Infrastructure demolition and/or removal | - Conduct dilapidation surveys and prepare reports on existing infrastructure on-site as necessary (eg for heritage archival recording)  
- Disassemble and remove rail crane gantries and lighting tower  
- Remove railway tracks, sleepers and ballast  
- Demolish, salvage and remove railway platform and awning  
- Demolish, salvage and remove workshop, signal shed and annex  
- Demolish, salvage and remove the Port Authority building and warehouse  
- Reassess the stormwater and groundwater drainage conditions as the Site is progressively cleared  
- Reassess the proposed work methodology. | Railway tracks and sleepers to be removed are located across the majority of the Site (refer to Figure 1-2 for an indicative location). The railway platform and awning is located in the western portion of the Site.  
The workshop is located next to the platform. The Port Authority building and warehouse are located east of Victoria Road bridge. |
| 5   | Remove redundant services              | - Seek approvals from the appropriate utility stakeholders before commencing work  
- Provide utilities as-built plans to DBYD  
- Excavate, blind/block/deactivate services and remove redundant utilities as needed  
- Reinstate excavated area to specified level with clean fill. | The precise location of redundant utilities is not yet known; however, Figure 1-3 shows the indicative location of some utilities. Redundant utilities would be identified in accordance with utility locating activities and in consultation with utility owners. |
| 6   | Site stabilisation                    | - Stabilise the Site to avoid erosion and protect against contamination of surface water flows  
- Locally reshape the surface of the Site where necessary, to facilitate erosion and sediment management, using existing material where possible  
- Reassess and confirm final erosion and sediment controls in consultation with soil conservation consultant.  
- Remove excess material. | Stabilisation would occur progressively across the Site in areas where rail infrastructure, ballast and/or vegetation have been removed (refer to Figure 1-2 for an indication of these locations). In areas where there is hardstand, internal access tracks/driveways and temporary buildings and in the eastern portion of the Site where rail infrastructure would not be removed, stabilisation of the ground surface would not be needed. Indicative staging is discussed in section 3.2.2. |
<table>
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<th>No.</th>
<th>Proposed activity</th>
<th>Summary of work required</th>
<th>Location of activity</th>
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</table>
| 7   | Site completion          | • De-mobilise temporary construction materials and facilities (eg internal fencing, signage)  
• De-mobilise all plant and equipment  
• Carry out final Site inspection and handover  
• Secure site.                             | This activity would occur across the whole Site.          |
Further information on activities, that would be completed before and during the proposal, are discussed below. These are indicative and would be confirmed by the nominated contractor.

**Site establishment**

Before works starting on-site a detailed Environmental Management Plan (EMP) would be developed. This EMP would be supported by a number of sub-plans and would be used by the contractor completing the works and by Roads and Maritime as the primary tool to manage the potential environmental impacts associated with the proposal. Further information on the proposed EMP is provided in Chapter 7 (Environmental management).

One of the key sub-plans for the proposal would be the Soil and Water Management Plan (SWMP), which would include detail of erosion and sediment controls amongst other things. At the start, and for the duration of the proposal, the contractor would employ a soil conservation consultant and a contamination expert to draft or provide input into the SWMP and confirm the appropriate safeguards and management measures for the works. This SWMP would be approved by Roads and Maritime.

The soil conservation consultant and contamination expert would also help confirm the design for the proposal and the finished site. They would help identify constraints to the proposed design and develop solutions as required. They would also agree appropriate temporary erosion and sediment controls for the proposal with the contractor and Roads and Maritime.

During site establishment the Site would be made secure by erecting fencing and gates and introducing temporary offices for site personnel. Fences would be erected around the entire Site (as required). Gates would be installed at the access points that the contractor decides to use. This could be any or all of the four proposed access points (ie City West Link (east), City West Link (west), Port Authority and Gordon Street). Temporary offices for security and site workers would be established on-site.

Internal access tracks at the Site would also be developed early in the works. These access tracks would provide a circular route around the Site and would use existing hardstand areas where available. Wheel washing facilities would be established at each access point to the Site as required.

Before and during the works a hygienist and contaminated land expert would complete HazMat surveys across the Site. The first survey would occur before any works at the Site commencing. These surveys would identify potentially hazardous materials (including asbestos) at the surface of the Site, which in turn may indicate potential contamination below the ground. The first survey would also examine the buildings and structures on-site that are to be demolished. Additional testing of the existing stockpiles at the Site would also be completed where required to appropriately classify the material before removal.

**Surface clearance**

Once the site establishment activities are complete, the proposed works would progress across the Site in a staged manner. Vegetation, wastes and existing stockpiles would be removed to ground level. Vegetation (primarily consisting of noxious weeds and exotic species) would be removed from approximately 70 per cent of the Site by cutting it to ground level, then mulching it (or bagging it as necessary for weed infested areas).

The stockpiles accessed to date have been characterised in accordance with the NSW Waste Classification Guidelines (EPA, 2014). These stockpiles would be removed from the Site, to appropriately licensed facilities. In the event that other existing stockpiles are identified during the proposal (following vegetation removal), these would also be characterised in accordance with the NSW Waste Classification Guidelines and handled, managed and disposed of appropriately.
The majority of the existing structures on the Site would be removed or demolished. This includes removal of the rail gantries, the workshop, signal shed and annex, lighting tower and railway platform in the west of the Site, and the Port Authority building and warehouse in the eastern part of the Site. The existing rail tracks and sleepers would also be removed, except from the area beneath and to the east of the Victoria Road bridge. Where buildings have slabs underneath them, these would be retained.

Waste from the demolition and removal activities would be classified in line with the NSW Waste Classification Guidelines (EPA, 2014) and if removed from Site, disposed of at appropriately licensed facilities.

A further HazMat survey is proposed once the vegetation, wastes, buildings, structures, rail track and sleepers have been cleared. This survey would identify potential issues that need to be managed before locating services, grubbing roots or other ground disturbance activities. This survey would be completed by a hygienist and contaminated land consultant experienced in the identification and management of potential asbestos and contaminated land impacts.

After the removal of vegetation at the Site further contamination, acid sulfate soil and groundwater investigations would be completed to inform where sediment basins and drainage channels are proposed. Construction of these elements may involve limited excavation into the natural soils and fill beneath the ballast, particularly in the case of the sediment basin walls, and may also encounter groundwater. These investigations would also be carried out to characterise the soil and fill material (including leachability characteristics). Samples would be tested for a suite of potential contaminants including those identified to date and those presumed to be present at the Site given its previous land uses and historical information.

Additional in-situ testing of the ballast would be completed to evaluate the suitability for the ballast to be recycled or disposed off-site. This testing along with visual inspection would help confirm the segregation method to maximise potential reuse and proper disposal of the material. Only one sample to date identified the presence of asbestos in the ballast (refer to section 6.1). As such the additional samples would be taken from different depths within the ballast and would be screened for asbestos and other relevant contaminants.

The information from these surveys would be used by the soil conservation consultant and contamination expert to:

- Confirm the most suitable approach for managing the proposal including the details of the temporary and permanent erosion and sediment controls
- Revise the SWMP (and other related parts of the EMP) if necessary
- Continue to advise on the final design of the works.

This advice would include confirming the correct approach to stabilising the Site during the progressive removal of the ballast (this is discussed under the subsection ‘Site stabilisation’ below).

Following receipt of results of the additional soil/fill, ballast and HazMat surveys, the soil conservation consultant and contamination expert would also provide advice to the service locators on specific contamination risks in particular parts of the Site. Spoil from the service location investigations would need to be collected, tested and disposed of in accordance with the SWMP and the Waste and Resource Management Plan (WMP) for the proposal.

Many of the utility services would be located early in the program in consultation with service providers, to ensure that live services are avoided and not damaged (eg during ground disturbance works). Where necessary, temporary erosion and sediment controls would be installed to manage stormwater flows that may interact with potholes/trenches or spoil from these investigations.
There is the potential for residual contamination/hazardous materials to be present within redundant subsurface infrastructure at the Site. This may include residual oil and grease or other contaminants. Aged service infrastructure may also comprise asbestos-containing materials. Inspection of services for the presence of contamination would be carried out before removal or disturbance of subsurface infrastructure. Protocols would be put in place and detailed within the SWMP to minimise the potential for leaks and spills during removal of redundant services.

Completing these additional investigations and employing suitably experienced and qualified soil conservation consultant and contamination expert would ensure that the correct approaches to managing potential contamination impacts associated with the works can be confirmed, implemented and revised where necessary to respond to site conditions.

Before ground disturbance activities commencing, temporary erosion and sediment controls would be installed as required and in accordance with the advice of the soil conservation consultant and contamination expert. These controls would be specific to the activities being completed and may involve, but not be limited to, the construction of temporary sediment basins, drainage channels and sediment fences. Temporary cross drainage would be installed as early as possible to ensure that stormwater from upgradient of the Site is transferred either through or around the disturbed areas to minimise the volume and velocity of stormwater that may cause erosion and also for water quality purposes. Temporary sediment basins would also be in place before ground disturbance works take place.

As the works progress there would be opportunities to construct the permanent erosion and sediment controls (specifically drainage channels and sediment basins); however this would need to occur once the ballast was removed.

**Ground disturbance**

The first ground disturbance activity would involve grubbing the surface. Grubbing would be completed to bring larger roots to the surface. Certain redundant utilities (eg cables) may also be brought to the surface as part of this activity. The vegetation waste from below the surface would be kept separate from the plant material removed above ground, as the below ground material could contain contaminants. Additional surveys by the hygienist and contaminated land expert would be completed as grubbing occurs to identify any materials that maybe considered hazardous and require special management. These works would be carried out in line with Roads and Maritime Specification G40 (Clearing and Grubbing).

Following grubbing, the ballast would be excavated. The ballast would be progressively excavated to ensure that ground disturbance activities are minimised and that they are appropriate for ground and weather conditions. Various controls would be used to manage potential impacts relating to dust, erosion, stormwater runoff and the storage and stockpiling of the ballast. These controls are discussed in more detail in section 6.1, section 6.2 and section 6.9 and would be included in the EMP. These controls would include a number of temporary erosion and sediment controls as discussed above and in section 6.1, and section 6.2.

**Site stabilisation**

As the ballast at the Site is excavated and removed, the exposed soils would be stabilised to minimise erosion and the potential contamination of surface water flows and to reduce the level of infiltration into the groundwater under the Site.

Minor grading and reshaping would be carried out to ensure that stormwater flows are managed appropriately. It is estimated that by removing rail ballast the works would reduce the surface level of parts of the Site by up to about 500 millimetres, with the exception of drainage channels and sediment basins, which may require excavation to a depth of up to two meters. There is potential to use existing fill material on-site to reshape the final landform where soil quality is acceptable.
In order to adequately stabilise the Site, a suitable method would be employed to avoid the potential off-site transport of contaminants to nearby watercourse and waterbodies. The method would be determined by the soil conservation consultant and contamination expert. Depending on the ground conditions in each location stabilisation may involve one or a combination of the following:

- Hydromulch
- Matting
- Geotextile (geofabric)
- Geobinders
- Applying a layer of top-soil or clean fill (usually up to 100 millimetres).

Once a substrate is applied, the new surface would be seeded where necessary.

The precise method of stabilising the residual soils/fill beneath the ballast for each part of the Site would be confirmed following completion of a number of additional investigations and in accordance with the advice of the soil conservation consultant and contamination expert.

As the works are progressively completed, the permanent sediment basins and drainage channels would be constructed. The main purpose of these permanent erosion and sediment controls would be to manage surface water flows on to and across the Site once the works have been carried out. However these controls would be constructed as early as practicable in the works and could also be used to manage surface water flows as the works are being completed.

Construction of the permanent drainage channels and sediment basins may require some excavation into the ground/fill beneath the ballast. For the drainage channels and the basins themselves, this excavation is expected to minor (ie less than one metre below ground level). However the construction of the embankment wall for the sediment basins may require excavation to a maximum depth of two metres below ground level. As noted above, the results of further ground investigations would be used to confirm the location, size and number of sediment basins and drainage channels. As limited excavation is required, where possible the sediment basins would be located to avoid areas of potential archaeology, contamination, acid sulfate soils (ASS), and/or live services. Further details of the sediment basin design are provided in section 6.2.3.

The permanent basins would be lined in order to prevent groundwater entering the basin and reducing its capacity to store water during heavy rain fall events. Water levels within the sediment basins (temporary or permanent) would be proactively managed to ensure full capacity was available for heavy rain events. Water that collects in these basins and needs to be removed would be tested in line with standard construction water quality discharge criteria and managed in line with the Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (RTA, 2011). If these criteria are met the water would be discharged into the Site’s existing stormwater drainage system which ultimately leads to Rozelle Bay. Water that does not meet these criteria would be collected and disposed off-site. Sediment that collects within the basins would also be tested and disposed of appropriately.

In addition to construction of the permanent drainage channels and sediment basins, existing stormwater drains at the Site that lead off-site (eg those that link to Easton Park drain) would be protected as far as practicable so that if surface water overtopped the sediment basins during a high rainfall event, this water could be contained within other parts of the Site as long as possible.

All of the ground disturbance activities, site stabilisation activities and erosion and sediment controls would be subject to regular inspection by the environmental representative for the works, the soil conservation consultant and contamination expert. These inspections would occur throughout the works and at their conclusion. Refer to section 3.3 for the description of the ongoing management of the finished site.
3.2.2 Staging and program

The proposal is expected to begin in 2017 and be carried out over a period of up to 12 months.

An indicative staging program for the proposal is presented in Figure 3-1. It is noted that this staging program is indicative only and may be changed by the proposal contractor. Under this indicative program of work, the activities outlined above would be completed during seven key stages.

These stages and how they relate to the various activities are presented in Table 3-2. This table should be read in conjunction with Table 3-1 (where the activity numbers can be found) and Figure 3-1.

Table 3-2: Description of indicative staging

<table>
<thead>
<tr>
<th>Stages</th>
<th>Area of works</th>
<th>Activities to be carried out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Site establishment</td>
<td>Over the whole site (about 110,500 metres squared)</td>
<td>All of the works listed for activity 1 (Site establishment)</td>
</tr>
</tbody>
</table>
| 2. Commence clearing of Site and extend access routes | Along the majority of the southern boundary and in the area west of Victoria Road bridge (about 16,000 metres squared) | Works include the following activities:  
- Conduct HazMat survey (activity 1)  
- Locate utilities (activity 2)  
- Develop new access on City West Link and temporary access roads for this stage (activity 1)  
- Clear vegetation (activity 3)  
- Remove waste (activity 3)  
- Remove railway infrastructure (activity 4, no buildings to be demolished in this stage)  
- Remove redundant services (activity 5)  
- Stabilise exposed area (activity 6). |
| 3. Continue clearing and demolish railway platform and awning | Clearing activities within portion between western end of stage 2 area and Gordon Street (about 20,500 metres squared) | Clearing works include the following activities:  
- Conduct HazMat survey (activity 1)  
- Locate utilities (activity 2)  
- Continue creating temporary access roads (activity 1)  
- Clear vegetation (activity 3)  
- Remove waste (activity 3)  
- Remove railway infrastructure (activity 4)  
- Remove redundant services (activity 5)  
- Stabilise exposed area (activity 6). |
| | Demolition would occur in the western portion of the Site, south of the staff workforce carpark. The lay down area would be created in this area also (about 2000 metres squared) | Demolition works include the following activities:  
- Conduct HazMat survey (activity 1)  
- Locate utilities (activity 2)  
- Remove railway infrastructure (activity 4)  
- Demolish railway platform and awning (activity 4)  
- Remove lighting tower (activity 4)  
- Continue creating temporary access roads (activity 1)  
- Create laydown area (activity 1). |
<table>
<thead>
<tr>
<th>Stages</th>
<th>Area of works</th>
<th>Activities to be carried out</th>
</tr>
</thead>
</table>
| 4.     | Clearing activities would occur through the centre of the Site (about 27,100 metres squared) | Clearing works include the following activities:  
- Conduct HazMat survey (activity 1)  
- Locate utilities (activity 2)  
- Continue creating temporary access roads (activity 2)  
- Clear vegetation (activity 3)  
- Remove waste (activity 3)  
- Remove railway infrastructure (activity 4)  
- Remove redundant services (activity 5)  
- Stabilise exposed area (activity 6). |
|        | Demolition would occur in the north-eastern corner of the Site, east of the western edge of Victoria Road bridge (about 450 metres squared) | Demolition works include the following activities:  
- Conduct HazMat survey (activity 1)  
- Locate utilities (activity 2)  
- Continue creating temporary access roads (activity 1)  
- Clear vegetation (activity 3)  
- Remove waste (activity 3)  
- Demolish Port Authority building and warehouse (activity 4). |
| 5.     | West of centre portion of the Site, immediately east of the workshop (about 29,700 metres squared) | Clearing works include the following activities:  
- Conduct HazMat survey (activity 1)  
- Locate utilities (activity 2)  
- Continue creating temporary access roads (activity 1)  
- Clear vegetation (activity 3)  
- Remove waste (activity 3)  
- Remove railway infrastructure (activity 4)  
- Remove redundant services (activity 5)  
- Stabilise exposed area (activity 6). |
| 6.     | Far western portion of the Site around the workshop (about 17,500 metres squared) | Works for the following activities:  
- Conduct HazMat survey (activity 1)  
- Locate utilities (activity 2)  
- Finalise site access roads (activity 1)  
- Clear vegetation (activity 3)  
- Remove waste (activity 3)  
- Remove railway infrastructure (activity 4)  
- Demolish workshop, signal shed and annex (activity 4)  
- Remove redundant services (activity 5)  
- Stabilise exposed area (activity 6). |
| 7.     | Whole of the site (about 110,500 metres squared) | All of the works listed for activity 7 (Site completion and handover). |

Staging the proposal would allow different activities to be carried out concurrently on different parts of the Site. The above stages have been designed to provide continuity and an effective use of workforce, plant and equipment. Implementing the site investigation, clearance and management activities in stages across the Site would help minimise potential environmental impacts such as those associated with erosion and sediment, air quality, noise and traffic. It would also allow parts of the Site to be systematically cordoned off to minimise disturbance.
Figure 3-1: Indicative staging

Construction stages

Stage 1 - Site establishment (whole of site)
Stage 2 - Commence clearing site & extend access routes
Stage 3 - Continue clearing & demolish railway platform & awning
Stage 4 - Continue clearing and demolish Port Authority building and warehouse
Stage 5 - Continue clearing
Stage 6 - Complete clearing and demolish workshop, signal shed and annex
Stage 7 - Site completion & handover (whole of site)

Note: Applicable works would be conducted under the Victoria Road bridge.
The staging plan shown is indicative only and is subject to change.

Key:
- Site access location
- Existing access route
- Southern Penstock and Exclusion Zone
- Temporary facilities
- Open drainage channel
- Waterway
- Site boundary
- LGA Boundary
3.2.3 Plant and equipment

An indicative list of plant/equipment for each stage of the works is listed below in Table 3-3. Additional minor plant/machinery may be needed throughout the work with the final plant and equipment requirements to be identified by the successful contractor.

Table 3-3: Indicative plant and equipment

<table>
<thead>
<tr>
<th>Plant</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
<th>Stage 6</th>
<th>Stage 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Establishment</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Commence clearing &amp; extend access routes</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Continue clearing &amp; demolish railway platform &amp; awning</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Continue clearing &amp; demolish Port Authority buildings</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Complete clearing &amp; demolish workshop</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Site completion</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>20 t Excavator</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<tr>
<td>20 t Excavator with rock breaker</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<tr>
<td>25 t Excavator</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<tr>
<td>30 t Crane</td>
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<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>30 t Excavator</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Elevated work platform</td>
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<td>3</td>
<td>4</td>
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<td>Fuel truck</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Hiab truck</td>
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<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Moxy (TR35t)</td>
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<td>1</td>
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<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>0</td>
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<tr>
<td>Road sweeper</td>
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<td>1</td>
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<tr>
<td>Telehandler</td>
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<td>3</td>
<td>4</td>
<td>3</td>
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</tr>
<tr>
<td>Tipper</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Water truck</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
3.2.4 Demolition material management

The proposal would generate a number of waste streams due to the removal of waste, redundant infrastructure and vegetation from the Site. Roads and Maritime aims to recycle as much material as possible; however recycling opportunities may be reduced depending on whether the material is contaminated.

As the work progresses, materials would be classified in accordance with the Waste Classification Guidelines, 2014 (NSW Environment Protection Authority (EPA)). Depending on the outcome of waste classification, appropriate controls would be implemented and a suitable licensed waste facility would be selected for off-site disposal. Appropriate waste documentation and permits would be maintained throughout the works.

While the Site may need to be reshaped during the works, this activity would be kept to a minimum and existing material on-site would be reused where possible to avoid the need for additional resources. The existing hardstand areas and slabs under demolished buildings would remain intact and would therefore not be disturbed, except where required to remove existing railway infrastructure underneath. These hardstand areas would be reinstated where needed.

3.2.5 Construction hours and duration

Standard construction hours would apply to the duration of the works, in accordance with the Interim Construction Noise Guideline (ICNG) (NSW Department of Environment Climate Change (DECC), 2009). General working hours would be:

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

While not anticipated, some out of hours work may be needed, and would be considered where it may reduce impacts on the public and local community (eg traffic considerations or utility service disruptions). These activities may include truck movements to and from the Site in order to reduce pressure on the local road network during normal peak periods.

If work is required outside standard construction hours, it would be carried out in accordance with the ICNG (DECC, 2009) and the Roads and Maritime Construction Noise and Vibration Guideline (2016). This would include notifying the local community in advance of any work planned to be carried out outside of standard hours.

3.2.6 Workforce

It is estimated that during periods of peak activity up to 51 staff would be on-site at any one time. This may include site supervisors, engineers, consultants and administrative staff and the workforce, comprising the trades, security and labour personnel.

3.2.7 Traffic management and access

The Site already has four established access points around the perimeter, which would serve as the access points to and/or from the Site during and after the proposal. These access points are presented in Figure 1-2 and are located at:

- City West Link (east) - vehicles using this access point would need to enter directly off City West Link travelling from the west
- City West Link (west) - vehicles using this access point would need to exit directly on to City West Link and travel east
- Port Authority access - vehicles using this access point would enter (or exit) from James Craig Road and Somerville Road (passing under ANZAC bridge), and drive through the Port Authority owned land to enter (or exit) the Site from the east via Port Authority owned roads
- Gordon Street - this access point may need minor repair work. It would be used by light vehicles only and would not be used for the movement of trucks, plant and equipment.
All four access points would be used by personnel completing the works and by personnel managing the Site after their completion.

Two options have been identified for the City West Link (west) access for exiting the Site. These are:

- City West Link (west) access Option 1 - use of the existing City West Link (west) access
- City West Link (west) access Option 2 - relocation of the existing City West Link (west) access around 140 metres to the east.

The final City West Link (west) access would be confirmed by the successful contractor and Roads and Maritime with consideration to the following criteria:

- Australian Standard 2890.2
- Provision of safe sight lines to oncoming traffic
- Good separation distance between the closest upstream and downstream intersections
- Vegetation removal requirements.

Both City West Link (west) access options have been assessed in this REF.

Heavy vehicles would enter the Site from City West Link or via the Port Authority access point. For City West Link, heavy vehicles would enter the Site by turning left from City West Link into the City West Link (east) access. Heavy vehicles would exit the Site from the City West Link (west) access (either Option 1 or Option 2) and travel east on City West Link. If heavy vehicles needed to head west they would turn right into James Craig Road and use the roundabout to turn around before re-entering City West Link and travelling west.

The Port Authority access is at the eastern site boundary to the east of the Victoria Road bridge. It is accessed via James Craig Road, Somerville Road, and the land controlled by the Port Authority. Once within the eastern portion of the Site, vehicles would travel under the southern span of the Victoria Road bridge which has an existing sealed surface. This opening is of suitable width and height to accommodate heavy vehicles. Refer to section 6.7 for further details on traffic and access requirements.

The administrative staff and workforce car parking would be confined to the Site, as presented in Figure 3-1. The main parking facility for staff would be in the north-west portion of the Site immediately south of Lilyfield Road. An overflow carpark and laydown area would also be provided in the south-east portion of the Site immediately north of the City West Link and The Crescent intersection.

Traffic management would be controlled by the on-site contractor team. The contractor would prepare a Traffic Management Plan (TMP) and Traffic Control Plan (TCP) in consultation with the Inner West Council. The TMP and TCP would be approved by the Transport Management Centre and Roads and Maritime before commencing works. The proposed routes and car parking within the Site are considered to be of sufficient area/condition for use during the works. No work is therefore anticipated to upgrade these facilities before work starts.

### 3.3 Finished site

Following completion of the works, the majority of the Site would be stabilised and of similar topography to existing conditions. The Site would also contain areas of hardstand, new drainage channels and sediment basins to manage surface water flows, and temporary Site offices. The Site offices would be used by a small number of security personnel, by maintenance staff on an as needs basis and would provide staff amenities for those working and visiting the Site. Over time, areas that had been seeded would include low lying vegetation.
Ongoing maintenance activities would need to be carried out at the Site. These activities would include vegetation management (including mowing any re-vegetated areas and weed control), general maintenance, and environmental management and monitoring activities (including managing the permanent erosion and sediment controls).

Environmental management activities would include regular inspection and testing of water and sediment collected within the sediment basins. As noted in section 3.2.1, water levels within the permanent sediment basins would be proactively managed to ensure that their full capacity was available for heavy rain fall events. Water that collects in these basins and needs to be removed would be tested in line with standard construction water quality discharge criteria and managed in line with the Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (RTA, 2011). If these criteria are met the water would be discharged into the Site’s existing stormwater drainage system which ultimately leads to Rozelle Bay. Water that does not meet these criteria would be collected and disposed off-site. Sediment that collects within the basins would also be tested and disposed of appropriately.

Other erosion and sediment controls at the Site would also be maintained as required (eg drainage channels would be kept clear, protection around existing stormwater drains would be maintained).

Ongoing inspection and maintenance of the ground cover and site stabilisation measures would be carried out to ensure the integrity of the cover is maintained. These inspections would be completed by a soil conservation consultant. The installation and maintenance of the surface cover at the Site would ensure that erosion and sedimentation and/or contamination of surface water flows is minimised. Erosion and sediment control is discussed in more detail in section 6.1 and section 6.2.

While all four access points could be used, the main access point would likely be directly off Gordon Street, as the management activities would mainly involve light vehicles.

After the works have been completed, only minimal amounts of green waste, general putrescible waste and vehicle oils/grease are expected to be generated from ongoing maintenance activities (including any maintenance of re-seeded areas as required) and associated use of the temporary Site facilities. Materials would be classified in accordance with the Waste Classification Guidelines, 2014 (NSW EPA) and transported to licensed waste facilities for off-site disposal.
4 Statutory and planning framework

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

4.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the primary legislation that governs land use and provides a framework for development control in NSW. The EP&A Act is supported by the *Environmental Planning and Assessment Regulation 2000* (NSW) (EP&A Regulation) and a number of Environmental Planning Instruments (EPIs) which include State Environmental Planning Policies (SEPPs) and Local Environment Plans (LEPs).

Part 4 of the EP&A Act establishes a framework for assessing development that requires consent under an EPI. It allows development to be classified as ‘exempt development’ (where no consent is required), ‘complying development’, ‘development that needs consent’, or ‘prohibited development’. The term ‘development’ is defined under section 4 of the EP&A Act.

In addition, section 76 of Part 4, and Part 5 of the EP&A Act, provide for development that does not need development consent. While development consent is not required for these activities, section 111 of the EP&A Act requires that Roads and Maritime, as a determining authority, take into account to the fullest extent possible, all matters affecting or likely to affect the environment. Section 112 of the EP&A Act requires that an environmental impact statement be obtained for an activity that is likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities or their habitats.

The proposal is considered to fall within the definition of ‘development’ as it involves categories of development, including ‘the use of land’, the ‘carrying out of a work’ and ‘the demolition of a building or work’. An exception to this is some works which form part of the proposal which are of a minor nature and would not on their own constitute ‘development’. Examples include testing of waste stockpiles, locating and tagging services, removal of loose refuse, disused plant and machinery, and carrying out dilapidation surveys. Even though some of these activities would not constitute ‘development’, they have been assessed in this REF for completeness.

The aspects of the proposal that fall within the definition of ‘development’ are considered ‘development permitted without consent’ for the reasons provided below.

4.1.1 State environmental planning policies

**State Environmental Planning Policy (Infrastructure) 2007**

*State Environmental Planning Policy (Infrastructure) 2007* (NSW) (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. ISEPP provides that certain development is permitted without development consent under Part 4 of the EP&A Act.

Clause 79 of ISEPP permits 'development' on any land for the purpose of a railway or rail infrastructure facilities to be carried out by or on behalf of a public authority without consent. 'Rail infrastructure facilities' include railway tracks, associated track structures, drainage systems, fences, embankments, power supply systems and other items. Under clause 79(2) of ISEPP, development for railway or rail infrastructure facilities also includes construction works 'in connection with a railway or rail infrastructure facilities' (i.e. Rozelle Rail Yards) including alteration, demolition, relocation of a local heritage item or environmental management work. The proposal would involve demolition activities, construction activities and environmental management works in connection with a railway or rail infrastructure facilities (namely the Rozelle Rail Yards).
The above ISEPP clause requires that the development is carried out by or on behalf of a public authority. Roads and Maritime is a public authority on whose behalf the proposal would be carried out.

As the proposal comprises development for the purpose of a railway or rail infrastructure facility and is to be carried out by or on behalf of a public authority, it is considered 'development permissible without development consent' and can be assessed under Part 5 of the EP&A Act. Development consent from the Council or the Minister is not required. In line with section 110 of the EP&A Act, the determining authority for the proposal (ie the authority by or on whose behalf the works are to be carried out or the public authority who grants approval) is Roads and Maritime.

Part 2 of ISEPP contains provisions for public authorities to consult with local councils and other public authorities before the start of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in Chapter 5 (Consultation) of this REF.

The proposal is not in land reserved under the National Parks and Wildlife Act 1974 (NSW) and does not affect land or development regulated by State Environmental Planning Policy No. 14 - Coastal Wetlands, State Environmental Planning Policy No. 26 - Littoral Rainforests or State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.

State Environmental Planning Policy No 55—Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) promotes the remediation of contaminated land by specifying when development consent is, and is not required to carry out remediation work, among other things. SEPP 55 aims to promote the remediation of contaminated land with the objective of reducing the risk of harm to human health or other aspects of the environment.

In SEPP 55 'remediation' is defined 'as removing, dispersing, destroying, reducing, mitigating or containing the contamination of any land, or eliminating or reducing any hazard arising from the contamination of any land (including by preventing the entry of persons or animals to the land)'. Certain proposal activities could be defined as remediation works, for example, stockpile, ballast and surplus fill removal where those stockpiles, ballast or fill, are contaminated.

SEPP 55 introduces the concepts of 'category 1 remediation work' which requires development consent and 'category 2 remediation work' which does not require consent.

Clause 14(b)(ii) of SEPP 55 states that: "For the purposes of this Policy, a category 2 remediation work is: (b) a remediation work (whether or not it is a work of a kind described in clause 9 (a)–(f)) that: (ii) may be carried out without consent under another State environmental planning policy or a regional environmental plan (as referred to in clause 19 (4)), or…"

The proposal is considered 'development permitted without consent' under Clause 79 of the ISEPP. Clause 19(4) of SEPP 55 provides that where SEPP 55 requires development consent for particular remediation work, this does not prevail over a provision of another SEPP which provides that development consent is not required for the remediation work. Therefore, as the proposal is considered "development permitted without consent", and as SEPP 55 is subordinate to the ISEPP, Clause 14(b)(ii) of SEPP 55 means the site management works are category 2 remediation works and do not require development consent.

Potential impacts that could arise from the disturbance of potentially contaminated land or the presence of contamination materials during the proposal are discussed within sections 6.1 and 6.2. A suite of ground investigations has been completed to confirm the type and concentrations of contamination at the Site (refer to Appendix C) and the measures that would be carried out to mitigate or manage these potential impacts.
Clauses 16-18 of SEPP 55 require notice to be given to the Council before and after completion of category 2 remediation work. These clauses also require category 2 remediation work to be undertaken in accordance with planning guidelines and guidelines in force under the *Contaminated Land Management Act 1997* (NSW). These requirements would be undertaken as part of the proposal. Consultation with Council is further discussed in Chapter 5 (Consultation).

**Sydney Regional Environmental Plan No. 26—City West**

*Sydney Regional Environmental Plan No 26 – City West* (SREP 26) is a deemed SEPP under clause 120 of Schedule 6 of the EP&A Act.

The principal aims of SREP 26 are to promote the orderly and economic use and development of City West by establishing planning principles and controls for the City West area.

The Site is zoned as ‘Port and Employment’ under the SREP 26. The proposal is generally consistent with the objectives of this zone to encourage a mix of land uses which generate employment opportunities, to provide pedestrian and cyclist links with surrounding public access networks and to provide road and rail access to port activities.

ISEPP prevails over SREP 26 to the extent of any inconsistency and in accordance with ISEPP the proposal is permissible without development consent and is subject to assessment under Part 5 of the EP&A Act. Nevertheless, the relevant SREP 26 objectives, planning principles and policies for The Bays Precinct (where the Site is located) are discussed in Table 4-1 below.

**Table 4-1: SREP 26 planning principles (Clause 11)**

<table>
<thead>
<tr>
<th>SREP Policy</th>
<th>Discussion</th>
</tr>
</thead>
</table>
| Clause 11 – Planning Principles of regional significance for City West | This clause requires that development within City West is consistent with a number of planning principles. These are discussed below:  
  - Regional Role – The proposal would not conflict with this principle being achieved in the future. In addition, the management and mitigation of environmental and safety issues at the Site would contribute towards benefiting the people of Sydney and New South Wales  
  - Land Use Activities – The proposal would not conflict with this principle being achieved in the future  
  - Mixed Living and Working Environment – The proposal would not conflict with this principle being achieved in the future  
  - Education – No educational establishment is proposed. The proposal would not conflict with this principle being achieved in the future  
  - Leisure and Recreation - The proposal would not conflict with this principle being achieved in the future  
  - Port Functions - This principle is not relevant to the proposal.  
  - Social Issues - The proposal would not conflict with this principle being achieved in the future  
  - Environment Issues – The proposal involves management of environmental and safety issues and would be carried out to minimise environmental impacts as set out in Chapter 7 (Environmental management) of this document. Section 8.2 of this document addresses the assessment of the proposal against the principles of ecologically sustainable development  
  - Urban Design and Public Domain - The proposal would not conflict with this principle being achieved in the future  
  - Heritage – The proposal would not impact on heritage items listed in the SREP and is therefore consistent with this principle. A heritage impact assessment has been prepared for the proposal and is provided in Appendix D. Refer to sections 6.4 and 6.5 of this REF for a summary of the heritage impacts and how impacts would be managed and mitigated |
<table>
<thead>
<tr>
<th>SREP Policy</th>
<th>Discussion</th>
</tr>
</thead>
</table>
|             | - Movement and Parking - The proposal would not conflict with this principle being achieved in the future  
|             | - Implementation and Phasing - The proposal would not conflict with achieving this principle in the future. |

**Division 3 – Planning principles for precincts**

Clause 15 of this division requires that development within The Bays Precinct is consistent with a number of planning principles. These are discussed below:
- Role and land use activities – The proposal would not conflict with this principle being achieved in the future  
- Urban Design – The visual assessment presented in section 6.10 shows how the proposal would not result in adverse visual impacts  
- Public domain – The issues discussed under this principle are not relevant to the proposal.

**Division 6 – Heritage Conservation (supported by Schedule 4)**

This division provides for the protection of heritage items and conservation areas shown on Map 4 of the SREP. Clause 30 requires that the consent authority considers the significance of a heritage item or conservation area, the potential impacts to it from the development and measures to conserve the heritage significance. It also requires that the consent authority considers any archaeological sites or potential.

Assessments of the proposal's potential impacts on non-Aboriginal heritage values are provided in section 6.4. The conclusion of this assessment confirms that potential impacts on historic heritage can be successfully avoided or mitigated and that the archaeological potential at the Site is low. Safeguards and management measures would be carried out to avoid and minimise heritage impacts at the Site.

**Division 9 – Miscellaneous provisions**

This division covers a number of issues of which the following are addressed within the REF:
- Clause 49 – Land decontamination – section 6.1 of this REF addresses land contamination at the Site. The proposal would include removal of some waste materials from the Site and would be managed to minimise impacts on soil, surface water and groundwater. Potential impacts are identified and measures recommended to avoid or mitigate potential impacts to the community and environment  
- Clause 50 – Services – this clause states that “development must not be carried out on any land until arrangements have been made for the supply of water, sewerage and drainage which are satisfactory to the Water Board.” The Site has existing water, sewage and drainage utilities in place, which are satisfactory to service the proposal  
- Clause 52 - Views of other bodies about development in Precincts – This clause lists a number of public bodies that can be consulted regarding the development, if appropriate. This consultation effort completed for the proposal is described within Chapter 5 (Consultation) of this REF. In addition, this REF would be placed on public display for a period of 21 calendar days for comment. As a part of this public display the public bodies identified in clause 52 would be sent a copy of the REF for their consideration.
State Environmental Planning Policy (State Significant Precincts) 2005

State Environmental Planning Policy (State Significant Precincts) 2005 (Precincts SEPP) aims to facilitate the development, redevelopment or protection of important sites of economic, environmental or social significance to NSW, and facilitate service delivery outcomes for a range of public services. The Precincts SEPP prevails over ISEPP.

A portion of the Site from the under and east of Victoria Road bridge and a portion along the south-eastern boundary next to City West Link is within the Sydney Harbour Port and Related Employment Lands area.

Clause 10A of the Precincts SEPP provides that the development in Schedule 7 to the SEPP is development that does not require consent under Part 4 of the EP&A Act.

Schedule 7(1)(b) of Precincts SEPP relevantly provides that the following development carried out in the following areas by a public authority does not require consent under Part 4 of the EP&A Act:

…development within the area identified as Glebe Island, White Bay, Rozelle Bay and Blackwattle Bay on the Sydney Harbour Port and Related Employment Lands Map, being development with a capital investment value of not more than $10 million.

As the portion of the proposal within the Sydney Harbour Port and Related Employment Lands would have a capital investment value of less than $10 million this portion of the proposal does not require consent from Council.

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Harbour SREP)

The part of the Site to the east of Victoria Road bridge is within the ‘Foreshore and Waterways area’ as defined by the Sydney Harbour Catchment and is subject to the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Harbour SREP), which is a deemed SEPP. No other zoning under this SREP applies to this area.

Clause 2 of the Sydney Harbour SREP lists its aims. Table 4-2 below demonstrates how the proposal is consistent or does not conflict with these aims.

Table 4-2: Aims of the Sydney Harbour SREP

<table>
<thead>
<tr>
<th>Aim</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) To ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are recognised, protected, enhanced and maintained: (i) as an outstanding natural asset (ii) as a public asset of national and heritage significance, for existing and future generations.</td>
<td>The proposal would help ensure that the Site is better managed in the future and that it has improved stormwater controls. As such it would not conflict with this aim.</td>
</tr>
<tr>
<td>(b) To ensure a healthy, sustainable environment on land and water.</td>
<td>The proposal would result in the removal of various wastes, noxious weeds, and redundant infrastructure. It would install improved erosion and sediment controls and would help support the sustainable use of the land in the future. Therefore, the proposal supports this aim.</td>
</tr>
<tr>
<td>(c) To achieve a high quality and ecologically sustainable urban environment.</td>
<td>Ecological sustainable development is discussed in section 8.2. The proposal is consistent with the principles of ecological sustainable development.</td>
</tr>
</tbody>
</table>
### Aim | Comment
--- | ---
(d) To ensure a prosperous working harbour and an effective transport corridor. | The proposal would not affect this aim.
(e) To encourage a culturally rich and vibrant place for people. | The proposal would not affect this aim or the future use of the Site as a culturally rich and vibrant place for people.
(f) To ensure accessibility to and along Sydney Harbour and its foreshores. | The works do not involve any development in may affect/provide public access to foreshores and waterways.
(g) To ensure the protection, maintenance and rehabilitation of watercourses, wetlands, riparian lands, remnant vegetation and ecological connectivity. | The proposal would not affect this aim.
(f) To provide a consolidated, simplified and updated legislative framework for future planning. | The proposal would not affect this aim.

In any case, the proposal is permissible without development consent pursuant to the provisions of the ISEPP, which override the zoning provisions of the Sydney Harbour SREP (refer to clause 7(5) of the Sydney Harbour SREP).

The matters for consideration listed in Division 2 at clauses 21-27 of the Sydney Harbour SREP are provided in Table 4-3. All of the matters, including heritage, are discussed in the relevant parts of Chapter 6 (Environmental assessment).

### Table 4-3: Division 2 matters

| Division 2 matter | Comment |
--- | ---|
Clause 21 Biodiversity, ecology and environment protection | Clause 21(a) relates to water quality of nearby waterways. The proposal would not result in any significant impacts on the water quality of nearby waterways. Further discussion is provided in section 6.2.
Clause 21(b) relates to the protection and enhancement of species and communities. A biodiversity assessment has been carried out for the proposal and is presented in Appendix F, and summarised in section 6.6. The proposal would not result in any significant impacts on any protected ecological communities or species.
Clause 21(h) relates to cumulative environmental impact. Cumulative impacts that may result from the proposal have been assessed in section 6.13. The proposal would not result in any significant cumulative impacts in conjunction with other nearby developments.
Other matters outlined under clause 21 are not relevant to the proposal as it does not involve development along the foreshore, or in close proximity of waterways or wetlands. |
**Division 2 matter** | **Comment**
--- | ---
Clause 22 Public access to, and use of, foreshores and waterways | This clause is not relevant to proposal, as works do not involve any development in close proximity to the foreshore that may affect/provide public access to foreshores and waterways.
Clause 23 Maintenance of a working harbour | This clause is not relevant to the proposal, as works do not involve the construction of a new development or facility next to a working harbour.
Clause 24 Interrelationship of waterway and foreshore uses | This clause is not relevant to the proposal as works would not be carried out along the foreshore.
Clause 25 Foreshores and waterways scenic quality | This clause is not relevant to the proposal as the proposal does not involve development along the foreshore.
Clause 26 Maintenance, protection and enhancement of views | A visual impact assessment has been carried out for the proposal and is presented in section 6.10. The proposal would not result in any significant impacts on the landscape character and visual amenity of the surrounding area. The proposal is unlikely to significantly impact on views to and from Sydney Harbour, or to and from public places landmarks or heritage items. The proposal is also unlikely to result in any cumulative impacts to landscape character and visual amenity in conjunction with other nearby developments. Cumulative impacts are assessed in section 6.13.
Clause 27 Boat storage facilities | This clause is not relevant to the proposal as the proposal does not involve the development of boating facilities.

Clause 31 of the Sydney Harbour SREP requires consultation for certain development proposals not requiring development consent. Consultation, including with the Foreshores and Waterways Planning and Development Advisory Committee under the Sydney Harbour SREP is discussed in Chapter 5 (Consultation).

Part 5 of the Sydney Harbour SREP contains heritage provisions that are to be taken into account in respect of Part 5 activities. No items located on-site are heritage listed. Notable heritage items surrounding the Site include, but are not limited to, the Lilyfield stormwater canal (also known as the Easton Park drain) and the State heritage listed White Bay Power Station. The heritage objectives from the Sydney Harbour SREP in clauses 53(1) and (2) are considered in Table 4-4 below.

**Table 4-4: Heritage objectives**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(a) To conserve the environmental heritage of the land to which this Part applies.</td>
<td>There are no listed heritage items located on-site. Impacts to other heritage items (not listed) have been assessed in section 6.4.</td>
</tr>
<tr>
<td>1(b) To conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items.</td>
<td>This division is not relevant to the proposal as there are no heritage items, as defined by the Harbour SREP, within the Site.</td>
</tr>
<tr>
<td>Objective</td>
<td>Comment</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1(c) To ensure that that archaeological sites and places of Aboriginal heritage significance are conserved.</td>
<td>This division is not relevant to the proposal, as the proposal is unlikely to result in any significant impacts to Aboriginal heritage or non-Aboriginal heritage values. Further detail is provided in sections 6.4 and 6.5.</td>
</tr>
<tr>
<td>1(d) To allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items.</td>
<td>The proposal would not result in significant impacts to any identified heritage places. Further detail is provided in sections 6.4 and 6.5.</td>
</tr>
<tr>
<td>2(a) To establish a buffer zone around the Sydney Opera House so as to give added protection to its world heritage value.</td>
<td>This division is not relevant to the proposal.</td>
</tr>
<tr>
<td>2(b) To recognise that views and vistas between the Sydney Opera House and other public places within that zone contribute to its world heritage value.</td>
<td>This division is not relevant to the proposal.</td>
</tr>
</tbody>
</table>

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) identifies State significant development and State significant infrastructure. Projects that are characterised as either of these are approved by the Minister for Planning. The proposal does not meet the requirements of State significant development or State significant infrastructure. As such this SEPP does not apply to the proposal.

4.2 Other relevant NSW legislation

4.2.1 Protection of Environment Operations Act 1997

The Protection of the Environment Operations Act 1997 (NSW) (PoEO Act) provides for the issue of an Environment Protection Licence (EPL) for premises based scheduled activities pursuant to section 48 of the PoEO Act, and non-premises based scheduled activities pursuant to section 49 of the PoEO Act. Activities requiring an EPL are listed in Schedule 1 of the Act. The proposal does not meet the definitions of any of the scheduled activities outlined in Schedule 1 of the PoEO Act. An EPL can also be sought for an activity if discharges to waters are proposed which would otherwise constitute pollution of waters.

The PoEO Act also provides for the management of water, air and noise pollution and the control of wastes. The proposed management measures outlined in Chapter 7 (Environmental management) would be carried out through an Environmental Management Plan (EMP) and various sub-plans to minimise the potential for the proposal to result in pollution of the environment.

4.2.2 Heritage Act 1977

The Heritage Act 1977 (NSW) (Heritage Act) provides for the protection and conservation of non-Aboriginal cultural heritage items (such as buildings, works, relics and other places of historic, cultural, social, archaeological, architectural, natural and aesthetic significance) both of local and state heritage significance in NSW and establishes the Heritage Council of NSW. A person must not disturb items, relics or artefacts that are listed on the State heritage register without the approval of the Heritage Council of NSW as is required by section 57 of the Heritage Act.
No items located on-site are heritage listed; however a number of items located on the Site have been assessed in this REF as having heritage significance. The most notable of these is the southern penstock in the north-eastern part of the Site which would have historically fed water to the State heritage listed White Bay Power Station. While this structure is outside of the White Bay Power Station state heritage listing curtilage, the Conservation Management Plan (CMP) for the White Bay Power Station considers the penstock 'highly significant'. No works are proposed on or within three metres of this structure, thereby avoiding potential adverse heritage impacts and the need for an approval.

Section 139 of the Heritage Act identifies those circumstances where a permit is required to excavate or disturb land, namely where there is existing knowledge or where there is reasonable cause to suspect that such work would, or is likely to, result in a relic being discovered, exposed, moved, damaged or destroyed. The Site is within a highly disturbed area and consists largely of fill material. Accordingly, there is a low potential for a relic to be discovered, exposed, moved, damaged or destroyed as a result of the proposal. Therefore, a permit is not required.

In addition to the State heritage listed White Bay Power Station a number of other listed non-Aboriginal heritage items occur in close proximity to the Site. As presented in section 6.4, these items are unlikely to be directly or indirectly impacted by the proposal.

4.2.3 Contaminated Land Management Act 1997
The overarching objective of the Contaminated Land Management Act 1997 (NSW) (CLM Act) is to establish a process for investigating and, where appropriate, remediating land that the NSW Environment Protection Authority (NSW EPA) has reason to believe is significantly contaminated so as to warrant regulation under the CLM Act.

Under section 60 of the CLM Act, an owner of land that has been contaminated (whether before or during the ownership of the land) must notify the NSW EPA that the land is contaminated where certain criteria are satisfied. Section 60 also states that a person whose activities have contaminated the land must notify the NSW EPA in writing.

Ground investigations completed to date have concluded that contaminants of potential concern including heavy metals, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs) and friable and bonded asbestos are variably present within soil and fill material at the Site. Contamination conditions at the Site have been discussed in section 6.1.

4.2.4 Threatened Species and Conservation Act 1995
The Threatened Species Conservation Act 1995 (NSW) (TSC Act) provides legal status for biota of conservation significance in NSW. The Act aims to "conserve biological diversity and promote ecologically sustainable development".

Section 6.6 and Appendix F provide the biodiversity assessment for the proposal. The assessment of potential impacts of the proposal on species, populations and communities listed under the TSC Act is in line with the requirements of this Act. This assessment has concluded that the proposal would not result in significant impacts to the values protected by the TSC Act.

4.2.5 Fisheries Management Act 1994
Part 7a, Section 220A of the Fisheries Management Act 1994 (FM Act) provides for the conservation of all biological diversity of aquatic and marine vegetation. It also ensures that the impact of any ‘action’ affecting threatened species, populations or ecological communities is appropriately assessed.

The potential for the proposal to impact on aquatic ecology has been assessed in section 6.6 and Appendix F. This assessment has concluded that no significant impacts on aquatic ecology are expected as a result of the proposal provided that stormwater runoff from the Site is managed in line with the EMP and SWMP.
4.2.6 National Parks and Wildlife Act 1974
Under the National Parks and Wildlife Act 1974 (NSW) (NP&W Act) the NSW National Parks and Wildlife Service (NPWS) (part of the Office of Environment and Heritage (OEH)) is responsible for the care, control and management of all national parks, historic sites, nature reserves, Aboriginal areas, state conservation areas and regional parks.

The relevant provisions of this Act have been considered within section 6.5 and Appendix E for Aboriginal heritage and section 6.6 and Appendix F for biodiversity. These assessments concluded that the proposal would not have a significant impact on ecological or heritage values protected under this Act.

4.2.7 Noxious Weeds Act 1993
The Noxious Weeds Act 1993 (NSW) provides for the identification and control of noxious weeds and specifies the duties of public and private landholders to control noxious weeds. The Act stipulates that an occupier of land must take steps to control noxious weeds on their land. The Act also provides for the monitoring of and reporting on the effectiveness of the management of weeds in NSW. Appropriate methods for controlling noxious weed species are defined under the control category or categories for particular species of weeds.

The impact of the proposal on noxious weeds and their management on the Site has been assessed within section 6.6 and Appendix F. The biodiversity assessment has identified various noxious weeds across the Site. These weeds would be managed and/or removed throughout the delivery of the proposal and measures would be put in place to manage the Site after the works are completed to ensure that the weeds do not return.

4.2.8 Water Management Act 2000 and Water Act 1912

Section 91 of the WM Act discusses activity approvals and notes that there are two types of approvals, namely controlled activity approvals and aquifer interference approvals.

Controlled activity approvals do not apply to the proposal as the Site is located over 60 m from Rozelle Bay and therefore is not within ‘waterfront land’ as defined by the WM Act. In addition, clause 38 of the Water Management (General) Regulation 2011 exempts Roads and Maritime from the need to obtain a controlled activity approval.

Aquifer interference approval requirements under the WM Act have not yet commenced for this proposal. Therefore, aquifer interference is instead regulated under Part 5 of the Water Act 1912 (NSW), “Under the Water Act 1912 you must have a water licence or authority to extract groundwater via any type of bore, well, spearpoint or groundwater interception scheme for all purposes except to take water from an aquifer under a basic landholder right”.

References:
Across the Site, groundwater is likely to be encountered in excavations deeper than one to 1.5 metres below ground level (refer to section 6.1). The majority of the excavations at the Site are not likely to extend further than 500 millimetres below the current ground level, and would therefore not intercept the groundwater table. However, construction of the drainage channels and sediment basins may need some excavation. The embankment walls for the sediment basins may require excavation to a maximum of two metres below ground level. As such these works may intercept groundwater, although large scale dewatering of excavations is not anticipated. Activities to locate utilities such as potholing may extend deeper than 500 millimetres; however utilities are expected to be located above the groundwater table.

Minor temporary dewatering activities that are estimated to take less than three mega litres per year of groundwater would generally not need a temporary licence under the Water Act 1912 (NSW). Consultation with the NSW Department of Primary Industries (Water) would occur as necessary, to ensure that any licence requirements are met.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

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

The relevant matters of national environmental significance (MNES) for the proposal include listed threatened species, namely the Grey-headed Flying-fox which is thought to occasionally forage at the Site and the Green and Golden Bell Frog which is highly unlikely to occur at the Site. EPBC Assessments of Significance have been competed for both these species and both assessments have concluded that the proposed works are not considered likely to have a significant impact on these species. No other MNES are relevant to the proposal and the proposal is not located on or near to Commonwealth land.

Potential impacts to these biodiversity matters are also considered in section 6.6 and Appendix F.

Findings – matters of national environmental significance (other than biodiversity matters)

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land (refer to Appendix A). Accordingly, the proposal has not been referred to the Australian Government Department of the Environment and Energy under the EPBC Act.

Findings – nationally listed biodiversity matters

The assessment of the proposal’s impact on nationally listed threatened species, populations, endangered ecological communities and migratory species found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Section 6.6.4 describes the safeguards and management measures to be applied.

4.4 Confirmation of statutory position

The proposal is categorised as development for the purpose of railway or rail infrastructure facilities, and is being carried out by or on behalf of a public authority. ISEPP provides that the proposal can be carried out without consent from Council. The proposal is not State significant infrastructure or State significant development. The proposal is therefore assessed under Part 5 of the EP&A Act.
5 Consultation

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

5.1 Consultation strategy

A number of consultation activities have been carried out for the proposal and additional activities are proposed.

The objectives of the community and stakeholder consultation for the proposal have been to:
- Ensure an open, accountable and transparent community involvement process
- Increase community and stakeholder awareness of the need and development of the proposal, the environmental assessment process and opportunities for participation
- Ensure community and stakeholder concerns regarding environmental and community impacts are considered and addressed where possible and in a timely manner.

The following stakeholder groups were consulted during the preparation of the REF:
- Government – including local and State representatives and officers
- Local Aboriginal Land Council (LALC)

In addition, a letterbox drop was carried out during November 2016 advising the local community about the upcoming REF and the REF display period.

A range of communication methods are being used to seek input from stakeholders and communities and support engagement on an ongoing basis for the proposal. A dedicated webpage would be available on the WestConnex website during the public display of the REF. The communication and consultation activities for the proposal include:
- Consultation carried out during the preparation of the REF (sections 5.2 to 5.7)
- Consultation activities to be carried out during public display of the REF (section 5.8.1)
- Consultation and notification activities proposed during the works (section 5.8.2).

5.2 Community involvement

Community consultation has been carried out for the proposal, as follows:
- REF factsheet – a factsheet for the proposal was prepared and made available at the community sessions which were held for the M4-M5 Link project in August 2016
- REF community notifications – community notifications advising of the proposal, the upcoming REF and the REF display period were letterbox dropped to the community surrounding the Rozelle Rail Yards in November 2016. A second notification was released before public display of the REF advising of the dates of the display period, the REF display locations and how to make a submission.

5.3 Aboriginal community involvement

Consultation with the Aboriginal community was carried out as part of the Aboriginal due diligence assessment, conducted in accordance with Stage 2 of the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime, 2011) and provided in Appendix E.
The following Aboriginal community consultation process was adopted:

- Identification of key Aboriginal stakeholders and the relevant Local Aboriginal Land Council (LALC) through searches of the National Native Title Register and Registrar of Aboriginal Owners
- Engagement of identified Aboriginal stakeholders to participate in the archaeological survey
- Preparation (by identified Aboriginal stakeholders) of cultural heritage survey feedback.

Searches of the National Native Title Register and Register of Aboriginal Owners did not identify any Aboriginal stakeholders. The Metropolitan Local Aboriginal Land Council (MLALC) was identified as the relevant LALC for this assessment. A representative from MLALC participated in the archaeological survey and provided feedback via email, which is provided in the Stage 2 PACHCI report.

Section 6.5 and the Stage 2 PACHCI report (Appendix E) provide more information on consultation carried out in relation to Aboriginal heritage.

5.4 ISEPP consultation

Appendix B contains an ISEPP consultation checklist that documents how ISEPP consultation requirements have been considered. Based on this checklist, Property NSW (formerly the Sydney Harbour Foreshore Authority) requires consultation about the proposal as per the requirements of Clause 16(2)(d) of ISEPP, as part of the Site is located within the Sydney Harbour Foreshore Area. Consultation with Property NSW is summarised in Table 5-1.

5.5 State and Regional Environmental Plan 26 – City West

Clause 52 of SREP 26 states that:

*Before granting consent to a development application relating to land in The Bays Precinct, the consent authority must, where it considers it appropriate, seek the views of the Leichhardt Council, the City West Development Corporation, the Sydney Ports Corporation, the Office of Marine Administration, the Maritime Authority of NSW, the Rail Access Corporation, the State Rail Authority, the Freight Rail Corporation and the Director-General of the Department of Transport.*

Development consent for the proposal is not required (refer to section 4.1.1). Nevertheless, consultation has been carried out with Inner West Council, Port Authority of NSW (Port Authority) and Sydney Trains. A summary of the consultation carried out is provided in Table 5-1 and issues that have been raised and how they have been addressed are outlined in Table 5-2.

5.6 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

Part of the Site, to the east of Victoria Road bridge, is within the Foreshores and Waterways area of the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. The proponents of certain developments within this area (as listed in Schedule 2 of the SREP) are required by Clause 31 of the SREP to give notice of proposals to the Foreshores and Waterways Planning and Development Advisory Committee. ‘Demolition’ is listed in Schedule 2 of the SREP, and therefore Roads and Maritime is required to give notice of the proposal to the Foreshores and Waterways Planning and Development Advisory Committee before carrying out the works.

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6 The Sydney Harbour Foreshore Authority functions have been consolidated with Government Property NSW under the new name Property NSW.
Consultation with the Foreshores and Waterways Planning and Development Advisory Committee would be carried out before the works start on the Site.

5.7 Government agency and stakeholder involvement

Various government agencies and stakeholders have been or are in the process of being consulted about the proposal. These stakeholders and details of the consultation carried out are summarised below in Table 5-1.

Table 5-1: Summary of stakeholder consultation

<table>
<thead>
<tr>
<th>Agency</th>
<th>Details of consultation</th>
<th>Date</th>
<th>Actions to occur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner West Council</td>
<td>Meeting with representatives from Inner West Council, where an overview of the proposal was provided</td>
<td>13 September 2016</td>
<td>• Council advised that minutes of this meeting would be placed on their website&lt;br&gt;• Roads and Maritime has committed to sending copies of the proposal factsheet and community notification to the Inner West Council, along with details of the REF display period and community consultation activities&lt;br&gt;• An additional briefing on the REF works is proposed during the REF public display period that would specifically include discussion on the proposed works, potential environmental impacts and proposed environmental management measures&lt;br&gt;• Roads and Maritime would provide a copy of the REF to the Inner West Council at the start of the display period&lt;br&gt;• Notifications would be distributed to surrounding residents to inform the community of the display of the REF</td>
</tr>
<tr>
<td></td>
<td>A second meeting was held to provide an update on the proposal</td>
<td>14 November 2016</td>
<td></td>
</tr>
<tr>
<td>NSW Office of Environment and Heritage (OEH)</td>
<td>N/A</td>
<td>N/A</td>
<td>• Roads and Maritime would provide a copy of the REF to OEH at the start of the display period and offer a briefing on the proposal to OEH</td>
</tr>
<tr>
<td>Agency</td>
<td>Details of consultation</td>
<td>Date</td>
<td>Actions to occur</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| NSW EPA                                    | Meeting with representatives of the NSW EPA, where an overview of the proposal was provided | 17 October 2016     | • Roads and Maritime would provide a copy of the REF to NSW EPA at the start of the display period and offer a briefing on the proposal to the NSW EPA  
• Follow-up meeting with the NSW EPA once the REF has been received |
| Port Authority of NSW                      | Meeting with representatives from the Port Authority, where an overview of the proposal was provided | 11 October 2016     | • Roads and Maritime would provide a copy of the REF to the Port Authority at the start of the REF display period |
| Property NSW (former Sydney Harbour Foreshore Authority) | Meeting with representatives from the Property NSW (formerly Sydney Harbour Foreshore Authority), where an overview of the proposal was provided | 11 October 2016     | • Roads and Maritime would provide a copy of the REF to Property NSW at the start of the REF display period |
| Sydney Trains                              | Meeting with representatives from Sydney Trains, where an overview of the proposal was provided | 5 October 2016      | • Roads and Maritime would provide a copy of the REF to Sydney Trains at the start of the REF display period |
| UrbanGrowth                                | Meeting with representatives from UrbanGrowth, where an overview of the proposal was provided | 10 November 2016    | • Roads and Maritime would provide a copy of the REF to UrbanGrowth at the start of the REF display period |
| Foreshores and Waterways Planning and Development Advisory Committee | No consultation conducted to date                                                       | N/A                 | • A letter would be sent to advise of the proposal and offer a meeting  
• Roads and Maritime would provide a copy of the REF to the listed agencies at the start of the REF display period and offer a briefing on the proposal during the display period |

Issues that have been raised as a result of consultation with these agencies and stakeholders are outlined below in Table 5-2.
### Table 5-2: Issues raised through stakeholder consultation

<table>
<thead>
<tr>
<th>Agency</th>
<th>Issues/comments raised</th>
<th>Response/where addressed in REF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner West Council</td>
<td>• Community consultation</td>
<td>• Consultation with the community has been discussed in section 5.2</td>
</tr>
<tr>
<td></td>
<td>• Public display of the REF</td>
<td>• Consultation throughout the display period and during the proposed works is discussed in section 5.8</td>
</tr>
<tr>
<td></td>
<td>• Timing</td>
<td>• Timing of the proposal is discussed in section 3.1</td>
</tr>
<tr>
<td></td>
<td>• Construction hours</td>
<td>• Construction hours are discussed in section 3.2.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW EPA</td>
<td>• Management of potential contamination that might result from surface water runoff from exposed areas</td>
<td>• Potential contamination impacts and relevant management measures are discussed in section 6.1</td>
</tr>
<tr>
<td></td>
<td>• Impact on water bodies near the Site</td>
<td>• Potential surface water impacts and relevant management measures are discussed in section 6.2</td>
</tr>
<tr>
<td></td>
<td>• Proposal program</td>
<td>• Timing of the works is discussed in section 3.1</td>
</tr>
<tr>
<td></td>
<td>• Consultation</td>
<td>• Consultation with the community has been discussed in section 5.2</td>
</tr>
<tr>
<td></td>
<td>• Construction hours</td>
<td>• Construction hours are discussed in section 3.2.5</td>
</tr>
<tr>
<td></td>
<td>• Noise impacts from truck movements</td>
<td>• Potential noise impacts from truck movements and relevant management measures are discussed in section 6.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port Authority</td>
<td>Issues raised were in regards to the area to the east of Victoria Road bridge and included the following:</td>
<td>The Port Authority gave in principle approval for the following activities in the area east of Victoria Road bridge:</td>
</tr>
<tr>
<td></td>
<td>• Access to the Site through Port Authority owned land</td>
<td>• Access to the Site through Port Authority owned land</td>
</tr>
<tr>
<td></td>
<td>• Clearing vegetation</td>
<td>• Demolition of the Port Authority building and warehouse (ensuring the retention of the southern penstock and an exclusion zone to be set up around it)</td>
</tr>
<tr>
<td></td>
<td>• Buildings to be demolished</td>
<td>• Clearing of vegetation</td>
</tr>
<tr>
<td></td>
<td>• Fencing</td>
<td>• Fencing of area as required</td>
</tr>
<tr>
<td></td>
<td>• Impact on rail infrastructure</td>
<td>• Leaving existing rail infrastructure in place</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Leaving existing hardstand in place</td>
</tr>
</tbody>
</table>
### 5.8 Ongoing or future consultation

#### 5.8.1 Consultation during display of the REF

The REF would be on public display for 21 calendar days and would be available for viewing at the following locations:

- Inner West Council Leichhardt Service Centre, 7-15 Wetherill Street, Leichhardt
- Leichhardt Library, 23 Norton Street, Leichhardt
- Balmain Library, 370 Darling Street, Balmain
- Roads and Maritime Services Rozelle office, 33 James Craig Road, Rozelle
- Roads and Maritime Services Milsons Point office, 20-44 Ennis Road, Milsons Point.

An electronic copy of the REF would be available for viewing on the WestConnex website (www.westconnex.com.au). A range of communication and consultation activities to be carried out during the public display period include:

- Advertisements in the Inner West Courier to provide information on the public display period, display locations for the REF and how to make a submission
- Updates on the WestConnex website and social media accounts, including links to where the documents can be accessed
- Email notification to people who are registered on the M4-M5 Link email distribution list
- A letterbox drop to the community surrounding the Site
- Briefings with Inner West Council and other stakeholders
- Staffed displays held at the Roads and Maritime Services Rozelle Office to allow for the community to ask questions regarding the proposal.

During the public display period, the community, government agencies and other interested parties may make written submissions on the proposal. After public display of the REF, Roads and Maritime would prepare a submissions report to respond to the issues raised in submissions. Roads and Maritime would then decide whether to proceed with the proposal as proposed or in a modified form.

#### 5.8.2 Consultation during the works

Roads and Maritime would continue to consult with stakeholders and the local community during carrying out of the works, and would focus on providing updates on activities and program, responding to enquiries and concerns in a timely manner and minimising potential impacts where possible.
The following communication tools and activities would be used during the works:
- Community updates and notifications to residents to advise of the start of works (at least seven days before start of the activity), duration of activities, any changes to traffic arrangements, any out of hours works (if carried out) and the progress of the works
- Advertising in local newspapers and signage around the Site to provide contact information during the works
- 24-hour project information line, a website, postal address and a dedicated email available throughout the works.

Specific notification/consultation with stakeholders and the local community in relation to a particular aspect of the works (eg traffic, noise and dust), are discussed in the relevant sections of Chapter 7 (Environmental management). Consultation requirements during the works, for specific environmental aspects would be detailed in the Environmental Management Plan (EMP) for the proposal, or its sub-plans.
6 Environmental assessment

6.1 Contamination, soil, fill and groundwater

6.1.1 Methodology
In order to complete this assessment existing ground condition information for the Site was reviewed and additional intrusive site investigations were completed.

The review of existing information included examining previous site investigations, historic information, records of contamination and contamination management, geological maps, acid sulfate soil and soil maps and information on previous land uses. This information was documented within a Preliminary Site Investigation (PSI) report (AECOM, 2016) for the Site. Section 6.1.2 below includes a summary of this information.

Additional contamination investigations and waste classification activities were carried out for various aspects of the Site including in situ soil and fill material, railway ballast, drums of soil and existing stockpiles. These assessment reports are provided in Appendix C.

The contamination investigations were carried out between June and October 2016 and included the following activities:

- Sampling and analysis of 51 boreholes drilled in various locations across the Site (refer to Figure 6-5). Two existing wells and nine newly installed groundwater monitoring wells were gauged and sampled
- Representative waste classification, sampling and analysis of the contents of 185 x 200-litre drums containing soil and organic material originating from unknown source(s)
- Waste classification, sampling and analysis of identified and accessible stockpiled soil and fill material of uncertain origin
- Waste classification, sampling and analysis of accessible stockpiled and in situ railway ballast.

The contamination investigations were conducted with reference to the following guidelines:


Following a review of the existing information and the results of the additional investigations an impact assessment of the proposal with regards to soils, fill, groundwater and contamination was completed. This assessment included identifying potential contamination pathways, potential receptors and developing a conceptual site model (refer to section 6.1.3).

For the purpose of this REF the level of ground investigations and assessment completed to date has been sufficient to understand the potential soil, groundwater and contamination impacts associated with the proposal. After the removal of certain access constraints at the Site (mainly existing vegetation and rail infrastructure) further ground investigations are proposed in certain areas to further inform the management of contamination. However, while additional investigations are planned in the future, this assessment has been precautionary in nature and used the information available to assess a realistic worst case.

A key focus of the assessment has been to demonstrate that various mitigation measures and safeguards are available to manage potential impacts.
For the purpose of this assessment the safeguards and management measures presented in section 6.1.4 are primarily outcome focused to ensure that the works are managed in a way that does not significantly affect the community and local environment.

### 6.1.2 Existing environment

#### Geology, soils and fill

**Overview of ground conditions**

The ground conditions of the Site and nearby areas consist of the following:

- Anthropogenic (man-made) fill (comprising dredged estuarine sand and mud, demolition rubble, industrial and household waste), overlying alluvium comprising silty to peaty quartz sand, silt and clay. The fill layer extends across all low-lying areas of the Site. It is likely that significant quantities of sandstone have been used for reclamation works, given the presence of cut sandstone walls along the Rozelle Rail Yards.
- Triassic Hawkesbury Sandstone consisting of medium to coarse grained quartz sandstone, very minor shale and laminate lenses, present in the higher areas.
- Part of the Great Sydney Dyke runs in a north-west to south-east orientation beneath Victoria Road on the western side.

The soil landscapes within the Site consist of disturbed terrain and Gymea erosional soils. The disturbed terrain covers an area similar to the man-made fill areas described above and the Gymea erosional soils are located above the Triassic sandstone. Site-specific soil and groundwater conditions are described in the following sections. Plans showing the geology and soils of the Site and surrounding area are also provided below.

#### Fill and Soils

**Figure 6-1** presents the soil landscape at the Site. Boreholes taken from across the Site encountered anthropogenic fill material to depths ranging from 0.4 to 5.5 metres below ground level, with an average fill depth of 1.7 metres below ground level. The greatest depth of fill was encountered along the south-western boundary (south of the workshop and railway platform structures). This fill primarily consisted of variable layers of sandy gravels, gravelly sands, silty sand, and sandstone cobbles and boulders. The fill contained minor layers of sand, clayey sands and sandy clay in some locations.

Approximately half of the boreholes drilled contained anthropogenic inclusions in the fill. Common inclusions were observed to include brick, slag and concrete. Less common inclusions included metal, timber, cloth, ash, netting, coal and porcelain. Fragments of asbestos cement sheeting were encountered in one borehole to the east of Gordon Street.

Alluvial soils were encountered across most of the Site, with the exception of the northern half of the western portion of the Site and two areas east of Gordon Street. The alluvium extended to depths of 2.2 to 19.5 metres below ground level, with an average depth of ten metres below ground level. The alluvium consisted of layers of sand, medium to high plasticity clay, high plasticity organic clay, peat and clayey sand. Traces of shell fragments and shell layers were also encountered in the alluvium. Potential acid sulfate soils (PASS) have been identified, primarily in natural alluvium at the Site.

Natural soils consisting of sand were identified in a small area beneath alluvial soils in the western section of the Site. Natural soils underlying fill were identified in a small area between Victoria Road and Gordon Street. Bedrock is located directly under the fill in the area next to the sandstone cutting.
The geology of the local area is shown in Figure 6-2. From the borehole data taken from across the Site bedrock was encountered at depths ranging from 0.55 to 20.4 metres below ground level, with an average encountered depth of 6.8 metres below ground level. Consistent with the regional geological maps, the bedrock was found to be Triassic Hawkesbury Sandstone, consisting of medium to coarse grained quartz sandstone and very minor shale and laminate lenses.

### Acid Sulfate Soils

According to information provided by the NSW Department of Planning and Environment, the Site includes three acid sulfate soil classes (refer to Figure 6-3):

- **Soil Class 1**: Acid sulfate soils in a class 1 area are likely to be found on and below the natural ground surface. Works trigger the requirement for assessment and may require management.
- **Soil Class 3**: Acid sulfate soils in a class 3 area are likely to be found beyond one metre below the natural ground surface. Works that extend beyond one metre below the natural ground surface, or works which are likely to lower water table beyond one metre below the natural ground surface, would trigger the requirement for assessment and may require management.
- **Soil Class 5**: Acid sulfate soils are not typically found in Class 5 areas. Works in a class 5 area that are likely to lower the water table below one metre AHD on adjacent class 1, 2, 3 or 4 land would trigger the requirement for assessment and may require management.

Previous investigations at the Site (AECOM, 2016) indicated that potential acid sulfate soils (PASS) are likely to be present in marine and estuarine (alluvial) sediments beneath the Site.
Figure 6-2: Rock unit type

Figure 6-3: Acid sulfate soil classes
Hydrogeology

Groundwater at the Site is present within the alluvium, fill and Hawkesbury Sandstone. In each case groundwater flow is eastward towards Rozelle Bay. Recently monitoring wells have been constructed within the alluvium and underlying Hawkesbury Sandstone. Groundwater levels have been monitored and this work indicates that rainfall events greater than 20 millimetres can change groundwater levels by 0.5 to 0.8 metres. Equally, the groundwater levels can be influenced by tidal fluctuations. This influence decreases with distance from Rozelle Bay. Groundwater levels are shallow ranging between 1 and 1.5 metres below ground level.

Groundwater quality in the alluvium is variable ranging from brackish where there is interaction with Rozelle Bay through to fresh groundwater up gradient where the alluvium is recharged by rainwater only. The groundwater quality within the Hawkesbury Sandstone is not as variable but is typically brackish with elevated concentrations of iron and manganese.

Contamination

Previous investigations

Several previous investigations have been carried out at the Rozelle Rail Yards. The locations of these previous investigations are shown on Figure 6-4. The Stage 1 Preliminary Site Investigation (PSI) (AECOM, 2016) reviewed the relevant investigation reports and noted the following:

- The Stage 1 PSI conducted a comparison of data from a 2003 soil investigation conducted by Parsons Brinckerhoff (PB) and the current ASC NEPM (2013) guidelines for open space and commercial/industrial land use. The comparison identified widespread exceedances of the open space criteria for polycyclic aromatic hydrocarbons (PAHs), primarily across the northern half of Rozelle Rail Yards, and particularly around the former Emoleum Plant. Less widespread exceedances of the open space criteria were identified for lead, arsenic, total petroleum hydrocarbons (TPH) and benzene. Exceedances of the commercial/industrial land use criteria for PAH, lead, TPH and benzene were also reported. The benzene exceedance was detected in shallow soil in the location of a former underground storage tank (UST) (refer to Figure 6-4).

- Groundwater investigations conducted in 2003 were limited to the former Emoleum Plant (outside the Site). Concentrations of arsenic and zinc exceeded the Australian and New Zealand Environment and Conservation Council [ANZECC (2000)] Trigger Values for Marine Water 95 per cent protection level. All other contaminants of potential concern (CoPC) analysed were less than the adopted assessment criteria (ANZECC 2000).

- An asbestos assessment conducted by PB in 2011 identified the presence of brake shoe linings containing asbestos across the Rozelle Rail Yards, as well as asbestos containing material (ACM) fragments and conduit piping on or protruding from the ground surface.

After the review outlined above, the Stage 1 PSI (AECOM, 2016) identified several potential contamination sources within the Site. These are detailed below in Table 6-1.
### Table 6-1: Potential contamination sources within the Rozelle Rail Yards (AECOM, 2016)

<table>
<thead>
<tr>
<th>Potential contamination source</th>
<th>Description</th>
<th>Main contaminants of potential concern (CoPC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uncontrolled fill from land reclamation and development</strong></td>
<td>Use of soil, ripped rock or sediments contaminated with or combined with industrial wastes or hazardous materials.</td>
<td>Heavy metals, PAHs, asbestos, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN), polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs) and cyanide.</td>
</tr>
<tr>
<td><strong>Railways</strong></td>
<td>Use of asbestos in brake linings, mercury in arc rectifiers, diesel, oil and PCBs in locomotive engines and track equipment and spills of transported chemicals</td>
<td>Heavy metals, PCBs, TRH, PAH, benzene, phenols, OCPs, organophosphate pesticides (OPPs), herbicides and asbestos.</td>
</tr>
<tr>
<td><strong>Historical workshops</strong></td>
<td>Workshops historically stored and handled oils, fuels and solvents. Former workshops may have contained hoists, underground waste oil tanks, oil/water interceptor pits, inspection pits and drains which could leak waste oil and fuel onto the subsurface</td>
<td>Metals (mainly lead), TRH, BTEX, PAHs and volatile organic compound (VOCs).</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td>Manufacturing processes may use a wide variety of chemicals, depending on the process and product. Common contaminants include solvents and plasticisers.</td>
<td>VOCs, semi volatile organic compounds (SVOCs), dioxins, cyanide.</td>
</tr>
<tr>
<td>Potential contamination source</td>
<td>Description</td>
<td>Main contaminants of potential concern (CoPC)</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------</td>
<td>---------------------------------------------</td>
</tr>
</tbody>
</table>
| Substations and transformers  | • Substations built before 1975 would have contained PCB in the transformer oil  
• Substations were also commonly constructed and contained ACM and lead paint. | Lead, TRH, PAH, PCBs and asbestos. |
| Hazardous building materials  | • The Site contains (or formerly contained) buildings that were constructed with ACM, were painted with lead paint or contained fittings with PCBs. Demolition or degradation of the buildings (paint flaking, ACM weathering) may have resulted in contamination of surface soils. | PCBs, lead and asbestos. |

**Sampling results**

In addition to the desktop review, ground investigations were completed at the Site to evaluate the presence and concentration of contaminants in soil and fill, groundwater, drums, existing stockpiles and railway ballast. In addition an asbestos survey has been completed and ongoing asbestos monitoring at the Site continues. A summary of these investigations is provided below.

**Soil and Fill**

A total of 51 boreholes were completed across the Site (refer to Appendix C). Figure 6-5 shows the locations of the boreholes and groundwater monitoring wells that were sampled at the Site. Samples were collected from each borehole and analysed for a range of CoPCs. The results were compared to human health and ecological criteria described in ASC NEPM (NEPC, 2013) and to the Waste Classification Guidelines (NSW EPA, 2014). Based on the reported results, contaminants of concern exceeding the adopted Site assessment criteria include heavy metals (arsenic, cadmium, copper, lead, nickel and zinc), PAHs and asbestos.

**Groundwater**

Groundwater sampling was carried out at the Site in 2016 (refer to Appendix C). Results identified generally low concentrations of CoPC with the exception of a sample from a previously installed monitoring well located on the Site where light non aqueous phase liquid (LNAPL) was encountered at a depth of 1.82 metres below top of casing.

All reported analytical results for the groundwater monitoring wells sampled on the Site were less than the ANZECC (2000) 95% marine trigger values with the exception of:

• Copper in a single location (RZ_BH47D, refer to Figure 6-5) exceeding the groundwater investigation level for marine ecosystems
• Zinc in two locations (RZ_BH47D and RZ_BH51, refer to Figure 6-5) exceeding the groundwater investigation level for marine ecosystems.

Elevated concentrations of TRH, naphthalene and Bis(2-ethylhexyl) phthalate associated with the presence of LNAPL were also reported at a single location (BH57) (refer to Figure 6-5).

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7 The ‘D’ in RZ_BH47D is an indicator of depth. Groundwater samples are often taken from different depths. In this case the ‘D’ stands for ‘deep’ as opposed to, for example, RZ_BH47S, where the ‘S’; would stand for ‘shallow’. 
Figure 6-5: Borehole and groundwater well locations

**KEY**
- Waterway
- Open drainage channel
- Boreholes
- Groundwater wells sampled
- Previously installed groundwater wells sampled (PB, 2003)

*Disclaimer*
Map produced by AECOM on behalf of Sydney Motorway Corporation.
Map data copyright 2016 Sydney Motorway Corporation, NSW. Spatial data used under licence from Land and Property Management Authority, NSW © 2016. AECOM/SMC makes no representations or warranties of any kind, about the accuracy, reliability, completeness, suitability or fitness for purpose in relation to the map content.
**Drums**
- 185 x 200-litre drums of material were identified on the central northern portion of the Site (refer to Figure 1-2). No reliable information was available to confirm the origin of the material. The drummed material consisted of homogenous topsoil comprising silty sand and organic matter, with occasional woodchips/mulch and plant growth. The observed composition and description of the material was consistent across all drums and no evidence of contamination or odours was identified.
- As the material was observed to be consistently homogenous, approximately one sample per five drums was selected for analysis, which is equivalent to a sampling density of approximately one sample per cubic metre of material. Samples were analysed for a suite of CoPC including heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, mercury and zinc), TPH, BTEX, PAHs, OCPs, OPPs, PCBs and asbestos.
- The material in each drum was inspected, screened for volatile organic compounds (VOCs) in the field, and logged on a sample register.
- The reported analytical results were consistent for all samples analysed. Based on the sampling and analysis carried out, the material in the drums was characterised as General Solid Waste.

**Stockpiles**
- Fourteen stockpiles (SP01 to SP14) containing various compositions of soil and waste materials were identified within the Site (refer to Figure 1-2).
- Representative samples from 13 of these stockpiles (SP01 to SP13) were collected and analysed for CoPC. Stockpile SP14 could not be sampled due to the presence of dense vegetation that could not be cleared at the time of sampling. This stockpile would require sampling and analysis in the future. It is noted that there may be other stockpiles present on-site concealed by vegetation.
- Stockpile results were compared with the criteria outlined in the Waste Classification Guidelines.
- The materials in the stockpiles were variably characterised as either General Solid Waste or General Solid Waste [Special Waste (Asbestos)]. It is noted that asbestos was detected in the largest stockpile on-site (SP08), which is around 2,000 cubic metres in volume.

**Railway ballast**
- Samples of railway ballast were collected from stockpiles and in situ locations within the Site.
- All samples were analysed for heavy metals, electrical conductivity and foreign materials in accordance with the Recovered Railway Ballast Order 2014. All samples were also analysed for asbestos.
- The analytical results were compared to the Recovered Railway Ballast Order 2014 and the Waste Classification Guidelines (NSW EPA, 2014) to provide an indication of the suitability of the material for reuse or off-site disposal to an appropriately licensed waste facility.
- The results of the sampling indicated that:
  - The 'maximum average concentration for characterisation' was exceeded for copper, zinc and metal, glass, asphalt, ceramics and slag in ballast samples.
  - The 'absolute maximum concentration' was also exceeded for copper and combined metal, glass, asphalt, ceramics and slag components in all samples.
  - Concentrations of plaster, clay lumps, other friable materials exceeded the 'absolute maximum concentration' in two samples and arsenic, lead and zinc also exceeded the 'absolute maximum concentration' in one of the samples analysed.
  - Friable asbestos bundles were detected in one sample.
- Based on the results for the limited number of samples analysed, the railway ballast does not meet the criteria specified in the Recovered Railway Ballast Order 2014.
Timber railway sleepers
As part of the removal of redundant railway infrastructure, timber railway sleepers would also require removal and disposal. Before removal the following would need to be considered:
- Treated timber, including treated railway sleepers, must not be reused or recycled or used at the Site (as defined in the Recovered Railway Ballast Order 2014)
- Timber sleepers may be pre-classified as General Solid Waste (non-putrescible) in accordance with the definitions outlined in Waste Classification Guidelines (NSW EPA, 2014). In assessing whether waste has been pre-classified as General Solid Waste (non-putrescible), the following definitions apply:
  - **Building and demolition waste**, meaning unsegregated material (other than material containing asbestos waste or liquid waste) that results from timber, including unsegregated timber, that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP). Sleepers falling under this category can be disposed of as General Solid Waste (non-putrescible).
  - **Wood waste**, meaning sawdust, timber offcuts, wooden crates, wooden packaging, wooden pallets, wood shavings and similar materials, and includes any mixture of those materials, but does not include wood treated with the chemicals noted above. Sleepers falling under this category are those that are segregated and therefore may not meet the definition of building and demolition waste. If the timber sleepers are defined as wood waste, further sampling and waste classification would be required to confirm the timber is not treated before disposal.

Asbestos
An asbestos survey of the Site was carried out in July 2016 and an asbestos register was prepared. The survey identified asbestos containing materials (ACM) in the form of minor quantities of flat asbestos cement sheeting, train brake pads, asbestos electrical backing boards, cable trays and asbestos cement debris in locations across the Site. No friable asbestos containing materials were identified at the Site.

ACM were identified in some of the structures including the workshop, railway platform and awning, signal shed, switching station and rail gantries. These ACM were in good and stable condition and at present do not present a measurable asbestos related health risk to workers on-site or the local community. The survey also identified the possibility of encountering additional ACM during the proposal.

Asbestos fibre air monitoring was carried out at five locations across the Site during the months of June, July and August 2016. All samples collected during this period show levels of airborne respirable fibres below the relevant detection limit (ie <0.01 fibres per millimetre). The air monitoring results demonstrate that the site conditions during this period present a negligible asbestos related health risk to workers on the Site, adjacent businesses and local residences.

In October 2016 an Asbestos Management Plan (AMP) was prepared for the Site. The AMP outlines the administrative and operational procedures for managing ACM and minimising the risk of exposure for personnel working on or visiting the Site.
Contamination summary

Both previous investigations and the additional investigations completed this year have confirmed varying concentrations and types of contamination in a number of locations across the Site. The contamination at the Site is considered likely to be related to historical land uses and the importation of fill materials of unknown origin. This has resulted in the presence of variable concentrations of heavy metals, PAHs, TRH, and bonded and friable asbestos in the soils, fill, ballast and existing stockpiles. However, elevated concentrations of these contaminants are not found in all locations across the Site. For example, the presence of friable asbestos was only identified in one existing stockpile and one sample of ballast. Further investigation of the Site would be completed once infrastructure and vegetation have been cleared as part of the works.

Contaminated groundwater has also been identified; however, this contamination is relatively minor and limited to exceedances of:
- Zinc and copper in one location (RZ_BH47D)
- Zinc in one other location (RZ_BH51)
- TRH, naphthalene and Bis(2-ethylhexyl) phthalate at one location (BH57).

6.1.3 Potential impacts

Site management works

Overview

A number of ground disturbance and waste management activities are proposed as part of the site management works. These activities have been carefully designed to ensure that the potential impacts related to contamination or pollution that could affect the local community and/or local environment are avoided or minimised. Nevertheless, certain potential impacts are possible. To help identify these potential impacts, a conceptual site model was developed. This model is presented in Figure 6-6.

Potential impacts relating to soils, contamination, surface water, and groundwater could include:
- Impacts on on-site workers through contact with contaminants and asbestos in the soil and/or structures
- Impacts on the local community (e.g., residents, off-site workers) through contact with contaminants (via dust from the Site) released during ground disturbance activities and demolition works
- Impacts resulting from ground disturbance activities on the Site, including:
  - Exposure of underlying ground surface following ballast, vegetation, and stockpile removal resulting in the potential mobilisation of contamination that may be present
  - Erosion and off-site transport of sediment/particulates/contamination via overland flow and stormwater runoff, affecting the water quality and ecology of water courses and bodies (e.g., Easton Park drain, Whites Creek, Rozelle Bay)
  - Excavation of the ballast and/or of the residual fill/soils beneath the ballast resulting in the potential contamination of groundwater via infiltration or leaching
  - Cross contamination of on-site soils during movement and/or storage of material
  - Physical disturbance of soil and fill material with an excavator, including loading and transporting to landfill by truck
  - Dust being created and spread off-site (via wind transport)
  - Mud and dirt being tracked onto the public road network with resulting dust and road safety impacts
  - Contamination of soils and groundwater resulting from leaks and spills from equipment and plant
  - Dewatering and disposal of groundwater.
Figure 6-6: Conceptual Site Model

LEGEND
- Dust generation
- Rail lines
- Groundwater level
- Groundwater flow direction
- Site workers + visitors
- Contamination migration
- Fill
- Alluvium
- Sandstone
- Clay and silt lenses
- Stockpile
- LNAVL - Light non-aqueous phase liquid
- Residual soils

Note: Conceptual Site Model is indicative only

Source: [Location of Source]

[Diagram details and layers related to the site model, including residential receptors, pumping station, railway yards, and contaminant pathways, with specific labels and annotations for groundwater flow, pollution sources, and receptors.]

[Detailed annotations and specifications related to the site's geology, hydrology, and environmental impacts, with references to specific locations, such as Easton Park, Rozelle Rail Yards, and Rozelle Bay.]
The potential impacts identified above and relevant safeguards and management measures are discussed further in this section below. As a number of the potential impacts identified above are interrelated, they have been discussed under the following broad headings:

- Soil, fill, ballast and stockpile management
  - Existing stockpiles
  - Contaminated vegetation and redundant infrastructure
  - Ballast removal and site stabilisation
  - Material transport
- Asbestos
- Acid sulfate soils
- Groundwater
- Drums.

A summary of this discussion is provided at the end of this section.

While a number of potential impacts related to soils, groundwater and contamination could occur, provided the measures outlined in section 6.1.4 below, section 6.2 (surface water, drainage and flooding), section 6.3 (waste management) and section 6.9 (air quality) are effectively implemented, impacts related to soil, contamination and groundwater are unlikely to be significant.

**Soil, fill, ballast and stockpile management**

**Overview**

Soil, fill, existing stockpiles and ballast at the Site have been identified as containing CoPC including heavy metals, TRH, PAHs and asbestos. Activities including soil disturbance (including vegetation removal, stockpiling etc) have the potential to create dust and mobilise contaminated soils through air and water erosion and workers and machinery spreading contamination. The text below notes a number of potential impacts and presents a range of mitigation measures related to soils, groundwater and contamination.

**Existing stockpiles**

A number of existing stockpiles are present on-site and would be removed as part of the proposal. If uncontrolled, the handling and transport of these stockpiles could spread contamination across the Site and offsite and result in the pollution of soils, surface water, groundwater and the creation of dust and air quality impacts.

The movement and storage of the existing stockpiles, ballast and other material would be carefully carried out to avoid spreading contamination and causing the associated soil, water and air impacts. While a suite of testing has been carried out to inform this assessment (refer to Appendix C), further testing of existing stockpiles where necessary would be completed in order to confirm the waste classification and contamination status of the material.

Once each stockpile has been appropriately characterised, it would be removed from the Site. The techniques to manage the removal of these stockpiles would depend on the material contained within them and the weather conditions at the time. For example if this activity was being completed during dry and windy weather, dust controls would be used (refer to Table 6-2 and section 6.9 for further details). Similarly, one of the existing stockpiles is known to contain asbestos. The removal of this stockpile would need to be carried out in line with the AMP for the proposal. The measures outlined within this REF would be able to mitigate potential impacts related to the removal of the temporary stockpiles.
Contaminated vegetation and redundant infrastructure
Before removing the ballast, the roots from the on-site vegetation and redundant infrastructure close to and at the surface would be removed by grubbing. The process of grubbing could potentially result in an increase in dust levels depending on weather conditions. To mitigate this, various measures would be employed and would include water sprays, wetting the surface, and avoiding grubbing during high winds.

Contaminated soil and other wastes may also be removed as the roots of vegetation and redundant infrastructure are removed. If this material is mixed with other material from the Site then it could potentially contaminate the clean material or result in various pollution impacts.

Wastes brought to the surface would be collected, tested and managed in line with the Waste and Resource Management Plan (WMP) developed for the proposal (refer to section 6.3). This plan would include measures to sort, stockpile and transport specific wastes together to avoid cross-contamination. Equally, during and after the grubbing activity the soil conservation consultant, contamination expert and hygienist would be present to evaluate material brought to the surface and ensure that correct procedures are followed to manage it.

The sleepers being removed from the ground would be managed either as ‘building and demolition waste’ or ‘wood waste’ (refer to section 6.1.2). The roots brought up to the surface after grubbing would be handled separately to the vegetation that was removed from above ground to avoid cross-contamination.

Ballast removal and site stabilisation
The removal of the ballast from around 70 per cent of the Site could result in a number of potential impacts. These include exposing potential contamination and mobilising it through the air, surface water and groundwater potentially affecting on and/or off-site receptors.

In addition, the removal of the ballast would expose the residual fill/soil layer beneath it. Based on the sampling completed to date it is expected that parts of this fill could be contaminated and/or contain asbestos. These contaminants could be exposed and mobilised by water or wind after the removal of the ballast. The residual fill/soil could be eroded by surface water flows if it is left exposed, resulting in contamination and/or sedimentation of surface water downstream. Contamination could also be mobilised at the surface and transported by infiltration into the groundwater.

To help avoid and minimise these potential impacts, a soil conservation consultant and contamination expert would be engaged to confirm the design of the proposal and draft relevant parts of the EMP (including the SWMP and specifically the erosion and sediment control measures within it) before works commencing on-site. The design and the measures in the EMP would be updated as additional information became available. Appropriate management actions would be implemented to prevent the dispersion of contamination via dust, soil or water from the Site.

Key to minimising and avoiding potential impacts would be the removal of the ballast in stages, with each stage stabilised before clearing the next stage and temporary and permanent stormwater controls being developed as required. The approach would be to limit the size of disturbed and exposed areas at the Site at any one time during the works to reduce the potential for contamination impacts affecting on-site or off-site receptors.

Figure 3-1 provides an indicative staging plan; however it is unlikely that a whole stage would be exposed at any one time. Works would progress across the Site to limit the amount of time a specific location was disturbed and exposed before stabilisation. The level of disturbance during each stage of the works would depend on ground conditions in a specific area, expected weather conditions and other site management considerations.
Ground disturbance activities would not start, or would cease and appropriate controls put in place, if adverse weather conditions are expected (eg high winds, heavy rainfall) in order to avoid or limit the contamination of stormwater runoff and the creation of dust. If a contaminated area was exposed and could not be stabilised ahead of adverse weather or the end of the working day, then a temporary cover (eg soil, liners, clean fill etc) would be used to prevent the mobilisation of contamination from this area.

The removal of the ballast and other material may require the creation of temporary stockpiles for storage or for testing before management, transport and/or disposal. If these stockpiles are not managed appropriately, a number of potential impacts to surface water, soils and air can occur. As such appropriate controls would be put in place to prevent against dust creation and erosion.

Temporary stockpiles would be stored on impermeable surfaces, such as hardstand areas or liners and have appropriate erosion and runoff controls (such as covers and bunds). In addition, where there is an identified potential for hydrocarbon contamination to be present (based on visual observations, odours or PID readings) absorbent booms would be put in place around the base of the stockpiles to minimise the potential for migration of hydrocarbon impacted soils. Temporary stockpiles would be removed from Site as each stage of the works is completed and generally would not be present for more than four weeks.

In addition to removal of the ballast, drainage channels and sediment basins are proposed in several locations across the Site. Sediment basins and drainage channels would require limited excavation of the residual fill/soils beneath the ballast. All material excavated from sediment basin locations would require waste classification before off-site disposal. This material would be tested, stockpiled, classified and if suitable either reused during the works or disposed off-site. The excavated material would be managed in line with the controls described above and presented in Table 6-2. Sediment basins would be located to avoid areas of known soil and groundwater contamination and ASS if possible. Drainage channels and sediment basins are discussed further in section 6.2.

Typically temporary stockpiles would not be mixed or combined unless the material within each stockpile was similar in nature and fell within the same category under the NSW Waste Classification Guidelines (eg General Solid Waste).

Following removal of the ballast, the residual ground surface would be stabilised. As outlined in section 3.2.1 the method to stabilise each part of the Site would be determined once the precise nature of the ground conditions is confirmed and in accordance with the recommendations of a soil conservation consultant and contamination expert. The aim of stabilising the surface soils is to prevent erosion and the release of potential contamination via stormwater runoff, dust or via leaching into the groundwater. A number of stabilisation techniques are available depending on the ground conditions present. These could include the use of one or a combination of hydromulch, matting, geotextile (geofabric), geobinders, and applying a layer of top-soil or clean fill (usually up to 100 millimetres). Once a substrate is applied, the new surface would be seeded where necessary.

Progressively stabilising the Site would help prevent erosion and would also provide a barrier between residual contamination that might be present in the ground and surface water flows (which could carry contamination off-site into nearby waterbodies) or people working on or nearby the Site. This barrier would also help reduce infiltration which could potentially affect groundwater flows.

During all stages of the proposal (including the ground disturbance and site stabilisation activities), regular inspections would be completed by the soil conservation consultant and contamination expert, to ensure that the erosion and sediment controls and site stabilisation techniques were working correctly and remained effective.
Material transport
Soils and other material coming to and leaving the Site would be transported in truck and dogs or similar vehicles. Vehicles entering and leaving the Site could potentially track soil and other sediments off-site onto the local road network and beyond. Similarly, if vehicles carrying soil, fill, ballast and other wastes do not cover their loads, these materials can also be released into the local environment, potentially resulting in contamination or other environmental impacts.

To address these potential impacts, wheel and undercarriage washing facilities would be established at exit points for the Site during the works. Trucks and other vehicles as necessary would have loose material removed from their exterior and their wheels washed clean of soils or sediments before leaving the Site. Wastewater from this activity would be collected, tested and managed in line with other water from the Site depending on its quality. An adequate area of hardstand would be maintained between the wheel wash facility and the site exit where possible to ensure that the vehicles stay clean. Similarly, vehicles coming to and leaving the Site with full loads would have their loads securely covered to prevent material being blown out.

Summary
While there are potential impacts related to soil, fill, ballast and stockpile management, a wide variety of established, documented and successful controls and measures exist to avoid and mitigate these impacts. Measures to manage ballast, fill, soils and stockpiles would be included in the SWMP, which would be a sub-plan to the Environmental Management Plan (EMP). These plans and the measures that they could potentially contain are discussed in more detail in Table 6-2 and Table 6-3.

Protocols for ongoing inspection, monitoring and maintenance and rehabilitation required as part of the staged works program would be detailed in the EMP. Contingency measures for environmental management during storm/flood events would also be outlined within the EMP.

Asbestos
Asbestos has been identified in fill material, ballast, stockpiles, in several structures and within objects (eg brake shoes) in a variety of forms, including friable fibre bundles and non-friable (bonded) ACM. Analytical data from the site investigations conducted to date indicate that asbestos impacts are generally located near the surface, within fill materials and within certain structures. Asbestos has the potential to impact the health of on-site workers and nearby off-site receptors (eg members of the public) if inhaled.

Safeguards have been developed to control exposure to asbestos. In order to ensure that measures to avoid and manage issues relating to asbestos are implemented during the works, an Asbestos Management Plan (AMP) would be prepared for the works based on available information and the existing AMP and asbestos register for the Site. The AMP would be prepared by a suitably qualified practitioner and in accordance with the following guidelines:
- Guidelines for the Assessment, Remediation and Management of Asbestos - Contaminated Sites in Western Australia, May 2009
- How to Safely Remove Asbestos Code of Practice (Safe Work Australia, 2016)
- Asbestos related work (Roads and Maritime, 2013).

Implementation of the measures detailed within this plan would avoid potential health impacts to on-site workers and off-site receptors. Further details on the AMP and the measures that would be contained within it are provided in section 6.1.4.
HazMat surveys and/or asbestos walkovers would be completed before works commencing at the Site, following removal of the above ground vegetation and during the grubbing of the surface, the excavation of the ballast and the stabilisation of the Site. These surveys would aim to identify asbestos and ACM at the ground surface or within excavations. Asbestos surveys would also be completed for the buildings and structures at the Site before their demolition or removal.

These surveys would be completed by a suitable qualified hygienist experienced in the identification and management of potential asbestos and contaminated land impacts. If asbestos is identified during the surveys, the measures contained within the AMP would be carried out. Where necessary, the AMP would be updated based on the findings of the surveys.

All works potentially involving the removal of asbestos would be carried out by suitable experienced, qualified and licensed personnel.

Additional measures relating to the potential release of asbestos fibres are addressed in the air quality assessment presented in section 6.9.

**Acid sulfate soils**

As noted in section 6.1.2 certain parts of the Site fall within areas where ASS are considered likely to be present and may be encountered. Previous investigations at the Site (AECOM, 2016) indicated that potential acid sulfate soils (PASS) are likely to be present in marine and estuarine (alluvial) sediments beneath the Site. ASS would not be present in the fill beneath the Site. Boreholes taken from across the Site encountered anthropogenic fill material to depths ranging from 0.4 to 5.5 metres below ground level, with an average fill depth of 1.7 metres below ground level.

The proposal is likely to involve limited impact to the fill and soils beneath the ballast and limited impact to other soils and fill where ballast is not present (eg through vegetation or stockpile removal). The key risk for encountering ASS relates to the limited excavation works required for the construction of the permanent drainage channels and sediment basins or for targeted pot-holing/trenching to locate services.

Much of the excavation for the permanent drainage channels and sediment basins would be into the fill beneath the ballast rather than the alluvial soils; however, some potential remains that ASS may be encountered. Therefore an Acid Sulfate Soil Management Plan (ASSMP) for the proposal would be prepared. This plan would be in general accordance with the Acid Sulfate Soil Manual (ASS Management Advisory Committee, 1998).

**Groundwater**

Groundwater beneath the Site could potentially be contaminated by:

- Spills and leaks from equipment and plant during the works
- The mobilisation of exposed contamination through infiltration during and following removal of the ballast
- Encountering groundwater in excavations and allowing it to interact with surface contamination.

Spills, leaks etc can be appropriately managed through a SWMP, which would include procedures for responding to emergency spills. Measures would include storing hazardous substances on hardstand areas and having emergency spill kits on-site at all times.

As noted above, the works to remove the ballast from the Site would be staged and would progressively move across the Site. Minimising the exposure of the residual fill/soil surface beneath the ballast and progressively stabilising the soils/fill would reduce infiltration and the mobilisation of contamination to the groundwater. Existing groundwater wells would be monitored before, during and following completion of proposal to confirm that groundwater had not been impacted.
Construction of the permanent sediment basin embankment walls may require excavation to two meters below the residual fill/soil level. This would be for part of the wall called the cut off trench (refer to Figure 6-14 in section 6.2.3). For the rest of the permanent sediment basins and drainage channels, excavation, if required, is expected to minor (ie less than one metre below the residual fill/soil level). Sediment basins would be lined and would not need to be constructed below the groundwater level at the Site.

Given the levels of groundwater expected at the Site (refer to section 6.1.2), construction of the embankment walls for the permanent sediment basins and the targeted pot-holing/trenching for service location works may encounter groundwater. To avoid potentially contaminated surface water flows entering excavations and interacting with groundwater, erosion and sediment controls would be placed around these excavations to redirect surface water flows.

If dewatering is required the accumulated water would be collected, tested and disposed of in accordance with the SWMP and in line with the Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (RTA, 2011). If olfactory or visual indicators suggest that the groundwater in excavations is already contaminated appropriate health and safety measures (eg the use of adequate PPE) would be implemented as part of the Health and Safety Management Plan (HSMP).

**Drums**

Based on the sampling and analysis carried out, the material in the drums was characterised as General Solid Waste. Based on this characterisation, the drums and contents can be disposed of to a licensed landfill as General Solid Waste. Standard management measures for handling, transport and disposal of General Solid Waste would be implemented at the Site. These would include covering or sealing the drums before transportation to limit the potential for accidental spills.

**Summary**

The ground conditions information for the Site has allowed a thorough assessment of the potential soil, groundwater and contamination impacts of the proposal to be completed. The conditions at the Site are typical of redundant railyards. As such numerous established and effective mitigation measures are available to ensure that the proposal is managed safely and would not result in significant adverse impacts.

**Table 6-2** below presents a list of potential safeguards and management measures that could be employed during the proposal to avoid or mitigate potential impacts/exposure pathways. Some of these specific measures would be used throughout the proposal, whereas others would only be used as required in certain areas or for certain activities. Not all of the measures would necessarily be required. The purpose of presenting the measures in **Table 6-2** is to demonstrate that a range safeguards and measures exist that could be employed by the contractor to manage potential impacts if required.

An initial decision on which measures are required would be made when the EMP, SWMP and other management plans are prepared. This decision would be made in accordance with the advice of the soil conservation consultant and contamination expert and having regard to the results of further investigations and the potential impacts associated with the proposed design. The list of measures within the management plans could be revised again during the works as necessary. The soil conservation consultant and contamination expert would provide advice on each revision of the SWMP.

These measures would be implemented in conjunction with the safeguards and measures to mitigate potential surface water impacts, waste impacts, and air quality impacts (presented in sections 6.2, 6.3 and 6.9 respectively).
Appropriate health and safety controls, such as appropriate personal protective equipment (PPE), would be required depending on the work being completed. These controls would be documented in the site-specific HSMP for the proposal.

It is noted that the management and mitigation measures referred to herein would:

- Remove waste material identified in stockpiles, drums and railway ballast
- Be conducted in a manner designed to minimise ground disturbance and therefore disturbance of residual contamination which may be present, to the extent practical
- Improve and manage the overall environmental condition of the Site from a contamination perspective.

Provided the measures outlined in section 6.1.4, 6.2, 6.3 and 6.9 are effectively implemented, impacts related to soil, contamination and groundwater are unlikely to be significant.
<table>
<thead>
<tr>
<th>Potential exposure pathways</th>
<th>Potential safeguards and management measures</th>
</tr>
</thead>
</table>
| Direct human contact with soil/fill/water/contamination | • On-site workers to use appropriate PPE and hygiene practices specific to the nature of the material being handled  
• If excavation works intersect alluvium underlying fill materials, work would be carried out in accordance with an approved ASSMP  
• Asbestos fibre air monitoring would be completed during activities which could liberate asbestos fibres  
• As ground disturbance works proceed, excavated materials would be inspected (visual and olfactory) for signs of potential contamination  
• Soils and ballast would be separated into stockpiles according to odours, staining, fouling (in the case of ballast) and other environmental indicators. Following sorting, they would be placed into uniquely identified stockpiles  
• Odours would be managed using odour suppressants eg Biosolve or by covering odorous material  
• Further dust control measures are discussed below and in section 6.9. |
| Transport of particles in wind | As above and including:  
• Using dust control mesh on site fencing  
• Surfacing internal access roads with crushed rock  
• Minimising stockpile areas to the extent practical  
• Wetting down (using water carts/hoses) exposed surfaces, internal access roads, before and during grubbing and ballast removal, stockpiles (including during formation and loading) to minimise dust  
• Ground disturbance and stockpiling activities would not take place during winds over eight metres per second  
• Ground disturbance and stockpiling works would cease if dust is seen to be blowing off-site and controls would be put in place to manage the issue  
• Covering of stockpiles with appropriate material (eg secured geofabric or plastic) when not being formed or removed as necessary (eg adverse weather conditions). Contaminated stockpiles would be covered at all times when not being formed or removed  
• Using trailer covers on completion of loading, to prevent load displacement  
• Carrying out asbestos fibre air monitoring during activities which could liberate asbestos fibres  
• Further dust control measures are discussed in section 6.9. |
<table>
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<tr>
<th>Potential exposure pathways</th>
<th>Potential safeguards and management measures</th>
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| Erosion - general           | • Fill, soil and groundwater data would be reviewed before starting sub-surface excavations to ensure understanding of and familiarity with site conditions  
• Ground disturbance works would be staged depending on weather conditions and/or expected ground conditions to limit the extent of the Site being disturbed at any one time. Works to excavate ballast and stabilise the Site would progressively move across the Site to reduce exposed areas  
• A soil conservation consultant and contamination expert would be engaged to advise on the final approach to managing erosion and stabilising soils  
• Appropriate ground surface cover would be provided via the application of coverage materials (eg mulch, matting, geotextile, geobinders, top-soil, clean fill) or similar as soon as possible. This would be followed by seeding areas as appropriate  
• Appropriate erosion mitigation controls across exposed areas of the Site would be used (eg bunds, mulch, matting, geotextile, geobinders, topsoil, crushed rock)  
• A site walkover by an occupational hygienist, soil conservation consultant and contamination expert would be completed to confirm integrity of the final ground surface following completion of the works  
• Ongoing (during and after the proposal) inspections and maintenance of surface covers and erosion mitigation controls would be completed to ensure integrity of final surface is maintained. |
<table>
<thead>
<tr>
<th>Potential exposure pathways</th>
<th>Potential safeguards and management measures</th>
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</thead>
<tbody>
<tr>
<td>Transport by water from overland flows and stormwater runoff</td>
<td>As above and including:</td>
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<td>• Using appropriate sediment controls/drainage design to manage and contain Site runoff (e.g., directing drainage runoff to drainage channels and sediment basins)</td>
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<td></td>
<td>• Constructing drainage structures such as drainage channels and sediment basins early in the works</td>
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<tr>
<td></td>
<td>• Forming and lining of drainage channels to convey concentrated flows through the Site. Suitable lining materials would be identified by assessing flow velocities and associated scour potential, and could include geotextiles, jute matting, turf, rock rip rap, shotcrete or concrete</td>
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<td>• Providing check dams (e.g., stacked rock, silt fences) along drainage channels at appropriate intervals to minimise velocities and assist in settling out sediments</td>
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<tr>
<td></td>
<td>• Installing culverts or other suitable stabilised crossing arrangements where channels are required to cross internal access roads</td>
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<tr>
<td></td>
<td>• Where possible locating drainage channels and sediment basins away from areas of high contamination or ASS potential</td>
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<tr>
<td></td>
<td>• Implementation of management measures such as absorbent booms in sediment basins or close to excavations where slicks are expected or apparent to reduce the risk of runoff/migration of hydrocarbons and other contaminants</td>
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<tr>
<td></td>
<td>• Silt fences and sediment traps would be installed close to existing stormwater drains, drainage channels and sediment basins in proximity to exposed areas and around stockpiles</td>
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<tr>
<td></td>
<td>• Ceasing works and inspecting sediment controls during periods of heavy rainfall</td>
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<td></td>
<td>• Undertaking routine water quality monitoring within sediment basins. This would determine its eligibility for discharge. If collected water is not of sufficient quality for discharge, it would be removed off-site for disposal</td>
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<td></td>
<td>• Where residual ballast is present, the Site drainage design should consider the presence of fouled ballast with a possibly lower permeability than surrounding soils. The design should include a safety factor to manage increased stormwater flows if required</td>
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<tr>
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<td>• Ensure drainage design adequately considers flood risks and associated contingency measures such as reducing the size of disturbed areas and increasing the capacity of sediment basins, where practical.</td>
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Rozelle Rail Yards – Site Management Works
Review of environmental factors
### Potential exposure pathways

<table>
<thead>
<tr>
<th>Potential exposure pathways</th>
<th>Potential safeguards and management measures</th>
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<tr>
<td>Physical mobilisation of soil/fill/contaminants to other areas of the Site and off-site</td>
<td>As above and including:</td>
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<td>- Covering the surface of internal access roads with crushed rock</td>
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<td>- Contaminated stockpiles would be uniquely identified and placed on impermeable surfaces, such as plastic sheeting or concrete surfaces</td>
</tr>
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<td></td>
<td>- Wetting down (using water carts/hoses) exposed surfaces, internal access roads, before and during grubbing and ballast removal, stockpiles (including during formation and loading) to minimise dust</td>
</tr>
<tr>
<td></td>
<td>- Ground disturbance and stockpiling activities would not take place during winds over eight metres per second</td>
</tr>
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<td></td>
<td>- Covering loads carried by trucks coming to, driving around (where necessary) and leaving the Site to prevent load displacement</td>
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<td></td>
<td>- Establishment and use of vehicle and plant wash down areas within a designated bunded area and on an impervious surface, before leaving the Site</td>
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<td></td>
<td>- Water-assisted dust sweepers would be used on the local roads, to remove, as necessary, any material tracked out of the Site.</td>
</tr>
<tr>
<td>Direct contact with groundwater</td>
<td>Reviewing groundwater data before starting sub-surface investigations to ensure familiarity with site conditions and to avoid intercepting shallow groundwater</td>
</tr>
<tr>
<td></td>
<td>Containing, sampling and analysing extracted groundwater for transport to a licensed liquid waste facility or treatment on-site.</td>
</tr>
<tr>
<td>Direct contact of pollution and site soils and infiltration of pollution into groundwater</td>
<td>Implementing controls to protect against spills and leaks. These would include ensuring that plant is in good working order and there is appropriate bunding and use of interceptors under liquid storage areas</td>
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<tr>
<td></td>
<td>Inspections of equipment to check that it is maintained and operated in a proper and efficient condition to reduce the likelihood of spills or leaks</td>
</tr>
<tr>
<td></td>
<td>Establishment of vehicle and plant wash down areas within a designated bunded area and on an impervious surface</td>
</tr>
<tr>
<td></td>
<td>A specific emergency spill protocol would be developed and included in the SWMP. It would address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers).</td>
</tr>
</tbody>
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Rozelle Rail Yards – Site Management Works  
Review of environmental factors  
74
Finished site
Following completion of the works, contaminants (including asbestos) may be present within residual fill materials contained on site. The implementation of erosion control measures and particularly the stabilisation of the Site would minimise exposure risks associated with the presence of residual contamination.

Works to be carried out during the finished site would be minimal and restricted to maintenance activities. No ground disturbance works are anticipated for the finished site. The surface of the Site would be stabilised with an appropriate surface cover in accordance with the recommendations of a soil conservation consultant and a contamination expert to minimise the disturbance/movement of soil and fill material at the residual ground surface. Erosion and sediment controls would also be established as part of the works (as outlined in section 6.2).

Ongoing inspection and maintenance would be required after the completion of the works to ensure the integrity of the cover is maintained. The installation and maintenance of the surface cover at the Site would ensure that erosion is minimised. This would also help minimise interactions between surface water flows crossing the Site and residual contaminated soils beneath the surface cover either during typical or heavy rainfall events, including events that may result in the overtopping of the sediment basins and the flooding of the Site.

To help ensure that overtopping events do not occur, water levels within the permanent sediment basins would be proactively managed to ensure that they were empty and could contain as much surface runoff as possible before heavy rain events occurred. The basins would be lined to ensure that groundwater ingress, which may reduce the storage capacity of the basins, could not occur. Water that collects in these basins and needs to be removed would be tested in line with standard construction water quality discharge criteria and managed in line with the Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (RTA, 2011). If these criteria are met the water would be discharged into the Site’s existing stormwater drainage system. Water that does not meet these criteria would be collected and disposed off-site. Sediment that collects within the basins would also be tested and disposed of appropriately.

As a result, no significant impacts are anticipated after the works are completed. Controls for the management of surface water runoff are described in section 6.2.

6.1.4 Safeguards and management measures
The previous section has considered a number of potential soil, groundwater and contamination related impacts which could arise from the proposal alongside a range of potential measures that would or could be implemented to manage these impacts. The assessment concludes that the proposal would be unlikely to result in a significant impact on the soil and groundwater environment on, beneath and around the Site, provided appropriate measures are implemented.

To confirm the management approach for the proposal, an EMP would be prepared. This EMP would consist of a main document supported by a number of sub-plans specific to particular aspects that need to be managed during the proposal. The following plans would form sub-plans of the EMP and would be prepared for approval by Roads and Maritime before the commencement of the proposal:
- SWMP - this would outline management measures for soils that are excavated or stored on-site during the works, erosion and sediment control provisions and water management requirements (further detail is also provided in section 6.2)
- AMP – this would be developed to manage the presence of asbestos both during and following completion of the proposal
- Acid Sulfate Soils Management Plan (ASSMP) – This would provide contingency measures in the event that excavation works intersect alluvium soils underlying the fill material
- Health and Safety Management Plan (HSMP)
- WMP (refer to section 6.3).
These plans would be live documents that would be updated as conditions change, new approaches are developed and/or as more information becomes available.

A key requirement for the successful implementation of the EMP would be the use of appropriately experienced and qualified personnel, including input from an occupational hygienist, soil conservation consultant and contamination expert throughout the development of the plan(s), during the implementation of the works and following completion and during the ongoing maintenance and monitoring phase. The focus would be to ensure the integrity of the final ground surface and erosion and sediment controls are maintained. Appropriate equipment and methodologies would be utilised for the work with due consideration to the contaminants present (including asbestos).

Table 6-3 summarises the required inputs to the management plans. It is noted the plans would also incorporate the relevant safeguards and mitigation measures detailed in Table 6-2.
Table 6-3: Summary of contamination, soil, fill and groundwater safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
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</table>
| Soil and water - general    | A SWMP would be prepared as a sub-plan of the EMP in accordance with the requirements of Section 2.1 of Roads and Maritime QA G38 Soil and Water Management. The SWMP would be prepared in consultation with soil conservation consultant and contamination expert and in general accordance with the following:  
  - The Roads and Maritime Code of Practice for Water Management (RTA, 1999)  
  - The Roads and Maritime Erosion and Sedimentation Procedure (RTA, 2008)  
  - The Blue Book, Volumes 1 and 2D (Landcom, 2004 and DECCW, 2009)  
  - Applicable WorkSafe NSW guidelines and NSW EPA requirements.                                                                                                 | Contractor     | Work preparation                 | Additional safeguard          |
| Soil and water - general    | The measures contained within the SWMP, AMP, ASSMP and other relevant parts of the EMP would aim to ensure that:  
  - Surface water flows leaving the Site do not pollute receiving water courses and bodies  
  - Erosion at the Site is minimised  
  - Potential contamination is managed appropriately and is not spread to cleaner parts of the Site or off-site  
  - Off-site receptors are not impacted by dust  
  - Appropriate asbestos controls are implemented at the Site to avoid potential human health impacts  
  - Direct impacts on groundwater from the proposal are avoided and existing impacts are not further exacerbated.                                                                 | Contractor     | Work preparation/during the works | Additional safeguard          |
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<th>Responsibility</th>
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</table>
| Soil and water - general     | The SWMP would include details on the following:  
  - Drainage controls  
  - Erosion and sediment controls (refer also to section 6.2)  
  - Wind erosion controls (refer also to section 6.9)  
  - Stockpiling procedures including specific controls regarding the stockpiling of soils and ballast (including assessment of fouled material and segregation methodologies for potential reuse for both soils and ballast)  
  - Procedures for handling, testing, storing and managing contaminated soil, surface water and groundwater  
  - Methods of preventing soil and water contamination/pollution.                                                                                                           | Contractor      | Work preparation/during the works          | Additional safeguard         |
| Soil and water - general     | In addition to the measures outlined in section 6.2, this plan would outline:  
  - The areas where ground disturbance works are likely  
  - The inspection program for erosion control structures and management measures  
  - Inclusion of post-completion management and maintenance protocols and a management schedule to ensure the integrity of the final ground surface condition is maintained  
  - Contingency actions that would be implemented in the event that erosion and sediment controls fail, in accordance with the protocols outlined in the specific management plans prepared for the Site. | Contractor      | Work preparation/during the works          | Additional safeguard         |
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<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
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</table>
| Soil and water – protection of site soil and water | The SWMP would contain the following measures to protect against the potential contamination of site soil and water:  
  • Measures to manage the storage of liquids, fuels and chemicals  
  • Measures to ensure equipment is maintained and operated in a proper and efficient condition to reduce the likelihood of spills or leaks  
  • Measures to manage vehicles leaving the Site to reduce soil on roads and production of dust  
  • A site-specific emergency spill plan which would include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management (RTA, 1999) and relevant NSW EPA guidelines. | Contractor       | Work preparation/during the works   | Additional safeguard            |
<p>| Soil and water – protection of site soil and water | A soil conservation consultant and contamination expert would advise of the preferred method of stabilisation/proposed ground surface before ground disturbance activities commencing. They would confirm the preferred method of stabilisation/proposed ground surface as the ballast is removed and the residual soil/fill layer is exposed. | Contractor       | Work preparation/during the works   | Additional safeguard            |</p>
<table>
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<th>Timing</th>
<th>Standard/additional safeguard</th>
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</table>
| Soil and water – contaminated materials    | The SWMP would also outline measures for monitoring, handling, storing and managing contaminated material. It would include the following:  
  - Assessment, development and implementation of appropriate surface covers across the Site in consultation with a soil conservation consultant and contamination expert to minimise disturbance of residual contamination via erosion and runoff  
  - Development of task specific methodologies in consultation with a soil conservation consultant and contamination expert to appropriately stabilise the Site and reduce the potential for surface water contamination  
  - Procedures for identifying potentially contaminated materials  
  - Procedures for separating stockpiled material according to contamination indicators  
  - Measures for the protection of on-site worker health and safety  
  - Measures for the dewatering, storage, movement and treatment of groundwater if encountered in accordance with the Roads and Maritime Environmental Management of Construction Site Dewatering (2011) guidance and other Roads and Maritime specifications  
  - Measures for sampling and testing of sediment and water contained in the sediment basins, at regular intervals and before discharge or disposal  
  - Measures for the management of odorous material, if encountered. | Contractor | Work preparation/during the works | Additional safeguard |
<table>
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<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
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</thead>
</table>
| Soil and water - groundwater  | The SWMP would contain measures to ensure that impacts on groundwater from the proposal are avoided and existing impacts are not further exacerbated. This would include:  
  - The protection of excavations where groundwater could be encountered from surface water flows  
  - The progressive stabilisation of soils to reduce the amount of the residual soil/fill exposed at any one time  
  - Details regarding the lining and maintenance of the sediment basins  
  - Dewatering procedures in line with the Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (RTA, 2011)  
  - Measures to protect against leaks and spills.                                                                                                                                                                                                                                           | Contractor      | Work preparation/during the works     | Additional safeguard          |
| Soil and water - disposal     | The SWMP would include the following:  
  - Procedures for the testing, disposal or reuse of materials, including soils, ballast, vegetation (including adhering soils)  
  - Material to be disposed of would be classified in accordance with specifications set out in a WMP and either the NSW Waste Classification Guidelines, *Contaminated Land Management Act 1997* (NSW) or the relevant exemption or order relating to the activity  
  - This would include disposal of contaminated materials to appropriately licensed facilities in accordance with NSW Waste Classification Guidelines  
  - Ballast material not meeting the Recovered Railway Ballast Order 2014 would be disposed of at appropriately licensed facilities, unless it is potentially suitable for segregation and reuse.                                                                                   |                 |                                       |                              |
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<th>Timing</th>
<th>Standard/additional safeguard</th>
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<tbody>
<tr>
<td>Acid sulfate soils</td>
<td>An Acid Sulfate Soils Management Plan (ASSMP) would be prepared in accordance with the Acid Sulfate Soils Manual (Stone et al 1998). If ASS are encountered, works in the relevant area would be carried out in accordance with the ASSMP.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
| Asbestos | An AMP would be prepared by a suitably qualified practitioner and in accordance with the following relevant guidelines:  
- Guidelines for the Assessment, Remediation and Management of Asbestos - Contaminated Sites in Western Australia, May 2009  
- How to Safely Remove Asbestos Code of Practice (Safe Work Australia, 2016)  
- Asbestos related work (Roads and Maritime, 2013).  
The AMP would include the following:  
- Measures for managing soils or ballast that may also contain contamination to ensure that both the asbestos and contamination are managed effectively  
- A summary of site conditions including consideration of residual asbestos which may be present, and how it would be managed  
- A risk assessment to help identify appropriate measures to protect on-site personnel and the local community  
- Communication strategy, where required, for notifying the community of asbestos management procedures  
- A list of the potential receptors including site workers, the local community, site visitors, owners and occupiers, and service workers. | Contractor | Work preparation/during the works | Additional safeguard |
<table>
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<tr>
<th>Impact</th>
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<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous materials</td>
<td>• A HazMat survey would be conducted during the early stages of the proposal before ground disturbance works start. This survey would be completed by a hygienist and contamination expert and would include the identification of ACM.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Soil, water and hazardous materials</td>
<td>• During all stages of the proposal (including the ground disturbance and site stabilisation activities), regular inspections would be completed by the soil conservation consultant and contamination expert, to ensure that the erosion and sediment controls and site stabilisation techniques were working correctly and remained effective.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>Impact</td>
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<tr>
<td>Material transport</td>
<td>Bunded wheel and undercarriage washing facilities would be established at exit points for the Site as necessary. Where required, vehicles would have loose material removed from their exterior and their wheels washed clean of soils or sediments before leaving the Site. Details of how waste water from this activity would be managed would be outlined in the SWMP. An adequate area of hardstand would be maintained between the wheel wash facility and the site exit where possible. Vehicles coming to and leaving the Site with full loads would have their loads covered to prevent material being blown out of them.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>On-site worker protection</td>
<td>A site-specific Health and Safety Management Plan (HSMP) would be developed for the works in accordance with the appropriate guidelines and legislation. The plan would include handling protocols for minimising human contact with contaminated soils and groundwater.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Training</td>
<td>Staff would be inducted and provided with appropriate training before working with potentially contaminated materials to prevent unnecessary disturbance (e.g., dust generation, asbestos fibre liberation, contaminant mobility).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Ongoing maintenance</td>
<td>Ongoing inspection and maintenance would be completed at the Site after the completion of the proposal to ensure the integrity of the surface cover is maintained. These inspections would be completed by a soil conservation consultant and contamination expert.</td>
<td>Contractor</td>
<td>Finished site</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
6.2  **Surface water, drainage and flooding**

An assessment has been carried out to determine the potential impacts on surface water receptors, drainage and flooding associated with the proposal.

This section should be read in conjunction with section 6.1, as a number of the potential impacts and mitigation measures are interrelated.

6.2.1  **Methodology**

**Study area**

The study area for the surface water, drainage and flooding assessment includes the Site and the following areas:

- The surrounding catchments that drain towards the Site from the north and west. The ‘northern’ catchment of roughly 55 hectares drains toward Easton Park and is generally conveyed to Rozelle Bay by the Easton Park drain. The ‘western’ catchment generally originates from the rail cutting further west, draining through the Rozelle Rail Yards from the west to east.
- Whites Creek, which runs to the south of City West Link, discharging to Rozelle Bay near the junction of City West Link and The Crescent.
- Johnstons Creek, which also discharges to Rozelle Bay, but does not interact with surface water from the Site.

The study area was chosen as it was determined to represent the extent of land that could impact on, or be impacted by, the interaction of the proposal with the surface water environment.

The boundaries of the study area and Site, as well as other relative features such as catchments and known watercourses/drainage infrastructure, are shown on Figure 6-7.

**Understanding the environment**

An assessment of existing site conditions and the study area was informed by a desktop review of available literature, data and observations made during Site visits. The following information sources were reviewed as part of this assessment:

- Aerial imagery
- Terrain data sourced from Light Detection and Ranging (LiDAR) survey
- Topographic and utility survey
- Sydney Water ‘Dial Before You Dig’ (DBYD) stormwater asset GIS database
- Inner West Council DBYD stormwater asset GIS database
- Leichhardt Flood Study (Cardno, 2014)
- The Sydney Central Business District and South East Light Rail (CSELR) Environmental Impact Statement (EIS) (Parsons Brinckerhoff, 2013).

An understanding of water quality for both the Site and its receiving environment was developed based on the characteristics of its catchment, soils and drainage mechanisms, as well as limited historic reporting of relevance to Rozelle Bay.

In addition, six surface water sampling events were completed by AECOM between July and October 2016 at the Easton Park drain upstream of the Site and in Rozelle Bay near the outlet of Whites Creek and the Easton Park drain. Four sampling events were carried out during dry weather in July, August, September and October 2016 and two wet weather events (greater than 15 millimetres of rainfall in 24 hours) were carried out in July and August 2016.
Surface water samples were analysed for heavy metals (arsenic, cadmium, chromium, copper, ferric iron, ferrous iron, lead, manganese, mercury, nickel and zinc); total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene and xylenes (BTEX); naphthalene; and nutrients [total kjeldahl nitrogen (TKN), nitrate, nitrite, total oxidised nitrogen, total nitrogen, reactive phosphorus and total phosphorus]. Field water quality parameters including turbidity, temperature, dissolved oxygen, electrical conductivity, reduction-oxidation potential (redox) and pH were also recorded.

The results of this sampling are provided in section 6.2.2. This information has been used to understand the water quality of the local area.

An understanding of existing flooding conditions within and surrounding the Site was established by:

- Reviewing the Leichhardt Flood Study (Cardno, 2014)
- Carrying out preliminary flood modelling using TUFLOW software to understand the current risk of flooding at the Site. Results of modelling the existing conditions have been used to assess indicative flood extents and depths throughout the Site for design events with an average recurrence interval (ARI) up to 100 years.

An understanding of the existing drainage network was informed through review of available asset data, sourced from the DBYD databases. Further information was obtained through surveys of the Site, and supplemented by Site inspections to visually assess accessible drainage infrastructure.

Assessing impacts

The proposal was considered and the likelihood of impacting the surface water environment was assessed. The potential impacts identified were assessed qualitatively, as the primary outcome of the works is to provide a stabilised site with minimal disruption to the existing surface water conditions.

Water quality impacts were assessed based on a review of the anticipated water management method for the Site. The potential for mobilisation and downstream transport of contaminated sediments was found to be a risk to the water quality of receiving water bodies. A high-level conceptual approach to site water management associated with the proposal was prepared based on principles and examples of typical and industry-standard soil and water management practices. This approach was used to inform the assessment of potential water quality related impacts, by demonstrating the feasibility of these principles and practices to manage risks to an acceptable level.

The assessment of potential drainage related impacts was carried out by reviewing the existing drainage infrastructure on-site, its current functionality and the likelihood that the proposal would interrupt how this infrastructure functions.

Flood risk was assessed by reviewing the nature of the proposal, from the perspective of how it may alter the ability of the Site to store and/or convey floodwaters. An understanding of the changes to topography resulting from the proposal was used to assess the potential impacts on the Site or on surrounding property and infrastructure.
Figure 6-7: Surface water features

KEY
- Waterway
- Open drainage channel
- Piped drainage line
- 1m Ground contours
- Indicative overland flow direction
- Site boundary
- Catchment

Source: Contours, drainage and imagery, LP12015
6.2.2 Existing environment

Overview
The Site comprises reclaimed land within a disused rail cutting. The Site spans a topographic low with levels ranging from about two metres Australian height datum to seven metres Australian height datum. The Site is bound by excavated, near-vertical rock walls up to nine metres in height along some of the northern boundary, and a fill-embankment in the south-west next to the City West Link.

Watercourses within the study area include:
- Easton Park drain
- Whites Creek
- Johnstons Creek.

Easton Park drain collects stormwater from a heavily urbanised catchment of about 55 hectares to the north and west of the study area, and discharges to Rozelle Bay through a combination of stormwater pipes, lined open channel and culverted reaches (Figure 6-7). After it passes under Lilyfield Road the drain has an open section for a distance of about 170 metres through the industrial area between Lilyfield Road and the Rozelle Rail Yards. It then flows into a culvert passing under the Site before discharging to Rozelle Bay to the east of the intersection of City West Link and The Crescent (Figure 6-8). Observations of the outfall suggest that discharges from the culvert are influenced by tidal fluctuations in the water level of Rozelle Bay.

Whites Creek is located to the south of both the Site and City West Link. The watercourse drains a dense urban catchment area of about 262 hectares originating about 1.9 kilometres south-west of the Site. Whites Creek is a concrete lined open channel spanned by a number of road and rail crossings in proximity to the Site. The creek discharges into Rozelle Bay immediately east of The Crescent and is also tidally influenced.

Although a direct surface water connection between the Site and Whites Creek has not been established, there are potential indirect surface water pathways. These include from the CSELR Rozelle maintenance depot facility site next to the Rozelle Rail Yards, which connects to the Inner West Light Rail Line. The light rail line passes underneath the City West Link and may present a pathway for surface water to exchange between the Rozelle Rail Yards area and an un-named tributary that runs from the west along the Light Rail line and into Whites Creek, south of the Site.

Another possible pathway relates to surface water from the Site flowing across the low point on City West Link, and into the lower reaches of Whites Creek near The Crescent. It is noted that these pathways would only be activated in very large and infrequent flood events.

Johnstons Creek also lies within the study area and discharges to Rozelle Bay south-east of the Site. This waterway does not interact with surface water from the Site and has therefore not been considered in the assessment.

Rozelle Bay is a tidal harbour embayment located about 65 metres south of the Site. The morphology and shoreline of the bay have been substantially modified by land reclamation activities. Rozelle Bay receives urban runoff from the suburbs of Rozelle, Lilyfield, Annandale and Forest Lodge.
Water quality
A range of historic reports show Rozelle Bay has one of the most heavily-polluted areas of Sydney Harbour. Montoya (2015) made the following conclusions:

- Heavy metals were present in relatively high concentrations
- Based on previous studies the combined Blackwattle/Rozelle Bay had the lowest overall condition rating of all regions of Sydney Harbour
- Urbanisation pressures were particularly strong for the combined Blackwattle/Rozelle Bay, which placed further stress on this waterbody
- Contamination of sediments and its influence on water quality was considered a key issue for Rozelle Bay.

The water quality sampling completed by AECOM in 2016 found that the range of concentrations of heavy metals was similar in both the Easton Park drain and Rozelle Bay with the exception of iron and lead which was an order of magnitude higher in the Easton Park drain than in Rozelle Bay. Concentrations of lead exceeded the ANZECC (2000) 95 per cent marine trigger values in three of the sampling events at the Easton Park drain and one event in Rozelle Bay. Reported concentrations of zinc exceeded the ANZECC (2000) 95 per cent marine trigger values in all six events at the Easton Park drain and three events in Rozelle Bay. The concentrations of total nitrogen and total phosphorus were also an order of magnitude higher in the Easton Park drain. TRH, BTEX and naphthalene were not detected at concentrations greater than the laboratory limit of reporting at either location. Field water quality parameters (eg turbidity, temperature, pH) were of a similar range in both the Easton Park drain and Rozelle Bay.

Drainage infrastructure
As noted above and shown on Figure 6-7, the Easton Park drain passes under the Site in a culvert and discharges to Rozelle Bay.

Besides this culvert, the Site has little known formal drainage infrastructure other than:

- An open channel running west to east along the base of the sandstone cutting to the south of Lilyfield Road, between Denison Street and Cecily Street, in the western portion of the Site. The eastern end of the channel discharges into a culvert underneath 92-94 Lilyfield Road. It is likely that this drain discharges into either the open part of Easton Park drain in the industrial estate or the culverted part that passes under the Site. The known open reach is shown on Figure 6-7
- A small number of pits and pipes are found throughout the Site. No information has been found indicating where these drain to. There is a potential for these pits and pipes to be blocked, or alternatively, they may drain into Rozelle Bay.

Indicative locations of these drainage channels, as understood from available surveys and utilities databases, are shown on Figure 6-7. Images of the visible drainage elements on and close to the Site are shown on Figure 6-8, Figure 6-9 and Figure 6-10. The drainage infrastructure on the Site is likely to be in relatively poor condition, due to a lack of maintenance since the Site ceased as an active rail facility. The Easton Park drain is the only known discharge from the Site; however, the extent of surface water flows that enter this drain from the Site is unclear.

From the limited drainage information available, it is expected that rainfall and runoff at the Site is generally drained through a combination of infiltration, evaporation and entering into the local drainage network (condition, connections and discharge points unknown). Observations on-site after rainfall events have recorded that water pools across the Site including at the stormwater pits east of the existing workshop in the north-west corner. This is understood to be due to the limited drainage infrastructure on-site and the drainage infrastructure present not being maintained and becoming blocked.

In large rainfall events, the transverse drainage system that conveys external catchments through the Site is expected to be at capacity, with overland flows entering the Site at numerous locations.
Figure 6. Easton Park drain

KEY

Waterway
Open drainage channel
Photo location
Site boundary
Figure 6: Tributary channel of Easton Park drain

KEY

- Waterway
- Open drainage channel
- Photo location
- Site boundary
Figure 6.10: Easton Park drain and Whites Creek outlets to Rozelle Bay

- Waterway
- Open drainage channel
- Site boundary
**Flooding conditions**

The Site is subject to surface water inputs through both piped drainage discharges and overland flow from external catchments to the north and west. According to Cardno (2014) a significant portion of the Site is inundated by floods as frequently as every five years.

The Site has minimal known formal conveyance other than the Easton Park drain. The main surface outlet from the Site is via a low point on City West Link near The Crescent where water spills over the road and discharges into Rozelle Bay. However, the overtopping of City West Link would only occur in relatively large, infrequent flood events. As the Site is within a topographic low, it receives runoff from relatively steep up-gradient catchments to the north and west. This, combined with the limited capacity of the local drainage network, means that the Site stores floodwater.

The existing flooding conditions for the 20 and 100 year ARI design events are shown in and **Figure 6-12**. The figures highlight the Site functioning as an area of surface water storage. Modelled flood depths for the 20 and 100 year ARI design events are generally less than 0.5 metres across the Site. Areas of higher ground in the north-east section and bordering parts of the southern boundary are outside of the 100 year ARI flood extent.

Flow velocities across the Site during flood events are generally low with associated low erosion potential. For example, in the 100 year ARI event, peak flow velocities are less than 0.5 metres per second across the vast majority of the Site, and typically less than 0.2 metres per second. Zones of faster moving floodwaters up to about two metres per second occur in the vicinity of the existing workshop in the north-west corner of the Site, with corresponding higher potential for erosion and transport of sediments.
Figure 6-11: Estimated flood extent - 20 year ARI event

Key:
- Piped drainage line
- Open drainage channel
- Waterway
- Site boundary
- Hydraulic model extent

20yr ARI flooding depth (m):
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- >1

Source:
Contours, drainage and imagery, LPI 2015
Rozelle Bay flood data, AECOM 2016
Figure 6-12: Estimated flood extent - 100 year ARI event

KEY

- Piped drainage line
- Open drainage channel
- Waterway
- Site boundary
- Hydraulic model extent

100yr ARI flooding depth (m)

0.1 - 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1
>1

Source:
Contours, drainage and imagery, LPI 2015
Rozelle Bay flood data, AECOM 2016

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6.2.3 Potential impacts

Site management works

Water quality

If uncontrolled, the proposal has the potential to result in the following impacts on the water quality of receiving water bodies such as Rozelle Bay:

- Erosion and entrainment of dust, soil and other material in surface water flows from areas where ground disturbance works and excavation have occurred
- Impact on stormwater quality, arising from the interaction of surface water flows with contaminated soils potentially exposed by removal of infrastructure, rail ballast, clearance of vegetation and minor excavation activities
- Impact from the interaction of surface water flows with acid sulfate soils (ASS)
- Leaks or spills of fuel, oils or other chemicals from vehicles, equipment or storage facilities required for the works
- Leaks of residual matter from within redundant services, equipment or machinery before removal as part of the proposal.

The key risk is the potential for mobilisation and transport of contaminants off-site as a result of the interaction of surface water flows with potentially contaminated soils. During the works, various controls would be implemented to reduce the potential for gross pollutants, sediments and other potentially more harmful contaminants from the Site being discharged to Rozelle Bay (see below). These controls would be documented within the EMP (and its sub-plans, including the SWMP and specifically the erosion and sediment control measures within it) for the proposal and implemented by the contractor.

The following sections outline key overarching principles and practices that would underpin the mitigation approach, noting that the Blue Book Volume 2D (DECCW, 2008) should be referred to for further details, sketches and photograph examples of referenced control measures.

Applicable guidelines

The proposal would be designed and maintained in accordance with the following guidelines:

- RMS Code of Practice for Water Management (Roads and Maritime, 1999)
- RMS Erosion and Sedimentation Management Procedure (Roads and Maritime, 2008)

Registered soil conservation consultant

A precautionary assessment of the proposal against the Roads and Maritime Erosion and Sedimentation Management Procedure (2008), recommended that the advice of a registered soil conservation consultant could be sought regarding erosion and sediment control issues. The advice of a registered soil conservation consultant would support the development of the detailed SWMP for the proposal before works commencing. The soil conservation consultant would be retained for the life of the proposed works to provide advice as required.
Management of stormwater runoff from external catchments

The major external catchment inputs are generally controlled and piped across the Site (eg via Easton Park drain); the major exception being the catchment that lies immediately to its west. As there is limited potential to intercept and divert this external catchment around the Site, it would be necessary to convey these flows through the Site using a separate water channel and a sump/pump arrangement discharging to an existing drain. Where this is not possible due to terrain/grade, live services or other constraints, this external runoff would be managed as site water through designed erosion and sediment controls as detailed within the SWMP.

In general, other uncontrolled runoff entering the Site (ie runoff not collected in Easton Park drain or from the west of the Site) would be relatively minor and could be managed onsite if necessary. However, the feasibility of diverting such runoff via bunding or other minor/temporary drainage works should be considered as part of further design development and/or by using stormwater management techniques presented in the SWMP, to reduce as far as possible the volume of ‘site water’ to be managed.

Control of stormwater through the Site

Key principles and practices for the control of stormwater through the Site would include:

- Installing, reviewing and if necessary changing temporary erosion and sediment control measures during site establishment and as the works progress to capture and direct flows to suitable discharge locations ahead of the permanent structures being commissioned.
- Separating ‘offsite’ and ‘site’ water, where possible, via separate drainage channels, (ie water that enters the Site from external drainage channels and which does not interact with Site surface is considered ‘clean’, whereas water that falls and collects on the Site could potentially come in contact with contaminated soils). Site water would be directed to the sediment basins.
- Protecting existing stormwater drains from ‘site water’ surface water flows to ensure that site water does not enter Rozelle Bay via these drains and is managed though appropriate erosion and sediment controls.
- Constructing the permanent drainage structures (eg drainage channels and sediment basins) as early as possible in the program.
- Forming and lining drainage channels to convey concentrated flows through the Site. Suitable lining materials would be identified by assessing soil conditions, flow velocities and associated scour potential, and could include geotextiles, jute matting, turf, rock rip rap, shotcrete or concrete.
- Providing check dams (eg stacked rock, silt fences, hay bales) along drainage channels at appropriate intervals to minimise velocities and assist in settling out sediments.
- Installing culverts or other suitable stabilised crossing arrangements where channels are required to cross internal access roads.

Minimising surface disturbance

Key principles and practices for minimising surface disturbance would include:

- Progressive staging of ground disturbance activities based on ground conditions, proposed activities and expected weather to minimise potential impacts related to the sedimentation and/or contamination of surface water flows (refer to section 6.1).
- Progressively stabilising soils using coverage materials (eg mulch, matting, geotextile, geobinders, topsoil/clean fill and reseeding) in accordance with the recommendations of the soil conservation consultant and contamination expert, as soon as possible.
- Developing a suitable schedule of maintenance/follow-up activities to ensure that the appropriate cover remains in place and performance standards are met.

Erosion control measures (stockpiles)

Key principles and practices to control erosion would include:

- Appropriately locating stockpiles on higher ground, away from concentrated and fast moving flows, and shaping/covering stockpiles to minimise erosion potential by minimising the velocity of runoff over the stockpile. Additional stockpile controls are provided in section 6.1.
Sediment control measures

There is the potential for surface water flows to interact with contamination and loose sediments during the works and transport them across the Site and potentially offsite. To avoid and minimise the chance of this occurring, a number of control measures would be carried out.

To avoid and minimise this impact at the source, the ground disturbance activities would be staged, with each stage stabilised before progressing to the next stage (as discussed above and in section 6.1). This would be to limit the size of disturbed and exposed areas at the Site at any one time and reduce the potential for surface water flows to interact with potential contamination or loose material.

Where surface water flows do occur it would be important to capture and store this water in order to allow sediment or contamination to settle out of suspension and to prevent the surface water flows leaving the Site. As a result, a critical control measure in terms of minimising the risk of transporting contaminants off-site would be the design and operation of a suitable combination of sediment basins.

Figure 6-13 shows an indicative sediment basin layout that would respond to the staging plan shown in Figure 3-1. It is noted that the actual location and size of basins would be subject to a detailed survey of the Site and detailed design of the proposal. This would allow for a better understanding of local flowpaths, the most suitable locations for basins, key constraints and the most efficient basin geometries. In particular, sediment basins would not preferably be located in areas of high contamination and/or where acid sulfate soils may be present close to the residual ground surface.

The final layout and design of the sediment basins and drainage channels would be confirmed before ground disturbing works commencing. This would allow further investigations to be completed which would help confirm the specific location of these features and also allow advice on the design of the basins to be sought from the soil conservation consultant and contamination expert.
Figure 6-13: Indicative sediment basin layout

Construction Staging
Stage 1 - Site Establishment (whole of site)
Stage 2 - Commence Clearing Site & Extend Access Routes
Stage 3 - Continue Clearing & Demolish Railway Platform & Awning
Stage 4 - Continue Clearing & Demolish Port Authority Buildings
Stage 5 - Continue Clearing
Stage 6 - Complete Clearing and Demolish Workshop
Stage 7 - Site Completion & Handover (whole of site)

KEY
- Waterway
- Indicative flowpath implied by current understanding of site topography.
- Indicative temporary sediment basin
- Indicative finished site sediment basin
- Site boundary
- Local government area
- 1m Ground Contours
- Open drainage channel
- Piped drainage line
- Indicative Flowpath (site water)
- Indicative Flowpath (off-site water)

Note:
- The figure shows indicative drainage sediment basins that are flexible and could be adjusted to meet constraints.

Source:
- Contours, drainage and imagery, LP2015

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An example plan and cross section of a typical basin design is shown in Figure 6-14. This basin would contain water by constructing earth embankments above surrounding ground levels. Subject to Site constraints, basins may be excavated below surrounding ground levels (up to two metres below ground level). This would need to be confirmed as part of further design development.

![Figure 6-14: Typical plan and cross-section through sediment basin (Source: Blue Book 1 (Landcom, 2004))](image)

The following conservative basin design criteria have been adopted (based on applying the Blue Book guidance for the basins):

- Worst case soils (Type D (dispersible)/Type F(fine))
- 85th percentile five-day duration rainfall, based on duration of disturbance and sensitivity of receiving environment
- Sediment storage zone sized as 50 per cent of sediment settling zone as specified for type D and F soils (these zones are shown on Figure 6-14).

In addition to the conservative design of the sediment basins, key principles and practices for the control of sediment dispersal would include:

- Using sediment basins to collect runoff and settle out associated sediments and potential contaminants
- Sediment basins would be lined to ensure that high groundwater levels do not reduce the capacity of the basins to store surface water flows
- The sediment basins would be emptied (dewatered) of standing water if heavy rain is expected to ensure that they have the capacity to manage surface water flows
- Stormwater collected in the sediment basins would be sampled and tested in line with standard construction water quality discharge criteria before being discharged or removed from the Site
The sediments settled in the basins would be removed during maintenance, tested and characterised before disposal. Depending on the characteristics of this sediment, these materials may need to be collected, appropriately stored and transported off-site to a suitable licensed waste facility.

In the event of a sediment basin overtopping during a high rainfall event, escaped surface water would be directed overland to a low point of the Site where it would be contained. The surface water would pond and have the opportunity to infiltrate or evaporate over time. Alternatively the ponded water could be pumped back to a sediment basin, once sufficient capacity in the basin has become available, or if it is of suitable quality it would be discharged to the existing drainage system.

Other key principles and practices would include:
- Establishing and implementing a suitable inspection, maintenance and monitoring regime. This would include a review and update of control measures as required
- Storing fuels, chemicals and liquids as far away as feasible and reasonable from drainage channels and areas that are unlikely to be flooded during a 20 year ARI event and on an impervious, bunded area within the Site
- Checking machinery and vehicles daily for leaks of oil, fuel or other liquids
- Washing vehicles and plant within a designated bunded area with an impervious surface
- Keeping accessible emergency spill kits on-site at all times
- Ensuring that the design of drainage channels and sediment basins consider health and safety issues.

**Stormwater drainage infrastructure**

If uncontrolled, the works would have the potential to result in:
- Temporary discharge, resulting in increased flows in the existing drainage network on-site
- Sedimentation, causing blockage to drainage elements on-site.

It is unlikely that the proposal would result in significant impacts on the existing Site drainage infrastructure if the measures below are implemented:
- Despite the proposal involving the removal of vegetation and rail ballast, no new hardstand areas would be introduced to the Site. Temporary access provisions would use permeable material to promote infiltration. As a result, change to runoff is not expected to be significant, and therefore the capacity of the Site’s overall drainage system would not change or be impacted
- Sediment and erosion controls (noted above) would be installed during the works. These controls would remove the potential for sediment build up in collected water to be discharged from the Site. As a result, the increased potential for sediments to build up and cause blockages in the drainage system is minimal
- Connection of temporary site drainage measures (both the temporary drainage channels and sediment basins) to existing stormwater drains (where accessible on the Site) may be required. The availability of a suitable connection point – via an existing surface inlet pit or similar – has been assumed, but would need to be confirmed by the proposal contractor. Temporary connection works that may be required would be minor in nature and could be readily removed on completion of the works.

**Flooding**

The Site is situated in a topographic low relative to its surroundings, and functions primarily as a storage area for floodwaters. The proposal is likely to result in minor reductions (generally up to 500 millimetres) to levels at the Site (refer to section 3.2) and it will also remove a number of structures and buildings. If topsoil is brought to site, the adjusted levels would still be lower (by around 400 millimetres) than the existing site levels.

This would increase the volume of available flood storage. The works are therefore unlikely to result in impacts on flooding mechanisms and extents within the Site or to neighbouring land.
The proposal would have the potential to impact local overland flows and existing minor drainage paths. This is expected to be manageable on-site with the implementation of standard control measures such as:

- Using temporary drainage measures, such as drainage channels
- Storing equipment and other potential obstructions to flood water (e.g., stockpiles) on high ground.

A Flood Evacuation Plan (FEP) would be developed for the proposal to ensure that staff on-site remain safe from floodwaters and potential waterborne contaminants and that equipment is removed or secured at the Site before any flood event. An access route to the south-west of the Site from City West Link is outside the 100 year ARI flood extent, so could act as a suitable flood evacuation route, using the City West Link (west) access.

With the implementation of standard mitigation measures outlined below, the proposal is unlikely to result in significant impacts on water quality, flooding and existing drainage.

**Finished site**

**Water quality**

Limited site management and maintenance activities are expected at the Site once the works are complete. No ground disturbance activities are anticipated. Following completion of the works the surface of the site would be stabilised with an appropriate surface cover in accordance with the recommendations of the soil conservation consultant and contamination expert to minimise the disturbance and movement of soil and fill material at the residual ground surface. Ongoing inspection and maintenance would be required after the completion of the works to ensure the integrity of the cover is maintained. This would also help minimise interactions between surface water flows crossing the Site and residual contaminated soils beneath the surface cover either during typical or heavy rainfall events.

In addition to stabilising the Site, during the works the drainage channels and sediment basins for the finished site would have been constructed and would be operational (refer to section 6.1). These would be located and sized using design criteria consistent with the Blue Book 2D (DECCW, 2009), providing additional mitigation to address the ongoing risk of on-site sediment or contamination polluting off-site surface waters. The basins would allow surface water and sediments to be collected and tested before being discharging or removed from the Site.

In the event of a sediment basin overtopping during a high rainfall event, escaped surface water would be directed overland to a low point of the Site where it would be contained and managed in line with the discussion above.

**Stormwater drainage infrastructure**

The existing stormwater drainage infrastructure on the Site would be retained to enable continued operation after the completion of the works. Ongoing sediment controls (described above) would help ensure no increase in sediment loads, minimising the potential for blockage by sediments.

The existing drainage infrastructure would be protected from surface water flows from the Site to ensure that these flows are managed though the permanent erosion and drainage controls described above.

**Flooding**

After the works have been completed, finished surface levels would be slightly lower than existing surface levels. No material change to extents, depths and velocities is anticipated on this basis. This includes the potential for high flood velocities to mobilise sediments, which is expected to remain low following stabilisation of the Site.
As noted above, following completion of the works the surface of the Site would be stabilised with an appropriate surface cover in accordance with the recommendations of the soil conservation consultant and contamination expert. The new surface cover would help minimise interactions between surface water flows crossing the Site and residual contaminated soils beneath the surface cover during heavy rainfall events, including events that may result in the overtopping of the sediment basins and the flooding of the Site.

A Flood Evacuation Plan (FEP) would be developed for the finished site to ensure that maintenance staff and other personnel visiting the Site remain safe from floodwaters and potential waterborne contaminants once the works are completed. An access route to the south-west of the Site from City West Link is outside the 100 year ARI flood extent and would act as a suitable flood evacuation route, using the City West Link (west) access.

Overall the potential impacts of the finished site on surface water, drainage and flooding are not considered to be significant, provided the appropriate management measures, described below, are put in place.

### 6.2.4 Safeguards and management measures

Environmental safeguards and management measures relating to surface water, drainage and flooding for the proposal are provided in Table 6-4. Related measures are also included in section 6.1.

After the completion of the works the stabilisation controls, drainage channels and sediment basins remaining on-site would need to be managed and maintained to ensure that the integrity of the final ground surface condition is maintained.
### Table 6-4: Summary of surface water, drainage and flooding safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Soil and water – erosion and sediment | The SWMP would include a range of temporary stabilisation measures to manage the risk of erosion and mobilisation of contamination. These controls are largely discussed in **Table 6-2** and **Table 6-3** in **section 6.1**. In addition the SWMP would include measures such as:  
  - Local reshaping of the land to direct runoff towards drainage channels and sediment basins  
  - Stabilisation of exposed soils through suitable surface covering, in accordance with the advice of a soil conservation consultant and contamination expert, followed by progressive stabilisation of the Site as early as possible  
  - The location and design of erosion and sediment control measures to minimise velocities and settle out sediments  
  - Process for monitoring and preparing for wet weather including ceasing works and inspecting sediment controls before and during periods of heavy rainfall  
  - Inspection and maintenance of the sediment and erosion controls would take place at regular intervals to ensure the system is working correctly  
  - Inclusion of post-completion management and maintenance protocols and a management schedule to ensure the integrity of the final ground surface condition is maintained  
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Soil and water - drainage  | The permanent sediment basins would be:  
  - Located and sized using design criteria consistent with the Blue Book 2D (DECCW, 2008)  
  - Lined to ensure that high groundwater levels do not reduce the capacity of the basins to store surface water flows  
  - Emptied (dewatered) of standing water if heavy rain is expected to ensure that they have the capacity to manage surface water flows.  
  Where possible they would not be located in areas of high contamination and/or areas where acid sulfate soils may be present close to the residual ground surface.  
  The design of drainage channels and sediment basins would also consider health and safety issues.                                                                                                                                 | Contractor      | Work preparation/during the works/finished site | Additional safeguard          |
|                             | The SWMP would also include drainage controls for the Site. This would include measures discussed in section 6.1 and:  
  - Inspection and maintenance of the drainage system would take place at regular intervals to ensure the system is working correctly  
  - The direction of runoff and provision of drainage measures during each stage of construction.                                                                                                                                 | Contractor      | Work preparation/during the works             | Additional safeguard          |
<p>| Soil and water - drainage  | In the event of a sediment basin overtopping during a high rainfall event, escaped surface water would be directed overland to a low point of the Site where it would be contained and appropriately managed.                                                                 | Contractor      | During the works/finished site               | Additional safeguard          |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil and water – erosion and sediment</td>
<td>A registered soil conservation consultant and a contamination expert would be engaged to provide advice in relation to methods of stabilisation exposed areas of the Site. These specialists would be retained for the life of the proposal to provide advice as required.</td>
<td>Roads and Maritime</td>
<td>Work preparation/detailed design/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Surface water and sediment quality</td>
<td>Stormwater collected in the sediment basins would be sampled and tested before being appropriately discharged or removed from the Site. Appropriate discharge criteria would be established as part of the future design development and would be documented within the SWMP. The sediments settled in the basins and removed during maintenance would be tested and characterised before being appropriately disposed.</td>
<td>Contractor</td>
<td>During the works/finished site</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Drainage – damage to existing drainage</td>
<td>The location of existing drainage infrastructure at and under the Site would be identified and confirmed with appropriate protection provided.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Drainage – existing drainage</td>
<td>The existing drainage infrastructure would be protected from surface water flows from the Site to ensure that these flows are managed through the temporary and permanent erosion and sediment controls.</td>
<td>Contractor</td>
<td>Work preparation/during the works/finished site</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
<td>Standard/additional safeguard</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>-------------------------------</td>
<td>-------------------------------</td>
</tr>
</tbody>
</table>
| Flooding – construction risk of impact on the floodplain function during a flood event | The contractor would monitor weather conditions to identify potential flood conditions and would manage potential flooding impacts in accordance with the EMP. Examples of appropriate controls include the following:  
  - Temporary drains on-site  
  - Storing equipment and other potential obstructions to flood water on higher ground wherever possible  
  - Local reshaping of the land to direct runoff towards sediment basins and maintain low points across the Site. | Contractor       | During the works              | Additional safeguard         |
| Flood risk                                                           | A Flood Evacuation Plan (FEP) would be developed and implemented for the proposal.                                                                                                                                              | Contractor       | Work preparation/during the works/finished site | Additional safeguard         |
6.3 Resource use and waste management

6.3.1 Existing environment
The Site has remained largely disused for a number of years, and there is evidence of dumping of waste, materials (stockpiles and drums) and machinery from unknown sources. Much of this waste and redundant infrastructure and buildings would be demolished and/or removed as part of the works.

The redundant infrastructure and buildings to be demolished and/or removed includes the following and is shown on Figure 1-2:
- The railway platform and awning, located next to the workshop, in the north-west portion of the Site
- The lighting tower, located between the workshop and the railway platform and awning
- A Port Authority building and warehouse in the east of the Site, east of the Victoria Road bridge
- Disused railway lines, sleepers and ballast, which are present over a large part of the Site, excluding those beneath and to the east of the Victoria Road bridge
- Three large and three small overhead railway gantries
- The workshop, comprising a large shed, in the north-west portion of Site
- Signal shed and annex, located to the south of the workshop
- Soil drums which were characterised as General Solid Waste under the Waste Classification Guidelines
- Stockpiles of varying volumes and materials (railway ballast and mixed soil) scattered throughout the Site
- Other material, including disused vehicles and machinery.

There is potential that additional waste and redundant infrastructure may be present at the Site which have been identified in the current investigations, due to the presence of overgrown vegetation.

In addition to this historical waste, the operation of the crane yard (in the south-east portion of the Site) and the existing security operation at the Site also generates small amounts of general putrescible and vehicular fuel waste.

6.3.2 Potential impacts

Site management works

Resource use
A number of resources would be required to carry out the proposal, such as:
- Geofabric (synthetic fabric used to stabilise soil and prevent erosion)
- Top-soil/clean fill and grass seed (for stabilisation activities)
- Other materials needed for sediment and erosion control (such as silt fences and soil stabilisers)
- Road base for internal access tracks
- Asphalt for minor repairs to the Gordon Street access
- Fuel to operate equipment, site vehicles and machinery.

Utility services required for the work include water and electricity. Details on the indicative volumes and quantities of imported materials and service usage are presented in Table 6-5. The relatively small sizes of resources required are unlikely to put excessive stress on local supply or cause supply or service problems for the local community.
Table 6-5: Estimated resource quantities required for the proposal

<table>
<thead>
<tr>
<th>Material</th>
<th>Estimated quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geofabric(^8)</td>
<td>78,000</td>
<td>Square metres</td>
</tr>
<tr>
<td>Top-soil (clean fill) (^9)</td>
<td>7,800</td>
<td>Cubic metres</td>
</tr>
<tr>
<td>Grass seed (^{10})</td>
<td>78,000</td>
<td>Square metres</td>
</tr>
<tr>
<td>Silt fencing</td>
<td>1,500</td>
<td>Metres</td>
</tr>
<tr>
<td>Silt bags part-filled with BM10</td>
<td>1,000</td>
<td>Bags</td>
</tr>
<tr>
<td>Soil stabiliser (hydro mulch) (^{11})</td>
<td>78,000</td>
<td>Square metres</td>
</tr>
<tr>
<td>Road base</td>
<td>10,000</td>
<td>Square metres</td>
</tr>
<tr>
<td>Asphalt</td>
<td>5,000</td>
<td>Square metres</td>
</tr>
<tr>
<td>Diesel</td>
<td>700</td>
<td>Kilolitres</td>
</tr>
<tr>
<td>Potable water</td>
<td>565</td>
<td>Kilolitres</td>
</tr>
<tr>
<td>Non-potable water</td>
<td>11,760</td>
<td>Kilolitres</td>
</tr>
<tr>
<td>Electricity usage (via the existing substation on Lilyfield Road)</td>
<td>88,100</td>
<td>Kilowatt hour</td>
</tr>
</tbody>
</table>

**Waste management**

The nature and volume of waste generated by the proposal has the potential to impact on the local environment if not managed appropriately. Inappropriately managed waste may have potential adverse impacts on:

- Soil and groundwater quality of the Site and immediate surrounds
- Visual amenity and aesthetic quality of the Site
- Water quality of local drainage channels, watercourses and waterbodies
- Workplace health and safety
- Local ecology by aiding the proliferation and spread of noxious weeds disturbed during clearing and ground disturbance work.

Waste generated by the proposal is mainly associated with the activities for site clearing and demolition/removal of redundant infrastructure. Waste would be generated from:

- Spoil from utility locating and the construction of sediment basins and drainage channels
- Green waste such as grass and other organic materials from vegetation clearance, including noxious weeds
- Stockpiled material, including fill (potentially contaminated) and other waste material
- Waste drums and contents
- Redundant machinery and equipment

---

\(^8\) Geofabric is an option of stabilisation and would not be implemented unless required. Quantity of geofabric is conservative and assumes that all of the area of the Site that would be subject to ground disturbance would need to be covered.

\(^9\) Top-soil (fill) is an option of stabilisation and would not be implemented unless required. Quantity of top-soil (fill) is conservative and estimates a depth of 100mm of top-soil to cover all of the area of the Site that would be subject to ground disturbance.

\(^{10}\) Re-seeding is an option of stabilisation and would not be implemented unless required. Quantity of grass seed is conservative and estimates all of the area of the Site that would be subject to ground disturbance.

\(^{11}\) Hydromulch is an option of stabilisation and would not be implemented unless required. Quantity of hydromulch is conservative.
- Railway lines, ballast and sleepers (potentially contaminated)
- Demolition waste from the removal of on-site buildings and structures, potentially containing asbestos containing material (ACM)
- Items potentially containing asbestos, such as brake shoes, switchboards, sheeting etc
- Wastes associated with redundant utilities including wiring, pipes, conduits, cement, potentially containing asbestos
- General putrescible waste from on-site personnel and workers
- Effluent generated by on-site personnel and workers
- Site setup and process waste from general site reinstatement, including road base, asphalt, gravels, sands, fencing and barricades where access tracks have to be reinstated
- Maintenance waste generated from site plant and vehicle maintenance, for example oil and wash down wastewater.

**Waste classification**

Conservative estimates of the quantity, classification and primary source of major waste streams generated by the proposal are summarised in Table 6-6. The waste classifications are preliminary and subject to change as the proposal progresses and more information is gathered about waste on the Site.

**Table 6-6: Estimated waste generation rates for the proposal**

<table>
<thead>
<tr>
<th>Waste type</th>
<th>Estimated quantity</th>
<th>Measurement unit</th>
<th>Preliminary classification</th>
<th>Primary source/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos</td>
<td>To be confirmed upon testing of materials during the proposal</td>
<td>-</td>
<td>Special waste</td>
<td>Potential presence of asbestos in some structures, stockpiles, ballast, redundant utilities, brake shoes and switchboards, and ACM</td>
</tr>
<tr>
<td>Hazardous material</td>
<td>Minor</td>
<td>-</td>
<td>Hazardous waste</td>
<td>None identified. HazMat surveys would be conducted before the work starts</td>
</tr>
<tr>
<td>Spoil</td>
<td>12,000</td>
<td>Cubic metres</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Utility locating activities, and the construction of sediment basins and drainage channels (spoil and liquid mix)</td>
</tr>
<tr>
<td>Vegetation</td>
<td>8,100</td>
<td>Tonnes</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Site establishment activities and removal of vegetation on-site</td>
</tr>
<tr>
<td>Railway ballast</td>
<td>31,350</td>
<td>Tonnes</td>
<td>General Solid Waste [Special Waste (Asbestos)]</td>
<td>Removal of redundant rail infrastructure and stockpiles</td>
</tr>
<tr>
<td>Railway tracks</td>
<td>1,350</td>
<td>Tonnes</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Removal of redundant rail infrastructure</td>
</tr>
<tr>
<td>Waste type</td>
<td>Estimated quantity</td>
<td>Measurement unit</td>
<td>Preliminary classification</td>
<td>Primary source/s</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>------------------</td>
<td>----------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Timber railway sleepers</td>
<td>2,100</td>
<td>Tonnes</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Removal of redundant rail infrastructure</td>
</tr>
<tr>
<td>Demolition material (including structural steel, metal roofing, concrete, and internal fitout items including chairs and plasterboard walls, ceilings, services and joinery)</td>
<td>1,100</td>
<td>Tonnes</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Demolition of railway platform and awning, Port Authority building and warehouse, and workshop</td>
</tr>
<tr>
<td>Track and sleeper stockpile</td>
<td>400</td>
<td>Tonnes</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Removal of stockpiles</td>
</tr>
<tr>
<td>Drums and contents</td>
<td>40 (total for all drums)</td>
<td>Cubic metres</td>
<td>General Solid Waste (non-putrescible)</td>
<td>185 drums present on-site</td>
</tr>
<tr>
<td>Fill and other unknown material in stockpiles</td>
<td>2,400</td>
<td>Cubic metres</td>
<td>General Solid Waste (non-putrescible) (aside from material classified as Special Waste (Asbestos))</td>
<td>A number of stockpiles of mixed soil are present on-site</td>
</tr>
<tr>
<td>Other miscellaneous unknown waste on-site (including redundant vehicles and machinery)</td>
<td>20</td>
<td>Tonnes</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Remaining unidentified material that has been stored on-site</td>
</tr>
<tr>
<td>General municipal waste – food waste</td>
<td>12,600</td>
<td>Kilograms</td>
<td>General Solid Waste (putrescible)</td>
<td>Demolition staff/contractors facilities</td>
</tr>
</tbody>
</table>

13 Estimate based on a conservative upper limit of 50 demolition contractors working an average of ten hours/day, six days/week on-site for 49 weeks.
<table>
<thead>
<tr>
<th>Waste type</th>
<th>Estimated quantity</th>
<th>Measurement unit</th>
<th>Preliminary classification</th>
<th>Primary source/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recyclables</td>
<td>4,000</td>
<td>Kilograms</td>
<td>General Solid Waste (non-putrescible)</td>
<td>Demolition staff/contractors facilities</td>
</tr>
<tr>
<td>Sewage effluent</td>
<td>1,500</td>
<td>Kilolitres</td>
<td>Liquid Waste</td>
<td>Site employees</td>
</tr>
</tbody>
</table>

**Finished site**

**Resource use**

After the completion of the proposal, it is expected that only limited use of resources would be needed to facilitate the ongoing management of the Site and service the site offices. This may include electricity, and potable and non-potable water supply. The demand for these resources from the operation of the finished site is unlikely to cause supply or service problems for the local community.

**Waste management**

The Site would be left vacant after the works have been completed, resulting in the generation of only minimal amounts of green waste, general putrescible waste and vehicle oils/grease during ongoing maintenance activities (including maintenance of sediment and erosion controls). Table 6-7 shows the wastes that would be generated for the finished site.

**Table 6-7: Estimated waste generation rates for the finished site**

<table>
<thead>
<tr>
<th>Waste type</th>
<th>Estimated Quantity</th>
<th>Measurement Unit</th>
<th>Classification</th>
<th>Primary Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Putrescible</td>
<td>Minor</td>
<td>-</td>
<td>General Solid Waste (putrescible)</td>
<td>Generated from site offices for ongoing maintenance</td>
</tr>
<tr>
<td>Sewage effluent</td>
<td>Minor</td>
<td>-</td>
<td>Liquid Waste</td>
<td>Generated from site offices for ongoing maintenance</td>
</tr>
<tr>
<td>Oils and wastewater</td>
<td>Minor</td>
<td>-</td>
<td>Liquid Waste</td>
<td>Generated from site offices and vehicles during ongoing maintenance, and minor dewatering of sediment basins if required</td>
</tr>
</tbody>
</table>

14 Estimate based on a conservative upper limit of 50 demolition contractors working an average of ten hours/day, six days/week on-site for 49 weeks.
15 Estimate based on a conservative upper limit of 50 demolition contractors working an average of ten hours/day, six days/week on-site for 49 weeks.
6.3.3 Safeguards and management measures

The management of waste generated during the works would be guided by the Waste and Resource Management Plan (WMP). The WMP would aim to:

- Minimise the waste generated during demolition work and effectively reuse and recycle waste materials where possible, rather than dispose waste to landfill
- Store, handle, transport, and dispose of waste in an environmentally-responsible manner that does not cause harm or contamination to soil, air or water
- Provide guidance and controls on the classification of waste and safe treatment and disposal of contaminated and hazardous waste, including asbestos.

The WMP would include procedures for the classification of waste. Waste classification would be carried out in accordance with the Waste Classification Guidelines (NSW EPA, 2014). As a minimum, waste, including waste soils and objects, would be separated, sampled and tested for a range of key potential contaminants. Based on the classification, waste would be disposed of to an appropriately licensed waste facility.

In order to minimise waste generated by the proposed work, and reduce the need to acquire additional resources, materials would be sourced locally where possible. Site soils would also be reused on-site if they are of an acceptable quality. Sampling and testing in accordance with the National Environmental Protection Measure (NEPC 2013) would be carried out to confirm this before material is reused on-site. Based on sampling carried out and described in section 6.1.2, material in existing stockpiles and drums would not be reused. The potential reuse of ballast is discussed below.

The appointed contractor would be required to investigate options for using materials with recycled content during procurement, where these options are considered cost and performance effective. The contractor would also identify and carry out water saving measures and investigate options to improve energy efficiency where possible.

Orders and exemptions

An assessment of the suitability for reusing railway ballast would be carried out in accordance with the Recovered Railway Ballast Exemption 2014 (NSW EPA, 2014), under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 (NSW) and the Recovered Railway Ballast Order 2014 (NSW EPA). An exemption would need to be obtained from the NSW EPA.

The preliminary results of the limited sampling carried out on the ballast (refer to section 6.1.2) indicate that the ballast does not meet the requirements of the Recovered Railway Ballast Order 2014. This means the ballast may need to be disposed of off-site. However, the WMP would include provisions for stockpiling and additional testing of ballast during the work, to allow for assessment against the Recovered Railway Ballast Order 2014 and the Waste Classification Guidelines (NSW EPA, 2014). Results from this assessment may differ from the preliminary assessment, and therefore there is a potential that the ballast may be reused on-site or on another Roads and Maritime project.
Resource use and waste management measures have been developed in accordance with the above objectives and are summarised in Table 6-8. In addition to the measures described below, some management measures associated with waste management have been discussed in section 6.1. These include:

- The SWMP would outline measures for monitoring, handling, storing, testing and managing contaminated material
- The SWMP includes measures for separating soil and ballast into stockpiles according to odours, staining, and other environmental indicators
- The SWMP would contain specific controls about the stockpiling of soils and ballast
- The AMP includes measures for managing and handling of asbestos
- A hazardous material survey would be conducted early in the proposal and would include information on asbestos, PCBs, lead paint for example.
Table 6-8: Summary of resource use and waste management safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource use and waste management - general</td>
<td>A Waste and Resource Management Plan (WMP) would be prepared and carried out as part of the EMP. The WMP would include:</td>
<td>Contractor</td>
<td>Detailed design/works preparation/during the works</td>
<td>Core standard safeguard W1</td>
</tr>
<tr>
<td></td>
<td>• Measures to avoid and minimise waste associated with the proposal</td>
<td></td>
<td>Section 4.2 of QA G36 Environment Protection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Classification of wastes and management options (reuse, recycle, stockpile, disposal)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Statutory approvals required for managing both on- and off-site waste, or application of any relevant resource recovery exemptions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Procedures for storage, transport and disposal of waste materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plans for monitoring, record keeping and reporting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Measures to manage the removal of vegetation waste, which would be carried out in accordance with Roads and Maritime Specification G40 (Clearing and Grubbing).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The WMP would be prepared, taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant Roads and Maritime waste fact sheets.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
<td>Standard/additional safeguard</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>---------------------------------------------</td>
<td>------------------------------</td>
</tr>
</tbody>
</table>
| Resource efficiency and waste minimisation  | The WMP would include cleaner production measures to maximise resource efficiency and minimise waste, including:  
|                                             | • Staging demolition of buildings so that components can be salvaged for reuse and recycling  
|                                             | • Adopting demolition techniques to minimise waste volumes generated  
|                                             | • Application of efficient demolition processes to ensure resourcefulness in the use of energy, water, and natural resources  
|                                             | • Inclusion of resource efficiency and waste minimisation procedures in contracts to encourage demolition contractors to consider environmental management objectives  
|                                             | • Providing separate waste containers/skips to ensure waste material segregation and maximise the opportunities for reuse and recycling  
|                                             | • Safely storing and disposing of residual demolition waste, ensuring the least amount of harm to the surrounding environment  
<p>|                                             | • Minimising site disturbance to avoid unnecessary excavation.                                                                                                                                                        | Contractor      | Works preparation/during the works          | Additional safeguard          |
| Resource procurement                        | The contractor would be required to investigate ways to reuse materials on-site, or source material from other Roads and Maritime projects where possible.                                                                  | Contractor      | Works preparation/during the works          | Additional safeguard          |
| Resource procurement                        | Procurement would aim to use materials with a recycled content and low carbon footprint where they are cost and performance effective.                                                                                  | Contractor      | Works preparation/during the works          | Additional safeguard          |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste management – contaminated/hazardous material</td>
<td>Handling, storage and disposal of contaminated waste, including asbestos would be carried out in accordance with the SWMP, WMP and the AMP (where applicable).</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Waste classification</td>
<td>All waste would be classified in accordance with the Waste Classification Guidelines (NSW EPA, 2014).</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Waste management practices</td>
<td>Waste stockpiled at the Site would be located with consideration to environmental factors such as site slope, drainage, surrounding native vegetation, and the location of waterways, drainage channels and sediment basins.</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Waste management – contaminated/hazardous material</td>
<td>Contaminated or potentially contaminated waste would be separated from potentially clean waste.</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Waste management – disposal</td>
<td>A licensed waste management contractor would be used to remove waste from the Site for reuse, recycling or disposal.</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Waste management - reuse and disposal</td>
<td>Materials to be reused would be analysed and assessed in accordance with the ASC NEPM and, in regards to ballast, the Recovered Railway Ballast Order 2014, to ensure material is not contaminated and reuse is appropriate. Material not suitable for reuse or recycling would be disposed of to an appropriate facility.</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Waste monitoring</td>
<td>A waste register would be prepared, used and maintained by the contractor to track all wastes generated from the proposal. All records for the disposal of waste would be retained and kept readily accessible for inspection by relevant regulatory authorities.</td>
<td>Contactor</td>
<td>Works preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
<td>Standard/additional safeguard</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Waste monitoring</td>
<td>On-site waste monitoring and auditing procedures would be developed for the proposal, identifying each waste stream, volumes produced, and waste management practices.</td>
<td>Contactor</td>
<td>Works preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Waste management practices</td>
<td>New waste streams would be addressed as they arise and assessed to determine the most suitable management measures to use when handling, storing, transporting and disposing of the waste.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
6.4 Non-Aboriginal heritage

A heritage impact assessment (HIA) has been prepared for the proposal (GML, 2016). This assessment is provided in Appendix D.

6.4.1 Methodology

The HIA assesses the potential impacts of these works on non-Aboriginal archaeology, built heritage and the industrial context of the Site.

The HIA has been prepared using the following method:

- Desktop assessment, including a review of environmental planning instruments and searches of relevant heritage registers to identify registered heritage sites and conservation areas within and surrounding the Site, and a review of the relevant legislation and previous studies or assessments of the Site
- Site inspections (June, July and September 2016) to confirm the physical nature of the Site and determine whether any of the remaining elements on-site have heritage significance
- Identification and assessment of potential impacts on heritage values and provision of management measures that are needed to minimise or manage these impacts.

The HIA was prepared with reference to the NSW Heritage Office guideline Statements of Heritage Impact (2002). In order to clarify the potential impacts of the proposed works, GML Heritage Pty Ltd (GML) developed a ranking for measuring the severity of potential impacts on heritage values. This ranking is explained in Table 6-9.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major adverse</td>
<td>Actions which would have a severe, long-term and possibly irreversible impact on the heritage values of an item. Actions in this category would include partial or complete demolition of a heritage item or addition of new structures in its vicinity that destroy the visual setting of the item. These actions cannot be fully mitigated.</td>
</tr>
<tr>
<td>Moderate adverse</td>
<td>Actions which would have an adverse impact on the heritage values of an item. Actions in this category would include removal of an important part of a heritage item’s setting or temporary removal of significant elements or fabric. The impact of these actions could be reduced through appropriate mitigation measures.</td>
</tr>
<tr>
<td>Minor adverse</td>
<td>Actions which would have a minor adverse impact on the heritage values of an item. This may be the result of the action affecting only a small part of the place or a distant/small part of the setting of a heritage place. The action may also be temporary and/or reversible.</td>
</tr>
<tr>
<td>Neutral</td>
<td>Actions which would have no heritage impact.</td>
</tr>
<tr>
<td>Minor positive</td>
<td>Actions which would bring a minor benefit to the heritage values of an item, such as an improvement in the item’s visual setting.</td>
</tr>
<tr>
<td>Moderate positive</td>
<td>Actions which would bring a moderate benefit to the heritage values of an item, such as removal of intrusive elements or fabric or a substantial improvement to the item’s visual setting.</td>
</tr>
<tr>
<td>Major positive</td>
<td>Actions which would bring a major benefit to the heritage values of an item, such as reconstruction of significant fabric, removal of substantial intrusive elements/fabric or reinstatement of an item’s visual setting or curtilage.</td>
</tr>
</tbody>
</table>
6.4.2 Historical land use

In the late nineteenth to early twentieth century, the local landscape was characterised by industrial and port activities, including the White Bay Power Station and the Glebe Island Container Terminal. Before the development of the Rozelle Rail Yards in 1916, the Site contained a range of industries, including glass manufacture, meat preserving, a saw mill and soap production. These industries were mainly carried out in the eastern portion of the Site between Gordon Street and Victoria Road.

Residential properties were also present in the local area during this time, including those on Lilyfield Road, north of the eastern portion of the Site. The western portion of the Site formed part of Rozelle Bay.

The Rozelle Rail Yards were established in 1916, when the double rail track from Dulwich Hill to Rozelle and Glebe Island was opened, creating a separate railway for the transport of freight. The Rozelle Rail Yards were originally developed as a holding yard for goods travelling to Darling Harbour. The Rozelle Rail Yards were created by filling in much of the Whites Creek estuary, and through the quarrying of the sandstone outcrops situated along the foreshore. Figure 6-15 shows an early image of the Rozelle Rail Yards.

![Figure 6-15: An early image of the Rozelle Rail Yards looking west towards Catherine Street Bridge (Source: Oakes J, 2002)](image)

During operation of the Rozelle Rail Yards, the Site contained a locomotive depot and infrastructure such as an engine shed, turntable, water columns and coal storage facilities. During World War II the locomotive depot was removed and the Rozelle Rail Yards became a storage area for the American Army.

After World War II, the Rozelle Rail Yards served a range of freight functions, including the transportation of grains and later coal in the 1960s. The last train of grain arrived at the Site in 1988. The freight line from Pymont to Rozelle then closed in 1996. After this closure the Site was still used periodically, serving functions such as the unloading of wheat and storage of concrete. The Site was completely closed in around 2007.
Since the decline in the use of the yards from 1996, there has been a high degree of modification to the Site. While the yards have largely been cleared of the infrastructure that related to their former uses, a number of redundant items of rail infrastructure and work sheds remain in varying states of degradation on the Site.

None of the remaining rail infrastructure is heritage-listed. However, the southern penstock in the eastern part of the Site has been identified as a component of the cooling water system associated with the State heritage listed White Bay Power Station. While not included within the listed State heritage register curtilage of the White Bay Power Station, the southern penstock has been identified in the White Bay Power Station Conservation Management Plan (CMP) (Design 5 Architects, 2004) as being of ‘High Significance’.

6.4.3 Existing environment

Heritage significance

Heritage values within the Site
The Rozelle Rail Yards as a whole has a moderate degree of historic importance for its function within the wider network of the former goods line. However, the Site has experienced a high degree of interference and alterations to its original form. It displays a low level of overall intactness and retains only a few industrial features dating to the early periods of its use as a train marshalling yard. This has impacted on the ability of the area to contribute to broader industrial heritage values.

The southern penstock is located in the north-eastern corner of the Site, east of the Victoria Road bridge. The southern penstock is closely associated with the White Bay Power Station, forming part of the power station cooling water system, which was integral to the operation of the complex. While not included within the listed State heritage register curtilage of the White Bay Power Station, the southern penstock is identified as being of ‘High Significance’ in the White Bay Power Station CMP for the important role it plays in strengthening and supporting the significance of the place.

The CMP provides the management policies for the State heritage values of all components of the White Bay Power Station complex, including the penstocks. Based on this the southern penstock has been classified by GML as being of State significance despite it having no formal local or State heritage listing.

While there are no locally-listed heritage items on the Site, some items have been assessed as having local heritage significance associated with the former use of the Site. These items are considered to be representative of the operation of the Rozelle Rail Yards in the first part of the twentieth century and include:
- The Victoria Road bridge, which dates from the 1920s and is an example of the brick overbridges built as part of the separation of the freight rail lines across Sydney
- The sandstone cutting, which is a representation of the nature of works carried out to develop the Rozelle Rail Yards and also has potential links to quarrying activities on Glebe Island
- A lighting tower, which dates from around the 1930s to 1950s and indicates the Site’s former use as a railway yard and is one of the few intact elements remaining within the Site.
In addition, the Port Authority building in the eastern portion of the Site, which likely dates from the late 1940s, has been classified as having potential local significance as it retains a good degree of intactness internally (notably the staircase) and externally and is representative of the early post-war period of Sydney architecture, combining late Art Deco and Bauhaus-style detailing in a structure influenced by Functionalist design in Europe in the 1930s.

However, there is a lack of evidence regarding its history, construction, use and association with other facilities or buildings in the rail yards. The later addition to this building, referred in this report as the Port Authority warehouse, is not considered to have heritage significance.

Photographs of these items are shown in Figure 6-16 and the staircase within the Port Authority building is shown in Figure 6-17.

Other items on the Site associated with its previous uses include the signal shed and annex, railway gantries, rail tracks, traffic control and rail marshalling machinery and platform structures. These items have been identified by GML as having neutral heritage significance against the NSW heritage criteria.
Figure 6-16: From left to right, the southern penstock, inside the southern penstock, the Victoria Road bridge, the lighting tower, the sandstone cutting, the Port Authority building, with warehouse behind (Source: GML, 2016)
**Figure 6-17: The staircase inside the Port Authority building (source: GML, 2016)**

**Heritage values within the vicinity of the Site**

Registered heritage items in the vicinity of the Site include both State and locally-listed items and are listed below in **Table 6-10**.

**Table 6-10: Listed heritage items in the vicinity of the Site**

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Level of significance</th>
<th>Listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lilyfield Road Stormwater Canal, Rozelle (also known as Easton Park drain)</td>
<td>Local</td>
<td>SREP 26(^1)</td>
</tr>
<tr>
<td>Cadden Le Messurier, 84 Lilyfield Road, Rozelle</td>
<td>Local</td>
<td>SREP 26</td>
</tr>
<tr>
<td>Former Hotel, 78 Lilyfield Road, Rozelle</td>
<td>Local</td>
<td>SREP 26</td>
</tr>
<tr>
<td>Arched Bridge, Whites Creek, Annandale</td>
<td>Local</td>
<td>SREP 26</td>
</tr>
<tr>
<td>Railway Bridge, Railway Parade, Annandale</td>
<td>Local</td>
<td>SREP 26, Railcorp S170</td>
</tr>
<tr>
<td>Catherine Street Railway Bridge, Lilyfield</td>
<td>Local</td>
<td>SREP 26, Railcorp S170</td>
</tr>
<tr>
<td>White Bay Power Station Complex, Rozelle</td>
<td>State</td>
<td>Heritage Act - State heritage register, SREP 26, Sydney Harbour Foreshore Authority S170</td>
</tr>
<tr>
<td>Sewage Pumping Station No 6 (SP0006), within Easton Park</td>
<td>Local</td>
<td>Sydney Water S170</td>
</tr>
<tr>
<td>Brennan’s Estate Heritage Conservation Area C16</td>
<td>Local</td>
<td>Leichhardt LEP 2013(^2)</td>
</tr>
<tr>
<td>Easton Park Heritage Conservation Area C18</td>
<td>Local</td>
<td>Leichhardt LEP 2013</td>
</tr>
<tr>
<td>Hornsey Street Heritage Conservation Area C19</td>
<td>Local</td>
<td>Leichhardt LEP 2013</td>
</tr>
<tr>
<td>Easton Park I752</td>
<td>Local</td>
<td>Leichhardt LEP 2013</td>
</tr>
</tbody>
</table>
The Lilyfield Road Stormwater Canal (also known as Easton Park drain) is a listed heritage item for the portion that is present above ground surface in the industrial area to the north of the Site. This canal also extends beneath the Site and discharges into Rozelle Bay; however the portion beneath the Site is not listed on a heritage register. No physical inspection was carried out on the portion below the Site to enable an assessment of the elements present and their relative heritage significance.

The White Bay Power Station is listed on the State heritage register and is strongly associated with the Rozelle Rail Yards, as it was built to supply power to the rail network in the region. The rail corridor is recognised as a key component of the historic industrial, transport and maritime landscape of the area in the White Bay Power Station CMP.

The potential and known heritage values within the Site and surrounding area are shown on Figure 6-18.

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The whole drainage channel, including both the above and below ground portions is referred to as the Easton Park drain in this REF.
Figure 6-18: Locations of non-Aboriginal heritage items

KEY
- Site boundary
- LGA Boundary
- State Heritage Register
- State Heritage Act
- SREP Heritage Register
- SREP 26 - City West
- S170 Agency Register
- S170 RailCorp Item
- S.170 Sydney Water Item
- GML 2016
- Heritage Conservation Area
- General
- Landscape
- Heritage item (not listed)

State Heritage Register
5051335, White Bay Power Station
5051544, Callan Park Conservation Area & Buildings
5051443, Sewage Pumping Station 27
5045444, Glebe Railway Viaduct

Leichhardt LEP2013 Heritage Register
City of Sydney LGA
C1. Arannadale Heritage Conservation
C16. Brennan’s Estate Heritage Conservation Area
C18. Easton Park Heritage Conservation Area
C19. Hornsey Street Heritage Conservation Area
0. Federal Park
02. Railway Viaduct
E30. Johnstons Creek

S170 Agency Register
Sydney Water S170
17. Whites Creek Channel
18. Sewage Pumping Station No 6 (SP0006)
Railcorp S170
4803231, Railway Bridge - Catherine Street Lilyfield
4803232, Railway Truss Bridge - Johnston Street Annandale
4803231, Railway Bridge - Railway Parade Annandale

S170 Heritage Register
17. Whites Creek Channel
18. Sewage Pumping Station No 6 (SP0006)

Leichhardt LEP 2013 Heritage Register
C1. Arannadale Heritage Conservation
C16. Brennan’s Estate Heritage Conservation Area
C18. Easton Park Heritage Conservation Area
C19. Hornsey Street Heritage Conservation Area
0. Federal Park
02. Railway Viaduct
E30. Johnstons Creek

SREP 26 Heritage Register
2. Former Hotel - 78 Lilyfield Road
3. "Cadden Le Messurier" - 84 Lilyfield Road
4. Sewerage pumping station - Roberts Street
6. Stormwater Canal - Lilyfield Road
7. Railway Bridge - Railway Parade
8. Arched Bridge - Whites Creek
9. Railway Truss Bridge - Johnston Street
11. White Bay Power Station complex
12. Catherine Street railway bridge
Assessment of archaeological potential

In addition to the potential heritage items identified, the Site has the potential to contain items of historical archaeological potential. Archaeological evidence is likely to be associated with the two phases of European occupation at the Site; namely, the industrial use from the 1880s to 1916 and the use of the Site as the Rozelle Rail Yards from 1916 onwards.

Potential archaeological evidence associated with the first phase of European occupation may be present in the north-eastern part of the Site. If present, this evidence would be associated with potential remains of the industrial buildings, artefacts or deposits and landscape modifications carried out in order to use the Site. There is a low potential for archaeological evidence of this first phase along the northern boundary of the Site, due to the quarrying that has taken place.

There is no historical archaeological potential in the north-eastern portion or in the western portion of the Site. Except in connection with inventoried items (such as the penstock), these areas are undeveloped, reclaimed foreshore areas, or have been previously subject to quarrying.

Should any remains, be present below fill in the south-eastern portion of the Site, they may consist of structural remains and artefact deposits associated with the industries located there in the nineteenth century.

Based on the conclusions of the HIA (refer to Appendix D), there is a low or moderate potential for the Site to contain archaeological evidence in the form of ‘relics’ of local significance in the north-eastern portion of the Site only. Areas of archaeological potential are shown on Figure 6-19.

Material evidence associated with the use of the Site as the Rozelle Rail Yards (ie the second phase of use) exists on the surface of the Site in the form of rail infrastructure. There may also be archaeological evidence associated with this phase of the Site’s history below the ground surface.

This evidence may be classified as ‘works’ as opposed to ‘relics’ under the Heritage Act 1977 (NSW) (Heritage Act), as these material elements do not meet the criteria to be considered ‘relics’, and are not likely to contain or be associated with deposits containing ‘relics’. Items classified as ‘works’ do not have statutory protection unless they are listed on a heritage schedule under the Heritage Act or EP&A Act. The rail infrastructure on-site has not been listed on a heritage schedule and the listing of these items is not considered necessary. Therefore these archaeological works, if they did exist, would not have heritage significance.
6.4.4 Potential impacts

Site management works
The proposed changes to the Site as part of the proposal, including demolition and removal of redundant rail infrastructure and buildings, have the potential to result in a minor adverse impact on the heritage of the local area. The local industrial character has changed over time and the Site now exists as one of a fragmented series of industrial areas including the White Bay Power Station, the Darling Harbour goods yard and Glebe Island. The Site has experienced a substantial loss of integrity through change in use and abandonment, and is now in a largely disused state.

Although not within the curtilage of the White Bay Power Station, the southern penstock was identified by GML as being of State significance, due to its association with the State heritage listed White Bay Power Station. The proposed works would not directly affect the southern penstock. During the works, an exclusion zone would be set up around the southern penstock to protect it from direct and indirect damage. Based on this, the proposal would have a neutral heritage impact on the southern penstock.

The Victoria Road bridge has been identified by GML as containing potential local heritage significance, due to its association with the development of freight rail lines in the region in the early twentieth century. Works including waste removal and vegetation clearing would be carried out beneath the Victoria Road bridge; however no activities are proposed to be to be carried out that would directly impact the Victoria Road bridge and therefore neutral heritage impacts are expected.

The sandstone cutting has been identified by GML as containing local heritage significance as it is a representation of the nature of works carried out to develop the Rozelle Rail Yards and also has potential links to quarrying activities on Glebe Island.

Figure 6-19: Historical archaeological potential at the Rozelle Rail Yards (Source: GML, 2016)
The proposed works in the vicinity of the sandstone cutting would include trimming of vegetation from the walls using minimal impact techniques (e.g., pruning), with no destructive removal of vegetation, to ensure the rock face remains intact. The sandstone cutting itself is not proposed to be affected by the works and, as a result, there would be a neutral heritage impact.

The lighting tower has been identified by GML as containing local heritage significance, given its association with the use of the Site as a railway yard. Further information describing the lighting tower is provided in the inventory sheets in the HIA, refer to Appendix D. The removal of the lighting tower would have a minor adverse impact on the heritage integrity of the Site (through the loss of representative features). Archival recording of the lighting tower would be carried out before it is removed.

The Port Authority building has been identified by GML as containing local heritage significance (not listed), due to its relatively intact building form and layout dating from the early post-war period, and some original interior features, in particular the Functionalist influenced internal staircase. Removal of Port Authority building would result in major adverse heritage impact on the item but only a minor impact on heritage values of the area. The significance of the building derives chiefly from its intact and representative interior and not from any major contribution to landscape character. It makes some contribution to the wider industrial and transport history of Glebe Island, White Bay Power Station and the Darling Harbour goods yard, a setting that has experienced a substantial loss of integrity, through change in use, abandonment, loss of original fabric and decommissioning. Removal of the building would therefore have only a minor impact on heritage values of the area.

Other rail infrastructure now on-site, such as the signal shed and annex, railway gantries, tracks, remnant traffic control and rail marshalling machinery and platform structures, are considered to contribute less to the Site’s heritage value. It is therefore anticipated that the removal of these items would have a neutral heritage impact. Nevertheless, where practicable, the lighting tower and overhead rail gantries would be removed and stored off-site to be considered for potential reuse as interpretative features.

The proposal is not anticipated to impact on nearby heritage sites (for example, the former hotel, Cadden Le Messurier and the Catherine Street bridge) due to the distance of these items from the Site.

It is noted that the locally-listed Lilyfield Stormwater Canal (also known as the Easton Park drain) extends beneath the Site. The part of the drain below the Site is not listed but could have some archaeological potential. The main ground disturbing works are generally limited to the top 500 millimetres of ground surface and are therefore unlikely to be at a depth sufficient to intercept the drain. Deeper excavations for the establishment of sediment basins would be located away from the drain. As the depth of works is unlikely to intercept the Lilyfield Stormwater Canal, no impacts on this heritage item is expected.

There is neutral to moderate potential for archaeology relating to evidence from the first phase of European occupation of the Site, where the Site was used for industrial purposes. The proposal would remove ballast to a depth of about 500 millimetres below ground surface, to fill material. Deeper excavations for the establishment of sediment basins are proposed in areas of no archaeological potential (refer to Figure 6-19).

As the proposal would be carried out in previously-disturbed areas of the Site, including within fill material, and in areas of no archaeological potential, it is unlikely that evidence from this first phase of occupation would be encountered. As such, the proposal is unlikely to impact on potential historical archaeology.
Archaeological potential associated with evidence of the use of the Site as part of the former Rozelle Rail Yards is present on-site, in the form of rail infrastructure. The proposal would impact on this phase as remnant infrastructure and redundant services are to be removed from the Site. These material elements have been classified as ‘works’ which are not registered and therefore do not have heritage significance.

Potential vibration impacts on heritage items as a result of the proposal are discussed in section 6.8. Vibration generating works are likely to be far enough away from the heritage items to avoid vibration impacts; however vibration levels would be confirmed by site measurements at the start of the works.

Overall the potential impacts of the proposal on non-Aboriginal heritage are not considered to be significant, provided the appropriate management measures, described below, are put in place.

**Finished site**

Minimal maintenance works would need to be carried out during the finished site. These works would not need ground disturbance activities or activities affecting the Victoria Road bridge or the southern penstock.

Some vegetation pruning may be needed to control plant growth on the sandstone cutting. Pruning of vegetation would be carried out by non-destructive techniques such as trimming, rather than pulling the vegetation out from the wall.

Due to the minimal amount of works needed for this phase and the carrying out of appropriate management measures, activities during the finished site would not impact on non-Aboriginal heritage values.

Overall the potential impacts of the finished site on non-Aboriginal heritage values are not considered to be significant, provided the appropriate management measures, described below, are put in place.

**6.4.5 Safeguards and management measures**

Measures to manage potential non-Aboriginal heritage impacts during and after the works are outlined in Table 6-11.
Table 6-11: Summary of non-Aboriginal heritage safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Aboriginal heritage – general</td>
<td>A Heritage Management Plan (HMP) would be prepared and implemented as part of the EMP. It would provide specific guidance on measures and controls to be carried out to avoid and mitigate potential impacts on non-Aboriginal heritage.</td>
<td>Contractor</td>
<td>Detailed design/work preparation/during the works</td>
<td>Core standard safeguard H1 Section 4.10 of QA G36 Environment Protection</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – unexpected finds</td>
<td>After vegetation clearance, any previously unsurveyed sections of the Site would be examined by an archaeologist to identify the presence of previously unidentified potential heritage items. Any additional items identified would be managed in accordance with the Roads and Maritime Unexpected Heritage Items Procedure (2015).</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – unexpected finds</td>
<td>The Unexpected Heritage Items Procedure (Roads and Maritime, 2015) would be followed in the event that any unexpected heritage items, archaeological remains or potential relics of non-Aboriginal origin, including the extension of the Lilyfield Road stormwater canal, are encountered. Work would only restart once the requirements of that procedure have been satisfied. Should elements of listed heritage items be identified during the works (eg the Lilyfield Road stormwater canal), they would be retained in situ.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Core standard safeguard H2 Section 4.10 of QA G36 Environment Protection</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – archaeological potential</td>
<td>Excavations beneath the ballast and into the underlying fill/soil would not be carried out in areas of low or moderate archaeological potential or above the continuation of the Lilyfield Road stormwater canal or other services.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
<td>Standard/additional safeguard</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – interpretation</td>
<td>Where practicable, the lighting tower and overhead rail gantries would be removed and stored off-site. This would potentially enable these elements to be incorporated as urban design features which interpret the Rozelle Rail Yards industrial history in a future development of the Site.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – Port Authority building</td>
<td>Removal of the Port Authority building would be carried out only after full archival recording in accordance with NSW guidelines <em>How to Prepare Archival Records of Heritage Items</em> has been carried out (NSW Heritage Office, 1998).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – southern penstock</td>
<td>A three metre exclusion zone would be installed around the southern penstock to protect it from accidental damage during the works. No works other than vegetation management would take place in this exclusion area.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – Victoria Road bridge</td>
<td>Any works beneath the Victoria Road bridge, including vehicle and equipment movements, would be conducted with care to avoid potential damage to the bridge.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – sandstone cutting</td>
<td>Vegetation clearing works on the face of the sandstone cutting would be carried out being careful to avoid any impact on the surface of the cutting (eg with hand tools if possible). Vegetation would not be cleared from the top of the sandstone cutting.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Non-Aboriginal heritage – lighting tower</td>
<td>Removal of the lighting tower would be carried out only after full archival recording in accordance with NSW guidelines <em>How to Prepare Archival Records of Heritage Items</em> (NSW Heritage Office, 1998).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
6.5 Aboriginal heritage

An Aboriginal heritage due diligence assessment has been carried out for the proposal in accordance with Stage 2 of the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime 2011). This Stage 2 assessment is provided in Appendix E.

6.5.1 Methodology

The Stage 2 PACHCI assessment was carried out based on the findings of the Stage 1 PACHCI assessment, which concluded that a survey of the Site was necessary to determine the likely extent of any potential impacts (direct and indirect), and to identify appropriate mitigation measures.

The assessment was carried out using the following method:

- A desktop assessment, involving:
  - A search of the OEH’s Aboriginal Heritage Information Management System (AHIMS) database
  - A review of the landscape context of the study area
  - A review of relevant archaeological and ethno-historic information for the study area
  - Identification of areas of potential Aboriginal archaeological sensitivity within the study area
- Consultation with the Metropolitan Local Aboriginal Land Council (MLALC), which was identified as the relevant Local Aboriginal Land Council (LALC) for this assessment
- Archaeological survey of the study area, accompanied by a representative from MLALC.

6.5.2 Historical land use

Before the settlement of the area by Europeans, the Site formed part of Rozelle Bay. The unmodified landscape of the study area and surrounds would have mainly consisted of coastal sandstone woodland and heathland, with species such as flax-leaved wattle (*Acacia linifolia*), myrtle wattle (*Acacia myrtifolia*), smooth-barked apple (*Angophora costata*), heath banksia (*Banksia ericifolia*), and Kangaroo grass (*Themeda australis*). This may have provided habitat for a range of fauna species.

Hawkesbury Sandstone forms the underlying geology of the area and sandstone outcrops were known to occur in the area. The Site was situated in close proximity to several waterways including Whites Creek and also once formed part of Rozelle Bay.

The Site is in an area inhabited by the Eora, Kuring-Gai and Darug language groups. The previously unmodified environment would have provided a range of resources for the Aboriginal people such as food, medicine and tools. Natural over-hangings and outcrops of sandstone within and surrounding the Site (where present) may have been used as rockshelters. In addition, local sandstone surfaces could have been used for the sharpening of edge-ground hatchets and spears (producing grinding grooves) as well as the production of engraved and/or pigment artwork.

The nearby waterways may have also provided marine and freshwater resources, as reflected in other nearby coastal areas with the presence of midden sites.

The Site has been highly disturbed since the 1880s, when the eastern portion of the Site was an industrial area, and throughout the development of the Rozelle Rail Yards from 1916. These phases of development included extensive quarrying of the sandstone outcrops, diversion and channelisation of watercourses, excavation and levelling of soil, the importation of fill, the laying of asphalt, concrete and rail lines, and the construction of associated buildings and other structures.

More recently the use of the Site has decreased and the area has become largely disused and overgrown with exotic vegetation and weeds.
6.5.3 Existing environment

AHIMS database
A search of the AHIMS register was carried out on 26 May 2016 for a 6.5 kilometre by five kilometre area centred on the Site, which equates to an area of about 32.4 square kilometres. The search identified 48 registered Aboriginal sites, which most commonly comprised midden sites within coastal fringe areas. No registered Aboriginal sites or places were identified within the Site, with the closest registered site, a rockshelter with deposit (#45-6-2278), about 60 metres north-west of the Site.

Site survey results
An archaeological survey of the Site was carried out by an archaeologist and a MLALC representative in May 2016. During the inspection, ground surface visibility was poor due to both the vegetation and other obscuring features, such as concrete slabs laid across the yard area. Despite this, evidence of gross levels of past ground disturbance were identified throughout the Site. Stockpiles were identified in the north-eastern sections of the Site, with the majority of the area previously levelled for the rail lines and yard area. In addition, the exposed sandstone cutting along the northern boundary of the Site showed evidence of extensive quarrying.

No surface expressions of Aboriginal objects or places were identified within the Site, and no areas of potential Aboriginal archaeological sensitivity were identified. In addition, the MLALC representative did not identify any areas of Aboriginal cultural attachment.

6.5.4 Potential impacts

Site management works
The Site may have historically been a highly attractive resource zone for Aboriginal people, due to the fauna and flora, naturally formed shelters in the sandstone and its location close to fresh and marine water resources. This is supported by the recordings of shell middens in the local area. However, since that time the wider area around Rozelle Bay has been heavily modified through industrialisation. Numerous developments have modified the landscape, including the reclaiming of land from Rozelle Bay, channelling and concreting of the nearby creeks and coastal areas, levelling of the Site, modification of the sandstone surfaces and the importing of fill to the Site.

Given that the desktop searches and site inspection did not identify any areas of known Aboriginal heritage sensitivity, and as the Site is within a highly modified landscape, there are unlikely to be any Aboriginal materials or sites present within the Site.

The works would disturb the ground surface at the Site. Three main activities involve ground disturbance, namely, non-destructive excavation and/or potholing for locating services, removal of the ballast and creation of the drainage channels and sediment basins.

Ballast would be removed from the majority of the Site generally to a maximum depth of about 500 millimetres below ground level. Given that the Site has been extensively filled, the remaining natural soils are likely to be deeper than 500 millimetres below ground level, with at least the first 500 millimetres of material expected to comprise fill material. It is unlikely that natural soils would be encountered during the removal of ballast at the Site, and therefore it is unlikely that any further unregistered Aboriginal heritage items would be found or impacted.

While the potholing work to locate services may need deeper excavations, the level of disturbance is likely to be considerably less. The work to identify existing utilities would be focused on parts of the Site where services are likely to be located, and therefore in areas where the ground has been previously disturbed. Given the disturbed nature of the ground at the Site, it is considered unlikely that any further unregistered Aboriginal heritage items would be found or impacted by the work.
The creation of drainage channels and sediment basins would need excavation to maximum depth of about two metres. The sediment basins (as shown in Figure 6-13) would be in areas that were formerly part of Rozelle Bay and have since been reclaimed. Therefore, as the basins would be in reclaimed areas, it is unlikely that any items of Aboriginal heritage would be uncovered during excavation.

It is unlikely that any evidence of Aboriginal archaeology on the sandstone cutting at the Site would remain, as it has been modified by quarrying activities. In addition, the proposal would not disturb the sandstone cutting or the vegetation that sits on top of it. In the unlikely event that evidence of Aboriginal heritage is found on the sandstone cutting, it would not be disturbed by the proposed work.

As no items of Aboriginal heritage were identified on-site, the proposal is unlikely to result in an impact on known Aboriginal heritage.

In addition, there is a low potential for unregistered items of Aboriginal heritage to be identified at the Site given:
- The level of existing disturbance
- The limited depth of proposed surface work
- Proposed areas of deeper excavation are restricted to the sediment basins and potholing activities
- The fact that the sandstone cutting would not be modified.

In the event that items of Aboriginal heritage are identified during the work, the Unexpected Heritage Items Procedure (Roads and Maritime, 2015) would be followed.

Overall the potential impacts of the proposal on Aboriginal heritage are not considered to be significant, provided the appropriate management measures, described below, are put in place.

**Finished site**

After the proposal is completed, the Site would be secured and managed, with only minor maintenance work to be carried out. Maintenance activities may include vegetation and soil and water management, and some light vehicle and foot traffic. No ground disturbance work or work on the sandstone cutting is proposed during this stage. Therefore, this phase of the works would not impact on Aboriginal heritage. Overall the potential impacts of the finished site on Aboriginal heritage are not considered to be significant, provided the appropriate management measures, described below, are put in place.

6.5.5 **Safeguards and management measures**

Aboriginal heritage management measures have been developed to further reduce the likelihood of potential impacts associated with the proposal. These measures are outlined below in Table 6-12. Further detail is also provided in Appendix E.
### Table 6-12: Summary of Aboriginal heritage safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aboriginal heritage – general</td>
<td>The <em>Unexpected Heritage Items Procedure</em> (Roads and Maritime 2015) would be followed in the event that unknown or potential Aboriginal object(s), including skeletal remains, are found during site work. Work would only restart once the requirements of that procedure have been satisfied.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Core standard safeguard AH2 Section 4.9 of QA G36 <em>Environment Protection</em></td>
</tr>
</tbody>
</table>
6.6 Biodiversity

A Biodiversity Assessment was carried out by Eco Logical Australia (ELA) (2016), to determine the potential impacts of the proposal on biodiversity values. The assessment was carried out in general accordance with the Environment impact assessment practice note: biodiversity assessment (EIA-N06). This assessment is provided in full in Appendix F and summarised below.

6.6.1 Methodology

The assessment was carried out using the following method:
- Desktop review of available information, mapping and relevant databases
- Field surveys of the study area, including targeted threatened fauna surveys
- Assessments of Significance for threatened biota (species, populations, communities) known to exist or have the potential to be present within the study area.

For the purpose of this section, the Site is the area defined by the site boundary shown on Figure 1-1 and the locality is defined as the land within a five kilometre radius of the Site.

Desktop review

A review of relevant literature and database records for the Site and surrounding area included:
- EPBC Act Protected Matters Search tool (Commonwealth Department of the Environment and Energy, 2016)
- Previous vegetation mapping - The Native Vegetation of the Sydney Metropolitan Area (OEH, 2013)
- Aerial photography to investigate extent of vegetation cover and landscape features.
- WestConnex M4-M5 Link Geotechnical Investigations Flora and Fauna Assessment (Niche Environment and Heritage, 2016)
- CBD Metro Environmental Assessment: Technical Paper 7 Biodiversity Assessment (Sinclair Knight Merz, 2010).

A number of species were identified by the database searches and literature review as either being known to, or have the potential to, use the Site. Using this information, a combined list of threatened flora and fauna species relevant to the proposal was prepared. An assessment of their likelihood of occurrence was then carried out for each species. This was achieved by:
- Reviewing the location of the recorded species
- Considering the likely presence or absence of suitable habitat for each species at the Site and immediate surrounding area
- Using expert knowledge and research of the ecology of each species.

A list of potentially ‘affected species’ was then identified (those that were defined as ‘yes’, ‘likely’ or having ‘potential’ to occur in the study area). The potential presence of these species was used to guide the field survey.

Site inspection

Two field surveys were conducted by ELA on 27 May and 8 June 2016. The purpose of the surveys was to:
- Determine the area, extent and condition of native vegetation communities
- Observe and record evidence of significant flora and fauna, particularly threatened species
- Assess the suitability of habitat for threatened species and record notable features
- Identify likely impacts of the proposed works upon flora and fauna habitat and identify mitigation and avoidance opportunities.
The flora survey involved carrying out three plots/transects to determine the biometric value (site value score) of the vegetation present. The plots/transects consisted of a 20 metre by 20 metre floristic plot within a broader habitat assessment a 50 metre by 20 metre plot.

A habitat assessment was also carried out to determine the potential for threatened flora and fauna to use the Site. This included the recording of important habitat features such as hollow-bearing trees.

**Targeted fauna surveys**

Targeted fauna surveys were conducted to supplement the initial field surveys and habitat assessment. Targeted surveys were conducted for the Long-nosed bandicoot, Green and Golden Bell Frog and Microchiropteran Bats.

Survey methods employed consisted of the following:

- **Long-nosed Bandicoot**: Setting up eight infrared remote cameras on-site for 14 nights in August 2016
- **Green and Golden Bell Frog**: Surveying potential habitat by a combination of tadpole surveys, call playback surveys and active screening both day and night, for a minimum of one hour, on four separate days/nights in September and October 2016
- **Microchiropteran Bats**: Setting up of four echo-location recording devices (Anabats) at separate locations within the Site over two consecutive nights on 21 September and 22 September 2016. A time delay was programmed into each device such that the calls were recorded from 5.30pm to 6.00am. Opportunistic follow-up Anabat surveys were conducted on 27 September and 24 October 2016 to supplement the initial surveys. During these surveys, the Anabat was set for an hour after sunset. An inspection (internal and external) of the Ports Authority building and the cavities of the northern span of Victoria Road bridge (access was limited at the southern span) was conducted in October 2016 for potential roost sites.

No targeted surveys for foraging individuals were conducted for the Grey-headed Flying Fox as the Commonwealth survey guidelines (Department of the Environment, Water Heritage and the Arts (DEWHA) 2010) indicate that surveys based on animal sightings are unlikely to be reliable, as this species occupies most areas in their distribution in highly irregular patterns. A more effective survey method would be to search appropriate databases and other sources for the locations of camps, and to conduct vegetation surveys to identify feeding habitat (DEWHA 2010b). These assessments were carried out as detailed previously in this section.

### 6.6.2 Existing environment

The Site comprises of a typical urban, disused, brownfield environment with redundant rail infrastructure. The Site is entirely modified and disturbed, and dominated primarily by exotic species and weeds. The Site consists of disturbance-tolerant species on compacted soils and introduced fill, and is unlikely to have any native resilience or recovery potential. No remnant native vegetation was observed to be present on-site.

**Flora species**

The vegetation present on the Site is dominated by exotic species or Australian native species not local to the area (non-indigenous native) across all vegetation layers. A total of 86 flora species were identified within the Site, of which 25 were natives, including planted and non-indigenous native species. Of the exotic species, four are listed as a Weed of National Significance and ten are declared noxious weeds within the Inner West LGA.

The desktop review identified 19 threatened flora species listed under the TSC Act and/or the EPBC Act that are known to occur within the locality. None of these species were observed during the field survey of the Site. Refer to Appendix F for a list of these species.
Threatened ecological communities
The desktop review identified a number of threatened ecological communities listed under the TSC Act and/or the EPBC Act as having the potential to occur within the locality. The closest known listed ecological community is Coastal Saltmarsh, which occurs along the banks of Johnstons Creek within Bicentennial Park, about 600 metres south of the Site (OEH, 2016). No threatened ecological communities were recorded within the Site during the field survey.

Fauna species
The desktop review identified 44 threatened fauna species listed under the TSC Act and/or EPBC Act or migratory agreements that have the potential to occur within the locality. Refer to the biodiversity assessment in Appendix F for a list of these species.

The habitat at the Site is highly modified and dominated by exotic vegetation. Any fauna species (including threatened species) with the potential to occur on-site are limited to those tolerant of disturbed environments, such as man-made structures and/or able to use exotic vegetation.

After the site inspection and habitat assessment, it was concluded that the following threatened species have potential habitat within the Site:

- *Litoria aurea* (Green and Golden Bell Frog)
- *Perameles nasuta* (Long-nosed Bandicoot)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Miniopterus schreibersii* (Eastern Bent-wing Bat)
- *Mormopterus norfolkensis* (Eastern Freetail-bat)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail bat).

An artificial open drainage channel at the base of the sandstone cutting may form potential habitat for the Green and Golden Bell Frog (refer to Figure 6-7 for the location of the open drainage channel). There have not been any recordings of the Green and Golden Bell Frog on the Site. However, there are records within the locality (17 years old, about three kilometres south, in the Marrickville area). The targeted surveys for the Green and Golden Bell Frog carried out to inform this assessment did not record any individuals within the Site and confirmed the Site’s low suitability for the species. The targeted surveys recorded the predatory fish, *Gambusia holbrooki* (Plague Minnow) within the drainage channel. This species feeds on tadpoles and is a known threat of the Green and Golden Bell Frog (OEH 2016a).

Habitat exists for Long-nosed Bandicoots within the Site in the form of degraded exotic habitat. The species is known to inhabit rail corridors within the Inner West LGA and forage in residential backyards. There have been no direct or indirect observations of the species at the Site, and none were made during the targeted survey in August 2016.

The nearest record (<10 years old) for this species is about 2.5 kilometres south-west of the Site in the Petersham and Marrickville area. Further, the species has not been previously recorded in the local area. The presence of feral predator species (feral cats and foxes) and compacted soil within the rail yard, which limits the ability for this species to forage, reduces the likelihood for this species to occur.

No camps for the Grey-headed Flying-fox were recorded during the habitat assessments. However, there are a number of suitable Fig trees and street tree plantings representing potential foraging habitat within and next to the Site (eg Easton Park, Bicentennial Park) and there are large expanses of suitable habitat present across the locality. Several Grey-headed Flying-fox were observed feeding on fig trees immediately next to the Site during one of the targeted surveys for the Green and Golden Bell Frog in October 2016. In addition, a large number of records for this species occur within close proximity to the Site and large expanses of suitable habitat exist across the locality. It is therefore likely that this species would use the Site on occasion for foraging.
Limited habitat for the three microbat species was observed on-site. No hollow-bearing trees were observed within the Site; therefore, if microbats are using the Site they would need to be able to use man-made structures. The underside of the Victoria Road bridge could potentially provide roosting or sheltering habitat for these species. However, it is noted that the majority of cavities are also used by nesting Feral Pigeons and Doves. Records of microbat species are limited for the area, are 10 to 20 years old and occurred 1.5 to three kilometres from the Site in Bridgewater Park, Balmain and Goat Island in Sydney Harbour. No records for the Yellow-bellied Sheathtail Bat exist within the locality.

Targeted surveys were carried out in September and October 2016 and recorded the Eastern Bentwing Bat within the Site. This species may be roosting in the cavities under the Victoria Road bridge, or using it as a flyway. *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat) was also recorded as a possible call from the targeted surveys and may be using the Site to forage.

**Aquatic habitat**
Whites Creek and Rozelle Bay are close to the Site. Whites Creek is a concrete lined open channel, located south of both the Site and City West Link. The creek discharges into Rozelle Bay, which is a harbour embayment about 65 metres south of the Site.

Aquatic habitat in Rozelle Bay would be heavily impacted by surrounding land use, dredging and reclamation. A small amount of mangroves (37 square metres) are found in Rozelle Bay and 715 square metres of *Halophila* seagrass are present north of White Bay (Creese et al., 2009). Coastal Saltmarsh, a threatened ecological community, also occurs along some of the banks on Johnstons Creek in Rozelle Bay.

**6.6.3 Potential impacts**

**Site management works**
The proposal would clear all vegetation at the Site, excluding the informal garden and the vegetation on the top of the sandstone cutting, which is located along part of the northern boundary. Vegetation would be trimmed from the face of the sandstone cutting. Limited vegetation outside the site boundary would be removed. Some vegetation would be removed from within part of the road corridor of City West Link, either to allow for adequate sight lines from the City West Link (west) access or to allow construction of a new access onto the same road.

The proposal would directly impact flora on the Site and in part of the City West Link road corridor. The majority of vegetation at the Site is relatively new and has grown since the use of the Site declined around 1996. Before 1996, the Site was used as railway yard and had limited vegetation, as can be seen in historical aerial photographs (refer to the Non-Aboriginal Heritage Assessment in Appendix D).

The majority of flora species identified at the Site, including within the City West Link road corridor, are exotic species including planted natives, non-indigenous natives, Weeds of National Significance and species declared noxious weeds within the Inner West LGA. A complete list of the species present is provided in Appendix F.

The identified threatened flora species that are known to occur within the locality were not observed during the field survey and are therefore considered unlikely to occur within the Site. Given the limited presence of native species, the relatively new vegetation at the Site and that no threatened flora species are likely to be present, no significant adverse impacts on flora as a result of the proposal are expected. Conversely, the removal of exotic species, including Weeds of National Significance and declared noxious species, as well as feral animals may have a potential beneficial impact for the local ecology. Vegetation removal would be carried out in accordance with Roads and Maritime Specification G40 (Clearing and Grubbing).
A number of threatened ecological communities were listed as having the potential to occur within the locality; refer to Appendix F for a full list of these communities. However, no threatened ecological communities were recorded during the field survey of the Site. Based on the survey and the condition of the Site, threatened ecological communities were not considered to have the potential to occur within the Site. Therefore, the clearing of vegetation at the Site is considered to have no impact on threatened ecological communities.

Several threatened fauna species were listed as having the potential to occur within the locality, in particular habitat for the Green and Golden Bell Frog, Long-nosed Bandicoot, Grey-headed Flying-fox and threatened microbats. Because the habitat at the Site is highly modified and dominated by exotic vegetation, the potential for suitable threatened fauna habitat is considered to be low.

However, the Eastern Bentwing Bat and Yellow-bellied Sheathtail-bat were recorded during the targeted surveys. Direct impacts on these species are considered to be limited to foraging habitat and would occur through the removal of all exotic vegetation within the Site. The cavities under the Victoria Road bridge that may represent potential roosts for the Eastern Bentwing Bat would not be directly impacted, but indirect impacts such as construction traffic, noise and lighting may occur.

Despite potential habitat being present for the Green and Golden Bell Frog and records showing that it has previously been recorded in the locality, this frog has not been recorded at the Site including during the most recent surveys. The potential occurrence of this species is likely to be limited at the Site for the following reasons:

- Lack of individuals recorded within the study area
- Accuracy or age of known records within the locality
- Distance from the Site and the known record (closest NSW BioNet record is three kilometres south)
- Lack of suitable dispersal/movement habitat between the known record and the Site.

Given the contraction of the species into a number of relatively small key populations within Sydney, it would be unlikely that the species would persist permanently or breed within the Site. As such, no potential impacts on the Green and Golden Bell Frog are expected.

Clumps of exotic vegetation within the Site may be considered suitable for the Long-nosed Bandicoot. No direct or indirect observations of the Long-nosed Bandicoot have been recorded at the Site. The compacted soil within the rail yard limits the ability for this species to forage and the presence of feral predator animals, which have been observed at the Site, reduces the likelihood for this species occurring. Based on this, no potential impacts on the Long-nosed Bandicoot are expected.

Suitable foraging habitat for the Grey-headed Flying-fox is within and near the Site in the form of Fig trees. Several Grey-headed Flying-foxes were also observed feeding on feeding on fig trees immediately next to the Site during one of the targeted surveys for the Green and Golden Bell Frog. It is therefore considered likely that this species would use the Site on occasion for foraging. Potential impacts on the Grey-headed Flying-fox are indirect and related to the minor foraging potential of the Site. As there are Fig trees next to the Site (eg in Easton Park and Bicentennial Park) and as there is ample foraging habitat within the locality, the clearing of vegetation at the Site would not result in a significant impact on the Grey-headed Flying-fox.
The Victoria Road bridge would not be modified during the works. However, some work, such as limited vegetation clearing and vehicle/equipment movements, would be conducted beneath the bridge. Indirect impacts have the potential to occur on the potential roost sites of the Eastern Bentwing Bat, including:

- Works under the bridge, vehicle movements, vegetation clearing, and site clearing including the removal of waste. However, it is noted that rail infrastructure under the bridge would not be removed as part of the works
- Works in close proximity to the bridge (such as the removal of rail infrastructure, site clearing, demolition works and vegetation removal).

Other potential impacts that may result from the proposal include the following:

- Temporary impacts on water quality and quantity of downstream surface water flows through runoff, sediment and erosion, potentially impacting ecology in Rozelle Bay
- Temporary increases in noise, light and construction traffic in surrounding areas during the proposal
- Increase in the spread of weeds. It is noted that the spread of weeds is listed as a key threatening process under the TSC Act and EPBC Act.

These potential impacts are unlikely be significant, would be temporary, and can be avoided or mitigated with the carrying out of various mitigation measures during and after the proposal. Management measures (included in section 6.6.4) would be carried out to ensure that these potential impacts are appropriately avoided and/or managed.

Vegetation would be removed from the City West Link road corridor for the City West Link (west) access (refer to Figure 6-25). This would result in a direct loss of vegetation; however, as discussed above, this loss is not considered significant based on the presence of exotic and weed species and the absence of threatened species in this area. In addition, there is the potential that work on the Site could result in damage to trees located off-site and close to the site boundary in other areas. Damage to the roots and main branches of off-site trees would be avoided by placing exclusion signage along the border of the Site where off-site trees could be affected.

In summary, potential direct and indirect impacts on fauna and flora as a result of the proposal are considered to be neutral and are not likely to cause a significant impact. This is based on the limited size of habitat within the Site in relation to similar habitat in the locality, the disturbed and degraded nature of the habitat present, and the lack of known breeding habitat within the Site.

Finished site

Only minor maintenance work would be carried out on the finished site. These management works would include vegetation and soil and water management. Considering any vegetation on-site would be minimal (as a form of site stabilisation), and would not be well established, the finished site would have no impacts on ecological receptors.

Although unlikely, the underside of the Victoria Road bridge could potentially provide roosting habitat for threatened microbat species. As work would not be conducted on the bridge and only minor maintenance work would be conducted below the bridge, no adverse impacts are expected on fauna potentially using the bridge during this phase.

After the proposal, surface water flows leaving the Site would need to be managed to avoid potential impacts on Rozelle Bay. Appropriate measures such as stabilisation works, drainage channels and sediment basins and testing of water quality before discharge would be carried out at the Site to ensure that these impacts are avoided. Measures to mitigate this potential impact are discussed further in section 6.1 and section 6.2.
**Conclusion on significance of impacts**

The proposal is not likely to significantly impact threatened species, populations or ecological communities or their habitats, within the meaning of the TSC Act or FM Act, and therefore a Species Impact Statement is not required.

The proposal is not likely to significantly impact threatened species, populations, ecological communities or migratory species, within the meaning of the EPBC Act.

**6.6.4 Safeguards and management measures**

Measures to manage potential biodiversity impacts during and after the proposal are outlined in [Table 6-13](#). In addition to the measures outlined below, a SWMP would be implemented for the Site. Further detail of this plan is included in [section 6.1](#).
Table 6-13: Summary of biodiversity safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Biodiversity            | A Flora and Fauna Management Plan (FFMP) would be prepared in accordance with Roads and Maritime's *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011) and implemented as part of the EMP. It would include the following:  
  - Plans showing areas to be cleared and areas to be protected, including exclusion zones  
  - Requirements set out in the *Landscape Guideline* (RTA, 2008)  
  - Pre-clearing survey requirements  
  - Procedures for unexpected threatened species finds and fauna handling  
  - Protocols to manage weeds (see below) and pathogens  
  - Measures to manage the removal of vegetation, which would be carried out in accordance with Roads and Maritime Specification G40 (Clearing and Grubbing)  
  - Measures to manage noxious weeds including the identification of noxious weeds, protocols for appropriate disposal and measures to prevent the spread of noxious weeds outside of the Site. | Contractor     | Work preparation/during the works | Core standard safeguard B1  
Section 4.8 of QA G36 Environment Protection  
Additional safeguard |
<p>| Fauna management        | If night work is required, a construction exclusion zone of 20 metres around the Victoria Road bridge would be established. This exclusion zone would be established 30 minutes before sunset each day. No works would take place within this zone until 30 minutes after sunrise the next day. | Contractor     | Work preparation/during the works | Additional safeguard |
| Fauna management        | If night work is required, any stationary lighting that may be used beyond the 20 metre exclusion zone would be hooded and would face away from the bridge.                                                                                                           | Contractor     | Work preparation/during the works | Additional safeguard |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fauna management</td>
<td>If practical, timing of works in close proximity to bridge would be carried out in summer (November to March), as the Eastern Bentwing Bats are likely to return to breeding sites (limestone caves) during this time and are less likely to be present.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Fauna management</td>
<td>Contractors working in close proximity to the Victoria Road bridge would receive a ‘toolbox talk’ on the presence of bats, what they look like, relevant management measures (eg exclusion zone) and what to do if they are encountered or injured.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Fauna management</td>
<td>The unexpected threatened species finds procedure (mentioned above) would also outline specific actions for any microbats observed.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Off-site biodiversity</td>
<td>The impact footprint would be clearly defined, with suitable fencing to prevent direct impacts to off-site trees, including to the root zone and overhanging branches, with the exception of minor trimming of overhanging branches. This would include trees directly next to the Site, excluding the vegetation to be removed from the City West Link road corridor. Fencing would be consistent with the Australian Standards for protection of trees on development sites (AS 4970-2009).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Off-site aquatic biodiversity</td>
<td>A SWMP would be implemented during the life of the proposed work to avoid significant adverse impacts on nearby aquatic ecosystems (refer to sections 6.1 and 6.2).</td>
<td>Contractor</td>
<td>Work preparation/during the works/finished site</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
6.7 Traffic and transport

A traffic and transport assessment was carried out for the proposal (AECOM, 2016) to identify potential impacts on the local traffic and transport network. The assessment considered the potential impacts that could result from generated traffic, heavy vehicle access and egress and on public and active transport. The assessment is provided in Appendix G.

6.7.1 Methodology

A two-step approach was carried out in the preparation of the assessment:

- Step 1 involved a review of generated traffic as a percentage of existing traffic volumes, where this percentage was higher than two per cent
- Step 2 involved a further mid-block assessment to determine what traffic impacts, if any, would result from the generated traffic.

Step 1 was carried out for key site access roads: City West Link, Victoria Road, ANZAC Bridge, James Craig Road, Lilyfield Road, Darling Street, The Crescent, Balmain Road and Gordon Street. Existing traffic volumes were taken from traffic counts carried out in 2014 and 2016.

Traffic was converted and assessed in passenger car units. Light vehicle traffic to be generated by the proposal was distributed based on existing volumes on City West Link, Victoria Road and ANZAC Bridge, as these are the key arterial roads with access to the Site.

Potential haulage routes were identified as being City West Link, ANZAC Bridge and Victoria Road. As heavy vehicle routes are dependent on the ultimate destination (which is yet to be confirmed) a ‘worst case’ for each of the potential haulage routes was tested where 100 per cent of heavy vehicles were assigned to each of the three heavy vehicle route options identified.

Step 2 was applied on roads where generated traffic constituted more than two per cent of existing traffic. On these roads, a mid-block Level of Service (LOS) assessment was carried out to assess the impact of the generated traffic.

The LOS of a road is a qualitative measure describing operational conditions within a traffic stream and the likely perception of these conditions by motorists and/or passengers. The LOS assessment was guided by the mid-block level of service criteria specified in the Austroads Guide to Traffic Management – Part 3 Traffic Studies and Analysis (2013). The derivation of the mid-block LOS performance uses the traffic volume divided by road capacity, which is the measure used to define traffic density and ultimately calculate LOS. The LOS definitions specified in the Austroads guide (2013) are shown in Appendix G.

Assessment of heavy vehicle access and egress safety was guided by the Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2010). Specifically, this guide has been used to identify appropriate sight distances, which account for road speed and vehicle type based on the proposed City West Link access points.

The public transport connections were assessed by reviewing the bus stops and light rail stops located next to the Site and the routes and frequency of services at these stops.

The existing active transport network has been assessed by reviewing the pedestrian and cycle routes next to the Site, their level of user amenity and connectivity with the wider pedestrian and cycle networks and the potential impacts as a result of the proposal.
6.7.2 Existing environment

Traffic

Existing traffic volumes on key arterial and local roads surrounding the Site (in 2014 and 2016) are shown in Table 6-14, A network peak hour\(^7\) was selected based on traffic count data that was recorded on City West Link and Victoria Road in 2014. The location of these roads is shown on Figure 1-1.

Table 6-14: Existing mid-block volumes

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Direction</th>
<th>Light Vehicles(^2)</th>
<th>Heavy Vehicles(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AM Peak Hour</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City West Link west of Catherine Street</td>
<td>2014</td>
<td>EB</td>
<td>2,230(^4)</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>1,820</td>
<td>110</td>
</tr>
<tr>
<td>Victoria Road north of Robert Street</td>
<td>2014</td>
<td>EB</td>
<td>3,390</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>1,350</td>
<td>110</td>
</tr>
<tr>
<td>James Craig Road south of City West Link</td>
<td>2014</td>
<td>EB</td>
<td>240</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>90</td>
<td>30</td>
</tr>
<tr>
<td>Lilyfield Road east of Balmain Road</td>
<td>2016</td>
<td>EB</td>
<td>490</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Balmain Road north of Lilyfield Road</td>
<td>2016</td>
<td>NB</td>
<td>340</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SB</td>
<td>280</td>
<td>10</td>
</tr>
<tr>
<td>Darling Street East of Waterloo Street</td>
<td>2016</td>
<td>EB</td>
<td>500</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>510</td>
<td>50</td>
</tr>
<tr>
<td>Gordon Street west of Victoria Road</td>
<td>2014</td>
<td>NB</td>
<td>310</td>
<td>10</td>
</tr>
<tr>
<td>The Crescent south of City West Link</td>
<td>2014</td>
<td>NB</td>
<td>1,220</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SB</td>
<td>840</td>
<td>50</td>
</tr>
<tr>
<td><strong>PM Peak Hour</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City West Link west of Catherine Street</td>
<td>2014</td>
<td>EB</td>
<td>2,190</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>2,370</td>
<td>80</td>
</tr>
<tr>
<td>Victoria Road north of Robert Street</td>
<td>2014</td>
<td>EB</td>
<td>2,490</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>2,410</td>
<td>90</td>
</tr>
<tr>
<td>James Craig Road south of City West Link</td>
<td>2014</td>
<td>EB</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>180</td>
<td>20</td>
</tr>
<tr>
<td>Lilyfield Road east of Balmain Road</td>
<td>2016</td>
<td>EB</td>
<td>480</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>260</td>
<td>0</td>
</tr>
<tr>
<td>Balmain Road north of Lilyfield Road</td>
<td>2016</td>
<td>NB</td>
<td>350</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SB</td>
<td>410</td>
<td>10</td>
</tr>
<tr>
<td>Darling Street East of Waterloo Street</td>
<td>2016</td>
<td>EB</td>
<td>540</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>730</td>
<td>20</td>
</tr>
<tr>
<td>Gordon Street west of Victoria Road</td>
<td>2014</td>
<td>NB</td>
<td>180</td>
<td>0</td>
</tr>
<tr>
<td>The Crescent south of City West Link</td>
<td>2014</td>
<td>NB</td>
<td>1,080</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SB</td>
<td>1,170</td>
<td>20</td>
</tr>
</tbody>
</table>

Note 1: EB: eastbound, WB: westbound, SB: southbound, NB: northbound

Note 2: Volumes rounded to nearest ten

Note 3: Refers to the peak one-hour period for vehicle trips, between 6.31am–9.30am on a weekday, as indicated by traffic count survey data on City West Link and Victoria Road.

Note 4: Figure includes volume heading on to ANZAC Bridge

Note 5: Refers to the peak one-hour period for vehicle trips, between 3.01pm–6.30pm on a weekday, as indicated by traffic count survey data on City West Link and Victoria Road.

\(^7\) The network peak hour is the highest number of cars reported in any one hour of morning and afternoon peaks.
Site access
The Site has four existing access points, all of which are proposed for use during the proposal (refer to Figure 1-2):
- City West Link (west)
- City West Link (east)
- Port Authority access
- Gordon Street.

The City West Link (west) access, located between Catherine Street and The Crescent, currently provides limited (eastbound only) access into the Site. The access is left in/left out, and has limited visibility to vehicles approaching on City West Link, which has a posted speed limit of 70 kilometres per hour. No acceleration or deceleration lanes are provided.

The City West Link (east) access is between The Crescent and James Craig Road. This area is used as a general access point to the Site and also to access a hardstand area, now used to store large crane equipment and associated transportation equipment.

This left in/left out access does not include acceleration or deceleration lanes. The access is at the diverging point for eastbound traffic between the ANZAC Bridge and Victoria Road bound traffic lanes. Exiting vehicles wishing to turn left onto Victoria Road at the Victoria Road/City West Link intersection therefore cross need to two lanes of traffic upon exit. If vehicles wished to exit the Site from the City West Link (east) access and then turn right into James Craig Road, they would need to cross three lanes of traffic in a very short distance as shown in Figure 6-20. Due to this short distance City West Link (east) access is not proposed to be used as a site exit.

Figure 6-20: Existing City West Link (east) access showing distance to right turn stop line

The Port Authority access is on the eastern side of the Site through the Port Authority area (east of the Victoria bridge). It can be accessed via James Craig Road and the road network controlled by the Port Authority.
The Gordon Street access is at the southern end of Gordon Street, accessed from Lilyfield Road, and also provides access to the nearby industrial premises. While this access is next to existing industrial land use, beyond the site entrance, Lilyfield Road is mainly bordered by residential properties.

Public transport
Bus and light rail services operate on the roads around the Site. Bus routes run along Victoria Road, The Crescent, Catherine Street and City West Link, with services connecting north-western Sydney, the inner west and the Lilyfield light rail stop to the city. Bus services also connect Balmain East and Campsie.

The existing light rail network runs from Dulwich Hill, through the inner west, and into the CBD via Pyrmont. Two stops are in close proximity to the Site; Rozelle Bay light rail stop to the south of the Site, and Lilyfield light rail stop to the south-west of the Site. Services run every eight to ten minutes during weekday peak periods.

Active transport
Active transport links in the area include the Victoria Road and ANZAC Bridge shared path, City West Link and The Crescent off-road path, Lilyfield Road on-road cycle link and Whites Creek shared path. Pedestrian links in the area include footpaths on at least one side of the road on the western, eastern and northern borders of the Site, which provide access for residents and businesses.

Site personnel would be able to access the Site via Gordon Street, which has footpaths on both sides of the road. The City West Link (east) access has limited footpath provisions and these footpaths do not connect to any other pedestrian links. Other than this, there are no pedestrian footpaths along the north side of City West Link in the vicinity of the Site and along the Port Authority controlled access road in the vicinity of the Port Authority access to the Site.

It is noted that a separated cycleway along Lilyfield Road has been proposed by Inner West Council and is under review. The cycleway is proposed to be constructed in the 2016-2017 financial year (Inner West Council, 2016).

6.7.3 Potential impacts

Site management works

Site access
Site access is available through the four proposed accesses at City West Link (west), City West Link (east), the Port Authority access and Gordon Street. Site access would be confirmed by the contractor and would be subject to further consultation with the Transport Management Centre, Roads and Maritime and any landholders (eg Port Authority) as needed. For the purposes of this assessment, it was assumed that all four accesses would be used during the works.

It is proposed that the Gordon Street access would be the main access point for light vehicles. This access may need some limited repair works to remain serviceable for the duration of the proposed works. It is proposed that heavy vehicles would access the Site via the two existing left in/left out access points on City West Link, and via the Port Authority access.
Heavy vehicles entering and leaving the Site via City West Link are proposed to enter the Site using a left turn into the City West Link (east) access and exit via a left turn from the City West Link (west) access. Access route options for heavy vehicles entering the Site via the City West Link (east) access are limited by the left in/left out nature of the site accesses on City West Link.

However, exiting heavy vehicles have a few travel route options, as follows:

- **City West Link**: heavy vehicles leaving the Site can travel to the west on City West Link by making a left turn onto City West Link (travelling east), followed by a right turn onto James Craig Road where the roundabout can be used to turnaround before re-entering City West Link in a western-bound direction. The intersection of City West Link and James Craig Road is signalised and heavy vehicle movements at this intersection are controlled.
- **Victoria Road**: heavy vehicles leaving the Site continue eastbound on City West Link and then turn left at the intersection of City West Link and Victoria Road.
- **ANZAC Bridge**: heavy vehicles leaving the Site continue eastbound on City West Link and travel east over the ANZAC Bridge.

These access points and route options for vehicles using the City West Link access points, are shown in **Figure 6-21**.

![Figure 6-21: Heavy vehicle access points and routes](image)

The City West Link accesses would be configured such that the City West Link (west) access would be an exit-only point for heavy vehicles, and the City West Link (east) access would be an entry-only point for heavy vehicles. This would be achieved by:

- Heavy vehicles would access the Site via a left turn movement from the kerbside lane into the City West Link (east) access.
- Heavy vehicles exiting the City West Link (west) access could enter the right-most lane, when safe traffic conditions allow, as there is adequate distance (about 460 metres) to enable a lane change before the right turning lane for James Craig Road starts.
- Where the road becomes three lanes further east, drivers can remain in the right-most lane, and thus not need to cross traffic lanes to enter the right-turn bay into James Craig Road.
These existing access points are shown in Figure 6-22 and Figure 6-23.

The existing City West Link (east) access, which is about 17 metres in width, permits truck and dogs to turn into the Site entirely from the kerbside lane. A swept path assessment has been carried out and is shown on Figure 6-24. This is a conservative assessment of the access as it has been carried out using an Australian Standard AS 2890 (AS2890.2:2002) for a 19 metre articulated vehicle, which is larger than a truck and dog vehicle. No heavy vehicles larger than a truck and dog are expected to access the Site.

![City West Link lane configuration at the existing City West Link (west) access](image)
Figure 6-23: City West Link lane configuration at the existing City West Link (east) access

Figure 6-24: City West Link (east) access kerbside lane entry based on a 19 m articulated vehicle
Conditions for exiting drivers at the City West Link (west) access would need to meet the sight distance requirements for vehicles at intersections, as specified in the Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2010).

In accordance with Austroads guidance, based on the design speed of the road, an appropriate sight distance at this exit point is 151 metres. Existing vegetation in the road corridor in this location would need to be removed to allow this sight distance to be achieved.

Two options have been proposed, which could enable the appropriate sight distance to be achieved for this access point. These have both been assessed and the preferred option would be confirmed by the contractor before works start. These options are presented below:

- In Option 1, the City West Link (west) access remains in its existing location and vegetation to the west of the access is cleared to enable the appropriate sight distance of 151 metres to be achieved. This is shown in Figure 6-25.
- In Option 2, the amount of vegetation that would need to be cleared from the road corridor is reduced by moving the City West Link (west) access about 140 metres to the east, creating a new exit for heavy vehicles. The new exit would be located on a straighter section of City West Link where sight distances are improved. Option 2 is shown in Figure 6-26.

Figure 6-25: Option 1: City West Link (west) access remains in existing location
The proposed relocated exit at the City West Link (west) access would need to be designed as a driveway in accordance with Australian Standard 2890.2 and Roads and Maritime Services standards.

Provision of an acceleration lane for the City West Link (west) access is not proposed, as:
- It is not common to provide acceleration lanes for speeds less than 80 kilometres per hour
- This could potentially induce risks associated with merging.

The potential maximum peak hourly exit volume of 13 heavy vehicles would have a minimal impact on traffic on City West Link. The provision of appropriate sight lines, as well as warning signs placed on City West Link on approach to the driveway, would enable the access to operate safely. In addition, a dedicated person located within the City West Link (west) driveway to help with the exit of heavy vehicles would be provided if required. Driveway design would be similar to that at the existing City West Link (east) access.

A Traffic Management Plan (TMP) and Traffic Control Plan (TCP) would need to be submitted and approved by the Transport Management Centre (TMC) before starting works to ensure that heavy vehicles can safely enter and exit the Site from and to City West Link. Considerations for the TMP and TCP would include the detailed design for the implementation of either Option 1 or Option 2 for the City West Link (west) access, and are discussed in more detail in section 6.7.4.

Provided the TMP and TCP are implemented appropriately, the potential road safety impact to existing traffic on City West Link is considered to be minimal. The potential impact due to the loss of vegetation is discussed in section 6.6 and 6.10 and is considered to be neutral and is not likely to cause a significant impact.

At the Port Authority access, vehicles would access the Site from a private road under Port Authority control. Figure 6-27 below shows the available traffic routes from James Craig Road to the Port Authority access via the private road.
The arrangements for traffic entering Port Authority controlled roads would need to be discussed and agreed with the Port Authority. The Port Authority has provided in principle agreement for use of this access route. No oversized vehicles are expected to travel to the Site as part of the proposal.

Heavy vehicles are not proposed to use the Gordon Street access point due to the restricted road width and proximity to residential properties along Lilyfield Road. Instead, heavy vehicles are proposed to use the City West Link and Port Authority Access points as described above. Light vehicles only are proposed to use the Gordon Street access and access to nearby business and residences would be maintained. As a result, potential impact from the use of the Gordon Street access point on road safety is considered to be minimal.

**Heavy vehicle routes**

There are a number of access and egress route options for heavy vehicles. The heavy vehicle access and egress route options for vehicles entering and exiting the Site to and from City West Link are shown in Figure 6-28. Certain route options are limited due to the left in/left out nature of the access points and the lanes on City West Link. Heavy vehicles using the City West Link accesses would enter the Site by turning left into the City West Link (east) access. Heavy vehicles would exit by turning left from City West Link (west) access on to City West Link travelling eastbound and then use James Craig Road to turn around at the first roundabout to then travel westbound on City West Link.
James Craig Road is mainly used by heavy vehicles and would be able to accommodate the relatively limited number of heavy vehicle movements associated with the proposal. This western section of the road has one lane of traffic eastbound and two lanes of traffic westbound and the intersection with City West Link is signalised. The potential impact from trucks using the roundabout to turn around on existing traffic using this section of James Craig Road is therefore considered to be minimal.

**Figure 6-28: Proposed heavy vehicle route along City West Link**

Heavy vehicles can also access the Site using the Port Authority access. Access and egress route options for this access point are shown in **Figure 6-29**.
Traffic

Peak hour vehicle movements of up to 51 light vehicle movements and nine heavy vehicle movements are anticipated during the proposal, when movement volumes are averaged over the entire project duration. A potential maximum of up to 26 movements from 13 trucks per hour (during construction hours) alongside the peak hour light vehicle movements could be expected as a worst case situation. Light vehicle movements would be via the Gordon Street access, whereas heavy vehicle movements would be restricted to the City West Link and the Port Authority access points.

Generated light vehicle traffic was distributed based on existing volumes on City West Link, Victoria Road and the ANZAC Bridge as these are the key arterial roads which provide access to the Site. Distributions for light vehicle access and exit routes were as follows:

- City West Link: 25 per cent
- Victoria Road: 25 per cent
- ANZAC Bridge: 50 per cent.

The generated traffic assessment was carried out for the following three scenario options:

- Route Options 1: Light vehicles distributed as above and 100 per cent of heavy vehicles assigned to City West Link
- Route Options 2: Light vehicles distributed as above and 100 per cent of heavy vehicles assigned to the ANZAC Bridge
- Route Options 3: Light vehicles distributed as above and 100 per cent of heavy vehicles assigned to Victoria Road.
The results of this assessment (presented in Table 6-15) show that generated traffic, across each of these route options constitutes less than two per cent of existing traffic on City West Link, Victoria Road and the ANZAC Bridge. It is generally accepted that traffic volume changes of up to ten per cent would fall within daily variation in traffic volumes. Therefore, the low volume of traffic to be generated would be expected to fall well within daily variation on these roads and is unlikely to have an impact on traffic using these roads.
### Table 6-15: Generated traffic as a percentage of existing traffic

<table>
<thead>
<tr>
<th>Mid-block location</th>
<th>Direction</th>
<th>Existing PCU</th>
<th>Route Option 1</th>
<th>Route Option 2</th>
<th>Route Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>City West Link west of Catherine Street</td>
<td>EB</td>
<td>2,677</td>
<td>39</td>
<td>1.5</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>2,044</td>
<td>27</td>
<td>1.3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>Victoria Road north of Robert Street</td>
<td>EB</td>
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<td>13</td>
<td>0.4</td>
<td>13</td>
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<tr>
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<td>WB</td>
<td>1,568</td>
<td>0</td>
<td>n/a</td>
<td>0</td>
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<tr>
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<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>ANZAC Bridge</td>
<td>EB</td>
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<tr>
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<td>WB</td>
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<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>James Craig Road south of City West Link</td>
<td>EB</td>
<td>322</td>
<td>27</td>
<td>8.5</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>147</td>
<td>27</td>
<td>18.5</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>Lilyfield Road east of Balmain Road</td>
<td>EB</td>
<td>555</td>
<td>12</td>
<td>2.2</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>83</td>
<td>25</td>
<td>30.5</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>Darling Street east of Waterloo Street</td>
<td>EB</td>
<td>589</td>
<td>0</td>
<td>n/a</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>608</td>
<td>13</td>
<td>2.2</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
</tr>
<tr>
<td>Gordon Street west of Victoria Road</td>
<td>NB</td>
<td>330</td>
<td>0</td>
<td>n/a</td>
<td>0</td>
</tr>
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<td>Mid-block location</td>
<td>Direction¹</td>
<td>Existing PCU</td>
<td>Route Option 1</td>
<td>Route Option 2</td>
<td>Route Option 3</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>------------</td>
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<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
<td>Generated PCU</td>
<td>Percentage of existing (%)</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City West Link west of Catherine Street</td>
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<td>27</td>
<td>1.2</td>
<td>0</td>
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<td>40</td>
<td>1.6</td>
<td>12</td>
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<td>WB</td>
<td>2,591</td>
<td>13</td>
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<tr>
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</tr>
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<td>WB</td>
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<td>27</td>
</tr>
<tr>
<td>James Craig Road south of City West Link</td>
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<td>79</td>
<td>27</td>
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</tr>
<tr>
<td></td>
<td>WB</td>
<td>225</td>
<td>27</td>
<td>12.1</td>
<td>27</td>
</tr>
<tr>
<td>Lilyfield Road east of Balmain Road</td>
<td>EB</td>
<td>510</td>
<td>0</td>
<td>n/a</td>
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<tr>
<td></td>
<td>WB</td>
<td>261</td>
<td>12</td>
<td>4.7</td>
<td>12</td>
</tr>
<tr>
<td>Darling Street east of Waterloo Street</td>
<td>EB</td>
<td>576</td>
<td>13</td>
<td>2.3</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>771</td>
<td>0</td>
<td>n/a</td>
<td>0</td>
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<td>Gordon Street west of Victoria Road</td>
<td>NB</td>
<td>179</td>
<td>25</td>
<td>14.1</td>
<td>25</td>
</tr>
</tbody>
</table>

Note 1: EB: eastbound, WB: westbound, SB: southbound, NB: northbound
Low volumes of traffic are forecast to be generated on James Craig Road, Lilyfield Road, Darling Street and Gordon Street, with less than 30 vehicles per direction per hour expected during the peak hour on any of these roads. However, because existing traffic volumes on these roads are much lower than on Victoria Road and City West Link, generated traffic would constitute a higher percentage – up to 35 per cent – of existing traffic.

To confirm that this generated traffic would not reduce the traffic amenity on these roads, further assessment was carried out by comparing the existing mid-block LOS performance to the mid-block LOS performance with generated traffic. The results of this assessment indicated that generated traffic would increase traffic on these roads; however, these increases in traffic would not impact on the LOS, as shown in Table 6-16.

Table 6-16: Existing mid-block performance

<table>
<thead>
<tr>
<th>Location</th>
<th>Direction</th>
<th>Mid-block capacity</th>
<th>Mid-block performance – existing</th>
<th>Mid-block performance – with generated traffic</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>PCU</td>
<td>V/C</td>
<td>LOS</td>
</tr>
<tr>
<td>AM Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>James Craig Road south of City West Link</td>
<td>EB</td>
<td>900</td>
<td>322</td>
<td>0.36</td>
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<tr>
<td></td>
<td>WB</td>
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<td>147</td>
<td>0.08</td>
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<tr>
<td>Lilyfield Road east of Balmain Road</td>
<td>EB</td>
<td>900</td>
<td>555</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>900</td>
<td>83</td>
<td>0.09</td>
</tr>
<tr>
<td>Darling Street east of Waterloo Street</td>
<td>EB</td>
<td>900</td>
<td>589</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>900</td>
<td>608</td>
<td>0.68</td>
</tr>
<tr>
<td>Gordon Street west of Victoria Road</td>
<td>NB</td>
<td>600</td>
<td>330</td>
<td>0.55</td>
</tr>
<tr>
<td>PM Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>James Craig Road south of City West Link</td>
<td>EB</td>
<td>900</td>
<td>79</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>1800</td>
<td>225</td>
<td>0.13</td>
</tr>
<tr>
<td>Lilyfield Road east of Balmain Road</td>
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<td>510</td>
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<td></td>
<td>WB</td>
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<td>576</td>
<td>0.64</td>
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<td></td>
<td>WB</td>
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<td>771</td>
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<tr>
<td>Gordon Street west of Victoria Road</td>
<td>NB</td>
<td>600</td>
<td>179</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Note 1: The difference in mid-block capacity between the east and west bound traffic on James Craig Road, south of City West Link is due to there being one lane for east bound traffic and two lanes for west bound.

Parking
Parked parking of all light and heavy vehicles for staff and visitors would be contained within the Site. As a result, the proposal would not to have an impact on parking in the surrounding area.

Public transport
Traffic impacts associated with the proposal is not expected to result in any changes to existing public transport bus or light rail provisions and are considered unlikely to have an impact on public transport because:
• The volume of generated traffic is low and not likely to result in significant impacts on the operational performance of mid-block locations or intersections surrounding the Site.

• No public transport stations or stops are proposed to be closed or have restricted access as a result of the proposal.

**Active transport**

There are no existing pedestrian facilities at the City West Link entry and exit points and the Port Authority access point. Therefore, impacts on pedestrians using these access points are unlikely.

The proposed increase in heavy vehicle movements turning in and out of James Craig Road would be unlikely to impact on cyclist or pedestrian safety, as the existing shared path extending from the ANZAC Bridge, along the southern edge of City West Link and into The Crescent, is protected by a signalised crossing at the intersection of James Craig Road. This would allow cyclists and pedestrians to continue to cross the road in a safe manner.

Along Lilyfield Road, the number of light vehicles crossing the existing on-road cycle path would increase. However, this is not expected to impact cyclist amenity because:

• There is a relatively low volume of generated vehicles (51 light vehicles in the peak hour of the peak period and limited vehicles during the rest of the day)

• The low traffic speed environment of 50 kilometres per hour.

The Inner West Council is proposing to construct a separated cycleway along Lilyfield Road within the 2016 to 2017 financial year. With the construction of this separated cycleway, cyclist use of the route would likely increase, and cyclist safety would also be improved.

The Site is close to Easton Park, on Lilyfield Road. Pedestrian activity would be expected to increase on streets next to the park on Saturdays when organised sports are played on the Easton Park sports field. As a relatively low number of generated vehicles would be using Lilyfield Road, traffic generated by the proposal would not be expected to impact on pedestrian amenity.

The Gordon Street access location is at the southern end of Gordon Street. The speed limit on Gordon Street is a 50 kilometres per hour, with pedestrian footpaths provided on both sides of the road. Considering the existing land use on Gordon Street, which is mainly light industrial, with low demand for pedestrian access, it is unlikely that pedestrian amenity would be impacted by the proposed light vehicle movements at the Gordon Street access.

**Cumulative impacts**

There is the possibility that construction works underway for the CSELR Rozelle maintenance depot facility (next to the Site to the west) could take place at the same time as the proposal. It is understood from the CBD and South East Light Rail Environmental Impact Statement (CSELR EIS) (Technical Paper 2: Construction Traffic Management Plan), that trucks access the Rozelle maintenance depot facility site via a Lilyfield Road access and that, in terms of travel routes, the majority of heavy vehicles generated by construction of the maintenance facility would use City West Link.

The CSELR EIS also anticipated that at peak times, truck movements would not exceed 100 truck trips (two-way movements) per day; this is equivalent to about ten trips (two-way movements) per hour. As such, cumulative vehicle movements from work at the CSELR site and the proposal would continue to represent only a small proportion of trips on City West Link and would not be anticipated to impact traffic performance.

Vehicle activity would be expected to increase on streets next to Easton Park on Saturdays when organised sports are played on the Easton Park sports field. As traffic generated by the proposal which may use Lilyfield Road would be low and consist of light vehicles, a significant cumulative effect with other traffic using this road is not expected.
Finished site
When the proposal is completed only a small number of light vehicles would be required to enter and exit the Site to conduct minor maintenance work. These vehicles would generally consist of passenger vehicles. However, a small truck may be required occasionally for vegetation maintenance activities. As the number of light and heavy vehicles accessing the Site would be low, the potential impact on traffic during this phase would be minimal. No other traffic or transport related impacts are expected during this phase.

Overall the potential impacts of the proposal on traffic and transport are not considered to be significant, provided the appropriate management measures, described below, are put in place.

6.7.4 Safeguards and management measures
Measures to manage potential traffic and transport impacts during the proposal and after completion are outlined in Table 6-17.

The measures would be detailed in a Traffic Management Plan (TMP) and Traffic Control Plan (TCP) for the works. These plans would include detailed design in accordance with Australian Standard 2890.2 and Roads and Maritime Services standards for the preferred City West Link (west) access option. The preferred option would be confirmed by the contractor before works beginning.

Preparation of the TMP and the TCP would be carried out in consultation with the Inner West Council. The TMP and TCP are required to be submitted and approved, by the Transport Management Centre and by Roads and Maritime, before starting work.

The overarching strategy of the TMP and TCP would be to:
- Ensure the safety and efficiency of all users on the adjacent road networks are considered and maintained throughout the proposal
- Minimise the number of changes to road users’ travel paths
- Carry out traffic controls to effectively warn, inform and guide motorists, cyclists and pedestrians where changes are required to minimise confusion
- Comprehensively communicate changes on roads or pathways to emergency services, public transport operators and any other affected stakeholders (eg cyclists groups).

The TMP and TCP would form part of the EMP and would be a working document with flexibility to address traffic issues that may arise during the proposal.
### Table 6-17: Summary of traffic and transport safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>City West Link (west) access</td>
<td>Before work starts at the Site, a decision would be made about which of the City West Link access options would be carried out in consultation with the Transport Management Centre and Roads and Maritime. If Option 1 is chosen, vegetation would be removed to ensure appropriate sight lines. If Option 2 is chosen, an appropriate design would be developed in accordance with Australian Standard 2890.2 and Roads and Maritime Standards.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contractor</td>
<td>Detailed design/work preparation</td>
<td>Additional safeguard</td>
<td></td>
</tr>
</tbody>
</table>
| Traffic and transport         | A TMP and TCP would be prepared and implemented as part of the EMP. The TMP and TCP would be prepared in accordance with the Roads and Maritime Traffic Control at Work Sites Manual (RTA, 2010) and QA Specification G10 Traffic Management (Roads and Maritime, 2015). The TMP and TCP would include the following:  
  • Confirmation of haulage routes and internal access tracks  
  • Site-specific traffic control measures (including signage) to manage and regulate traffic movement  
  • Requirements and methods to keep the local community and Council informed of impacts on the local road network  
  • Access to the Site including access and egress locations for heavy and light vehicles and measures to prevent construction vehicles queuing on public roads  
  • A response plan for potential construction traffic incidents  
  • Consideration of other developments under construction (e.g., the CSELR project) to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic  
  • Monitoring, review and amendment mechanisms.                                                                 | Contractor       | Detailed design/work preparation | Core standard safeguard TT1  
  Section 4.8 of QA G36 Environment Protection |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Traffic and transport          | In addition to the above the TMP and TCP would also include:  
  - Hours of permitted vehicle activity and an out-of-hours work procedure if required  
  - Designated staff and contractor parking locations  
  - Duration of work  
  - Permitted vehicle types  
  - Designated areas within the Site for truck turning movements, parking, loading and unloading to allow heavy vehicles to enter and leave the Site in a forward direction  
  - Sequence for implementing traffic management measures  
  - Procedures and/or principles for vehicle speed limits and the safe operation of vehicles within the Site  
  - Potential for a dedicated person to help with exiting trucks at the City West Link (west) access.                                                                 | Contractor     | Detailed design/work preparation/during the works | Additional safeguard         |
<p>| Oversize trucks                | The use of oversize trucks is considered unlikely for this proposal. In the event that this changes and oversize trucks are required, the TMP and TCP would be updated and work would be carried out in accordance with the Roads and Maritime guidelines for oversize movements. | Contractor     | Work preparation/during the works    | Additional safeguard         |
| Coordination of works vehicles | Coordination of the vehicle movements arriving to and departing from the Site would ensure that disruptions to existing traffic on the surrounding road network are minimised.                                                   | Contractor     | Work preparation/during the works    | Additional safeguard         |
| Traffic – Port Authority access | Arrangements for traffic entering Port Authority controlled roads would need to be discussed and agreed with the Port Authority. Considerations would include access arrangements in the event of a special event at the temporary Sydney Exhibition Centre at Glebe Island, and any line-marking changes required near the access point into the Site. | Contractor     | Work preparation/during the works    | Additional safeguard         |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic and transport – out of hours work</td>
<td>In the unlikely event that work needed to be conducted outside standard construction hours, the TMP would outline an out-of-hours works procedure, which would include communication and notification to local residents, businesses and sensitive receivers of the out-of-hours works and a complaints line.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
6.8 Noise and vibration

A noise and vibration assessment has been carried out by SLR Consulting Australia (2016) to assess the potential noise and vibration impacts from the proposal. This section provides a summary of that assessment. The assessment is provided in Appendix H.

6.8.1 Methodology

The assessment was carried out using the following method:

- Identification of nearby noise and vibration sensitive receivers potentially affected by the proposal
- Identification of eight noise catchment areas (NCAs) representative of nearby sensitive receivers
- Noise monitoring to identify relevant background noise levels (RBLs) within each identified NCA
- Identification of applicable noise and vibration management levels for the proposal
- Assessment of potential noise and vibration impacts from the proposal at nearby sensitive receptors and NCAs
- Provision of noise and vibration mitigation measures where required.

Assessment guidance and criteria

The noise and vibration assessment has been prepared in accordance with the following policies and guidelines:

- On-site noise – Interim Construction Noise Guideline (ICNG) (DECC, 2009)
- Road traffic noise – NSW Road Noise Policy (RNP) ((NSW Department of Environment, Climate Change and Water, 2011).

The following additional guidelines and standards are also referenced in this assessment:

- Construction Noise and Vibration Mitigation – Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime, 2016)
- Sleep Disturbance – Application Notes to Industrial Noise Policy (OEH, 2010)
- Road traffic noise - Noise Criteria Guideline (NCG) (Roads and Maritime, 2015).

Noise monitoring

Ambient noise monitoring was carried out in July and August 2016 in order to quantify and characterise the existing noise environment within the surrounding area. The noise monitoring survey comprised both long-term unattended monitoring and short-term attended measurements to determine the existing background noise environment at sensitive receiver locations surrounding the Site.

Unattended noise measurements involved deploying noise loggers for up to two weeks to determine the $L_{\text{Amax}}$, $L_{\text{Aeq}}$ and $L_{\text{A90}}$ noise levels within each NCA:

- The $L_{\text{A90}}$ is taken as the background level
- The $L_{\text{Amax}}$ is indicative of the maximum noise level (often due to individual noise events such as the passing by of a heavy vehicle)
- The $L_{\text{Aeq}}$ level is the equivalent continuous sound level and has the same sound energy over the sample period as the actual noise environment with fluctuating sound levels.
Monitoring was conducted at the following locations (refer to Figure 6-30):

- R01 – within NCA03 at the southern end of Hutcheson Street, Rozelle (both attended and unattended noise monitoring was conducted at this location)
- R02 – within NCA04 at 22 Lilyfield Road, Lilyfield (both attended and unattended noise monitoring was conducted at this location)
- BG14 – within NCA06 at 52 Starling Street, Lilyfield (only unattended noise monitoring was conducted at this location)
- A01 – within NCA06 at Brenan Street, Lilyfield (only attended noise monitoring was conducted at this location).

While eight NCAs were identified for this assessment (see below), noise monitoring at the above locations was determined as adequate for identifying the existing noise environment at surrounding sensitive receivers across all the NCAs.

6.8.2 Existing environment

Noise-sensitive receivers
For the purpose of this assessment, representative sensitive noise receivers that could potentially be impacted by the proposal include (refer to Figure 6-30):

- Residential dwellings
- Commercial and industrial facilities
- Education institutions, child-care centres, medical facilities, and places of worship
- Outdoor open areas (including passive and active recreation).

Receivers in the immediate vicinity of the Site are mainly residential dwellings with some commercial facilities. Other receiver types are typically further away from the Site.

In addition to the receivers listed above, there are several items of heritage importance in the vicinity of the Site. Section 6.4 contains further details on the heritage values associated with the Site and surrounding area. Section 6.8.3 identifies the potential noise and vibration impacts on these items that could occur as a result of the proposal.

Noise catchment areas
For the purpose of this assessment, the local area surrounding the Site was divided into eight NCAs. These NCAs reflect varying land uses and groups of receivers which are affected by the same proposal activities. These eight NCAs and sensitive receiver locations are presented in Figure 6-30.

Existing background noise levels

Unattended noise measurements
Unattended ambient noise monitoring was carried out at four locations over a period of two weeks from 18 July to 2 August 2016, and supplemented by noise measurements previously carried out in April 2009 in Lilyfield, south of the Site, on behalf of the CBD Metro proposal (Heggies Pty Ltd 2009) (location BG14 below).

Operator attended noise measurements indicate that these 2009 measurements are consistent with the current noise environment in this area and are therefore suitable to inform this assessment.

The rating background levels (RBL) for day, evening and night time monitoring at each location were determined. These RBLs are presented in Table 6-18 and provide the noise goals for the proposal. Results of the 24-hour daily noise levels are presented graphically in Appendix H.
Figure 6-30: Sensitive receiver locations and noise catchment areas (source SLR, 2016)
Table 6-18: Existing background rating noise levels

<table>
<thead>
<tr>
<th>Noise monitoring location</th>
<th>Rating background level (decibel A-weighting, dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
</tr>
<tr>
<td>R01</td>
<td>54</td>
</tr>
<tr>
<td>R02</td>
<td>51</td>
</tr>
<tr>
<td>BG14</td>
<td>49</td>
</tr>
</tbody>
</table>

Note 1: Day is defined under ICNG Governing Periods as 7:00 am to 6:00 pm Monday to Saturday and 8:00 am to 6:00 pm Sundays and Public Holidays
Evening is defined as 6:00 pm to 10:00 pm
Night is defined as 10:00 pm to 7:00 am Monday to Saturday, and 10:00 pm to 8:00 am Sundays and Public Holidays.

**Attended noise monitoring measurements**

Attended noise monitoring was carried out at three locations (refer to Table 6-19 below). Atmospheric conditions at the time of monitoring were noted as calm and dry.

At the time of monitoring, the ambient noise environment was dominated by road traffic from City West Link to the south, Victoria Road to the east and Lilyfield Road to the north of the Site. Frequent aircraft and light rail passbys also contributed to the acoustic environment.

Table 6-19: Attended ambient noise levels

<table>
<thead>
<tr>
<th>Noise monitoring location</th>
<th>Description</th>
<th>Date/start time</th>
<th>Measured Noise Levels (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L\text{A}_{\text{max}}</td>
</tr>
</tbody>
</table>
| R01 (Rozelle)             | • Ambient noise is dominated by road traffic noise from City West Link to the south  
                            | • Frequent light and heavy vehicle passbys on Lilyfield Road contribute to the L\text{A}_{\text{eq}}  
                            | • Aircraft noise contributes to the L\text{A}_{\text{eq}}  | 18/07/2016 11:07 | 75  | 59  | 51  |
| R02 (Lilyfield)           | • Ambient noise environment at this location dominated by road traffic noise from Victoria Road to the east and City West Link to the south  
                            | • Frequent aircraft noise contributes to the L\text{A}_{\text{eq}}  
                            | • Discrete traffic noise level peaks from heavy vehicle movements and car horns occur several times per minute  | 21/07/2016 12:05 | 84  | 59  | 54  |
### 6.8.3 Potential impacts

#### Assessment criteria
The Roads and Maritime Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime 2016) outlines the approach to assessing and mitigating construction noise. This guideline should be read in conjunction with the relevant policy and guidelines discussed in this section.

#### Demolition (proposal) assessment criteria

The Interim Construction Noise Guideline (ICNG) (DECC 2009) is the primary guideline for the assessment and management of construction and demolition noise in NSW. This guideline presents assessment-based approaches that are tailored to the scale of the proposed work. A qualitative assessment has been carried out for the proposal in accordance with the recommendations of ICNG.

The ICNG requires project specific Noise Management Levels (NMLs) to be established for noise-affected receivers. In the event that construction/demolition noise levels are predicted to exceed the NMLs, possible and reasonable work practices are investigated to minimise noise emissions.

The ICNG recommends standard demolition work hours be confined to the following:
- Monday to Friday: 7.00am to 6.00pm
- Saturday: 8.00am to 1.00pm
- Sundays and public holidays: no work.

The NMLs adopted for the proposal for residential and other sensitive land uses are detailed in Table 6-20 and Table 6-21.

#### Table 6-20: Noise management levels for residential receivers during the proposal

<table>
<thead>
<tr>
<th>Noise catchment area/monitoring location</th>
<th>Standard Construction (RBL+10 dBA)</th>
<th>Out of Hours (RBL+5dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daytime period</td>
<td>Daytime period</td>
</tr>
<tr>
<td>NCA01 (R01)</td>
<td>64</td>
<td>59</td>
</tr>
<tr>
<td>NCA02 (R01)</td>
<td>64</td>
<td>59</td>
</tr>
</tbody>
</table>
### Table 6-21: Noise management levels for other receivers during the proposal

<table>
<thead>
<tr>
<th>Land use</th>
<th>NMLs LAeq 15min (applies when properties are in use)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day time (RBL+10 dBA)</td>
</tr>
<tr>
<td>Commercial</td>
<td>70</td>
</tr>
<tr>
<td>Other (childcare)</td>
<td>50</td>
</tr>
<tr>
<td>Other (educational)</td>
<td>55</td>
</tr>
<tr>
<td>Other (hotel)</td>
<td>60&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Other (medical)</td>
<td>55</td>
</tr>
<tr>
<td>Other (outdoor active)</td>
<td>65</td>
</tr>
<tr>
<td>Other (outdoor passive)</td>
<td>60</td>
</tr>
</tbody>
</table>

Note 1: Out of Hours construction hours – Evening hours are 6.00pm to 10.00pm. Night-time hours are 10.00pm to 7.00am Sunday to Saturday and 10.00pm Saturday to 8.00am Sunday.
### Land use

<table>
<thead>
<tr>
<th>Land use</th>
<th>NMLs LAeq 15min (applies when properties are in use)</th>
<th>Day time (RBL+10 dBA)</th>
<th>Day time (out of hours RBL + 5 dBA)</th>
<th>Evening period (out of hours RBL + 5 dBA)</th>
<th>Night period (out of hours RBL + 5 dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other (place of worship)</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>n/a</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Out of Hours construction hours – Evening hours are 6.00pm to 10.00pm. Night-time hours are 10.00pm to 7.00am Sunday to Saturday and 10.00pm Saturday to 8.00am Sunday.

Note 2: Internal design noise levels specified in AS 2107 for ‘Bars and Lounges’ + ten decibels on the basis of a conservative ‘windows open’ noise reduction between outside and inside.

Note 3: Internal design noise levels specified in AS 2107 for ‘Hotels near major roads - Sleeping Areas’ + ten decibels on the basis of a conservative ‘windows open’ noise reduction between outside and inside. Applicable during night-time hours only.

Noise levels at sensitive receivers can be significantly lower than the worst case scenario when the construction works move to a more distant location in a works area. This concept of noise levels reducing with distance is shown in **Figure 6-31** and **Figure 6-32**.

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The “Worst Case” locates all plant and equipment at the closest construction area to the receiver. As works move around the site, noise levels typically reduce further from the receiver.

**Figure 6-31: Illustration of works areas (source SLR 2016)**

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**Figure 6-32: Indicative noise attenuation over distance - sound decreases with distance from the source**
Traffic noise criteria
Noise generated from traffic associated with the proposal on public roads is assessed in accordance with the Roads and Maritime Noise Criteria Guideline (NCG) and NSW Road Noise Policy (RNP) as vehicle movements are regarded as ‘additional road traffic’ rather than as part of the work on-site.

Where noise levels increase by more than two decibels, further assessment is required in accordance with the criteria set out in the NCG. Further detail on the NCG criteria is provided in Appendix H.

Vibration assessment criteria
The effects of vibration on buildings can be divided into three main categories:
- Those in which the occupants or users of the building are inconvenienced or possibly disturbed
- Those where the building contents may be affected
- Those in which the integrity of the building or the structure itself may be impacted.

The NSW EPA’s Assessing Vibration: a technical guideline (AVTG) provides guideline values for occupants or users of a building only (ie human comfort). The AVTG provides values for continuous transient and intermittent events based on a Vibration Dose Value (VDV), under the likelihood that a person would be annoyed by the level of vibration over the assessment period.

Users of buildings can perceive floor vibration at levels well below those likely to cause damage to building contents or operation of equipment, so separate criteria in relation to the effect of construction vibration on most building contents is not required.

The VDVs recommended for vibration of an intermittent nature (ie construction work where more than three distinct vibration events occur) are presented in Table 6-22.

Table 6-22: Criteria for human exposure to intermittent vibration (human comfort)

<table>
<thead>
<tr>
<th>Location</th>
<th>Daytime¹ Preferred value</th>
<th>Daytime¹ Maximum value</th>
<th>Night time¹ Preferred value</th>
<th>Night time¹ Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical areas (such as hospital operating theatres and precision laboratories)</td>
<td>0.10</td>
<td>0.20</td>
<td>0.10</td>
<td>0.20</td>
</tr>
<tr>
<td>Residences</td>
<td>0.20</td>
<td>0.40</td>
<td>0.13</td>
<td>0.26</td>
</tr>
<tr>
<td>Offices, schools, educational institutions and places of worship</td>
<td>0.40</td>
<td>0.80</td>
<td>0.40</td>
<td>0.80</td>
</tr>
<tr>
<td>Workshops</td>
<td>0.80</td>
<td>1.60</td>
<td>0.80</td>
<td>1.60</td>
</tr>
</tbody>
</table>

Note 1: Daytime is 07:00 am to 10:00 pm and night time is 10:00 pm to 07:00 am

Criteria to avoid structural damage to buildings are set out in Australian Standard AS 2187: Part 2-2006 Explosives - Storage and Use - Part 2: Use of Explosives (AS 2187) and British Standard BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2 (BS 7385). These standards provide frequency-dependent vibration limits related to cosmetic damage, noting that cosmetic damage is very minor in nature, is readily repairable and does not affect the structural integrity of the building.

The recommended vibration limits from BS 7385 for transient vibration for minimal risk of cosmetic damage to residential and industrial buildings are shown in Table 6-23.
Table 6-23: Criteria for structural damage (BS 7385)

<table>
<thead>
<tr>
<th>Type of building</th>
<th>Peak component particle velocity in frequency range of predominant pulse in millimetres per second</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 hertz to 15 hertz</td>
</tr>
<tr>
<td>Reinforced or framed structures industrial and heavy commercial buildings</td>
<td>50 at four hertz and above</td>
</tr>
<tr>
<td>Unreinforced or light framed structures Residential or light commercial type buildings</td>
<td>15 at four hertz increasing to 20 at 15 hertz</td>
</tr>
</tbody>
</table>

The Roads and Maritime CNVG notes that separate guidance for assessment of heritage structures is contained in German Standard DIN 4150 Part 3 - Structural vibration - Effects of vibration on structures, Deutsches Institute fur Normung (1999). DIN 4150 provides levels for short-term vibration, and the ‘safe limits’ given in DIN 4150 are more conservative than BS 7385.

The relevant criteria set out by DIN 4150 for short-term vibration events (ie those unlikely to cause resonance or fatigue) are presented in Table 6-24.

Table 6-24: DIN 4150 Structural damage – safe limits for short-term building vibration

<table>
<thead>
<tr>
<th>Type of structure</th>
<th>Vibration velocity in millimetres per second</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At foundation</td>
</tr>
<tr>
<td></td>
<td>1 hertz to 10 hertz</td>
</tr>
<tr>
<td>Buildings used for commercial purposes, industrial buildings and buildings of similar design</td>
<td>20</td>
</tr>
<tr>
<td>Dwellings and buildings of similar design and/or use</td>
<td>5</td>
</tr>
<tr>
<td>Structures that, because of their particular sensitivity to vibration (structurally unsound), do not correspond to those listed in the first two rows above</td>
<td>3</td>
</tr>
</tbody>
</table>

Note 1: For frequencies above 100 hertz the upper value in this column should be used.
Site management works

Demolition noise
While seven primary activities are proposed (as detailed in Chapter 3 (Description of the proposal)), these activities have been further divided into 10 work scenarios for the purpose of the noise assessment, to reflect the equipment used and crews working. These work scenarios have been developed to represent the realistic worst case noise generating work.

Noise generating activities and equipment and their associated sound power levels relating to each work scenario are outlined in Table 6-25.

Table 6-25: Works scenarios and associated noise generating activities

<table>
<thead>
<tr>
<th>Works scenario</th>
<th>Description</th>
<th>Equipment used</th>
<th>Maximum $\text{LA}_{eq}$ (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.0001 - Site establishment</td>
<td>Installation of project office compound Installation of sediment controls</td>
<td>• Excavator (20 tonne) • Bobcat • Truck (HIAB) • Franna crane • Elevated working platform • Generator • Water tanker (8000 litre) • Tipper truck • Road sweeper</td>
<td>109</td>
</tr>
<tr>
<td>W.0002 - Utility location</td>
<td>General utility location</td>
<td>• Positrack (bobcat) • Bogies • Telehandler • Generator • Water tanker (8000 litre) • Water gurney • Road sweeper</td>
<td>112</td>
</tr>
<tr>
<td>W.0003 - Site clearing</td>
<td>General clearing of vegetation</td>
<td>• Excavator (30 tonne) • Truck (HIAB) • Franna crane • Telehandler • Chipper • Generator</td>
<td>120</td>
</tr>
<tr>
<td>W.0004 - Site clearing</td>
<td>General material removal</td>
<td>• Excavator (25 tonne) • Positrack (bobcat) • Generator • Grader • Roller (non-vibratory) • Semi-trailer</td>
<td>111</td>
</tr>
<tr>
<td>W.0005 - Infrastructure clearing and/or removal</td>
<td>Infrastructure demolition and/or removal using rock-breaker</td>
<td>• Truck (HIAB) • Franna crane • Bogies • Generator • Mobile crane (100 tonne) • Excavator (breaker) • Concrete saw</td>
<td>119</td>
</tr>
<tr>
<td>Works scenario</td>
<td>Description</td>
<td>Equipment used</td>
<td>Maximum LAeq (dBA)</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>W.0006 - Infrastructure clearing and/or removal</td>
<td>General infrastructure demolition and/or removal</td>
<td>• Truck (HIAB) • Franna crane • Bogies • Generator • Mobile crane (100 tonne) • Elevated working platform • Concrete saw</td>
<td>112</td>
</tr>
<tr>
<td>W.0007 - Remove redundant services</td>
<td>Remove redundant services</td>
<td>• Excavator (25 tonne) • Positrack (bobcat) • Vacuum (industrial) • Truck (HIAB) • Franna crane • Tipper truck • Concrete saw</td>
<td>112</td>
</tr>
<tr>
<td>W.0008 - General site stabilisation</td>
<td>General site stabilisation</td>
<td>• Excavator (30 tonne) • Dozer • Grader • Water tanker (8000 litre) • Roller (non-vibratory)</td>
<td>113</td>
</tr>
<tr>
<td>W.0009 - Site stabilisation using mulcher/chipper</td>
<td>Site stabilisation using mulcher/chipper</td>
<td>• Excavator (30 tonne) • Dozer • Grader • Water tanker (8000 litre) • Roller (non-vibratory) • Chipper</td>
<td>121</td>
</tr>
<tr>
<td>W.0010 - Site completion and handover</td>
<td>Site completion and handover</td>
<td>• Bobcat • Vacuum (industrial) • Truck (HIAB) • Elevated working platform • Generator • Road sweeper</td>
<td>108</td>
</tr>
</tbody>
</table>

A summary of the predicted noise levels in each of the NCAs for the various work scenarios listed in Table 6-25 is presented in Table 6-26 for residential receivers and Table 6-27 for commercial receivers. The noise levels are representative of the worst case impacts where work is closest to each NCA, and are intended to give an overview of the potential noise from the proposal. These noise levels also represent levels before management measures are applied.
Table 6-26: Predicted worst case noise levels at nearest residential receivers

<table>
<thead>
<tr>
<th>NCA</th>
<th>Representative Receivers</th>
<th>NMLs</th>
<th>Predicted LAeq(15minute) Noise Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Day</td>
<td>W.0001 General site establishment</td>
</tr>
<tr>
<td>01</td>
<td>Corner of Lilyfield Road and Grove Street</td>
<td>64</td>
<td>44</td>
</tr>
<tr>
<td>02</td>
<td>Lilyfield Road</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>03</td>
<td>Lilyfield Road</td>
<td>64</td>
<td>48</td>
</tr>
<tr>
<td>04</td>
<td>Lilyfield Road</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>05</td>
<td>Corner of Catherine Street and City West Link</td>
<td>59</td>
<td>40</td>
</tr>
<tr>
<td>06</td>
<td>Brenan Street</td>
<td>59</td>
<td>49</td>
</tr>
<tr>
<td>07</td>
<td>Railway Parade</td>
<td>59</td>
<td>53</td>
</tr>
<tr>
<td>08</td>
<td>City West Link</td>
<td>59</td>
<td>36</td>
</tr>
</tbody>
</table>

Note 1: Colouring indicates the range of predicted NML exceedances based on nearest receiver (red >20 dB, orange 11-20 dB, and yellow 1-10 dB)

Note 2: The nearest receiver is commercial. Assessment of all sensitive receivers is provided in Appendix H
## Table 6-27: Predicted worst case noise levels at nearest commercial receivers

<table>
<thead>
<tr>
<th>NCA</th>
<th>Representative Receivers</th>
<th>NMLs</th>
<th>Predicted LAeq(15minute) Noise Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>W.0001</td>
<td>W.0002</td>
</tr>
<tr>
<td>01</td>
<td>Corner of Lilyfield Road and Grove Street</td>
<td>Day</td>
<td>70</td>
</tr>
<tr>
<td>02</td>
<td>Lilyfield Road</td>
<td>70</td>
<td>50</td>
</tr>
<tr>
<td>03</td>
<td>Lilyfield Road</td>
<td>70</td>
<td>59</td>
</tr>
<tr>
<td>04</td>
<td>Lilyfield Road</td>
<td>70</td>
<td>74</td>
</tr>
<tr>
<td>05</td>
<td>Corner of Catherine Street and City West Link</td>
<td>70</td>
<td>39</td>
</tr>
<tr>
<td>06</td>
<td>Brenan Street</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>07</td>
<td>Railway Parade</td>
<td>70</td>
<td>36</td>
</tr>
<tr>
<td>08</td>
<td>City West Link</td>
<td>70</td>
<td>59</td>
</tr>
</tbody>
</table>

Note 1: Colouring indicates the range of predicted NML exceedances based on nearest receiver (red >20 dB, orange 11-20 dB, and yellow 1-10 dB)

Note 2: The nearest receiver is commercial. Assessment of all sensitive receivers is provided in Appendix H.
The results in Table 6-26 indicate sensitive receivers in most NCAs would experience noise impacts; however:

- Neither NCA01 nor NCA05 is expected to experience any NML exceedances, and no sensitive receivers in these NCAs are likely to be highly noise affected by the proposal
- NCAs to the south of the Site (NCA05 to NCA08) are generally likely to experience lower noise levels from the work than NCAs to the north. Receivers in these NCAs are situated south of City West Link, and the existing embankment at the southern edge of the Site provides a noise screen between the receivers and the work
- Only one minor NML exceedance (ie up to ten decibels) is predicted in NCA08 at one receiver.

In the remaining five NCAs, the proposal would likely impact mainly on the nearest receivers. The NCA with the (generally) highest predicted noise levels is NCA04, where receivers are around 30 to 40 metres from the nearest work area. A total of 58 sensitive receivers are likely to be ‘highly noise affected’ in this NCA, with eight receivers predicted to experience an exceedance of 21 to 25 decibels above the NML. Sensitive receivers are also likely to be highly noise affected in NCA02 and NCA03 (11 sensitive receivers in both NCAs).

The mulcher/chipper is likely to dominate the noise levels from the loudest work scenarios (W.0003 and W.0009). As a result, the highest predicted NML exceedances are associated with work scenario ‘W.0009 – Stabilisation using mulcher/chipper’, where $L_{Aeq}$ (15 minute) noise levels of up to 86 dBA are predicted when these works are at the closest position to receivers in NCA04. However, when the mulcher/chipper is not used (represented by work scenario ‘W.0008 – General site stabilisation’), the noise levels are expected to be eight decibels lower. The mulcher/chipper therefore needs additional mitigation considerations in order to minimise impacts on sensitive receivers (refer to section 6.8.4).

In addition to those NCAs likely to be highly noise affected, moderate exceedances (ie up to 20 decibels) are likely in NCA02, NCA03 and NCA04.

While receivers in a majority of NCAs are expected to experience NML exceedances, the worst case impact on sensitive receivers is only likely for a small portion of the duration of the proposal (around one per cent to two per cent or about one week of the entire work duration), due to the activities progressing through the Site and away from receivers.

While the work scenarios would generally be carried out in stages, there is also a possibility of worst case work being carried out concurrently in the south-west of the Site when activity ‘W.0005 – Infrastructure demolition and/or removal using rock-breaker’ coincides with activity ‘W.0009 - Site stabilisation using mulcher/chipper’. The nearest receivers to these works are in NCA02. However, the receiver noise level from both of these scenarios operating at the same time increases by only around one to two decibels above the noise level generated by each individual scenario.

In order to mitigate these potential noise exceedances a number of reasonable and feasible measures from the ICNG and the CNVG have been identified. These are presented in section 6.8.4. Further assessment of the potential noise impact from the works following implementation of these measures is provided in section 6.8.5.

**Vehicle movements on-site**

Noise levels from trucks operating on-site are predicted to result in a noise level of 68 dBA $L_{Aeq}$ (15 minute) at the nearest receivers in NCA04. This is due to the residential receivers in this catchment being situated close to the site boundary and next to the northern access track.

Based on the proposed truck volumes, the predicted noise impacts within the other surrounding NCAs at all sensitive receivers were assessed. The results of the noise assessment during standard construction hours indicated that no NML exceedances are predicted at any receivers within the other NCAs for on-site truck movements.
Demolition vibration

The potential for vibration impacts on sensitive receivers is dependent upon the type of equipment used and the type of work carried out within each of the works scenarios.

Vibration-intensive equipment is proposed during works activity ‘W.0005 - Infrastructure demolition and/or removal using a rock-breaker’ which is around 50 metres from the nearest receivers in NCA02 and NCA04. Other vibration intensive equipment such as jackhammers are also proposed to be used during the proposal. This equipment has a potential to impact on nearby sensitive receivers.

Safe working distances are provided for both cosmetic damage (refer to BS7385:2 Evaluation and Measurement for Vibration in Buildings Part 2: Guide to Damage Levels from Ground-borne Vibration, 1993) and human comfort (refer to NSW EPA Assessing Vibration: a technical guideline, 2006). The distances are indicative and would vary depending on the particular item of plant and local geotechnical conditions.

For most sources of intermittent vibration during construction, such as rock-breakers, the predominant vibration energy occurs at frequencies usually in the 10 hertz to 100 hertz range. On this basis, and with reference to BS7385:2, a vibration damage screening level of 7.5 millimetres per second has been adopted for the purpose of assessing potential impacts from continuous vibration.

Based on the safe working distances presented in the CNVG, there is adequate separation distance from the nearest receivers outside the works area to avoid potential impacts. The proposal is therefore unlikely to result in structural or cosmetic damage to nearby receivers from vibration.

In relation to human comfort, the safe working distances relate to continuous vibration. For most construction activities, vibration emissions are intermittent in nature. Higher vibration levels, occurring over shorter periods, are therefore allowed.

For rock breaking works, where the nearest affected residential receivers in NCA02 and NCA04 are around 50 metres from the works, the time to reach the day-time VDV criterion of 0.4 metres per second\(^1.75\) is anticipated to be greater than eight hours for a heavy rock-breaker operating continuously near the adjacent site boundary. The rock-breaker is not expected to operate continuously as part of the proposal. As a result, it is considered unlikely that the human comfort vibration goal would be exceeded during the proposal.

Several structures of heritage significance (not listed) have also been identified next to proposed rock breaking works within the Site, being:
- The sandstone cutting along Lilyfield Road on the north-west boundary of the Site and close to the railway platform demolition works (potential heritage item of local significance)
- Victoria Road bridge in the east of the Site and next to the Port Authority building/warehouse demolition works (potential heritage item of local significance)
- The southern penstock, which is associated with the State heritage listed White Bay Power Station, is in the east of the Site and next to the Port Authority building/warehouse demolition works. This structure is understood to potentially be in a state of disrepair.

While the above structures are close to the works, the rock breaker is likely to be far enough away from these heritage items to avoid vibration impacts. The proposal is therefore unlikely to result in exceedances of DIN 4150 criteria. Conservatively, use of the large rock-breaker may result in vibration levels exceeding five millimetres per second. These vibration levels would be confirmed by site measurements at the start of the works (refer to section 6.8.4).
Other items of heritage significance outside the Site include the Lilyfield Road stormwater canal (an open stormwater channel), a former hotel building and ‘Cadden Le Messurier’ near the intersection of Gordon Street, and Lilyfield Road. These items are not located near the proposed rock-breaking works and would not be impacted, and are therefore not considered further in this assessment.

Road traffic

Four established access points around the perimeter of the Site would serve as entrance and exit points for vehicles throughout the duration of the proposal. These include:

- City West Link (east): Vehicles using this access point would enter directly off City West Link travelling from the west
- City West Link (west): Vehicles using this access point would exit directly on to City West Link and travel east
- Port Authority access: The Port Authority access is on the eastern side of the Site through the Port Authority area (east of the Victoria bridge). It can be accessed via James Craig Road, Somerville Road (passing under ANZAC bridge), and the road network controlled by the Port Authority. Once within the eastern portion of the Site, vehicles would enter/exit the areas west of the Victoria Road bridge via the southern underbridge
- Gordon Street: (light vehicles only) via Lilyfield Road.

Truck movements

All truck movements to and from the Site would be via City West Link and or James Craig Road. James Craig Road has no adjoining residential receivers situated along the proposed route and as such, no further consideration of road traffic noise impacts is considered warranted. As City West Link is subject to high existing traffic volumes in the region of 50,000 to 60,000 annual average daily traffic flows (Roads and Maritime, 2016), the addition of a limited number of heavy vehicles would result in a relatively small increase (ie less than two decibels), resulting in a neutral impact on existing road traffic noise levels.

Light vehicles

Given the relatively low number of light vehicles which would access the Site via Gordon Street, increases in existing road traffic noise levels due to light vehicle movements associated with the work are not anticipated. Further consideration of noise impacts due to construction traffic is therefore not required for this route.

Finished site

After the completion of the works, only minor maintenance work would be carried out on-site, such as vegetation management, stormwater management and general maintenance of the Site.

The existing access points would be used during this stage of the proposal; however, it is anticipated that the main access point would be directly off Gordon Street. Noise would be mainly generated by light vehicles entering and exiting the Site and the operation of security offices. Given the nature of the works that would be conducted after completion of the proposal, noise emissions from the Site are expected to be minimal and consistent with maintenance activities now carried out on the Site.

6.8.4 Safeguards and management measures

Noise and vibration measures have been developed to minimise potential impacts associated with the proposal and finished site. These are presented in Table 6-28. While the duration of the worst case impacts would likely be short in relation to the overall work program, noise mitigation measures would be required to reduce the potential noise impacts associated with predicted NML exceedances when work is near the closest receivers.

A noise and vibration management plan (NVMP) would be prepared by the proposal contractor once the schedule for the work, the equipment to be used and the local geotechnical conditions are confirmed.
### Table 6-28: Summary of noise and vibration safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Noise and vibration - general | A Noise and Vibration Management Plan (NVMP) would be prepared and implemented as part of the EMP. The NVMP would generally follow the approach in the Interim Construction Noise Guideline (ICNG) (DECC, 2009) and would identify:  
  - All potential noise and vibration generating activities  
  - Possible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Roads and Maritime, 2014)  
  - A monitoring program to assess performance against relevant noise and vibration criteria  
  - Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures  
  - Contingency measures in the event of non-compliance with noise and vibration criteria.  
  
  The NVMP would be regularly updated to account for any changes in noise and vibration management strategies. | Contractor      | Works preparation/during the works                                                                                                                            | Core standard safeguard NV1  
  Section 4.6 of QA G36 Environment Protection |
| Noise and vibration - notification | All sensitive receivers (eg schools, local residents) likely to be affected would be notified before the start of any work that may have an adverse noise or vibration impact. The notification would provide details of:  
  - The work to be carried out  
  - The proposal work hours  
  - Contact information for project management staff  
  - Complaint and incident reporting  
  - How to obtain further information. | Contractor | Works preparation | Core standard safeguard NV2 |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise and vibration - training</td>
<td>Induction and training would be provided to staff and subcontractors outlining their responsibilities for noise management on-site. The inductions would highlight the need to limit noise (including from shouting, vehicle stereos, radios, dropping of materials, throwing of metal items and slamming of doors). The induction would include the following:  - All project specific and relevant standard noise and vibration mitigation measures  - Relevant licence and approval conditions  - Permissible hours of work  - Any limitations on high noise generating activities  - The location of nearest sensitive receivers  - Construction employee parking areas  - Designated loading/unloading areas and procedures  - Site opening/closing times (including deliveries)  - Environmental incident procedures.</td>
<td>Contractor</td>
<td>Works preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
### Environmental safeguards

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Noise - equipment      | In regards to plant and equipment the following would be carried out:  
  - Quieter work methods and equipment would be adopted including the use of mufflers and silencers where practicable  
  - The noise levels of plant and equipment items would be considered in rental decisions and must be compliant with the criteria in Table 2 of the Construction Noise and Vibration Mitigation – Construction Noise and Vibration Guideline (Roads and Maritime, 2016)  
  - All plant and equipment would be properly maintained and operated according to manufacturers’ recommendations in such a manner as to avoid causing excessive noise  
  - Noise-intensive equipment would be turned off when not in use  
  - Only necessary equipment, of an appropriate size and power, would be on-site.                                                                                                                                   | Contractor      | During the works | Additional safeguard          |
| Noise – location of work areas | Work compounds, parking areas, equipment and material stockpiles would be located as far as practicable from noise-sensitive receivers.                                                                                           | Contractor      | During the works | Additional safeguard          |
| Noise - vehicles       | In regards to vehicles the following would be carried out:  
  - The use of engine compression brakes near residential areas would be limited.  
  - Non-tonal reversing alarms would be fitted on construction vehicles.  
  - Opportunities to design the internal access tracks to allow for the forward movement of trucks and other plant would be prioritised.                                                                             | Contractor      | During the works | Additional safeguard          |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise – location of plant/equipment</td>
<td>Use of the mulcher/chipper would be limited to the southern area of the Site (along the City West Link boundary). This may need movement of vegetation and other material from the clearing area to the mulcher/chipper.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Noise – timing of works</td>
<td>Specific timing of plant items in each work area would be considered during preparation of the NVMP when the equipment requirements are finalised.</td>
<td>Contractor</td>
<td>Works preparation</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Demolition vibration</td>
<td>Building condition surveys of heritage structures within 50 metres of vibration intensive equipment would be completed both before and after the work to identify existing damage and any damage due to the work.</td>
<td>Contractor</td>
<td>Works preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Demolition vibration</td>
<td>The heritage structures would be inspected during preparation of the NVMP to determine the applicable safe vibration level.</td>
<td>Contractor</td>
<td>Works preparation</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Demolition vibration</td>
<td>If vibration intensive work is required within the safe working distances, vibration monitoring or attended vibration trials would be carried out at the outset to ensure that levels are within relevant criterion. At locations where the predicted and/or measured vibration levels are greater than the nominated screening levels, a more detailed analysis of the building structure, vibration source, dominant frequencies and dynamic characteristics of the structure would be required to determine the applicable safe vibration level.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
6.8.5 Post mitigation noise assessment

When the noise management measures shown in section 6.8.4 are adopted, the residual noise impact is reduced. The predicted residual noise impact summary for the works is shown in Table 6-29 and Figure 6-33.

Table 6-29: Predicted residual noise impacts – post mitigation

<table>
<thead>
<tr>
<th>NCA</th>
<th>Representative Worst-affected Receivers</th>
<th>NML</th>
<th>Number of Receivers</th>
<th>Highly Noise Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total in NCA</td>
<td>With NML Exceedance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0-10 decibels</td>
<td>11-20 decibels</td>
</tr>
<tr>
<td>01</td>
<td>Corner of Lilyfield Road and Grove Street</td>
<td>64</td>
<td>512</td>
<td>0</td>
</tr>
<tr>
<td>02</td>
<td>Lilyfield Road</td>
<td>64</td>
<td>750</td>
<td>25</td>
</tr>
<tr>
<td>03</td>
<td>Lilyfield Road</td>
<td>64</td>
<td>773</td>
<td>12</td>
</tr>
<tr>
<td>04</td>
<td>Lilyfield Road</td>
<td>61</td>
<td>376</td>
<td>13</td>
</tr>
<tr>
<td>05</td>
<td>Corner of Catherine Street and City West Link</td>
<td>59</td>
<td>418</td>
<td>0</td>
</tr>
<tr>
<td>06</td>
<td>Brenan Street</td>
<td>59</td>
<td>477</td>
<td>35</td>
</tr>
<tr>
<td>07</td>
<td>Railway Parade</td>
<td>59</td>
<td>1281</td>
<td>68</td>
</tr>
<tr>
<td>08</td>
<td>City West Link</td>
<td>59</td>
<td>85</td>
<td>0</td>
</tr>
</tbody>
</table>

Note 1: Residential receiver NML during daytime Standard Construction Hours

The results of the residual noise impact assessment show that once mitigation measures are introduced, residual noise exceedances are less than 20 decibels during daytime on-site activities for all NCA’s excluding NCA04. The results for NCA04 predict four highly noise affected receivers, which are located on Lilyfield Road at Rozelle. Based on guidance provided in the CNVG, no additional noise mitigation is required for all NCAs excluding NCA04, as there are no NML exceedances over 20 decibels for the other NCAs. Under the CNVG the predicted highly noise affected receivers in NCA04 would need additional management.

The predicted Highly Noise Affected receivers in NC04 need the following management measures under the CNVG:
- Notification by informing the community through letterbox drops or equivalent and phone calls
- Verification noise monitoring of construction noise levels
- Respite offers.

The approach to respite periods would be confirmed during preparation of the NVMP and in consultation with the affected community. These additional management measures are described in Table 6-30.
Figure 6-33: Exceedances post mitigation (source SLR 2016)
Table 6-30: Additional noise management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Noise – highly noise-affected receivers | The following additional management measures would be carried out for the predicted highly noise-affected receivers in accordance with the Construction Noise and Vibration Mitigation – Construction Noise and Vibration Guideline (Roads and Maritime 2016):  
  - Notifying the community through letterbox drops, doorknocking or phone calls  
  - Verifying demolition noise levels through noise monitoring  
  - Offering respite. The approach to respite periods would be confirmed during preparation of the NVMP and in consultation with the affected community. | Contractor | Works preparation/during the works | Additional safeguard |
6.9 Air quality

An air quality assessment has been carried out by Pacific Environment Limited (2016) to identify potential impacts of the proposal on air quality. This assessment has been summarised below and is provided in Appendix I.

6.9.1 Methodology

The assessment has been carried out using the following method based on the UK Institute of Air Quality Management (IAQM) method:

- Identifying the activities to be carried out as part of the proposal
- Dividing the proposed activities according to the likely impacts generated including demolition, ground disturbance works and vehicle track-out
- Conducting a semi-quantitative risk-based assessment on dust, which considered the size of the proposal, the volume of traffic on unsealed roads, and the locations of sensitive receptors
- Identifying project-specific management/mitigation measures to minimise potential impacts of the proposal.

The IAQM method divides the activities into different categories to reflect their different potential impacts. These categories are demolition, ground disturbance works, vehicle track-out and construction activities. As there are no building or other construction activities as part of the proposal, construction impacts have been excluded from the assessment.

Site management works risk assessment

A semi-quantitative risk assessment of potential dust impacts on surrounding sensitive receptors was carried out for the proposal in line with the method described in the Guidance on the assessment of dust from demolition and construction (IAQM, 2014) using a four-step process to assess dust impacts:

- Step 1: Screening based on distance to nearest sensitive receptors
- Step 2: Assessing the risk of dust impacts from activities based on:
  - The scale and nature of the works, which determines the potential dust emission magnitude
  - The sensitivity of the area
- Step 3: Determining site-specific mitigation for each of the three identified dust-emitting activities (demolition, ground disturbance work and vehicle track-out)
- Step 4: Determining any residual significant risks after mitigation measures have been identified.

The risk of dust soiling and human health impacts due to particulate matter (PM$_{10}$) on surrounding areas was also assessed based on the scale of activities and proximity to sensitive receptors.

Air quality criteria and standards

*Pollutants of potential concern*

The pollutants of potential concern for the proposal are considered to be related to particulate emissions, specifically particulates with an aerodynamic diameter of less than ten micrometres ($\mu$m), referred to as PM$_{10}$.

Particles of this size can enter the pulmonary regions of the respiratory tract. Particles less than 2.5 micrometres (PM$_{2.5}$) are typically associated with combustion processes, and are only produced in very small amounts by mechanical disturbance of materials, such as during demolition.
The most common impacts from construction-related activities are dust soiling and increased ambient PM$_{10}$. Dust soiling would arise from the deposition of dust in all size fractions. The ambient dust relevant to health outcomes would be that measured as PM$_{10}$, although most of this would be in the coarse (PM$_{2.5-10}$) fraction, rather than the PM$_{2.5}$ fraction. PM$_{2.5}$ was therefore not considered in this assessment.

There is a potential for the proposal to generate other emissions such as odour, exhaust emissions and asbestos fibres.

Asbestos has been identified in fill material, ballast, stockpiles and within objects (e.g. brake shoes) in a variety of forms, including friable fibre bundles and non-friable (bonded) Asbestos Containing Materials (ACM). Asbestos has the potential to result in health risks to on-site workers and nearby off-site receptors (e.g. members of the public) if disturbed and made airborne. Previous surveys and site investigations (including asbestos fibre monitoring) carried out for the Site have been discussed earlier in section 6.1.

**Air quality criteria**

In NSW, the impact assessment criteria for PM$_{10}$ are specified in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC 2005). These criteria represent the maximum allowable pollution levels within an airshed and are presented in Table 6-31.

**Table 6-31: NSW DEC (2005) Air quality standards for particulate matter**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Period</th>
<th>Concentration (microgram per cubic metre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{10}$</td>
<td>24-hour</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>annual</td>
<td>30</td>
</tr>
</tbody>
</table>

The above criteria have been used to determine the existing air quality and to assess potential impacts from the proposal.

### 6.9.2 Existing environment

**Meteorology**

Annual and seasonal wind roses for the Site for 2015 were generated based on the data collected at the OEH Rozelle meteorological station (located at the Sydney College of the Arts to the north-west of the Site). These identified the following observations:

- Winds from the south are dominant in all seasons except winter, when north-westerlies are most common
- The patterns in summer and spring are similar, with southerlies and north-easterlies more common
- Winds from the north-west start in autumn and increase in prevalence through winter.

**Background air quality**

In general, air quality in Sydney has been improving over the last few decades, due to initiatives to reduce emissions from industry, motor vehicles, businesses and residences (Pacific Environment, 2015).
Gaseous pollutant levels continue to be below national standards; however, levels of particles (including PM$_{10}$) still exceed the standards on occasion. Particulate matter levels are affected by:

- The annual variability in the weather
- Natural events such as bushfires and dust storms, as well as hazard-reduction burns
- The location and intensity of local emission sources, such as wood heaters, transport and industry.

Background particulate matter concentrations were obtained from a monitoring station operated by OEH at Rozelle, about one kilometre north-west of the Site. These concentrations are presented in Table 6-32. The average concentration of PM$_{10}$ over the six-year period was 17.1 micrograms per cubic metre.

Table 6-32: Annual average PM$_{10}$ concentrations at Rozelle

<table>
<thead>
<tr>
<th>Year</th>
<th>PM$_{10}$ (microgram per cubic metre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>16.1</td>
</tr>
<tr>
<td>2011</td>
<td>16.6</td>
</tr>
<tr>
<td>2012</td>
<td>16.9</td>
</tr>
<tr>
<td>2013</td>
<td>18.3</td>
</tr>
<tr>
<td>2014</td>
<td>17.8</td>
</tr>
<tr>
<td>2015</td>
<td>16.7</td>
</tr>
<tr>
<td>Average</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Sensitive receptors

The locations of relevant sensitive receptors are presented in Figure 6-34. The sensitive receptors surrounding the Site include residential, commercial/industrial, child care and places of worship, education, accommodation and medical. Receptor areas were identified up to 500 metres from the Site.

Residential properties are situated next to the Site in the north-east, across Lilyfield Road in the north-west and across City West Link to the south. Commercial/industrial properties are located next to the Site in the central north. A former hotel is located within 50 metres to the north of the Site and religious, educational and childcare facilities are located within 200 to 500 metres north and south of the Site.

Recreational receptors located within 350 metres of the Site include Whites Creek Park to the south across City West Link and Easton Park to the north across Lilyfield Road. No sensitive ecological receptors have been identified within 50 metres of the site boundary.
6.9.3 Potential impacts

Site management works
An assessment of the proposal’s potential impact on local air quality is discussed in the following sections. This assessment progresses through a number of steps as defined by IAQM.

Step 1: Screening
The IAQM method recommends further assessment of dust impacts for work where:
- Human receptors are within 350 metres of the Site and/or within 50 metres of the routes used by vehicles on the public highway (up to 500 metres from the site entrance)
- Ecological receptors are situated 50 metres from the site boundary and/or within 50 metres of the routes used by vehicles on the public highway, up to 500 metres from the site entrances.
A ‘human receptor’ refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM$_{10}$ over a time period relevant to air quality standards and goals. In terms of annoyance effects, this would most commonly relate to dwellings, but may also refer to other premises such as buildings with cultural heritage collections (eg museums and galleries), vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations (eg salad or soft-fruit production). There are a number of human receptors within 350 metres of the site boundary, as shown in Figure 6-34. Based on this, further assessment of the dust impacts was determined necessary.

Recreational receptors were also located within 350 metres of the Site include Whites Creek Park to the south across City West Link and Easton Park to the north across Lilyfield Road.

An ‘ecological receptor’ refers to any sensitive habitat (eg RAMSAR sites, National Parks, endangered ecological communities, local nature reserves) affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (eg on foraging habitats) (IAQM, 2014) related to these habitats. Based on investigations and definitions above, no ecological receptors have been identified within 50 metres of the site boundary. Further assessment of dust impacts was therefore not carried out for these receptors.

**Step 2A: Dust emissions magnitude**

Dust emission magnitudes are estimated according to the scale of works being carried out, and other considerations such as meteorology, types of material being used, or general demolition method. The IAQM guidance provides examples to aid this classification.

Based on the examples provided by the IAQM and the specifics of the proposal, the dust emission magnitude would be classified as small for demolition and medium for earthworks and track-out. Justification and factors used in determining this classification are presented Table 6-33.

**Table 6-33: Maximum dust emission magnitudes in accordance with IAQM guidance**

<table>
<thead>
<tr>
<th>Category</th>
<th>Potential pre-mitigation dust emission magnitude</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demolition of buildings and structures such as the:</td>
<td>Small</td>
<td>• Demolition activities would involve the removal of the rail gantries, lighting tower, workshop, signal shed and annex, rail platform and awning and Port Authority building and warehouse</td>
</tr>
<tr>
<td>• Railway platform and awning</td>
<td></td>
<td>• The rail platform and awning are reinforced concrete, the Port Authority building is brick and the Port Authority warehouse, workshop, gantries and lighting tower are mainly metal</td>
</tr>
<tr>
<td>• Workshop</td>
<td></td>
<td>• Overall low potential for dust release.</td>
</tr>
<tr>
<td>• Lighting tower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Rail gantries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Port Authority building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Port Authority warehouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Potential pre-mitigation dust emission magnitude</td>
<td>Justification</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------</td>
<td>---------------</td>
</tr>
</tbody>
</table>
| Ground disturbance work such as:  
  - Clearing the Site and extending access routes  
  - Removal of redundant utilities  
  - Removal of railway tracks, sleepers and ballast in designated areas  
  - General vegetation clearing  
  - Removal of existing stockpiles  
  - Stockpiling  
  - Loading, unloading and hauling material to and from the Site  
  - Construction of sediment basins. | Large | - While the Site is larger than 10,000 square metres, the work is unlikely to involve a substantial amount of ground disturbance activity (only to a depth of 500 millimetres to remove ballast and targeted excavation of up to two metres depth for sediment basins)  
  - Ballast to be removed is estimated at 31,350 tonnes  
  - Delivery, unloading and shaping of potentially 7,800 m³ of topsoil over a maximum area of 78,000 m²  
  - The total weight of all material to be removed from Site is estimated at less than 100,000 tonnes  
  - It is unlikely there would be more than ten heavy earth moving vehicles active on-site at any one time  
  - Stockpiles are unlikely to be higher than eight metres. |
| Track-out, which involves the transport of dust and dirt by heavy-duty vehicles (HDVs) from the Site onto the public road network, where it may be deposited and then resuspended by vehicles using the roads. | Medium | - The maximum average daily truck movement for the busiest stage of the proposal would likely be about 46 trucks  
  - Unpaved tracks on-site are about 900 metres long. |

**Step 2B: Sensitivity of the surrounding area**

The IAQM method allows the sensitivity of an area to dust soiling and human health impacts (due to PM$_{10}$) to be classified as high, medium or low, based on a series of factors including:

- Receptor sensitivity (for individual receptors in the area):
  - High sensitivity – locations where members of the public are likely to be exposed for eight hours or more in a day, eg private residences, hospitals, schools or aged care homes  
  - Medium sensitivity – places of work where exposure is likely to be eight hours or more in a day  
  - Low sensitivity – locations where exposure is transient, ie one or two hours’ maximum. For example: parks, footpaths, shopping streets, playing fields
- Annual mean PM$_{10}$ concentration  
- Number of receptors of each sensitivity type in the area  
- Distance from source.

The overall sensitivity of the area is determined by selecting the highest relevant sensitivity classification from the matrix tables (there may be more than one classification depending on the number of receptors of each sensitivity type in the area). Based on this approach, the overall sensitivity of the area to dust soiling was classified as high and the overall sensitivity to human health impacts was classified as low. The justification for these classifications is provided in Appendix I.
Step 2C: Unmitigated risks of impacts
The potential dust emission magnitude classification of small and medium, as presented in Table 6-33, was combined with the sensitivity of the area to determine the risk of construction dust air quality impacts before mitigation measures are applied. This assessment was completed in line with the IAQM risk matrix and is summarised in Table 6-34.

Table 6-34: Summary of the proposal dust risks without mitigation

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk of dust impacts on sensitive receptors – without mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dust soiling</td>
</tr>
<tr>
<td>Demolition</td>
<td>Medium risk</td>
</tr>
<tr>
<td>Ground disturbance work</td>
<td>High risk</td>
</tr>
<tr>
<td>Track-out</td>
<td></td>
</tr>
</tbody>
</table>

The outcome of the qualitative air quality risk assessment concluded that the proposal is considered to pose a high risk of dust soiling and a negligible to low risk of human health impacts from dust impacts (ie PM$_{10}$).

Step 3: Mitigated risks of impacts
The outcome of Step 2C was used to determine the level of mitigation required to ensure that dust impacts on surrounding sensitive receptors were at an acceptable level.

The highest risk category was used for each activity involved in the proposal. A high or medium-level risk rating means that suitable management measures would need to be implemented during the proposal to ensure that dust impacts on surrounding sensitive receptors are reduced.

Recommended site-specific and in-principle management measures are described in detail in section 6.9.4.

Step 4: Reassessment
The final step of the IAQM method is to determine whether there are significant residual impacts arising from a proposed development after mitigation measures have been implemented.

There is a risk that some nearby commercial buildings, residential and other sensitive receivers may experience some occasional dust soiling impacts. The windroses for Rozelle indicated that, due to the transitional nature of the prevailing winds, emissions could be transported toward receptors at any time of year. However, the proposal is unlikely to result in a significant impact on sensitive receptors as the potential impacts resulting from the work would:
- Only be temporary in nature
- Only arise during specific conditions at a time when dust is being generated (eg in dry weather with the wind blowing towards a receptor)
- Only occur if management measures are inadequate.

Other emissions
In addition to the potential dust impacts, there is also a possibility of asbestos fibres becoming airborne during the works. Air monitoring for asbestos would be conducted throughout the works and a HazMat survey would be carried out before works start. Refer to section 6.9.4 and 6.1 for further detail on the proposed Asbestos Management Plan (AMP).
There is also a possibility of odour impacts to occur during the works. In the unlikely event that odour emissions are released during the removal of ballast or waste, work in that specific area would need to be suspended until the source and nature of the odour could be determined and an appropriate course of action carried out to manage the odour impacts. Depending on the source and type of odour, further assessment may be required at that time to determine whether it is likely to cause a reduction in health and/or amenity for the nearest sensitive receptors.

As mentioned earlier, there is a potential for the proposal to generate exhaust emissions. However, given the scale and nature of the works and the type and number of plant equipment proposed, it is unlikely that exhaust emissions from on-site plant would impact on local air quality.

Detail on the potential and known contaminants on-site (including asbestos), and the management of associated potential impacts, is provided in section 6.1. Overall the potential impacts of the proposal on air quality are not considered to be significant, provided the appropriate management measures, described below, are put in place.

**Finished site**

After completion of the proposal the Site would be secured and managed, with only minor maintenance work to be carried out. Ongoing maintenance activities would include ground surface and vegetation management, involving some light vehicle and foot traffic. Given the Site would be stabilised during the works, and the minor nature of the ongoing maintenance activities, it is unlikely that this phase would result in impacts on local air quality provided appropriate management measures are maintained.

Overall the potential impacts of the finished site on air quality are not considered to be significant.

### 6.9.4 Safeguards and management measures

An Air Quality Management Plan (AQMP) would be prepared and implemented for the proposal. It would contain details of the site-specific mitigation measures to control and reduce potential air quality impacts, as presented in Table 6-35. Additional measures to control soil erosion impacts including from wind are discussed in section 6.1.

In addition to the AQMP, an AMP would be prepared and implemented throughout the proposal. The AMP would include measures for handling, storage, transport and disposal of asbestos and asbestos containing material (ACM), and air monitoring and other health and safety requirements. Details regarding the AMP have been provided in section 6.1. Additional measures to mitigate potential air quality impacts are provided below.

Measures to manage potential air quality impacts resulting from the proposal are outlined in Table 6-35.
### Table 6-35: Summary of air quality safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Air quality – general | An Air Quality Management Plan (AQMP) would be prepared and implemented as part of the EMP. The AQMP would include the following:  
- Potential sources of air pollution  
- Air quality management objectives consistent with any relevant published NSW EPA and/or OEH guidelines  
- Mitigation and suppression measures required  
- Methods to manage work during strong winds or other adverse weather conditions  
- A progressive strategy to stabilise exposed surfaces for reduced erosion risk and dust generation (cross referenced to the SWMP as required). | Contractor | Detailed design/works preparation | Core standard safeguard AQ1 Section 4.4 of QA G36 Environment Protection |
| Air quality – general | The AQMP would include contingency measures in case complaints about air quality are received. | Contractor | Works preparation/during the works | Additional standard safeguard |
| Air quality – general | Work activities would be reviewed if the air quality management measures are ineffective in minimising emissions and dust. | Contractor | During the works | Additional safeguard |
| Air quality – hazardous material | Biological debris or other hazardous materials such as asbestos would be bagged and removed, or wet down before demolition. Refer to below discussion on asbestos and the contamination section (section 6.1). | Contractor | During the works | Additional safeguard |
| Air quality – dust emissions | The AQMP would include measures to manage dust emissions. These would include the following:  
- Loads that may produce dust or odour would be covered  
- Water would be sprayed on unsealed access roads and open areas during conditions conducive to dust generation | Contractor | Works preparation/during the works | Additional safeguard |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
|        | • A wheel washing system would be established for vehicles leaving the Site  
• An adequate area of hardstand would be maintained between the wheel wash facility and the site exit, wherever site size and layout permits  
• Internal access tracks would be inspected and necessary repairs to the surface made as soon as reasonably practicable  
• On-site vehicle speed limits would be established and enforced to prevent dust emissions  
• Vehicles and activities would be confined to the designated work areas to prevent inadvertent encroachment into exposed areas  
• Water-assisted dust sweepers would be used on internal access tracks and local roads, to remove material tracked out of the Site  
• Before and during grubbing and ballast removal, soils/ballast would be wet down to limit the movement of dust and other materials off-site  
• Exposed areas would be stabilised as soon as reasonable and possible (refer to section 6.1 for further detail on stabilisation)  
• Stockpiled material would be appropriately shaped to reduce wind erosion and covered as appropriate (refer to section 6.1 for more detail)  
• During extreme weather events where dust generation cannot be effectively minimised (such as high winds), dust generating works would cease until adequate controls can be implemented or until adverse weather conditions subside  
• Demolition of buildings and structures would be carried out using techniques and practices that minimise dust generation. This may include soft stripping inside buildings before demolition. | | | |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| Air quality – asbestos      | An Asbestos Management Plan (AMP) would be prepared by a suitably-qualified practitioner, as discussed in section 6.1. The AMP would include the following:  
  • Investigating material before demolition and stockpile removal to determine the potential for the release of asbestos fibres  
  • Completing asbestos fibre air monitoring during activities which could liberate asbestos fibres.  
  Refer to section 6.1 of the REF for further detail. In addition, as described in section 6.1 a HazMat survey would be conducted before works are carried out. | Contractor      | Works preparation             | Additional safeguard          |
| Air quality – exhaust emissions | Measures to manage exhaust emissions would include the following:  
  • Machinery would be turned off while not in use  
  • Equipment (including all internal combustion engines) would be properly maintained and running efficiently to ensure exhaust emissions are minimised, where practicable  
  • All emission controls used on vehicle and equipment would comply with standards listed in Schedule 4 of the Protection of the Environment Operations (Clean Air) Regulation 2010. | Contractor      | Works preparation/during the works | Additional safeguard          |
| Air quality – odour emissions | In the event that odour emissions are generated, work would cease until the source and nature of the odour can be determined and an appropriate course of action carried out. This may include further assessment to determine potential impacts on the nearest sensitive receptors. | Contractor      | During the works              | Additional standard safeguard  |
| Air quality – ash           | All wastes are to be removed off-site and disposed of to an appropriately-licensed facility in accordance with the site Waste and Resource Management Plan. No waste would be burned on-site.  
  Refer to section 6.3 for further information on waste management. | Contractor      | During the works              | Additional standard safeguard  |
6.10 Landscape character and visual impacts

An assessment has been carried out to determine the potential impacts on landscape character and visual amenity associated with the proposal, in accordance with the Roads and Maritime Environment impact assessment practice note: guideline for landscape character and visual impact assessment (EIA-N04).

6.10.1 Existing environment

Landscape character

As discussed in section 6.4.2, before the development of the Rozelle Rail Yards, the Site contained a range of industries in the eastern portion and was also located next to residential properties (to the north). The Rozelle Rail Yards were established in 1916 when the double rail track from Dulwich Hill to Rozelle and Glebe Island was opened. During the late nineteenth to early twentieth century the local landscape was mainly characterised by industrial and port activities. The landscape included the Rozelle Rail Yards and other industrial features such as White Bay Power Station and the Glebe Island Container Terminal.

After the freight line from Pyrmont to Rozelle closed in 1996, the Site was used periodically, serving functions such as the unloading of wheat and storage of concrete. The Site was completely closed in around 2007. Along with the decline of the Rozelle Rail Yards in the second half of the twentieth century, other industries moved away from area or were closed. As such, the local area around the Site now has an inner city urban character dominated by residential land use, with only pockets of active and redundant industry remaining (eg White Bay Power Station), along with the continued evolution of certain historic infrastructure (eg CSELH). As indicated in section 6.11, the housing in the area is still mainly single and multi-storey residential dwellings and there are also several open spaces designated as public recreation (such as Easton Park), some mixed used development, and some commercial development along Victoria Road.

The landscape character of the Site is associated with its former use as a railway yard. The Site is mainly flat with gentle gradients. It now consists of a disused and degraded brownfield site with associated redundant rail infrastructure, stockpiles and vegetation regrowth of poor quality that has been established relatively recently. The key elements that influence the character of the Site relate to the visible structures, notably the railway gantries, warehouse, lighting tower, railway platform and the Port Authority building and warehouse. Victoria Road traverses the eastern portion of the Site via an overbridge. Along its southern boundary the Site is partly screened by vegetation along the City West Link road corridor.

The Site has been identified as a ‘destination’ within The Bays Precinct Transformation Plan, which has the potential to alter the landscape character of the wider area. The plan identifies the potential future use of the Rozelle Rail Yards for residential housing, public spaces and employment use, and notes that part of the Rozelle Rail Yards is subject to a proposal for WestConnex (UrbanGrowth, 2015).

Potential receptors to a change in the landscape character of the Site include residential properties, commercial/industrial properties and open space areas. The sensitivity of the landscape character to change is based on the Site’s former use as a railway yard; and its current degraded and disused state. Based on the above, the sensitivity of the landscape character of the Site is considered to be low.

Visual amenity

The topography of the Site was previously modified to provide a level area for the construction of the Rozelle Rail Yards. This involved certain cutting and filling, the movement and channelisation of Whites Creek to the south, and clearing of vegetation. As a result, the elevation of the Site is lower than the surrounding landscape, particularly in areas to the north, south and west of the Site.
Due to the difference in ground surface height, the surrounding roads and neighbouring properties in these elevated areas may have views into the Site. In particular, some of the residential properties on Lilyfield Road are located immediately next to and above the Site, and have views down into the Site.

Views of the Site consist of transient views from nearby roads and bridges (eg Victoria Road, City West Link, The Crescent, Lilyfield Road and the Catherine Street Road bridge) and permanent views from houses and businesses in the surrounding area. Residents and, to a lesser extent, workers on and close to Lilyfield Road are likely to be particularly sensitive to visual changes at the Site due to their proximity and elevated position.

While there is the potential for visual impacts on a variety of transient and permanent receptors, the magnitude of these potential impacts would in many cases be reduced by the presence and retention of trees and other vegetation around the periphery of the Site. Vegetation along the road corridors surrounding the Site (eg on the southern side of Lilyfield Road and along the northern side of the City West Link road corridor) obstructs views of the Site from those residences on the north side of Lilyfield Road and road users on Lilyfield Road and the City West Link. Equally other buildings, such as existing houses and businesses along the southern side of Lilyfield Road, also obstruct views to the Site from other residences in Lilyfield and Rozelle as well as from Easton Park.

Given the views to the Site from the local area, the following receptors could potentially be affected by changes in visual amenity resulting from the proposal:
- Residential properties on the southern side of Lilyfield Road next to the eastern end of the Site (view reference V01)
- Workers in the commercial/industrial area on the southern side of Lilyfield Road next to the middle of the Site (view reference V02)
- Commuters (on foot and in vehicles) crossing over Catherine Street or Victoria Street bridges and/or driving along Lilyfield Road or City West Link (view reference V03).

A description of the visual sensitivity of these three receptor groups is provided in Table 6-36.

Figure 6-36 to Figure 6-41 show views of the Site from Lilyfield Road, City West Link and Victoria Road. A map showing the location of the views and the photographs is provided in Figure 6-35.

Table 6-36: Visual sensitivity of receptors

<table>
<thead>
<tr>
<th>View</th>
<th>Description of setting &amp; visual receptor</th>
<th>Sensitivity of view</th>
</tr>
</thead>
<tbody>
<tr>
<td>V01</td>
<td>Residential properties are located next to the north-eastern end of the Site on the southern side of Lilyfield Road. These properties are elevated about six to eight metres above the site ground level. They are set back from the Site by private gardens. The informal garden on top of the rock retaining wall in this area also provides a buffer between the proposed works and the properties. From this elevated position these properties potentially have views across a large part of the Site and beyond. However, these views may be obscured by a number of trees and shrubs growing within the private gardens and on top of the rock retaining wall.</td>
<td>Moderate</td>
</tr>
<tr>
<td>View</td>
<td>Description of setting &amp; visual receptor</td>
<td>Sensitivity of view</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>V02</td>
<td>A number of industrial/commercial businesses are located immediately north of the Site, south of Lilyfield Road. These businesses are largely at the same level as the Site, but some of them have first-floor offices. Despite the fact these businesses may have views across large parts of the Site including from an elevated position, the workers are unlikely to spend a great deal of time looking at the Site. As such, this receptor is considered less sensitive than residential properties.</td>
<td>Low</td>
</tr>
<tr>
<td>V03</td>
<td>Commuters passing by in cars have glimpses of the Site but these are obscured by road infrastructure, various buildings and vegetation. Commuters on foot may see more of the Site, but again some of these views would be obscured.</td>
<td>Low</td>
</tr>
</tbody>
</table>
Figure 6.35: Views into the Site

KEY

- Receiver
  - Residential (V01)
  - Commercial/Industrial (V02)
  - Public (V03)
- Photos A to F
- Temporary facilities
- Site boundary
- LGA Boundary

Disclaimer
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AECOM/SMC makes no representations or warranties of any kind, about the accuracy, reliability, completeness, suitability or fitness for purpose in relation to the map content.
Figure 6-36: Photograph A - view looking south from the intersection of Gordon Street and Lilyfield Road, showing industrial properties in the foreground and the Site in the background.

Figure 6-37: Photograph B - view from the Victoria Road bridge looking west. A large portion of the Site is visible as well as City West Link in the distance.
Figure 6-38: Photograph C - view looking south-east from the Victoria Road pedestrian bridge, showing the Port Authority building and warehouse in the eastern portion of the Site.

Figure 6-39: Photograph D - view from the Victoria Road pedestrian bridge looking south-west showing a residential property on the southern side of Lilyfield Road and a view into the Site and of City West Link in the distance.
Figure 6-40: Photograph E - view looking south-east, from the intersection of Foucart Street and Lilyfield Road, showing the view a commuter on Lilyfield Road would have of the Site and the road corridor vegetation in the foreground.

Figure 6-41: Photograph F - view from City West Link travelling west, west of The Crescent intersection, showing the Site on the right hand side of the image and the road corridor vegetation.
6.10.2 Potential impacts

Site management works
A number of activities associated with the proposal have the potential to affect the landscape character of the Site and the local area. These activities could also potentially result in visual impacts on the receptors listed above, and include the following:

- Clearance work including the demolition of buildings and structures, and the removal of vegetation, rail infrastructure, waste, existing stockpiles
- Ground disturbance and site stabilisation works including removal of the ballast, establishment of temporary and permanent sediment controls and minor reshaping of the surface
- Use of construction machinery, storage of construction materials (eg stockpiling), the establishment of ancillary facilities and storage areas
- Traffic management measures put in place during the proposal, such as road barriers, signage and temporary lighting
- Other temporary management measures carried out at the Site, such as fencing/hoarding.

The potential impact of the proposal on landscape character and visual amenity is discussed in the below sections.

Landscape character
The removal and demolition of the more prominent elements of the Site would change the landscape character of the Site. These prominent elements consist of largely recent vegetation growth and established but disused rail infrastructure (eg rail gantries, buildings). The vegetation is relatively recent and does not support the historic character of the Site or its use as a rail yard. The rail infrastructure does support the character of the Site and the local area. However given that large parts of the Site are screened, this impact is expected to be largely limited to the Site itself. The proposal is therefore likely to result in a low residual impact on landscape character from the removal of these elements.

The removal of historical rail infrastructure would change the landscape character of the Site, in the context of its connection to the industrial history of the surrounding land. As discussed in section 6.5, the Site displays a low level of overall intactness and retains only a few industrial features dating to the early periods of its use as a railway yard. This has impacted on the ability of the area to contribute to broader industrial heritage values. The proposal is therefore likely to result in a low residual impact on landscape character associated with the removal of the rail infrastructure.

As the Rozelle Rail Yards have fallen into disuse, the areas around the Site have maintained their inner city urban character. This character is unlikely to be diminished or impacted by the proposal and particularly by the removal of redundant infrastructure. A negligible impact on the inner city urban character of the area is therefore expected as a result of the proposal.

As the proposal progress, there could also be temporary impacts related to a greater level of activity on the Site. The proposal would result in increased activity over a 12-month period on a site that is reasonably open to the surrounding area. The introduction of equipment and machinery, vehicular movements and demolition activities may therefore alter the local landscape character of the Site and surrounding area. This impact would be temporary and would largely be limited to daytime construction hours. The proposal is therefore likely to result in a low residual impact on landscape character associated with a greater level of activity on the Site.

Table 6-37 summarises the potential impacts on landscape character resulting from the proposal discussed above.
Table 6-37: Summary of potential impacts on landscape character during the proposal

<table>
<thead>
<tr>
<th>Element of landscape character</th>
<th>Sensitivity of landscape character</th>
<th>Nature of impact</th>
<th>Magnitude of impact</th>
<th>Summary</th>
<th>Residual rating of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prominent elements of the Site (eg vegetation, railway gantries)</td>
<td>Low</td>
<td>Adverse and permanent (removal of these elements)</td>
<td>Low</td>
<td>As large parts of the Site are screened, vegetation is relatively recent, and the Site is degraded</td>
<td>Low</td>
</tr>
<tr>
<td>Historic use of the Site as a railway yard in context of its connection to the industrial history of the surrounding land</td>
<td>Low</td>
<td>Adverse and permanent (removal of rail infrastructure)</td>
<td>Low</td>
<td>As the Site displays a low level of overall intactness and is degraded</td>
<td>Low</td>
</tr>
<tr>
<td>Inner city urban character of the area</td>
<td>Low</td>
<td>Adverse and permanent (change in character of the Site)</td>
<td>Negligible</td>
<td>This character is unlikely to be diminished or impacted by the proposal</td>
<td>Negligible</td>
</tr>
<tr>
<td>Level of activity at the Site during the works</td>
<td>Low</td>
<td>Adverse and temporary (eg construction equipment, vehicle movements)</td>
<td>Low</td>
<td>This impact would be temporary and would largely be limited to daytime construction hours</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Visual amenity**

The proposal may also result in temporary visual impacts for local receptors including the removal of prominent rail infrastructure, existing structures (eg the warehouse), vegetation and stockpiles. While vegetation on the Site would be removed, most of the vegetation next to the Site, within the road corridor along City West Link and along Lilyfield Road, as well as vegetation growing on top of the sandstone cutting and on the rock retaining wall in the north of the Site would be retained. Some vegetation in the northern road corridor along City West Link, in the western portion of the Site, would be removed to create adequate sightlines for trucks exiting the Site. The elevated residential properties on Lilyfield Road would have views of the works being completed including the removal of the vegetation, rail infrastructure and ground disturbance works. The works however would not block views or introduce new intrusive elements into their view lines. Measures discussed below (refer to section 6.10.3) would ensure that during the works the Site is kept in a tidy state and that the Site would only be progressively exposed and stabilised. As such, the views from the elevated residential properties in Lilyfield are unlikely to be significantly affected.
The views toward City West Link from the industrial area on the southern side of Lilyfield Road may change as a result of vegetation removal at the Site. However, given the industrial land use, this view is considered less sensitive. Due to the less elevated position of the industrial properties, this change is unlikely to have a noticeable impact. Equally, the transient nature of the views from the two bridges and Lilyfield Road are also considered to be less sensitive. As a result, it is considered that views from these locations are unlikely to be noticeably impacted.

During the work, activity on the Site would increase and views from the sensitive receptors to the Site itself would change. Construction plant and the work itself, albeit temporary, would be visible. However, the proposal and the plant needed to complete it would not block or obscure any views from the sensitive receptors. The work would not affect the skyline or views to the horizon and would not result in a loss of daylight for any properties or businesses.

Table 6-38 summarises the potential visual amenity impacts on sensitive receivers resulting from the proposal.
<table>
<thead>
<tr>
<th>View</th>
<th>Visual sensitivity</th>
<th>Visible element</th>
<th>Nature of impact</th>
<th>Magnitude of visual effect</th>
<th>Summary</th>
<th>Residual rating of visual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>V01 – residences on southern side of Lilyfield Road</td>
<td>Moderate</td>
<td>Works to the eastern part of the Site including the loss of vegetation, rail infrastructure, plant and equipment and views to City West Link.</td>
<td>Adverse and temporary</td>
<td>Negligible</td>
<td>Vegetation next to the Site would be safeguarded and the works would not block or obscure any views from the sensitive receptors.</td>
<td>Negligible</td>
</tr>
<tr>
<td>V02 – workers in commercial/industrial units to the north</td>
<td>Low</td>
<td>Works to the central and east of central part of the Site including plant and equipment.</td>
<td>Adverse and temporary</td>
<td>Negligible</td>
<td>The commercial/industrial units are at a similar level to the Site in the central portion and elevated in the portion east of central and are not likely to be looking into the Site for a large amount of time.</td>
<td>Negligible</td>
</tr>
<tr>
<td>V03 – commuters on surrounding road network</td>
<td>Negligible</td>
<td>Transient and generally obscured views of the Site including plant and equipment, and transient views of vehicles using the Port Authority access point east of the Site.</td>
<td>Adverse and temporary</td>
<td>Negligible</td>
<td>Views are largely obscured and/or transient in nature.</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
Overall, based on the potential impacts on landscape character and visual amenity ranging from negligible to low, the proposal is not considered to have a significant impact on landscape character and visual amenity.

**Finished site**

After the works are completed, the landscape character of the Site would be altered through the removal of vegetation, structures and redundant rail infrastructure, and subsequent increase in the extent of open land and a largely vacant site. This largely vacant use is unlikely to have an impact on the landscape character of the local area, as it would neither add nor detract from the area’s inner city urban character. However, the change would be noticeable to some receptors.

Once the works are complete the Site would be managed but the level of activity would be minor. Views to the Site would have changed (eg the Site may be slightly lower and would contain sediment basins) but no views would be blocked or obstructed. Certain views to City West Link may change but, as discussed above, the trees to the north of the Site and within the City West Link road corridor screen the road.

A summary of the potential landscape character impacts and visual amenity impacts from the finished site of the proposal is provided below in Table 6-39 and Table 6-40.
Table 6-39: Summary of potential impacts on landscape character from the finished site

<table>
<thead>
<tr>
<th>Element of landscape character</th>
<th>Sensitivity of landscape character</th>
<th>Nature of impact</th>
<th>Magnitude of impact</th>
<th>Summary</th>
<th>Residual rating of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largely vacant and disused character of the Site</td>
<td>Low</td>
<td>Adverse and permanent</td>
<td>Low</td>
<td>The character would change but the, but it would not impact on the area's inner city urban character.</td>
<td>Low</td>
</tr>
</tbody>
</table>

Table 6-40 Summary of potential visual sensitivity from the finished site

<table>
<thead>
<tr>
<th>View</th>
<th>Visual sensitivity</th>
<th>Visible element</th>
<th>Nature of impact</th>
<th>Magnitude of visual effect</th>
<th>Summary</th>
<th>Residual rating of visual impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>V01 – residences on southern side of Lilyfield Road</td>
<td>Moderate</td>
<td>Views of the Site and views to City West Link</td>
<td>Negligible change to views</td>
<td>Negligible</td>
<td>The work would not block or obscure any views from the residences and most screening vegetation next to the Site would be retained, therefore the potential impact is considered to be negligible.</td>
<td>Negligible</td>
</tr>
<tr>
<td>V02 – workers in commercial/industrial units to the north</td>
<td>Low</td>
<td>Works to the central part of the Site including plant and equipment</td>
<td>Negligible change to views</td>
<td>Negligible</td>
<td>The commercial/industrial units are at a similar level to the Site. As the sensitivity of the view is low, the potential impact is considered to be negligible.</td>
<td>Negligible</td>
</tr>
<tr>
<td>V03 – commuters on surrounding road network</td>
<td>Negligible</td>
<td>Transient and generally obscured views of the Site</td>
<td>Negligible change to views</td>
<td>Negligible</td>
<td>Due to the transient and obscured nature of views, the potential impacts are considered negligible.</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
Overall, based on the potential impacts on landscape character and visual amenity ranging from negligible to low, the finished site of the proposal is not considered to have a significant impact on landscape character and visual amenity.

While alone the proposal is unlikely to result in a significant impact, it has a potential to generate a minor cumulative impact on the existing landscape character of the local area, when considered in combination with surrounding developments such as the CSELR project. Further detail on the cumulative impacts resulting from the proposal is provided in section 6.13.

6.10.3 Safeguards and management measures

Safeguards and management measures would be carried out to manage potential impacts of the proposal on landscape character and visual amenity, as outlined in Table 6-41. Further measures relating to the off-site storage of certain elements from the Site (such as the lighting tower) for potential re-use have previously been included in section 6.4.5.
Table 6-41: Summary of landscape character and visual amenity management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual amenity – views of the Site</td>
<td>Exposed areas would be progressively stabilised as detailed in sections 6.1 and 6.2.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional standard safeguard</td>
</tr>
<tr>
<td>Visual amenity – views of the Site</td>
<td>The Site would be left in a tidy state at the end of each day of work. All machinery and equipment, ancillary facilities, and excess material (aside from temporary site offices and sediment basins), would be removed from the Site once the proposal is complete. A site inspection would be carried out to ensure disturbed areas have been stabilised and the Site has been left in a tidy state.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional standard safeguard</td>
</tr>
<tr>
<td>Visual amenity – views of the Site</td>
<td>Before work starts, additional screening options (e.g., hoarding or shade cloth) would be investigated in order to restrict views into the Site from surrounding areas.</td>
<td>Contractor</td>
<td>Work preparation</td>
<td>Additional standard safeguard</td>
</tr>
</tbody>
</table>
6.11 Property and land use

6.11.1 Existing environment

The Site is in Sydney’s inner west within the suburbs of Rozelle and Lilyfield, about 3 kilometres west of the Sydney central business district (CBD). It is between Lilyfield Road and City West Link and is within the Inner West Local Government Area (LGA). The Site is also close to Annandale, but is separated from this suburb by the City West Link and the Sydney Light Rail. The Site is zoned as Port and Employment under the Sydney Regional Environmental Plan No. 26—City West (SREP 26) (Department of Urban Affairs and Planning 1997).

When operational, the rail yards met an objective of land use zoning under SREP 26, “to provide road and rail access to port activities”. The Site has remained disused for many years and is now a typical industrial brownfield environment comprising vegetation, waste materials and redundant rail infrastructure and no longer meets this objective.

Roads and Maritime is soon to be the sole owner of the Site. Currently four NSW government authorities – namely Rail Corporation NSW, Port Authority of NSW, Roads and Maritime and the Sydney Harbour Foreshore Authority – own different parts of the Site (refer to Figure 6-42).

Current uses at the Site include the following:

- The majority of the Site contains redundant infrastructure, waste and buildings from its former use as a railway yard and is maintained by the various land owners
- An informal garden used by local Lilyfield Road residents has been constructed on the top of the rock retaining wall on the northern boundary of the Site in the eastern portion
- An area in the south-eastern portion of the Site is now leased for use as a crane yard (owned by Port Authority of NSW) relating to an adjoining industrial property
- Two advertising billboards are located on the south-east and south-west corners of the Site
- A transformer within the crane yard in the south-eastern portion of the Site is now leased by Ausgrid
- An existing live Sydney Trains switching station is on the southern boundary of the Site, opposite the intersection of the City West Link and The Crescent.

In addition, parts of the western end of the Site are occasionally used by CSELR Rozelle maintenance depot facility workers accessing City West Link and for temporary storage during construction works on the neighbouring site. This practice would not continue during the works.

The local area is dominated by residential/industrial land uses with associated open spaces, recreational areas, public services and facilities, commercial areas and transport infrastructure. The industrial history of the area is also apparent in some of the maritime related land use around Rozelle Bay and White Bay, as well as redundant industrial and transport infrastructure at the Site and White Bay Power Station. The Site extends for a small distance east under the Victoria Road bridge, is bordered by City West Link to the south and is next to the future CSELR Rozelle maintenance depot facility site to the west.

The land use zoning for the areas around the Site is provided in the SREP and the Leichhardt Local Environment Plan 2013 respectively. Some of the key surrounding land uses are shown on Figure 6-43 and are described as follows:

- General residential areas (R1) make up a majority of land use close to the Site. The nearest residential dwellings are immediately north of the Site along Lilyfield Road. The objectives of the general residential zone are to allow for residential development and facilities or services to meet the needs of residents
- Several local centres (B2) are also close to the Site, particularly along Lilyfield Road and Catherine Street, which are north and south of the Site respectively. The objectives of the local centre zone are associated with retail, business, entertainment and community uses
Several areas zoned as public recreation (RE1) are close to the Site. Notable areas include Easton Park on Denison Road about 50 metres north of the Site, and Whites Creek Valley Park and Cohen Park, which are both more than 100 metres south of the Site, south of City West Link. Some other public recreation areas further away from the Site include Bicentennial Park and Federal Park (about 280 metres and 430 metres south-east of the Site respectively). The objectives of the public recreation zones under the Leichhardt LEP are to provide public open space or serve recreational purposes.

Several areas zoned as Port and Employment (SREP 26) are in the surrounding area, including the White Bay Power Station, which is immediately east of Victoria Road.

Several waterways and water bodies are close to the Site, including Rozelle Bay, which is about 65 metres south-east of the Site. A waterfront zoned area (under SREP 26) is in Rozelle Bay on the southern side of Victoria Road.

Remaining uses surrounding the Site include a business park on Lilyfield Road (B7) and several areas of light industry (IN2).

The land uses and zoning provisions around the Site are anticipated to undergo substantial transformation over the coming decades under a number of infrastructure and urban renewal projects.

A Plan for Growing Sydney (2014) is the NSW Government’s plan for the future of the Sydney Metropolitan Area over the next 20 years. The Plan provides key directions and actions to guide Sydney’s productivity, environmental management, and liveability. Action 1.1.3 of this plan notes that UrbanGrowth NSW would ‘lead the revitalisation of The Bays Precinct as a world class, iconic foreshore destination’. The Site is at the western end of The Bays Precinct.

UrbanGrowth NSW’s The Transformation Plan: The Bays Precinct Sydney divides The Bays Precinct into eight distinct transformation areas, providing commercial/industrial, residential, and public open spaces, and improving connectivity within the wider precinct. One of the areas identified in the strategy is the Rozelle Rail Yards and this area is identified as a longer-term priority (2022 and beyond). Identified future uses for the area include housing, public spaces and employment (UrbanGrowth, 2015).

Since the release of the Transformation Plan, the NSW Government has announced its intention to use the Rozelle Rail Yards as a site for the planned WestConnex M4-M5 Link project, should this project be approved. The Site is proposed to be transformed into a road interchange, which would mainly be underground, generating new areas of open space for community uses and improved active transport linkages at the surface.

In addition, the west portion of the Rozelle Rail Yards (west of the site boundary) would also be used as a maintenance depot facility under the approved CSELR project.

In relation to property and land use, the receptors which could potentially be affected by the proposal include the following:

- Users of the informal garden in the northern part of the Site
- The lease-holder for the south-eastern corner of the Site (used as a crane yard)
- The lease-holder for the advertising billboards
- Users of the surrounding land, including residents and workers.
Figure 6-42: Existing property ownership

KEY
- Waterway
- Open drainage channel
- Site boundary
- Local government area boundary
- State government land
- Easements
  - E. Existing utilities easement

Note: Property ownership information current as of October 2016
Figure 6-43: Existing land use zones

KEY
- Light rail stop
- Light rail
- Waterway
- Site boundary
- LGA Boundary

SREP 26 - City West
- (P&E) Port & Employment
- (WF) Waterfront
- (DM) Deferred Matter

Leichhardt LEP Land Zoning
- B2 Local Centre
- B7 Business Park
- IN2 Light Industrial
- R1 General Residential
- RE1 Public Recreation
- RE2 Private Recreation
- SP2 Infrastructure

Disclaimer: Map produced by AECOM on behalf of Sydney Motorway Corporation. Map data copyright 2016 Sydney Motorway Corporation, NSW. Spatial data used under licence from Land and Property Management Authority, NSW © 2016. AECOM/SMC makes no representations or warranties of any kind, about the accuracy, reliability, completeness, suitability or fitness for purpose in relation to the map content.
6.11.2 Potential impacts

Site management works
No property acquisition (temporary or permanent) is required. The Site includes an area on top of a rock retaining wall that is used as an informal garden by the local Lilyfield Road residents. This garden is proposed to be retained as part of the proposal.

Access to surrounding land uses would not be restricted during the work, as the proposed access routes to the Site do not require the purchase or lease of any land outside of the site boundary. All heavy vehicle access would be via City West Link or the road network controlled by the Port Authority to the east, and James Craig Road. While the use of Port Authority land would be required in order to access the Site via the Victoria Road underbridge, this access point is already established, and would enable use of the existing road network, allowing vehicles to access James Craig Road via Somerville Road. Traffic management measures would be carried out to ensure access to neighbouring properties is maintained throughout the work. Refer to section 6.7 for further detail about traffic and access.

The land uses surrounding the Site would not need to be changed. Therefore, the objectives of these surrounding land use zones would not be impacted by the proposal.

Overall the proposal would not significantly impact on property and land use, based on the points discussed above.

Finished site
As discussed above, no properties would need to be acquired as part of the proposal, and rezoning of the Site is not proposed. In addition, the proposal would not result in changes to surrounding land use zones or affect their objectives.

The proposal aims to remove redundant infrastructure and buildings and leave the Site largely cleared, with only minor maintenance activities occurring on the Site. Considering the Site cannot be used in its current state, the proposal would enable the Site to be used for future development. These uses could align with the current zoning at the Site and/or with the NSW Government’s intention to use the Site for the proposed WestConnex M4-M5 Link project.

In summary, it is unlikely that the proposal would result in significant impacts on land use or property.

6.11.3 Safeguards and management measures
While no significant impacts are expected, the safeguards and management measures outlined in Table 6-42 would be carried out to further reduce potential impacts of the proposal on property and land use.

Measures relating to other environmental aspects such as traffic and transport (including access), and amenity issues, have been addressed in their respective sections of the REF and have not been addressed further in this section.
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property access</td>
<td>Access to neighbouring properties and local roads would not be compromised by the proposal. In the unlikely event access restrictions occurred, affected residents or business would be consulted before restrictions take place.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional standard safeguard</td>
</tr>
</tbody>
</table>
6.12 Other impacts

Other potential impacts that may occur as a result of the proposal include socio-economic, hazard and risk, and utilities. These other impacts (particularly hazards associated with asbestos) have been briefly discussed in the following sections in relation to particular environmental aspects:

- Contamination and asbestos (**section 6.1**)
- Spills and leaks (**section 6.2**)
- Waste (**section 6.3**)
- Traffic impacts on surrounding roads (**section 6.7**)
- Noise impacts on residents (**section 6.8**)
- Air quality and dust (**section 6.9**)
- Impacts on views into the Site (**section 6.10**)
- Property and land use (**section 6.11**).

6.12.1 Existing environment and potential impacts

The existing environment and potential impacts of the other impacts, socio-economic, hazard and risk and utilities are summarised below in **Table 6-43**. The impacts outlined below primarily relate to the proposal rather than the finished site, considering this phase would involve only minor maintenance activities.
### Table 6-43: Existing environment and potential impacts of other issues

<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Existing environment</th>
<th>Potential impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic</td>
<td>The Site lies within the Inner West Local Government Area (LGA), and formerly formed part of the Leichhardt LGA.</td>
<td>The potential socio-economic impacts associated with proposal are summarised below:</td>
</tr>
<tr>
<td></td>
<td>The Site has remained unused for many years. The Site is not currently accessible to the public, and is fenced and manned by some security personnel.</td>
<td>- No acquisition of properties (temporary or permanent) would be required (refer to section 6.11)</td>
</tr>
<tr>
<td></td>
<td>The Site currently has four established access points around the perimeter, comprising two directly off City West Link, one through Port Authority owned land and one off Gordon Street. Vehicles access Gordon Street via Lilyfield Road.</td>
<td>- No direct impacts to users of the informal garden are expected, as the garden would be retained during the works</td>
</tr>
<tr>
<td></td>
<td>As discussed in section 6.11, the local area surrounding the Site is primarily characterised by residential areas, along with some commercial and industrial businesses, especially those immediately north of the Site on Lilyfield Road. There is also an informal garden which has been established within the Site on top of the rock retaining wall. This garden is used by local residents.</td>
<td>- Minor generation of temporary employment is expected under the proposal, with up to 50 staff on-site at any one time. This may include site supervisors, engineers, consultants and administrative staff and the workforce, comprising the trades, security and labour personnel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The proposal is unlikely to impede access to businesses or surrounding residences. Potential impacts on traffic, public and active transport are considered temporary, minimal and are discussed in section 6.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Amenity impacts on the community and surrounding businesses may result from increases in noise and vibration, a reduction in air quality, and reduced visual amenity (particularly those residents on Lilyfield Road), during the proposal. These impacts would be temporary and are addressed separately in sections 6.8, 6.9 and 6.10 respectively.</td>
</tr>
<tr>
<td>Environmental factor</td>
<td>Existing environment</td>
<td>Potential impacts</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>The existing land uses and character of the local area around the Site are anticipated to undergo substantial transformation over the coming decades under a number of infrastructure and urban renewal projects. The NSW Government has also announced its intention to use the Rozelle Rail Yards as a site for the planned WestConnex M4-M5 Link project.</td>
<td>- No direct impacts on social infrastructure (community services/facilities) of the area are anticipated during the proposal. In addition, there may be some beneficial social impacts resulting under the preparation of the Site for future development. This may include the development of the M4-M5 Link project (should it be approved) which would use the Site for development of a mainly underground road interchange and generate large areas of new open space for community uses. Alternatively the Site could be developed for another undetermined potential project in the future. This would enhance local visual amenity and provide further open spaces and active transport linkages for the local community. Overall, the proposal is unlikely to result in any significant adverse socio-economic impacts, provided the measures outlined for each environmental aspect are implemented effectively.</td>
</tr>
<tr>
<td>Environmental factor</td>
<td>Existing environment</td>
<td>Potential impacts</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------</td>
<td>-------------------</td>
</tr>
</tbody>
</table>
| Hazard and risk      | The Site contains waste in the form of soils (stockpiles and in drums), redundant infrastructure and ACM. Contaminated soils, ballast and groundwater are also present on the Site. The Site is not accessible to the public, as it is fenced and has security personnel now present on-site. | Potential hazard and risk impacts associated with the proposal include:  
- The potential health and safety impacts on-site workers and the nearby public during the works associated with contamination leaving the Site, through air or surface water  
- Potential for leaks and spills from on-site equipment and plant and storage, and use of associated chemicals  
- Potential hazards associated with traffic and pedestrian/vehicle interactions.  
These potential hazard and risk impacts from the proposal are discussed in other sections of the REF, being 6.1, 6.2, 6.3, 6.7 and 6.9. Overall the potential hazard and risk impacts of the proposal are not considered to be significant, provided the appropriate management measures, described in the relevant sections, are put in place. |
<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Existing environment</th>
<th>Potential impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>Live and redundant utilities are present throughout the Site and potentially include a range of services such as electrical, water, sewer, stormwater, gas and communications. Live 132 kilovolt, 33 kilovolt and 11 kilovolt electrical services traverse the Site and are connected to the Sydney Trains switching station. Numerous other services enter the Site, including Ausgrid, communications, Jemena Gas and Sydney Water services (refer to Figure 1-3) The exact location and depth of the live and redundant utilities is unknown.</td>
<td>The proposal would include activities to locate services across the Site using utility locating methods such as ground penetrating radar and non-destructive excavation. Non-destructive excavation would involve potholing to the top of each utility at about ten metre spacing’s. Slit trenching (to fit a 4-inch suction hose down) may also be implemented where multiple services are located. A surveyor would then prepare an as-built survey of the top of each utility once exposed. Redundant utilities would be removed as part of the proposal. Live utilities are not proposed to be removed and, where appropriate, would be protected during the works. There is a potential that live utilities could be located within the ballast. This would be investigated before ballast is removed. In the event that live utilities are unexpectedly found during the works, a stop work/unexpected find procedure would be implemented. Considering the live utilities would be located and protected before works start, the proposal is unlikely to result in any impacts on users of these services, or associated service providers, provided the measures identified in section 6.12.2 are implemented effectively.</td>
</tr>
</tbody>
</table>
6.12.2 Safeguards and management measures

While the above impacts are unlikely to be significant, management measures have been developed to further reduce the likelihood of potential impacts associated with the proposal. These measures are outlined below in Table 6-44.

Hazard and Risk

As discussed in sections 6.1, 6.2 and 6.9, the following hazard and risk management measures have been proposed. Additional measures are described below in Table 6-44.

- Preparation and implementation of a site-specific Health and Safety Management Plan (HSMP) and Hazard and Risk Management Plan (HRMP)
- A Hazmat survey would be conducted and would include information on materials such as asbestos, PCBs, and lead paint
- An Asbestos Management Plan (AMP) would be developed and implemented in accordance with the appropriate guidelines
- A Soil and Water Management Plan (SWMP) would be prepared and implemented and would outline management measures for soils that are excavated or stored on-site during the works and water management requirements. This plan would also outline measures for testing, handling, storing and managing contaminated soils, surface water and contaminated groundwater (if encountered). The SWMP would also include measures to protect against the potential contamination of site soil and groundwater related impacts, eg from leaks and spills of equipment.
Table 6-44: Summary of other impacts safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/ additional safeguard</th>
</tr>
</thead>
</table>
| Socio-economic              | A Communication Plan (CP) would be prepared and implemented as part of the EMP to help provide timely and accurate information to the community during the proposal. The CP would include (as a minimum):  
  - Mechanisms to provide details and timing of proposed activities to affected residents  
  - Contact name and number for complaints.  
  The CP would be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008).                                                                                                                                                                                                                           | Contractor     | Detailed design/work preparation | Core standard safeguard SE1             |
| Hazards and risk management | A Hazard and Risk Management Plan (HRMP) would be prepared and implemented as part of the EMP. The HRMP would include the following:  
  - Details of hazards and risks associated with the activity  
  - Measures to be implemented during construction to minimise these risks  
  - Record keeping arrangements, including information on the materials present on the Site, material safety data sheets, and personnel trained and authorised to use such materials  
  - A monitoring program to assess performance in managing the identified risks  
  - Contingency measures to be implemented in the event of unexpected hazards or risks arising, including emergency situations.  
  The HRMP would be prepared in accordance with relevant guidelines and standards, including relevant Safe Work Australia Codes of Practice, and NSW EPA or Office of Environment and Heritage publications.                                                                                                                                                                     | Contractor     | Detailed design/work preparation | Core standard safeguard HAZ1            |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>Before the start of ground disturbance works, the location of existing utilities would be confirmed after consultation with the affected utility owners.</td>
<td>Contractor</td>
<td>Detailed design/work preparation</td>
<td>Core standard safeguard U1</td>
</tr>
<tr>
<td>Utilities</td>
<td>An unexpected utility find procedure would be developed before works commencing. In the event that live utilities are unexpectedly uncovered during the works, works would cease and the procedure would be implemented.</td>
<td>Contractor</td>
<td>Work preparation</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>Utilities</td>
<td>On-going consultation with utility owners would be carried out during the utility identification activities, and in the ongoing protection of live services.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
6.13 Cumulative impacts

6.13.1 Approach

Under Part 5 of the EP&A Act the determining authority must consider the environmental impacts of proposed works. The supporting Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) states that “for the purpose of the EP&A Act, the factors to be taken in to account when consideration is being given to the likely impact of an activity on the environment include…any cumulative environmental effect with other existing or likely future activities”.

There is no guidance on carrying out cumulative impact/effect assessment in NSW or Australia. Therefore, this assessment has made reference to the European Commission (EC) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions 1999 and the Canadian Environmental Assessment Agency Cumulative Effects Assessment Practitioner’s Guide 1999.

The assessment is done in a number of stages:

- The first stage is to understand the adverse residual impacts of the proposal. This has been completed by reviewing the assessments detailed earlier in this chapter
- The second stage is to identify other development nearby that may affect the same receptors as the proposal and/or change the effectiveness of the other’s mitigation and management measures.

Other relevant projects that may generate a cumulative impact with the proposal have been identified using the following assessment parameters:

- The spatial parameter depends on the characteristics of the environmental impact and the likely area over which a residual impact would occur. For example, an air quality impact would potentially affect different human or environmental receptors, in different ways than a noise impact
- The temporal parameter relates to how far into the future or the past the assessment considers cumulative proposals or activities. Projects that are operational have already been considered as they form part of the existing environmental baseline for each environmental aspect assessed in this REF (refer to sections 6.1 to 6.12). Projects that are not yet on display have been discounted as their assessments do not contain enough detail on residual effects or final design to allow a robust cumulative impact assessment to take place.

Therefore, this CEA has considered the following:

- Projects/activities that are on display
- Projects/activities that have completed display but are not yet determined
- Projects/activities that have gained development approval but are not yet fully operational.

In order to identify relevant projects and/or activities, the following databases were reviewed:

- Major Projects Assessments register on the NSW Department of Planning and Environment website for the Inner West and Sydney City LGAs
- Public notices and the ‘invitations to comment’ register on the Commonwealth Department of the Environment and Energy website.

Local development applications on public display (as listed on the Inner West Council website) were also considered. However, given the relatively small scale of the development and nature of impacts resulting from the local development applications submitted to Inner West Council, they were considered unlikely to result in any cumulative impacts in conjunction with the proposal.
Similarly, strategic projects (such as The Bays Precinct Transformation Plan) have not been considered, as there is not enough detailed information available at this point of time to identify the likely issues arising from these plans. In addition, they are unlikely to overlap with the relatively short timeframe of the proposal.

The M4-M5 Link has also not been included in this assessment as the construction phase would not coincide with the proposal. However, there is a potential for this project to result in construction fatigue to residents in close proximity to the Site. These and other potential cumulative impacts would be assessed under the development application and environmental assessment for the M4-M5 Link project.

6.13.2 Other projects and developments

A number of other developments are currently being constructed or planned in the local area. As such, there is a potential for these projects or activities to have cumulative effect, in combination with the proposal on similar community and/or environmental receptors.

Given the relatively short time frame of the proposal (around 12 months), only those projects or activities that are likely to have a major interaction with this timescale have been considered. These include major projects within one kilometre of the Site, and notable local development applications within streets close to the Site.

Table 6-45 presents a high level summary of the major developments close to the Site. A list of other potentially cumulative projects or activities is also presented below this table.
### Table 6-45: Other local potential cumulative projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Construction impacts</th>
<th>Operational impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Central Business District and South East Light Rail Project (CSELR):</strong>&lt;br&gt;- This project involves the construction of about 13 kilometres of new light rail track from circular quay to central, Kingsford and Randwick by Surry Hills and Moore Part and maintenance and stabling facilities&lt;br&gt;- Elements of relevance to the proposal include:&lt;br&gt;  - 20 light rail stops&lt;br&gt;  - Pedestrian zone on George Street&lt;br&gt;  - 12 substations to provide power for the light rail vehicles&lt;br&gt;  - Light rail vehicle stabling facility in Randwick&lt;br&gt;  - Rozelle depot maintenance facility&lt;br&gt;- The location of the Rozelle depot maintenance facility is next to the existing Lilyfield light rail stop, west of the Site within the western portion of the Rozelle Rail Yards&lt;br&gt;- Early works have begun for the Rozelle maintenance depot facility&lt;br&gt;- Construction would coincide with the proposal. Construction of the CSELR is expected to be complete in 2018 and operational in 2019.</td>
<td>- Truck movements were considered to be low during construction and would not exceed 100 two-way truck trips per day. Trucks approaching from the west would enter via Lilyfield Road/Catherine Street and exit to the City West Link&lt;br&gt;- Moderate to high exceedances (of up to 12 decibels) of the noise management levels during standard construction hours are predicted at nearest residences on Lilyfield Road and up to eight decibels for commercial and other sensitive receptors. The most intensive works are likely to be building demolition activities, which may need use of a rock breaker&lt;br&gt;- Some construction activities that could cause vibration would be carried out within 20 metres of sensitive residential receptors and within the recommended safe working distances. Any exceedances are expected to be of short duration. This also applies to potential vibration impacts on nearby heritage buildings&lt;br&gt;- Minor adverse landscape impact during construction due to removal of trees from the southern boundary&lt;br&gt;- Moderate adverse visual impact from lighting for night works&lt;br&gt;- Neutral impact on the Catherine Street Railway Bridge (heritage listed)&lt;br&gt;- Neutral to major adverse impact on non-Aboriginal historical archaeology depending on the activity being carried out.</td>
<td>- Operational impacts of the CSELR project have largely not been considered, as the operational phase would not coincide with the proposal. However, moderate adverse visual impacts are anticipated from Lilyfield Road and Catherine Street, primarily associated with the erection of larger structures on the Site and removal of vegetative screening which would result in more prominent views of the Site. Views of the City and Harbour Bridge from the west may also be partially obscured.</td>
</tr>
<tr>
<td>Project</td>
<td>Construction impacts</td>
<td>Operational impacts</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Rozelle Rail Yards – Site Management Works</td>
<td>Neutral to slightly negative social impacts expected due to noise and vibration during demolition and excavation activities which may need a rock breaker. Moderate to significant negative economic impacts due to the requirement to relocate businesses to allow for construction and potential noise and vibration impacts (slight to moderate impacts after mitigation measures have been implemented).</td>
<td>Construction of this development is proposed to be staged, with completion by September 2019. The operation phase may start in a staged manner, and as a result, the project may open during the proposal. It is expected that: Satisfactory traffic conditions would be maintained after construction. Air quality and noise generated by the operational phase of the project are unlikely to result in significant adverse impacts on nearby receptors.</td>
</tr>
</tbody>
</table>

Sydney Superyacht Marina Redevelopment at Rozelle Bay:  
- Involves the redevelopment of the Sydney Superyacht Marina comprising two buildings for mixed use, car parking facilities and domain works.  
- Construction of the Western building would be completed in October 2016.  
- The redevelopment was approved with conditions in 2012. Since then, numerous modifications for the redevelopment have been approved or are in the application stage, involving amendments such as the consolidation of the land and water based components into a single development application, reconfiguration of the marina, and relocation of approved uses and outdoor seating.  
- The development is about 400 metres south-east of the Site.  
- Construction would coincide with the proposal, with construction of the project expected to be completed by September 2019.  
- Limited adverse impacts on receptors are expected due to the distance of the development from residences.  
- Generated traffic is expected to be within the limits specified in the Rozelle and Blackwattle Bays Masterplan. The Level of Service is expected to be either good or good with acceptable delays and spare capacity. Traffic would mainly use James Craig Road.  
- The project would not result in adverse impacts on the level of service traffic intersections of James Craig Road and The Crescent.  
- Construction noise is expected to comply with relevant criteria under a worst case scenario.  
- Limited dust emissions are expected during construction; however given the distance of the development from receptors, the project would not result in significant impacts on air quality.
It is also noted that a separated cycleway along Lilyfield Road has been proposed by the Inner West Council and is now being reviewed before public display of the concept plans. The cycleway is proposed to be constructed in the 2016-2017 financial year (Inner West Council 2016). While detailed information is not yet available for this project, the development of this separated cycleway is likely to result in increased cyclist use of the route. It would also likely improve cyclist safety.

Other projects within the vicinity of the Site that may contribute to cumulative impacts where construction/demolition timeframes coincide include the following:

- The approved construction of a new digital advertising display sign about 80 metres east of Catherine Street next to City West Link, west of the Site within Rozelle Rail Yards. This development was approved on 26 July 2016; however, information on the timing of the construction stage was not available at the time of preparing this REF.
- Approval to construct a dry boat storage and marine facility on James Craig Road Rozelle, south-east of the Site. Approval was originally granted in 2007; however, there have been numerous approvals for modifications to the design, including the recent approval (5 February 2015) to amend the design and increase the number of berths in the marina.
- Approval for alterations to an existing maritime construction facility, comprising two new buildings and alterations to the parking layout at Lot 23 James Craig Road. Approval was granted 14 September 2012.
- Ongoing modifications to the White Bay Cruise Terminal, which began operation in 2013.
- Numerous smaller-scale residential and mixed use developments that are either under assessment or have recently been approved, located next to the Site on local roads such as Lilyfield Road.

The above projects have not been considered in detail due to either their distance from the Site, and/or relatively minor nature of the works to be carried out.

6.13.3 Potential impacts

The proposal has the potential to generate a number of cumulative environmental impacts. These have been grouped, assessed and discussed under 12 different environmental aspects (refer to sections 6.1 to 6.12).

For the majority of these aspects, the works are not expected to have any significant residual impacts on any of the identified receptors.

Provided the proposed management and mitigation measures detailed in Chapter 7 (Environmental management) are implemented and remain effective, there would be no likely significant residual adverse impacts for the following aspects given the existing environment:

- Contamination, soil and groundwater (refer to section 6.1)
- Surface water, drainage and flooding (refer to section 6.2)
- Resource use and waste management (refer to section 6.3)
- Non-Aboriginal heritage (refer to section 6.4)
- Aboriginal heritage (refer to section 6.5)
- Biodiversity (refer to section 6.6)
- Landscape character and visual impacts (refer to section 6.10)
- Property and land use (refer to section 6.11)
- Other impacts (refer to section 6.12).

The proposal would likely generate residual adverse impacts on traffic and transport, noise and vibration, and air quality. As a result, further investigations of potential cumulative impacts have been carried as the proposal could have a cumulative effect with one of the other projects or activities in the local area. These aspects are discussed in Table 6-46.
Aside from landscape character and visual amenity, impacts relating to the finished site have not been considered. Given the minor nature of the works during this stage of the proposal and the application of safeguards identified in this REF, it is highly unlikely that the management activities taking place on the finished site would result in significant adverse cumulative impacts.

**Table 6-46: Potential cumulative impacts**

<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Potential impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic and transport</td>
<td>Nearby projects and activities have the potential to result in additional construction traffic on the surrounding road network, particularly City West Link and James Craig Road.</td>
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<tr>
<td></td>
<td>In particular, the construction of the Rozelle maintenance depot facility (as part of the CBD and CSELR project) is being carried out next to the Site to the west. Construction of this facility may coincide with the proposal.</td>
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<tr>
<td></td>
<td>A review of the approval documentation for this project has indicated that the volume of traffic generated by this development is anticipated to be low. Considering the proposal would also result in the addition of only a low volume of traffic on City West Link, the potential for both of these projects to result in a significant cumulative impact on the road network is also considered unlikely. <strong>Section 6.7</strong> provides further detail on the potential traffic impacts resulting from the proposal.</td>
</tr>
<tr>
<td></td>
<td>The Sydney Superyacht Marina Redevelopment is now under construction south-east of the Site, with construction vehicles mainly using James Craig Road. Several smaller scale projects are also planned/under construction on James Craig Road, including alterations to the dry boat storage and marine facility. Considering the construction of these facilities coincides with the proposal, there is a potential for these projects to result in a cumulative impact on the road network of James Craig Road, particularly the signalled intersection of James Craig Road and Crescent. However the Level of Service resulting from the Sydney Superyacht Marina Redevelopment is expected to be either good, or good with acceptable delays and spare capacity. The traffic generated by the project is also expected to be within the limits specified in the Rozelle and Blackwattle Bays Masterplan. In addition, the proposal would also result in the addition of only a low volume of traffic on James Craig Road.</td>
</tr>
<tr>
<td></td>
<td>Other surrounding developments (identified in <strong>section 6.13.2</strong>) may also result in additional traffic using the local road network, such as the construction of a separated cycleway along Lilyfield Road. However, considering only light vehicles are proposed to use the local road network north of the Site, and given the low volume of additional traffic proposed on City West Link and James Craig Road, it is not anticipated that the cumulative effect of these additional projects in combination with the proposal would result in a significant adverse cumulative impact on the local traffic environment.</td>
</tr>
<tr>
<td>Environmental factor</td>
<td>Potential impacts</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td>Noise and vibration</td>
<td>Certain residences are likely to be highly noise affected by the proposal; particularly those located 30 to 40 metres north of the eastern part of the Site in NCA04 (refer to section 6.8). Given the location of the Site, the development with the most potential to contribute to cumulative noise and vibration effects with the proposal is the CSELR development. This development could potentially cumulatively affect NCA02 (ie the residential area to the north of Lilyfield Road and the western part of the Site). Cumulative noise from work being carried out concurrently at the Site and at the CSELR development was therefore included in a quantitative noise assessment. The assessment found that there is a low likelihood that cumulative noise would significantly affect the worst case noise predictions, as the predicted cumulative exceedances (up to 20 dB) are consistent with the worst case predicted noise levels for the proposal in this area (also up to 20 dB). While other local developments may also coincide with the proposal, they are unlikely to result in significant cumulative adverse impacts. Most of the other projects near the Site, are east of Victoria Road, and are unlikely to impact the same receivers as the proposal. James Craig Road has no adjoining residential receivers situated along the proposed route of heavy vehicle movements (to access the Site via the Port Authority access point). Noise generated by these heavy vehicle movements is therefore unlikely to result in a significant cumulative impact in conjunction with other projects in this area. Similarly, projects located south of City West Link are unlikely to affect receivers north of the Site due to the existing noise generated by traffic on surrounding roads (most notably City West Link). Considering the NCAs located south of the Site are likely to experience lower noise levels, the proposal is unlikely to result in a significant cumulative adverse effect in combination with other identified projects. In terms of cumulative vibration effects, nearby developments are considered to be a sufficient distance from the works not to result in an adverse cumulative effect on relevant items of heritage significance. In addition, measures would be in place to protect heritage items from potential vibration impacts caused by the proposal. These measures would be detailed within a Noise and Vibration Management Plan (NVMP) for the proposal and would involve locating vibration intensive activities (eg use of a rock breaker) away from heritage items where possible. Significant cumulative vibration impacts to heritage items are therefore unlikely.</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

Rozelle Rail Yards – Site Management Works  
Review of environmental factors  
236
<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Potential impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality</td>
<td>There is the potential for the proposal to result in cumulative air quality impacts (dust) in conjunction with nearby developments. In particular, construction of the CSELR project. However, while dust may be generated by this development; these potential impacts are likely to be temporary. Considering the proposal is unlikely to result in significant adverse air quality impacts, and that both projects would have a number of detailed measures to control the creation and movement of dust, it is considered unlikely that both projects would result in significant cumulative adverse air quality impacts on surrounding receivers.</td>
</tr>
<tr>
<td>Landscape character and visual impacts</td>
<td>There is a potential for the proposal to result in cumulative visual impacts in conjunction with other developments, particularly the CSELR project. The proposed removal of vegetation may result in more prominent views of the larger sheds to be constructed on the CSELR site, particularly from commuters on Lilyfield Road. However, considering the potential views resulting from the proposal are anticipated to be negligible to low alone, the finished site is unlikely to have a significant cumulative impact on landscape character and visual amenity in conjunction with the CSELR project or other nearby developments.</td>
</tr>
</tbody>
</table>

Overall, provided the safeguards and management measures (detailed in Chapter 6 (Environmental assessment) and Chapter 7 (Environmental management)) are implemented effectively, it is unlikely that the proposal would result in any significant adverse impacts on the surrounding environment and community receptors in combination with nearby developments.

It is anticipated that future projects would carry out their own assessment of cumulative effects in conjunction with the proposal.

6.13.4 Safeguards and management measures

Individual measures to manage potential cumulative impacts (relating to individual environmental aspects) have been addressed in each section relating to each environmental aspect. Further management measures are included in Table 6-47.
Table 6-47: Summary of cumulative safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative impacts</td>
<td>Where relevant, consultation would be carried out with proponents of other developments (such as the proponent of the CSELR project) to increase the overall awareness of project timeframes and impacts. Where necessary, the timing of certain proposal activities (such as heavy vehicle movements and high noise generating activities) would be managed to avoid coinciding works that may result in adverse cumulative impacts on sensitive receivers.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
7 Environmental management

This chapter describes how the proposal would be managed to reduce potential environmental impacts throughout detailed design and during and after the proposal. A summary of site-specific environmental safeguards is provided, and the licence and/or approval requirements are also listed.

7.1 Environmental management plans (or system)

This REF has identified a number of safeguards and management measures to minimise potential adverse environmental and social impacts as a result of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and/or applied during and after the proposal as applicable.

An Environmental Management Plan (EMP) would be prepared by the contractor to describe the safeguards and management measures identified, to provide a framework for establishing how these measures would be implemented and to describe who would be responsible for their implementation.

The EMP would be reviewed and certified by the Roads and Maritime Environment Officer, Sydney Region, before the start of any on-site works.

The EMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements arising during work. The EMP would be developed in accordance with the specifications set out in the Roads and Maritime QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan), QA Specification G40 – Clearing and Grubbing and QA Specification G10 - Traffic Management.

The EMP would include a number of sub-plans, as identified in Chapter 6 (Environmental assessment):
- A Communication Plan (CP)
- Acid Sulfate Soil Management Plan (ASSMP)
- Air Quality Management Plan (AQMP)
- Asbestos Management Plan (AMP)
- Flood Evacuation Plan (FEP)
- Flora and Fauna Management Plan (FFMP)
- Hazard and Risk Management Plan (HRMP)
- Heritage Management Plan (HMP)
- Noise and Vibration Management Plan (NVMP)
- Health and Safety Management Plan (HSMP)
- Soil and Water Management Plan (SWMP)
- Traffic Control Plan (TCP)
- Traffic Management Plan (TMP)
### 7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF would be incorporated into the detailed design phase of the proposal as well as during and after the proposal, should it proceed. The safeguards and management measures are summarised in **Table 7-1**.

**Table 7-1: Summary of safeguards and management measures**

<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| GEN1| General - minimise environmental impacts during works | An EMP would be prepared and submitted for review and endorsement by the Roads and Maritime Environment Manager before start of the activity. As a minimum, the EMP would address the following:  
- Any requirements associated with statutory approvals  
- Details of how the identified safeguards outlined in the REF would be implemented  
- Issue-specific environmental management plans  
- Roles and responsibilities  
- Communication requirements  
- Induction and training requirements  
- Procedures for monitoring and evaluating environmental performance, and for corrective action  
- Reporting requirements and record-keeping  
- Procedures for emergency and incident management  
- Procedures for audit and review  
- The endorsed EMP would be implemented during the proposal. | Contractor/Environment Manager | Work preparation/detailed design/during the works | Core standard safeguard GEN1 |
<p>| GEN2| General - notification                              | All businesses, residential properties and other key stakeholders (eg schools, local councils) affected by the activity would be notified at least five days before the start of the activity. | Contractor                  | Work preparation/during the works      | Core standard safeguard GEN2 |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
</table>
| GEN3| General – environmental       | All personnel working on-site would receive training to ensure awareness of environment protection requirements to be implemented during the proposal. This would include up-front site induction and regular ‘toolbox’ style briefings. Site-specific training would be provided to personnel engaged in activities or areas of higher risk:  
  • Areas of non-Aboriginal heritage sensitivity  
  • Potential contamination and health and safety issues  
  • Adjoining residential areas requiring particular noise management measures  
  • Traffic management including site access points and parking arrangements. | Contractor      | Work preparation/during the works                                                                                                                                  | Core standard safeguard GEN3 |
<p>| GEN4| General                       | All environmental safeguards must be incorporated within the EMP and contract specifications for the proposal.                                                                                                               | Project Manager| Work preparation             | Additional safeguard                            |
| GEN5| General                       | A contractual hold point must be maintained until the EMP is reviewed by the Environmental Manager                                                                                                                  | Project Manager| Work preparation             | Additional safeguard                            |
| GEN6| General                       | The Project Manager must notify the Environmental Manager and Communication and Stakeholder Engagement Manager at least ten working days before work commencing to enable appropriate pre-work measures to be implemented. | Project Manager| Work preparation             | Additional safeguard                            |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN7</td>
<td>General</td>
<td>A risk assessment must be carried out on the proposal in accordance with Roads and Maritime’s requirements. A review of the risk assessment must be carried out after the initial audit or inspection to evaluate whether the level of risk assigned to the works is appropriate. Any works resulting from the proposal and covered by the REF may be subject to environmental audit(s) and/or inspections(s) at any time during their duration.</td>
<td>Project Manager</td>
<td>Work preparation, after first audit</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>GEN8</td>
<td>General</td>
<td>If changes to the proposal occur after the REF has been determined a post-determination modification may be required. Post-determination modifications would occur in accordance with the Roads and Maritime Environmental assessment procedure: project review of environmental factors (2016). Advice would be sought from the Environmental Manager on whether the proposed modification would require further environmental assessment.</td>
<td>Project Manager</td>
<td>Work preparation/ during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>GEN9</td>
<td>Consultation</td>
<td>The proposal contractor must undertake the works in consultation with all key stakeholders and be staffed in a manner to minimise disruption, keep residents and stakeholders informed before and during works and effectively manage any complaints arising from the work.</td>
<td>Contractor</td>
<td>Work preparation/ during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>No.</td>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
<td>Standard/additional safeguard</td>
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</table>
| CSGW1 | Soil and water – general | A SWMP would be prepared as a sub-plan of the EMP in accordance with the requirements of Section 2.1 of Roads and Maritime QA G38 Soil and Water Management. The SWMP would be prepared in consultation with soil conservation consultant and contamination expert and in general accordance with the following:  
- The Roads and Maritime Code of Practice for Water Management (RTA, 1999)  
- The Roads and Maritime Erosion and Sedimentation Procedure (RTA, 2008)  
- The Blue Book, Volumes 1 and 2D (Landcom, 2004 and DECCW, 2009)  
- Applicable WorkSafe NSW guidelines and NSW EPA requirements. | Contractor | Work preparation | Additional safeguard |
| CSGW2 | Soil and water - general | The measures contained within the SWMP, AMP, ASSMP and other relevant parts of the EMP would aim to ensure that:  
- Surface water flows leaving the Site do not pollute receiving water courses and bodies  
- Erosion at the Site is minimised  
- Potential contamination is managed appropriately and is not spread to cleaner parts of the Site or off-site  
- Off-site receptors are not impacted by dust  
- Appropriate asbestos controls are implemented at the Site to avoid potential human health impacts  
- Direct impacts on groundwater from the proposal are avoided and existing impacts are not further exacerbated. | Contractor | Work preparation/ during the works | Additional safeguard |
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSGW3</td>
<td>Soil and water - general</td>
<td>The SWMP would include details on the following:</td>
<td>Contractor</td>
<td>Work preparation/ during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Drainage controls</td>
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<td></td>
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<td>• Erosion and sediment controls Wind erosion controls</td>
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<tr>
<td></td>
<td></td>
<td>• Stockpiling procedures including specific controls regarding the stockpiling of soils and ballast (including assessment of fouled material and segregation methodologies for potential reuse for both soils and ballast)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Procedures for handling, testing, storing and managing contaminated soil, surface water and groundwater</td>
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<td></td>
<td></td>
<td>• Methods of preventing soil and water contamination/pollution.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CSGW4</td>
<td>Soil and water - general</td>
<td>In addition to the measures outlined in section 6.2, this plan would outline:</td>
<td>Contractor</td>
<td>Work preparation/ during the works</td>
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<td>• The areas where ground disturbance works are likely</td>
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<td>• The inspection program for erosion control structures and management measures</td>
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<td>• Inclusion of post-completion management and maintenance protocols and a management schedule to ensure the integrity of the final ground surface condition is maintained</td>
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<td>• Contingency actions that would be implemented in the event that erosion and sediment controls fail, in accordance with the protocols outlined in the specific management plans prepared for the Site.</td>
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| CSGW5 | Soil and water – protection of site soil and water | The SWMP would contain the following measures to protect against the potential contamination of site soil and water:  
- Measures to manage the storage of liquids, fuels and chemicals  
- Measures to ensure equipment is maintained and operated in a proper and efficient condition to reduce the likelihood of spills or leaks  
- Measures to manage vehicles leaving the Site to reduce soil on roads and production of dust  
- A site-specific emergency spill plan which would include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management (RTA, 1999) and relevant NSW EPA guidelines. | Contractor | Work preparation/during the works | Additional safeguard |
<p>| CSGW6 | Soil and water – protection of site soil and water | A soil conservation consultant and contamination expert would advise of the preferred method of stabilisation/proposed ground surface before ground disturbance activities commencing. They would confirm the preferred method of stabilisation/proposed ground surface as the ballast is removed and the residual soil/fill layer is exposed. | Contractor | Work preparation/during the works | Additional safeguard |</p>
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</table>
| CSGW7 | Soil and water – contaminated materials | The SWMP would also outline measures for monitoring, handling, storing and managing contaminated material. It would include the following:  
  • Assessment, development and implementation of appropriate surface covers across the Site in consultation with a soil conservation consultant and contamination expert to minimise disturbance of residual contamination via erosion and runoff  
  • Development of task specific methodologies in consultation with a soil conservation consultant and contamination expert to appropriately stabilise the Site and reduce the potential for surface water contamination  
  • Procedures for identifying potentially contaminated materials  
  • Procedures for separating stockpiled material according to contamination indicators  
  • Measures for the protection of on-site worker health and safety  
  • Measures for the dewatering, storage, movement and treatment of groundwater if encountered in accordance with the Roads and Maritime Environmental Management of Construction Site Dewatering (2011) guidance and other Roads and Maritime specifications  
  • Measures for sampling and testing of sediment and water contained in the sediment basins, at regular intervals and before discharge or disposal  
  • Measures for the management of odorous material, if encountered. | Contractor | Work preparation/ during the works | Additional safeguard |
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| CSGW8 | Soil and water - groundwater | The SWMP would contain measures to ensure that impacts on groundwater from the proposal are avoided and existing impacts are not further exacerbated. This would include:  
- The protection of excavations where groundwater could be encountered from surface water flows  
- The progressive stabilisation of soils to reduce the amount of the residual soil/fill exposed at any one time  
- Details regarding the lining and maintenance of the sediment basins  
- Dewatering procedures in line with the Roads and Maritime Technical Guideline Environmental Management of Construction Site Dewatering (RTA, 2011)  
- Measures to protect against leaks and spills. | Contractor       | Work preparation/ during the works | Additional safeguard |
| CSGW9 | Soil and water - disposal     | The SWMP would include the following:  
- Procedures for the testing, disposal or reuse of materials, including soils, ballast, vegetation (including adhering soils)  
- Material to be disposed of would be classified in accordance with specifications set out in a WMP and either the NSW Waste Classification Guidelines, *Contaminated Land Management Act 1997* (NSW) or the relevant exemption or order relating to the activity  
- This would include disposal of contaminated materials to appropriately licensed facilities out in accordance with NSW Waste Classification Guidelines  
- Ballast material not meeting the Recovered Railway Ballast Order 2014 would be disposed of at appropriately licensed facilities, unless it is potentially suitable for segregation and reuse. | Contractor       | Work preparation/ during the works | Additional safeguard |
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<tr>
<td>CSGW10</td>
<td>Acid sulfate soils</td>
<td>An Acid Sulfate Soils Management Plan (ASSMP) would be prepared in accordance with the Acid Sulfate Soils Manual (Stone et al 1998). If ASS are encountered, works in the relevant area would be carried out in accordance with the ASSMP.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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| CSGW11 | Asbestos         | An AMP would be prepared by a suitably qualified practitioner and in accordance with the following relevant guidelines:  
• Guidelines for the Assessment, Remediation and Management of Asbestos - Contaminated Sites in Western Australia, May 2009  
• How to Safely Remove Asbestos Code of Practice (Safe Work Australia, 2016)  
• The National Model Work Health and Safety Regulations, Safe Work Australia, March 2016  
• Asbestos related work (Roads and Maritime, 2013).  
The AMP would include the following:  
• Measures for managing soils or ballast that may also contain contamination to ensure that both the asbestos and contamination are managed effectively  
• A summary of site conditions including consideration of residual asbestos which may be present at the Site, and how it would be managed  
• A risk assessment to help identify appropriate measures to protect on-site personnel and the local community  
• Communication strategy, where required, for notifying the community of asbestos management procedures | Contractor     | Work preparation/during the works   | Additional safeguard           |
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<td>• A list of the potential receptors including site workers, the local community, site visitors, owners and occupiers, and service workers</td>
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<td>• The primary exposure concerns including human activities with the potential to generate the release of airborne asbestos fibres and/or natural forces such as wind and water erosion</td>
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<td>• A plan of investigation for materials to determine the potential for the release of asbestos fibres</td>
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<td>• A plan of management for each activity or group of activities that, according to the risk assessment, requires controls to complete the works. This plan would include a method for each activity explaining how these controls would be implemented</td>
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<td>• Appropriate handling, transporting, storing and disposal measures, including for soils, fragments and ballast</td>
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<td>• Work would be carried out by appropriately licenced contactors</td>
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<td>• The requirement to complete asbestos fibre air monitoring during activities that could liberate asbestos fibres</td>
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<td>• An audit and reporting process to check that controls are in place and being implemented.</td>
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<td>Hazardous materials</td>
<td>A HazMat survey would be conducted during the early stages of the proposal before ground disturbance works start. This survey would be completed by a hygienist and contamination expert and would include the identification of ACM.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<td>CSGW13</td>
<td>Soil, water and hazardous materials</td>
<td>During all stages of the proposal (including the ground disturbance and site stabilisation activities), regular inspections would be completed by the soil conservation consultant and contamination expert, to ensure that the erosion and sediment controls and site stabilisation techniques were working correctly and remained effective.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<td>CSGW14</td>
<td>Material transport</td>
<td>Bunded wheel and undercarriage washing facilities would be established at exit points for the Site as necessary. Where required, vehicles would have loose material removed from their exterior and their wheels washed clean of soils or sediments before leaving the Site. Details of how waste water from this activity would be managed would be outlined in the SWMP. An adequate area of hardstand would be maintained between the wheel wash facility and the site exit where possible. Vehicles coming to and leaving the Site with full loads would have their loads covered to prevent material being blown out of them.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>CSGW15</td>
<td>On-site worker protection</td>
<td>A site-specific Health and Safety Management Plan would be developed for the works in accordance with the appropriate guidelines and legislation. The plan would include handling protocols for minimising human contact with contaminated soils and groundwater.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>CSGW16</td>
<td>Training</td>
<td>Staff would be inducted and provided with appropriate training before working with potentially contaminated materials to prevent unnecessary disturbance (e.g., dust generation, asbestos fibre liberation, contaminant mobility).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
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<tr>
<td>CSGW17</td>
<td>Ongoing maintenance</td>
<td>Ongoing inspection and maintenance would be completed at the Site after the completion of the proposal to ensure the integrity of the surface cover is maintained. These inspections would be completed by a soil conservation consultant and contamination expert.</td>
<td>Contractor</td>
<td>Finished site</td>
<td>Additional safeguard</td>
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</table>
| SWDF1 | Soil and water – erosion and sediment | The SWMP would include a range of temporary stabilisation measures to manage the risk of erosion and mobilisation of contamination. In addition the SWMP would include measures such as:  
- Local reshaping of the land to direct runoff towards drainage channels and sediment basins  
- Stabilisation of exposed soils through suitable surface covering, in accordance with the advice of a soil conservation consultant and contamination expert, followed by progressive stabilisation of the Site as early as possible  
- The location and design of erosion and sediment control measures to minimise velocities and settle out sediments  
- Process for monitoring and preparing for wet weather including ceasing works and inspecting sediment controls before and during periods of heavy rainfall  
- Inspection and maintenance of the sediment and erosion controls would take place at regular intervals to ensure the system is working correctly  
- Inclusion of post-completion management and maintenance protocols and a management schedule to ensure the integrity of the final ground surface condition is maintained  
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| SWDF2| Soil and water - drainage | The permanent sediment basins would be:  
  - Located and sized using design criteria consistent with the Blue Book 2D (DECCW, 2008)  
  - Lined to ensure that high groundwater levels do not reduce the capacity of the basins to store surface water flows  
  - Empty (dewatered) of standing water if heavy rain is expected to ensure that they have the capacity to manage surface water flows.  
  
  Where possible they would not be located in areas of high contamination and/or areas where acid sulfate soils may be present close to the residual ground surface. 
  
  The design of drainage channels and sediment basins would also consider health and safety issues. | Contractor     | Work preparation/during the works/finished site | Additional safeguard |
| SWDF3| Soil and water - drainage | The SWMP would also include drainage controls for the Site. This would include:  
  - Inspection and maintenance of the drainage system would take place at regular intervals to ensure the system is working correctly  
  - The direction of runoff and provision of drainage measures during each stage of construction. | Contractor     | Work preparation/during the works | Additional safeguard |
<p>| SWDF4| Soil and water - drainage | In the event of a sediment basin overtopping during a high rainfall event, escaped surface water would be directed overland to a low point of the Site where it would be contained and appropriately managed. | Contractor     | During the works/finished site | Additional safeguard |</p>
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<tr>
<td>SWDF5</td>
<td>Soil and water – erosion and sediment</td>
<td>A registered soil conservation consultant and a contamination expert would be engaged to provide advice in relation to methods of stabilisation exposed areas of the Site. These specialists would be retained for the life of the proposal to provide advice as required.</td>
<td>Roads and Maritime</td>
<td>Work preparation/detailed design/during the works</td>
<td>Additional safeguard</td>
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<td>SWDF6</td>
<td>Surface water and sediment quality</td>
<td>Stormwater collected in the sediment basins would be sampled and tested before being appropriately discharged or removed from the Site. Appropriate discharge criteria would be established as part of the future design development and would be documented within the SWMP. The sediments settled in the basins and removed during maintenance would be tested and characterised before being appropriately disposed.</td>
<td>Contractor</td>
<td>During the works/finished site</td>
<td>Additional safeguard</td>
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<tr>
<td>SWDF7</td>
<td>Drainage – damage to existing drainage</td>
<td>The location of existing drainage infrastructure at and under the Site would be identified and confirmed with appropriate protection provided.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>SWDF8</td>
<td>Drainage – existing drainage</td>
<td>The existing drainage infrastructure would be protected from surface water flows from the Site to ensure that these flows are managed though the temporary and permanent erosion and sediment controls.</td>
<td>Contractor</td>
<td>Work preparation/during the works/finished site</td>
<td>Additional safeguard</td>
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| SWDF9| Flooding – construction risk of impact on the floodplain function during a flood event | The contractor would monitor weather conditions to identify potential flood conditions and would manage potential flooding impacts in accordance with the EMP. Examples of appropriate controls include the following:  
- Temporary drains on-site  
- Storing equipment and other potential obstructions to flood water on higher ground wherever possible  
- Local reshaping of the land to direct runoff towards sediment basins and maintain low points across the Site. | Contractor | During the works | Additional safeguard |
<p>| SWDF10| Flood risk                                     | A Flood Evacuation Plan (FEP) would be developed and implemented for the proposal.       | Contractor | Work preparation/during the works/finished site | Additional safeguard |</p>
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| RUWM1 | Resource use and waste management - general | A Waste and Resource Management Plan (WMP) would be prepared and carried out as part of the EMP. The WMP would include:  
- Measures to avoid and minimise waste associated with the proposal  
- Classification of wastes and management options (reuse, recycle, stockpile, disposal)  
- Statutory approvals required for managing both on- and off-site waste, or application of any relevant resource recovery exemptions  
- Procedures for storage, transport and disposal of waste materials  
- Plans for monitoring, record keeping and reporting  
- Measures to manage the removal of vegetation waste, which would be carried out in accordance with Roads and Maritime Specification G40 (Clearing and Grubbing).  
The WMP would be prepared, taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant Roads and Maritime waste fact sheets. | Contractor | Detailed design/works preparation/during the works | Core standard safeguard W1 Section 4.2 of QA G36 Environment Protection |
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| RUWM2 | Resource efficiency and waste minimisation | The WMP would include cleaner production measures to maximise resource efficiency and minimise waste, including:  
- Staging demolition of buildings so that components can be salvaged for reuse and recycling  
- Adopting demolition techniques to minimise waste volumes generated  
- Application of efficient demolition processes to ensure resourcefulness in the use of energy, water, and natural resources  
- Inclusion of resource efficiency and waste minimisation procedures in contracts to encourage demolition contractors to consider environmental management objectives  
- Providing separate waste containers/skips to ensure waste material segregation and maximise the opportunities for reuse and recycling  
- Safely storing and disposing of residual demolition waste, ensuring the least amount of harm to the surrounding environment  
- Minimising site disturbance to avoid unnecessary excavation. | Contractor | Works preparation/during the works | Additional safeguard |
<p>| RUWM3 | Resource procurement | The contractor would be required to investigate ways to reuse materials on-site, or source material from other Roads and Maritime projects where possible. | Contractor | Works preparation/during the works | Additional safeguard |
| RUWM4 | Resource procurement | Procurement would aim to use materials with a recycled content and low carbon footprint where they are cost and performance effective. | Contractor | Works preparation/during the works | Additional safeguard |</p>
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<td>RUWM5</td>
<td>Waste management – contaminated/hazardous material</td>
<td>Handling, storage and disposal of contaminated waste, including asbestos would be carried out in accordance with the SWMP, WMP and the AMP (where applicable).</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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<td>RUWM6</td>
<td>Waste classification</td>
<td>All waste would be classified in accordance with the Waste Classification Guidelines (NSW EPA, 2014).</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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<td>RUWM7</td>
<td>Waste management practices</td>
<td>Waste stockpiled at the Site would be located with consideration to environmental factors such as site slope, drainage, surrounding native vegetation, and the location of waterways, drainage channels and sediment basins.</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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<tr>
<td>RUWM8</td>
<td>Waste management – contaminated/hazardous material</td>
<td>Contaminated or potentially contaminated waste would be separated from potentially clean waste.</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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<tr>
<td>RUWM9</td>
<td>Waste management – disposal</td>
<td>A licensed waste management contractor would be used to remove waste from the Site for reuse, recycling or disposal.</td>
<td>Contactor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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<tr>
<td>RUWM10</td>
<td>Waste management - reuse and disposal</td>
<td>Materials to be reused would be analysed and assessed in accordance with the ASC NEPM and, in regards to ballast, the Recovered Railway Ballast Order 2014, to ensure material is not contaminated and reuse is appropriate. Material not suitable for reuse or recycling would be disposed of to an appropriate facility.</td>
<td>Contactor</td>
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<td>RUWM11</td>
<td>Waste monitoring</td>
<td>A waste register would be prepared, used and maintained by the contractor to track all wastes generated from the proposal. All records for the disposal of waste would be retained and kept readily accessible for inspection by relevant regulatory authorities.</td>
<td>Contactor</td>
<td>Works preparation/during the works</td>
<td>Additional safeguard</td>
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<td>RUWM12</td>
<td>Waste monitoring</td>
<td>On-site waste monitoring and auditing procedures would be developed for the proposal, identifying each waste stream, volumes produced, and waste management practices.</td>
<td>Contactor</td>
<td>Works preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>RUWM13</td>
<td>Waste management practices</td>
<td>New waste streams would be addressed as they arise and assessed to determine the most suitable management measures to use when handling, storing, transporting and disposing of the waste.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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<td>NAH1</td>
<td>Non-Aboriginal heritage – general</td>
<td>A Heritage Management Plan (HMP) would be prepared and implemented as part of the EMP. It would provide specific guidance on measures and controls to be carried out to avoid and mitigate potential impacts on non-Aboriginal heritage.</td>
<td>Contractor</td>
<td>Detailed design/work preparation/during the works</td>
<td>Core standard safeguard H1 Sect 4.10 of QA G36 Environment Protection</td>
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<tr>
<td>NAH2</td>
<td>Non-Aboriginal heritage – unexpected finds</td>
<td>After vegetation clearance, any previously unsurveyed sections of the Site would be examined by an archaeologist to identify the presence of previously unidentified potential heritage items. Any additional items identified would be managed in accordance with the Roads and Maritime Unexpected Heritage Items Procedure (2015).</td>
<td>Contractor</td>
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<td>Additional safeguard</td>
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<td>NAH3</td>
<td>Non-Aboriginal heritage – unexpected finds</td>
<td>The Unexpected Heritage Items Procedure (Roads and Maritime, 2015) would be followed in the event that any unexpected heritage items, archaeological remains or potential relics of non-Aboriginal origin, including the extension of the Lilyfield Road stormwater canal, are encountered. Work would only restart once the requirements of that procedure have been satisfied. Should elements of listed heritage items be identified during the works (e.g., the Lilyfield Road stormwater canal), they would be retained in situ.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Core standard safeguard H2 Section 4.10 of QA G36 Environment Protection</td>
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<tr>
<td>NAH4</td>
<td>Non-Aboriginal heritage – archaeological potential</td>
<td>Excavations beneath the ballast and into the underlying fill/soil would not be carried out in areas of low or moderate archaeological potential or above the continuation of the Lilyfield Road stormwater canal or other services.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>NAH5</td>
<td>Non-Aboriginal heritage – interpretation</td>
<td>Where practicable, the lighting tower and overhead rail gantries would be removed and stored off-site. This would potentially enable these elements to be incorporated as urban design features which interpret the Rozelle Rail Yards industrial history in a future development of the Site.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>NAH6</td>
<td>Non-Aboriginal heritage – Port Authority building</td>
<td>Removal of the Port Authority building would be carried out only after full archival recording in accordance with NSW guidelines <em>How to Prepare Archival Records of Heritage Items</em> has been carried out (NSW Heritage Office, 1998).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>NAH7</td>
<td>Non-Aboriginal heritage – southern penstock</td>
<td>A three metre exclusion zone would be installed around the southern penstock to protect it from accidental damage during the works. No works other than vegetation management would take place in this exclusion area.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>NAH8</td>
<td>Non-Aboriginal heritage – Victoria Road bridge</td>
<td>Any works beneath the Victoria Road bridge, including vehicle and equipment movements, would be conducted with care to avoid potential damage to the bridge.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>NAH9</td>
<td>Non-Aboriginal heritage – sandstone cutting</td>
<td>Vegetation clearing works on the face of the sandstone cutting would be carried out being careful to avoid any impact on the surface of the cutting (eg with hand tools if possible). Vegetation would not be cleared from the top of the sandstone cutting.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>NAH10</td>
<td>Non-Aboriginal heritage – lighting tower</td>
<td>Removal of the lighting tower would be carried out only after full archival recording in accordance with NSW guidelines <em>How to Prepare Archival Records of Heritage Items</em> (NSW Heritage Office, 1998).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>AH1</td>
<td>Aboriginal heritage – general</td>
<td>The <em>Unexpected Heritage Items Procedure</em> (Roads and Maritime 2015) would be followed in the event that unknown or potential Aboriginal object(s), including skeletal remains, are found during site work. Work would only restart once the requirements of that procedure have been satisfied.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Core standard safeguard AH2 Section 4.9 of QA G36 Environment Protection</td>
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</table>
| BO1 | Biodiversity            | A Flora and Fauna Management Plan (FFMP) would be prepared in accordance with Roads and Maritime's *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011) and implemented as part of the EMP. It would include the following:  
  - Plans showing areas to be cleared and areas to be protected, including exclusion zones  
  - Requirements set out in the *Landscape Guideline* (RTA, 2008)  
  - Pre-clearing survey requirements  
  - Procedures for unexpected threatened species finds and fauna handling  
  - Protocols to manage weeds (see below) and pathogens  
  - Measures to manage the removal of vegetation, which would be carried out in accordance with Roads and Maritime Specification G40 (Clearing and Grubbing)  
  - Measures to manage noxious weeds including the identification of noxious weeds, protocols for appropriate disposal and measures to prevent the spread of noxious weeds outside of the Site. | Contractor      | Work preparation/during the works                  | Core standard safeguard B1  
Section 4.8 of QA G36 Environment Protection  
Additional safeguard |
<p>| BO2 | Fauna management        | If night work is required, a construction exclusion zone of 20 metres around the Victoria Road bridge would be established. This exclusion zone would be established 30 minutes before sunset each day. No works would take place within this zone until 30 minutes after sunrise the next day.                                                                                           | Contractor      | Work preparation/during the works                  | Additional safeguard |
| BO3 | Fauna management        | If night work is required, any stationary lighting that may be used beyond the 20 metre exclusion zone would be hooded and would face away from the bridge.                                                                                                                                                                                                 | Contractor      | Work preparation/during the works                  | Additional safeguard |</p>
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<tr>
<td>BO4</td>
<td>Fauna management</td>
<td>If practical, timing of works in close proximity to bridge would be carried out in summer (November to March), as the Eastern Bentwing Bats are likely to return to breeding sites (limestone caves) during this time and are less likely to be present.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>BO5</td>
<td>Fauna management</td>
<td>Contractors working in close proximity to the Victoria Road bridge would receive a ‘toolbox talk’ on the presence of bats, what they look like, relevant management measures (eg exclusion zone) and what to do if they are encountered or injured.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>BO6</td>
<td>Fauna management</td>
<td>The unexpected threatened species finds procedure (mentioned above) would also outline specific actions for any microbats observed.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>BO7</td>
<td>Off-site biodiversity</td>
<td>The impact footprint would be clearly defined, with suitable fencing to prevent direct impacts to off-site trees, including to the root zone and overhanging branches, with the exception of minor trimming of overhanging branches. This would include trees directly next to the Site, excluding the vegetation to be removed from the City West Link road corridor. Fencing would be consistent with the Australian Standards for protection of trees on development sites (AS 4970-2009).</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
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<tr>
<td>BO8</td>
<td>Off-site aquatic biodiversity</td>
<td>A SWMP would be implemented during the proposed work to avoid significant adverse impacts on nearby aquatic ecosystems.</td>
<td>Contractor</td>
<td>Work preparation/during the works/finished site</td>
<td>Additional safeguard</td>
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<td>TT1</td>
<td>City West Link (west) access</td>
<td>Before work starts at the Site, a decision would be made about which of the City West Link access options would be carried out in consultation with the Transport Management Centre and Roads and Maritime. If Option 1 is chosen, vegetation would be removed to ensure appropriate sight lines. If Option 2 is chosen, an appropriate design would be developed in accordance with Australian Standard 2890.2 and Roads and Maritime Standards.</td>
<td>Contractor</td>
<td>Detailed design/work preparation</td>
<td>Additional safeguard</td>
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</table>
| TT2 | Traffic and transport          | A TMP and TCP would be prepared and implemented as part of the EMP. The TMP and TCP would be prepared in accordance with the Roads and Maritime Traffic Control at Work Sites Manual (RTA, 2010) and QA Specification G10 Traffic Management (Roads and Maritime, 2015). The TMP and TCP would include the following:  
• Confirmation of haulage routes and internal access tracks  
• Site-specific traffic control measures (including signage) to manage and regulate traffic movement  
• Requirements and methods to keep the local community and Council informed of impacts on the local road network  
• Access to the Site including access and egress locations for heavy and light vehicles and measures to prevent construction vehicles queuing on public roads  
• A response plan for potential construction traffic incidents  
• Consideration of other developments under construction (e.g., the CSELR project) to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic  
• Monitoring, review and amendment mechanisms. | Contractor      | Detailed design/work preparation | Core standard safeguard TT1  
Section 4.8 of QA G36 Environment Protection |
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| TT3 | Traffic and transport        | In addition to the above the TMP and TCP would also include:  
  - Hours of permitted vehicle activity and an out-of-hours work procedure if required  
  - Designated staff and contractor parking locations  
  - Duration of work  
  - Permitted vehicle types  
  - Designated areas within the Site for truck turning movements, parking, loading and unloading to allow heavy vehicles to enter and leave the Site in a forward direction  
  - Sequence for implementing traffic management measures  
  - Procedures and/or principles for vehicle speed limits and the safe operation of vehicles within the Site  
  - Potential for a dedicated person to help with exiting trucks at the City West Link (west) access. | Contractor      | Detailed design/work preparation/during the works | Additional safeguard                           |
<p>| TT4 | Oversize trucks              | The use of oversize trucks is considered unlikely for this proposal. In the event that this changes and oversize trucks are required, the TMP and TCP would be updated and work would be carried out in accordance with the Roads and Maritime guidelines for oversize movements. | Contractor      | Work preparation/during the works           | Additional safeguard                           |
| TT5 | Coordination of works vehicles | Coordination of the proposal vehicle movements arriving to and departing from the Site would ensure that disruptions to existing traffic on the surrounding road network are minimised. | Contractor      | Work preparation/during the works           | Additional safeguard                           |
| TT6 | Traffic – Port Authority access | Arrangements for traffic entering Port Authority controlled roads would need to be discussed and agreed with the Port Authority. Considerations would include access arrangements in the event of a special event at the temporary Sydney Exhibition Centre at Glebe Island, and any line-marking changes required near the access point into the Site. | Contractor      | Work preparation/during the works           | Additional safeguard                           |</p>
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<td>TT7</td>
<td>Traffic and transport – out of hours work</td>
<td>In the unlikely event that work needed to be conducted outside standard construction hours, the TMP would outline an out-of-hours works procedure, which would include communication and notification to local residents, businesses and sensitive receivers of the out-of-hours works and a complaints line.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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</table>
| NV1 | Noise and vibration - general              | A Noise and Vibration Management Plan (NVMP) would be prepared and implemented as part of the EMP. The NVMP would generally follow the approach in the Interim Construction Noise Guideline (ICNG) (DECC, 2009) and would identify:  
  - All potential noise and vibration generating activities  
  - Possible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Roads and Maritime, 2014)  
  - A monitoring program to assess performance against relevant noise and vibration criteria  
  - Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures  
  - Contingency measures in the event of non-compliance with noise and vibration criteria.  

The NVMP would be regularly updated to account for any changes in noise and vibration management strategies.       | Contractor     | Works preparation/ during the works | Core standard safeguard NV1 Section 4.6 of QA G36 Environment Protection |
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| NV2 | Noise and vibration - notification         | All sensitive receivers (eg schools, local residents) likely to be affected would be notified before the start of any work that may have an adverse noise or vibration impact. The notification would provide details of:  
  - The work to be carried out  
  - The proposal work hours  
  - Contact information for project management staff  
  - Complaint and incident reporting  
  - How to obtain further information.                                                                 | Contractor      | Works preparation             | Core standard safeguard NV2            |
| NV3 | Noise and vibration - training             | Induction and training would be provided to staff and subcontractors outlining their responsibilities for noise management on-site.  
  
  The inductions would highlight the need to limit noise (including from shouting, vehicle stereos, radios, dropping of materials, throwing of metal items and slamming of doors). The induction would include the following:  
  - All project specific and relevant standard noise and vibration mitigation measures  
  - Relevant licence and approval conditions  
  - Permissible hours of work  
  - Any limitations on high noise generating activities  
  - The location of nearest sensitive receivers  
  - Construction employee parking areas  
  - Designated loading/unloading areas and procedures  
  - Site opening/closing times (including deliveries)  
  - Environmental incident procedures.                                                                 | Contractor      | Works preparation/during the works | Additional safeguard                    |
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| NV4 | Noise - equipment       | In regards to plant and equipment the following would be carried out:  
- Quieter work methods and equipment would be adopted including the use of mufflers and silencers where practicable  
- The noise levels of plant and equipment items would be considered in rental decisions and must be compliant with the criteria in Table 2 of the Construction Noise and Vibration Mitigation – Construction Noise and Vibration Guideline (Roads and Maritime, 2016)  
- All plant and equipment would be properly maintained and operated according to manufacturers’ recommendations in such a manner as to avoid causing excessive noise  
- Noise-intensive equipment would be turned off when not in use  
- Only necessary equipment, of an appropriate size and power, would be on-site. |
|     |                         | Contractor                                                                                                                                                    |                | During the works | Additional safeguard          |
| NV5 | Noise – location of work areas | Work compounds, parking areas, equipment and material stockpiles would be located as far as practicable from noise-sensitive receivers.                                                                                       | Contractor     | During the works | Additional safeguard          |
| NV6 | Noise - vehicles        | In regards to vehicles the following would be carried out:  
- The use of engine compression brakes near residential areas would be limited  
- Non-tonal reversing alarms would be fitted on construction vehicles  
- Opportunities to design the internal access tracks to allow for the forward movement of trucks and other plant would be prioritised.                        | Contractor     | During the works | Additional safeguard          |
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<tr>
<td>NV7</td>
<td>Noise – location of plant/equipment</td>
<td>Use of the mulcher/chipper would be limited to the southern area of the Site (along the City West Link boundary). This may need movement of vegetation and other material from the clearing area to the mulcher/chipper.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>NV8</td>
<td>Noise – timing of works</td>
<td>Specific timing of plant items in each work area would be considered during preparation of the NVMP when the equipment requirements are finalised.</td>
<td>Contractor</td>
<td>Works preparation</td>
<td>Additional safeguard</td>
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<tr>
<td>NV9</td>
<td>Demolition vibration</td>
<td>Building condition surveys of heritage structures within 50 metres of vibration intensive equipment would be completed both before and after the work to identify existing damage and any damage due to the work.</td>
<td>Contractor</td>
<td>Works preparation/ during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>NV10</td>
<td>Demolition vibration</td>
<td>The heritage structures would be inspected during preparation of the NVMP to determine the applicable safe vibration level.</td>
<td>Contractor</td>
<td>Works preparation</td>
<td>Additional safeguard</td>
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<tr>
<td>NV11</td>
<td>Demolition vibration</td>
<td>If vibration intensive work is required within the safe working distances, vibration monitoring or attended vibration trials would be carried out at the outset to ensure that levels are within relevant criterion.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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<td>At locations where the predicted and/or measured vibration levels are greater than the nominated screening levels, a more detailed analysis of the building structure, vibration source, dominant frequencies and dynamic characteristics of the structure would be required to determine the applicable safe vibration level.</td>
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| NV12| Noise – highly noise-affected receivers | The following additional management measures would be carried out for the predicted highly noise-affected receivers in accordance with the Construction Noise and Vibration Mitigation – Construction Noise and Vibration Guideline (Roads and Maritime 2016):  
  - Notifying the community through letterbox drops, doorknocking or phone calls  
  - Verifying demolition noise levels through noise monitoring  
  - Offering respite. The approach to respite periods would be confirmed during preparation of the NVMP and in consultation with the affected community. | Contractor     | Works preparation/during the works | Additional safeguard |
| AQ1 | Air quality – general        | An Air Quality Management Plan (AQMP) would be prepared and implemented as part of the EMP. The AQMP would include the following:  
  - Potential sources of air pollution  
  - Air quality management objectives consistent with any relevant published NSW EPA and/or OEH guidelines  
  - Mitigation and suppression measures required  
  - Methods to manage work during strong winds or other adverse weather conditions  
  - A progressive strategy to stabilise exposed surfaces for reduced erosion risk and dust generation (cross referenced to the SWMP as required). | Contractor     | Detailed design/works preparation | Core standard safeguard AQ1  
Section 4.4 of QA G36 Environment Protection |
<p>| AQ2 | Air quality – general        | The AQMP would include contingency measures in case complaints about air quality are received.                                                                                                                          | Contractor     | Works preparation/during the works | Additional standard safeguard                   |
| AQ3 | Air quality – general        | Work activities would be reviewed if the air quality management measures are ineffective in minimising emissions and dust.                                                                                                  | Contractor     | During the works               | Additional safeguard                           |</p>
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<tr>
<td>AQ4</td>
<td>Air quality – hazardous material</td>
<td>Biological debris or other hazardous materials such as asbestos would be bagged and removed, or wet down before demolition.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional safeguard</td>
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| AQ5 | Air quality – dust emissions    | The AQMP would include measures to manage dust emissions. These would include the following:  
  - Loads that may produce dust or odour would be covered  
  - Water would be sprayed on unsealed access roads and open areas during conditions conducive to dust generation  
  - A wheel washing system would be established for vehicles leaving the Site  
  - An adequate area of hardstand would be maintained between the wheel wash facility and the site exit, wherever site size and layout permits  
  - Internal access tracks would be inspected and necessary repairs to the surface made as soon as reasonably practicable  
  - On-site vehicle speed limits would be established and enforced to prevent dust emissions  
  - Vehicles and activities would be confined to the designated work areas to prevent inadvertent encroachment into exposed areas  
  - Water-assisted dust sweepers would be used on internal access tracks and local roads, to remove material tracked out of the Site  
  - Before and during grubbing and ballast removal, soils/ballast would be wet down to limit the movement of dust and other materials off-site  
  - Exposed areas would be stabilised as soon as reasonable and possible  
  - Stockpiled material would be appropriately shaped to reduce | Contractor     | Works preparation/ during the works | Additional safeguard          |
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<td>wind erosion and covered as appropriate</td>
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<td>• During extreme weather events where dust generation cannot be effectively minimised (such as high winds), dust generating works would cease until adequate controls can be implemented or until adverse weather conditions subside</td>
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<td>• Demolition of buildings and structures would be carried out using techniques and practices that minimise dust generation. This may include soft stripping inside buildings before demolition.</td>
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| AQ6 | Air quality – asbestos | An Asbestos Management Plan (AMP) would be prepared by a suitably-qualified practitioner. The AMP would include the following: 
- Investigating material before demolition and stockpile removal to determine the potential for the release of asbestos fibres 
- Completing asbestos fibre air monitoring during activities which could liberate asbestos fibres. | Contractor | Works preparation | Additional safeguard |
| AQ7 | Air quality – exhaust emissions | Measures to manage exhaust emissions would include the following: 
- Machinery would be turned off while not in use 
- Equipment (including all internal combustion engines) would be properly maintained and running efficiently to ensure exhaust emissions are minimised, where practicable 
- All emission controls used on vehicle and equipment would comply with standards listed in Schedule 4 of the Protection of the Environment Operations (Clean Air) Regulation 2010. | Contractor | Works preparation/during the works | Additional safeguard |
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<tr>
<td>AQ8</td>
<td>Air quality – odour emissions</td>
<td>In the event that odour emissions are generated, work would cease until the source and nature of the odour can be determined and an appropriate course of action carried out. This may include further assessment to determine potential impacts on the nearest sensitive receptors.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional standard safeguard</td>
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<tr>
<td>AQ9</td>
<td>Air quality – ash</td>
<td>All wastes are to be removed off-site and disposed of to an appropriately-licensed facility in accordance with the site Waste and Resource Management Plan. No waste would be burned on-site.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional standard safeguard</td>
</tr>
<tr>
<td>LCVA1</td>
<td>Visual amenity – views of the Site</td>
<td>Exposed areas would be progressively stabilised as detailed in sections 6.1 and 6.2.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional standard safeguard</td>
</tr>
<tr>
<td>LCVA2</td>
<td>Visual amenity – views of the Site</td>
<td>The Site would be left in a tidy state at the end of each day of work. All machinery and equipment, ancillary facilities, and excess material (aside from temporary site offices and sediment basins), would be removed from the Site once the proposal is complete. A site inspection would be carried out to ensure disturbed areas have been stabilised and the Site has been left in a tidy state.</td>
<td>Contractor</td>
<td>During the works</td>
<td>Additional standard safeguard</td>
</tr>
<tr>
<td>LCVA3</td>
<td>Visual amenity – views of the Site</td>
<td>Before work commences, additional screening options (eg hoarding or shade cloth) would be investigated in order to restrict views into the Site from surrounding areas.</td>
<td>Contractor</td>
<td>Work preparation</td>
<td>Additional standard safeguard</td>
</tr>
<tr>
<td>PLU1</td>
<td>Property access</td>
<td>Access to neighbouring properties and local roads would not be compromised by the proposal. In the unlikely event access restrictions occurred, affected residents or business would be consulted before restrictions take place.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional standard safeguard</td>
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| O11 | Socio-economic          | A Communication Plan (CP) would be prepared and implemented as part of the EMP to help provide timely and accurate information to the community during the proposal. The CP would include (as a minimum):  
- Mechanisms to provide details and timing of proposed activities to affected residents  
- Contact name and number for complaints.  
The CP would be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008). | Contractor | Detailed design/work preparation | Core standard safeguard SE1 |
| O12 | Hazards and risk management | A Hazard and Risk Management Plan (HRMP) would be prepared and implemented as part of the EMP. The HRMP would include the following:  
- Details of hazards and risks associated with the activity  
- Measures to be implemented during construction to minimise these risks  
- Record keeping arrangements, including information on the materials present on the Site, material safety data sheets, and personnel trained and authorised to use such materials  
- A monitoring program to assess performance in managing the identified risks  
- Contingency measures to be implemented in the event of unexpected hazards or risks arising, including emergency situations.  
The HRMP would be prepared in accordance with relevant guidelines and standards, including relevant Safe Work Australia Codes of Practice, and NSW EPA or Office of Environment and Heritage publications. | Contractor | Detailed design/work preparation | Core standard safeguard HAZ1 |
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Standard/additional safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>O13</td>
<td>Utilities</td>
<td>Before the start of ground disturbance works, the location of existing utilities would be confirmed after consultation with the affected utility owners</td>
<td>Contractor</td>
<td>Detailed design/work preparation</td>
<td>Core standard safeguard U1</td>
</tr>
<tr>
<td>O14</td>
<td>Utilities</td>
<td>An unexpected utility find procedure would be developed before works commencing. In the event that live utilities are unexpectedly uncovered during the works, works would cease and the procedure would be implemented.</td>
<td>Contractor</td>
<td>Work preparation</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>O15</td>
<td>Utilities</td>
<td>On-going consultation with utility owners would be carried out during the utility identification activities, and in the ongoing protection of live services.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
<tr>
<td>CU1</td>
<td>Cumulative impacts</td>
<td>Where relevant, consultation would be carried out with proponents of other developments (such as the proponent of the CSELR project) to increase the overall awareness of project timeframes and impacts. Where necessary, the timing of certain proposal activities (such as heavy vehicle movements and high noise generating activities) would be managed to avoid coinciding works that may result in adverse cumulative impacts on sensitive receivers.</td>
<td>Contractor</td>
<td>Work preparation/during the works</td>
<td>Additional safeguard</td>
</tr>
</tbody>
</table>
7.3 Licensing and approvals

At this time no additional licences or approvals are considered necessary to complete the proposal. However certain management plans may need to be approved by various government agencies and other relevant stakeholders.
8 Conclusion

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

8.1 Justification

This REF has been prepared to assess the potential environmental impacts of the proposal to be carried out on a portion of the former Rozelle Rail Yards. The proposal would remove rail and rail related infrastructure from the Site and allow existing issues at the Site, such as waste and weeds to be appropriately managed.

The key features of the proposal are:

- Site establishment for the site management works – including fencing, installing temporary site offices, arranging site access, erosion, sediment and drainage controls and defining lay down, stockpile and transfer areas
- Utility location and site investigations
- Removal of waste, existing stockpiles and vegetation
- Removal of existing above ground rail infrastructure, including gantries, railway lines, ballast, sleepers and buildings (but excluding the southern penstock, the switching station, the transformer and infrastructure to the east of the Victoria Road bridge) and redundant services where intercepted when removing infrastructure (eg gantries and ballast) generally to a depth of 500 millimetres below ground level, except where drainage channels and sediment basins are required
- Site stabilisation comprising reshaping of the ground surface as a result of the site management works and installation of final stormwater controls including the construction of drainage channels and sediment basins
- Site completion—de-mobilise all temporary construction materials, plant and equipment installed for the works and leave the Site secure.

The proposal would not include the remediation of the subsurface material (other than certain activities associated with the proposal specified above).

Rail infrastructure, such as railway lines and sleepers, and redundant services would not be removed from the part of the Site beneath or to the east of the Victoria Road bridge. However other works such as the clearance of weeds and the demolition of the Port Authority building and warehouse would be carried out in this area as part of the proposed works.

Roads and Maritime is soon to be the sole owner of the Site and proposes to use the Site in the future for the M4-M5 Link project if that project is approved by the NSW Minister for Planning. The site management works which comprise this proposal do not form part of the M4-M5 Link project and would be commenced before the determination of and irrespective of whether or not the M4-M5 Link project is approved. The proposal would benefit future uses of the Site (including construction of the separate M4-M5 Link project if it is approved) because the works would remove material and redundant facilities associated with the rail and rail related infrastructure use from the Site.
The benefits of the proposal are expected to include improvement of the quality of the local environment by removal and appropriate disposal of waste including some contaminated material, demolition and removal of redundant infrastructure and removal of vegetation including noxious weeds, exotic species and regrowth. The proposal would also improve access to surface conditions across the Site, which would allow for further investigation into the location of utilities and the presence of contamination and waste.

If the proposal does not proceed, the Site would continue to have unmanaged environmental issues including lack of control of noxious weeds, dumped and stockpiled material including contaminated material would remain unsecured on-site, redundant infrastructure would continue to degrade and the Site would not be properly secured. The proposal is consistent with the need for Roads and Maritime to manage environmental issues on its property.

8.2 Objects of the EP&A Act

Table 8-1 sets out how each of the relevant objects of the EP&A Act have been addressed.

Table 8-1: Objects of the EP&A Act

<table>
<thead>
<tr>
<th>Object</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.</td>
<td>The proposal would result in minimal and short-term impacts on the environment. The impacts would be managed via mitigation measures (refer to Chapter 7 (Environmental management)). The proposal would facilitate proper on-going management of the Site and would help improve the environment by removing noxious weeds, wastes, and certain contaminated material.</td>
</tr>
<tr>
<td>5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.</td>
<td>The proposal would facilitate a future use of the Site and therefore would encourage the orderly economic use and development of land.</td>
</tr>
<tr>
<td>5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.</td>
<td>The proposal would include locating existing services at the Site and removing redundant utility services.</td>
</tr>
<tr>
<td>5(a)(iv) To encourage the provision of land for public purposes.</td>
<td>Completion of the proposal would not be inconsistent with provision of the land for public purposes if this were to occur in the future.</td>
</tr>
<tr>
<td>5(a)(v) To encourage the provision and co-ordination of community services and facilities.</td>
<td>Completion of the proposal would not be inconsistent with the provision and co-ordination of community services and facilities if this were to occur in the future.</td>
</tr>
<tr>
<td>5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.</td>
<td>The environmental impacts of the proposal are considered in Chapter 6 (Environmental assessment). The Site is brownfield in nature and environmentally degraded. No threatened biota would be impacted by the proposal and various noxious weeds would be removed. Safeguards for biodiversity are included in section of this REF.</td>
</tr>
<tr>
<td>Object</td>
<td>Comment</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>5(a)(vii) To encourage ecologically sustainable development.</td>
<td>Ecologically sustainable development (ESD) is considered in sections 8.2.1 to 8.2.4 below.</td>
</tr>
<tr>
<td>5(a)(viii) To encourage the provision and maintenance of affordable housing.</td>
<td>Completion of the proposal would not be inconsistent with the provision of affordable housing if this were to occur in the future.</td>
</tr>
<tr>
<td>5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.</td>
<td>Not relevant to the proposal.</td>
</tr>
<tr>
<td>5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.</td>
<td>Consultation for the proposal is set out in Chapter 5 (Consultation). This includes that this REF would be placed on public display for community comment. After public display of the REF, Roads and Maritime would prepare a submissions report to consider the issues raised during public display before making a decision whether to proceed with the proposal.</td>
</tr>
</tbody>
</table>

### 8.2.1 The precautionary principle

The precautionary principle deals with certainty in environmental and technical decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

A REF undergoes a public display process that allows for better examination of the potential effects of proposed activities or development. Thus, the assessment process can be defined as precautionary in nature. The requirement to assess the impacts of the proposal is a form of regulation designed to identify and address uncertainty about the effects of these activities. Indeed, some elements of the works are exempt development but nonetheless the potential environmental impacts have been assessed in this REF as a precautionary measure.

Roads and Maritime has commissioned specialists to conduct detailed assessments on a range of environmental aspects as outlined in Chapter 6 (Environmental assessment). These assessments provide sufficient scientific understanding of the proposal, their interactions with the surrounding environment and implications they may have to enable a decision to be made that is consistent with this principle. The assessments within this REF have been completed using various conservative assumptions. An example of how the precautionary principle has been included in the assessment of impacts is the noise assessment where for certain work scenarios the noise modelling includes the use of all relevant equipment at once. This is highly unlikely to occur but provides a precautionary assessment.

The precautionary principle has also driven the development of a number of management and mitigation measures presented within this REF (refer to Chapter 7 (Environmental management)).

This REF indicates that the proposal does not pose a risk of serious or irreversible environmental damage. Further, adverse impacts associated with the proposal are not likely to be significant and are largely temporary in nature.
8.2.2 Intergenerational equity

Inter-generational equity requires that the present generation should ensure that the health diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

Through the implementation of mitigation and management measures for avoiding and minimising any short-term or long-term environmental impacts, inter-generational social equality impacts have been addressed.

The proposal seeks to remove waste, redundant infrastructure and vegetation including weed species from the Site. This would improve the environment on the Site and facilitate beneficial use of the Site for future generations.

8.2.3 Conservation of biological diversity and ecological integrity

This REF includes an assessment of the ecological impacts of the proposal against the requirements of NSW and Commonwealth legislation. The Site is located in a highly developed urban area and is in a degraded condition. The proposal is not likely to result in any loss of biodiversity or ecological integrity. The Biodiversity Assessment (refer to Appendix F) concluded that the works would not be likely to cause significant ecological impacts provided that certain mitigation measures were followed.

8.2.4 Improved valuation, pricing and incentive mechanisms

This ESD principle is premised on an assumption that all resources should be appropriately valued and that the value of environmental resources should be considered alongside any economic or cost benefit analysis for the life of the proposal.

One of the key objectives of this proposal is to manage a number of legacy issues at the Site. The Site provides some limited environmental value from a historic heritage perspective but otherwise the Site has limited value in respect to other environmental and social aspects. The value of the heritage items have been assessed and appropriate mitigation measures have been identified to address the limited impacts to these items as a result of the works.

On balance the proposal would improve the environmental value of the Site by removing a number of legacy issues (eg noxious weeds, wastes etc). Therefore, the proposal is consistent with this principle.

8.3 Conclusion

The proposed site management works at the Rozelle Rail Yards is subject to assessment under 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 (where relevant) of conservation agreements and plans of management under the NP&W Act, joint management and biobanking agreements under the TSC Act, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to MNES listed under the Commonwealth EPBC Act and impacts on the environment of Commonwealth land.
A number of potential environmental impacts from the proposal have been avoided or reduced during the options considerations and development of the final scope of the proposal. The proposal as described in the REF best meets the project objectives but would result in potential impacts relating to surface water quality, traffic, noise, air quality and landscape character; however these impacts were all considered to be limited in duration. Safeguards and management measures as detailed in this REF avoid or minimise these expected impacts. The proposal would also result in the positive impacts of removal of waste, redundant infrastructure and weeds from the Site which would facilitate the future beneficial use of the Site. On balance the proposal is considered justified and the following conclusions are made.

Significance of impact under NSW legislation
The proposal would be unlikely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities, or their habitats. Therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act. A Species Impact Statement is not required. The proposal is subject to assessment under Part 5 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation
The proposal is not likely to have a significant impact on MNES or the environment of Commonwealth land within the meaning of the EPBC Act. As discussed in section 4.3, a referral to the Australian Department of the Environment and Energy is not required.
9 Certification

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

Andrew Cook
Technical Director - Environment
AECOM Australia Pty Ltd.
Date: 18/11/2016

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

Nicholas Francesconi
Principal Manager Environment
NSW Roads and Maritime Services
Date: 18/11/2016
10 References


AECOM, 2016, WestConnex M4-M5 Link Rozelle Interchange, Stage 1 Preliminary Site Investigation, 19 May 2016, Final.


European Commission, Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, May 1999, NE80328/D1/3.


Heggies Pty Ltd, 2009, CBD Metro Noise and Vibration Assessment, Construction, Operations and Maintenance,


Leichhardt Local Environmental Plan 2013, updated 4 April 2016.


NSW Department of Urban Affairs and Planning, 1997, Sydney Regional Environmental Plan No. 26—City West, New South Wales Government.


Rozelle Rail Yards – Site Management Works
Review of environmental factors


### Table 10-1: Terms and acronyms used in this REF

<table>
<thead>
<tr>
<th>Term/Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>μm</td>
<td>Micrometre</td>
</tr>
<tr>
<td>ACM</td>
<td>Asbestos containing material(s)</td>
</tr>
<tr>
<td>AECOM</td>
<td>AECOM Australia Pty Ltd</td>
</tr>
<tr>
<td>AHIMS</td>
<td>Aboriginal Heritage Information Management System, managed by the NSW Office of Environment and Heritage</td>
</tr>
<tr>
<td>AMP</td>
<td>Asbestos Management Plan</td>
</tr>
<tr>
<td>AQMP</td>
<td>Air Quality Management Plan</td>
</tr>
<tr>
<td>ARI</td>
<td>Average recurrence interval</td>
</tr>
<tr>
<td>ASS</td>
<td>Acid sulfate soils</td>
</tr>
<tr>
<td>ASSMP</td>
<td>Acid Sulfate Soil Management Plan</td>
</tr>
<tr>
<td>BTEXN</td>
<td>Benzene, toluene, ethylbenzene, xylenes and naphthalene</td>
</tr>
<tr>
<td>BTOC</td>
<td>Below top of casing</td>
</tr>
<tr>
<td>CBD</td>
<td>Central business district</td>
</tr>
<tr>
<td>CCA</td>
<td>Copper chrome arsenate</td>
</tr>
<tr>
<td>CEA</td>
<td>Cumulative Effects Assessment</td>
</tr>
<tr>
<td>CLM Act</td>
<td>Contaminated Land Management Act 1997 (NSW)</td>
</tr>
<tr>
<td>CMP</td>
<td>Conservation Management Plan</td>
</tr>
<tr>
<td>CNVG</td>
<td>NSW Roads and Maritime Services, Construction Noise and Vibration Guideline (CNVG), Roads and Maritime, 2016, New South Wales Government</td>
</tr>
<tr>
<td>CoPC</td>
<td>Contaminants of potential concern</td>
</tr>
<tr>
<td>CSELR</td>
<td>Central Business District and South-east Light Rail project</td>
</tr>
<tr>
<td>CSM</td>
<td>Conceptual Site Model</td>
</tr>
<tr>
<td>Term/Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>dB</td>
<td>Decibel</td>
</tr>
<tr>
<td>dBA</td>
<td>Decibel measured using a sound level meter with an ‘A-weighting’ filter</td>
</tr>
<tr>
<td>DBYD</td>
<td>Dial Before You Dig</td>
</tr>
<tr>
<td>DIN 4150</td>
<td>German Standard DIN 4150:Part 3-1999 Structural vibration - Effects of vibration on structures, Deutsches Institute fur Normung, 1999</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
</tr>
<tr>
<td>ECD SEPP</td>
<td>State Environmental Planning Policy (Exempt and Complying Development Codes) 2008</td>
</tr>
<tr>
<td>ELA</td>
<td>Eco Logical Australia Pty Ltd</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>EP&amp;A Act</td>
<td>Environmental Planning and Assessment Act 1979 (NSW). Provides the legislative framework for land use planning and development assessment in NSW</td>
</tr>
<tr>
<td>EP&amp;A Regulation</td>
<td>Environmental Planning and Assessment Regulation 2000 (NSW)</td>
</tr>
<tr>
<td>EPA</td>
<td>NSW Environment Protection Authority</td>
</tr>
<tr>
<td>EPI</td>
<td>Environmental planning instrument</td>
</tr>
<tr>
<td>EPL</td>
<td>Environment protection licence</td>
</tr>
<tr>
<td>ESD</td>
<td>Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.</td>
</tr>
<tr>
<td>FEP</td>
<td>Flood Evacuation Plan</td>
</tr>
<tr>
<td>FFMP</td>
<td>Flora and Fauna Management Plan</td>
</tr>
<tr>
<td>FM Act</td>
<td>Fisheries Management Act 1994 (NSW)</td>
</tr>
<tr>
<td>GML Heritage</td>
<td>GML Heritage Pty Ltd</td>
</tr>
<tr>
<td>GPR</td>
<td>Ground penetrating radar</td>
</tr>
<tr>
<td>Harbour SREP</td>
<td>Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005</td>
</tr>
<tr>
<td>HazMat</td>
<td>Hazardous materials</td>
</tr>
<tr>
<td>Term/Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>HDV</td>
<td>Heavy-duty vehicles</td>
</tr>
<tr>
<td>Heritage Act</td>
<td><em>Heritage Act 1977 (NSW)</em></td>
</tr>
<tr>
<td>HIA</td>
<td>Heritage impact assessment</td>
</tr>
<tr>
<td>HMP</td>
<td>Heritage Management Plan</td>
</tr>
<tr>
<td>HRMP</td>
<td>Hazard and Risk Management Plan</td>
</tr>
<tr>
<td>HSMP</td>
<td>Health and Safety Management Plan</td>
</tr>
<tr>
<td>HTC</td>
<td>High temperature creosote</td>
</tr>
<tr>
<td>IAQM</td>
<td>UK Institute of Air Quality Management</td>
</tr>
<tr>
<td>ICNG</td>
<td>Interim Construction Noise Guideline DECC, 2009).</td>
</tr>
<tr>
<td>INP</td>
<td>NSW Industrial Noise Policy</td>
</tr>
<tr>
<td>ISEPP</td>
<td>State Environmental Planning Policy (Infrastructure) 2007</td>
</tr>
<tr>
<td>kg</td>
<td>Kilograms</td>
</tr>
<tr>
<td>kL</td>
<td>Kilolitres</td>
</tr>
<tr>
<td>KTP</td>
<td>Key threatening process</td>
</tr>
<tr>
<td>kWh</td>
<td>Kilowatt hour</td>
</tr>
<tr>
<td>L</td>
<td>Litre</td>
</tr>
<tr>
<td>LALC</td>
<td>Local Aboriginal Land Council</td>
</tr>
<tr>
<td>LGA</td>
<td>Local Government Area</td>
</tr>
<tr>
<td>LiDAR</td>
<td>Light Detection and Ranging</td>
</tr>
<tr>
<td>LOS</td>
<td>Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.</td>
</tr>
<tr>
<td>LOSP</td>
<td>Light organic solvent preservative</td>
</tr>
<tr>
<td>m</td>
<td>Metres</td>
</tr>
<tr>
<td>m²</td>
<td>Square metres</td>
</tr>
<tr>
<td>m³</td>
<td>Cubic metres</td>
</tr>
<tr>
<td>MLALC</td>
<td>Metropolitan Local Aboriginal Land Council</td>
</tr>
<tr>
<td>Term/Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>MNES</td>
<td>Matters of national environmental significance under the Commonwealth <em>Environment Protection and Biodiversity Conservation Act 1999</em>.</td>
</tr>
<tr>
<td>NCA</td>
<td>Noise catchment areas</td>
</tr>
<tr>
<td>NCG</td>
<td>Noise Criteria Guideline (NCG), Roads and Maritime, December 2014, RMS 14.583</td>
</tr>
<tr>
<td>NDE</td>
<td>Non-destructive excavation</td>
</tr>
<tr>
<td>NEPC</td>
<td>National Environment Protection Council</td>
</tr>
<tr>
<td>NML</td>
<td>Noise management levels</td>
</tr>
<tr>
<td>Noxious Weeds Act</td>
<td><em>Noxious Weeds Act 1993 (NSW)</em></td>
</tr>
<tr>
<td>NP&amp;W Act</td>
<td><em>National Parks and Wildlife Act 1974 (NSW)</em></td>
</tr>
<tr>
<td>NP&amp;WS</td>
<td>NSW National Parks and Wildlife Service</td>
</tr>
<tr>
<td>NVMP</td>
<td>Noise and Vibration Management Plan</td>
</tr>
<tr>
<td>OCP</td>
<td>Organochlorine pesticide</td>
</tr>
<tr>
<td>OEH</td>
<td>NSW Office of Environment and Heritage</td>
</tr>
<tr>
<td>OPP</td>
<td>Organophosphate pesticide</td>
</tr>
<tr>
<td>PACHCI</td>
<td>Procedure for Aboriginal Cultural Heritage Consultation and Investigation (Roads and Maritime 2011).</td>
</tr>
<tr>
<td>Pacific Environment</td>
<td>Pacific Environment Limited</td>
</tr>
<tr>
<td>PAH</td>
<td>Polycyclic aromatic hydrocarbons</td>
</tr>
<tr>
<td>PASS</td>
<td>Potential acid sulfate soils</td>
</tr>
<tr>
<td>PB</td>
<td>Parsons Brinckerhoff</td>
</tr>
<tr>
<td>PCB</td>
<td>polychlorinated biphenyl</td>
</tr>
<tr>
<td>PEC</td>
<td>pigmented emulsified creosote</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>Particulate matter with particles less than 10 microns</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>Particulate matter with particles less than 2.5 microns</td>
</tr>
<tr>
<td>POEO Act</td>
<td><em>Protection of the Environment Operations Act 1997 (NSW)</em></td>
</tr>
<tr>
<td>PPE</td>
<td>Personal protective equipment</td>
</tr>
<tr>
<td>Proposal</td>
<td>The site management works</td>
</tr>
<tr>
<td>PSI</td>
<td>Stage 1 Preliminary Site Investigation (AECOM 2016)</td>
</tr>
<tr>
<td>Term/Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>QA Specifications</td>
<td>Specifications developed by Roads and Maritime Services for use with road work and bridge work contracts let by Roads and Maritime Services.</td>
</tr>
<tr>
<td>RBL</td>
<td>Rating background noise level</td>
</tr>
<tr>
<td>REF</td>
<td>Review of environmental factors</td>
</tr>
<tr>
<td>RNP</td>
<td>NSW Road Noise Policy (RNP) (NSW) Environment Protection Authority (EPA), 2011</td>
</tr>
<tr>
<td>Roads and Maritime</td>
<td>NSW Roads and Maritime Services</td>
</tr>
<tr>
<td>S170</td>
<td>Section 170 of the Heritage Act 1977 (NSW)</td>
</tr>
<tr>
<td>SEPP 55</td>
<td>State Environmental Planning Policy No. 55—Remediation of Land</td>
</tr>
<tr>
<td>SHL</td>
<td>State heritage listed</td>
</tr>
<tr>
<td>SLR</td>
<td>SLR Consulting Australia Pty Ltd</td>
</tr>
<tr>
<td>SREP 26</td>
<td>Sydney Regional Environmental Plan No. 26—City West</td>
</tr>
<tr>
<td>SSI</td>
<td>State Significant Infrastructure</td>
</tr>
<tr>
<td>SVOC</td>
<td>Semi volatile organic compounds</td>
</tr>
<tr>
<td>SWL</td>
<td>Standing water levels</td>
</tr>
<tr>
<td>SWMP</td>
<td>Soil and Water Management Plan</td>
</tr>
<tr>
<td>t</td>
<td>Tonnes</td>
</tr>
<tr>
<td>TCP</td>
<td>Traffic Control Plan</td>
</tr>
<tr>
<td>the Site</td>
<td>A part of the former Rozelle Rail Yards where the proposal would take place</td>
</tr>
<tr>
<td>TMP</td>
<td>Traffic Management Plan</td>
</tr>
<tr>
<td>TPH</td>
<td>Total petroleum hydrocarbons</td>
</tr>
<tr>
<td>TRH</td>
<td>Total recoverable hydrocarbons</td>
</tr>
<tr>
<td>TSC Act</td>
<td>Threatened Species Conservation Act 1995 (NSW)</td>
</tr>
<tr>
<td>UST</td>
<td>Underground storage tank</td>
</tr>
<tr>
<td>VDV</td>
<td>Vibration Dose Value</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile organic compound</td>
</tr>
<tr>
<td>Term/Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>WM Act</td>
<td><em>Water Management Act 2000 (NSW)</em></td>
</tr>
<tr>
<td>WMP</td>
<td>Waste and Resource Management Plan</td>
</tr>
<tr>
<td>WSP</td>
<td>Water Sharing Plan</td>
</tr>
</tbody>
</table>
Rozelle Rail Yards
SITE MANAGEMENT WORKS

APPENDIX A

Consideration of clause 228(2) factors and matters of national environmental significance
The following factors, listed in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000*, have been considered to assess the likely impacts of the proposal on the natural and built environment.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Any environmental impact on a community?</strong></td>
<td>Proposal: Non-significant, short term, negative impact for the local area</td>
</tr>
<tr>
<td></td>
<td>Finished site: Neutral impact</td>
</tr>
<tr>
<td>During the proposal the local community may be temporarily affected by noise from the Site during the day; however these impacts would be of low magnitude or short duration. Potential impacts relating to dust and traffic are also possible but unlikely to be significant. The landscape character of the Site may also change, altering the views for nearby community receptors. While these impacts are unlikely to be significant, a number of safeguards have been recommended to avoid or further mitigate these potential impacts during the proposed works. After completion of the works, no impacts on the local community are expected. Further detail relating to traffic and transport, noise and vibration, air quality, and landscape character and visual impacts are provided in sections 6.7 to 6.10 respectively.</td>
<td></td>
</tr>
<tr>
<td><strong>b. Any transformation of a locality?</strong></td>
<td>Proposal and finished site: Neutral impact</td>
</tr>
<tr>
<td>The proposal would involve the removal of redundant infrastructure and the clearing of the Site. While these activities may change the character of the Site, they are unlikely to transform the local area. As such no impacts are expected. Refer to Chapter 3 (Description of the proposal) and section 6.10 for further detail relating to landscape character and visual impacts.</td>
<td></td>
</tr>
<tr>
<td><strong>c. Any environmental impact on the ecosystems of the locality?</strong></td>
<td>Proposal: Non-significant, short term, negative impact for the Site</td>
</tr>
<tr>
<td>The vegetation at the Site is dominated by exotic species (including weeds) or regrowth. The proposal would involve the removal of all vegetation at the Site and some in the nearby City West Link road corridor. This loss is not considered significant, although some limited foraging habitat may be lost for certain species. In addition the works would include the removal of noxious weeds which would be a benefit for the local environment. Potentially the works could impact the water quality in Rozelle Bay; however measures would be put in place to ensure that significant pollution impacts are mitigated or avoided. Therefore, in summary, no significant impacts on the ecosystems are expected. Section 6.6 provides further detail relating to potential ecological impacts resulting from the proposal.</td>
<td>Finished site: Neutral impact</td>
</tr>
</tbody>
</table>
### Factor

**d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?**

The proposal is unlikely to significantly reduce the aesthetic, recreational, scientific or other environmental quality or value of a locality. The aesthetics of the local area would change as a result of the works (eg through the removal of the gantries and other infrastructure and buildings) but this change would be limited in extent.

Equally the removal of certain local heritage features from the Site could reduce the scientific value of the Site. However, these items would be subject to archival recording and therefore this concern would be addressed.

The Site is not used for recreation, and the works are unlikely to significantly impact the environmental quality or value of the locality. Potential impacts on non-Aboriginal heritage values are addressed in section 6.4. Socio-economic issues (including amenity) are addressed in section 6.12.

**Proposal:** Non-significant, short term, negative impact for the aesthetic and scientific values of the Site

**Finished site:** Neutral impact

### Impact

**Proposal:** Non-significant, short term, negative impact for the non-aboriginal values of the Site

**Finished site:** Neutral impact

### Factor

**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 is unlikely to impact Aboriginal heritage; however it would result in the removal of a number of local non-Aboriginal heritage values (not listed). These non-aboriginal heritage values (ie the lighting tower and Port Authority building) would be subject to archival recording to capture their value before removal.

The lighting tower and the gantries from the Site would be retained for reuse once dismantled. The southern penstock would be safeguarded during the works with an exclusion zone to avoid damage to this important value.

Areas of archaeological potential have been identified in the north-eastern corner of the Site. No works that may excavate in the soil/fill layer beneath the ballast would be allowed in this location.

Overall, the works are unlikely to impact on the heritage values of the local area.

Potential impacts on non-Aboriginal and Aboriginal heritage values are assessed in sections 6.4 and 6.5.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>f. <strong>Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?</strong></td>
<td>Proposal and finished site: Neutral impact</td>
</tr>
<tr>
<td>A biodiversity assessment was completed for the proposal. This assessment concluded that there would be no significant impact on the habitat of protected fauna.</td>
<td></td>
</tr>
<tr>
<td><strong>Section 6.6</strong> provides further detail relating to potential ecological impacts resulting from the proposal.</td>
<td></td>
</tr>
<tr>
<td>g. <strong>Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</strong></td>
<td>Proposal and finished site: Neutral impact</td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td><strong>Section 6.6</strong> provides further detail relating to potential ecological impacts resulting from the proposal.</td>
<td></td>
</tr>
<tr>
<td>h. <strong>Any long-term effects on the environment?</strong></td>
<td>Proposal and finished site: Non-significant, long term, positive impact on the environment</td>
</tr>
<tr>
<td>The proposal would result in a long term beneficial effect on the environment by managing certain contamination present on-site, and removing redundant infrastructure, wastes and noxious weeds from the Site.</td>
<td></td>
</tr>
<tr>
<td>Refer to <strong>Chapter 3 (Description of the proposal)</strong> and sections 6.1 and 6.3 which relate to contamination and waste and resource management at the Site respectively.</td>
<td></td>
</tr>
<tr>
<td>i. <strong>Any degradation of the quality of the environment?</strong></td>
<td>Proposal: Non-significant, short term, negative impact</td>
</tr>
<tr>
<td>The proposal has the potential to impact the quality of the environment in terms of air, land and water in the short term. Potential impacts may include deterioration of air quality, increased noise and mobilisation of soil and water contamination. The majority of these impacts would be temporary and can be appropriately managed.</td>
<td></td>
</tr>
<tr>
<td>There is the potential for erosion of site soils after vegetation clearance, infrastructure and waste removal, and excavations. Erosion and sediment controls would be set up across the Site to manage this potential impact.</td>
<td></td>
</tr>
<tr>
<td>After completion of the works, the activities at the Site would be unlikely to degrade the environment.</td>
<td></td>
</tr>
<tr>
<td>Refer to <strong>Chapter 3 (Description of the proposal)</strong> and sections 6.1, 6.2 and 6.3 which relate to contamination, surface water drainage and flooding, and waste and resource management at the Site respectively.</td>
<td></td>
</tr>
<tr>
<td>Factor</td>
<td>Impact</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>j. Any risk to the safety of the environment?</strong></td>
<td>Proposals: Non-significant, short term, negative impact</td>
</tr>
<tr>
<td></td>
<td>Finished site: Neutral impact</td>
</tr>
<tr>
<td>There is a potential that the safety of the environment may be</td>
<td></td>
</tr>
<tr>
<td>affected by existing contamination now found on-site. However these</td>
<td></td>
</tr>
<tr>
<td>impacts can be avoided or controlled by the implementation of</td>
<td></td>
</tr>
<tr>
<td>appropriate management measures.</td>
<td></td>
</tr>
<tr>
<td>There is potential that the removal of waste (potentially including</td>
<td></td>
</tr>
<tr>
<td>contaminated soil) may increase the safety of the site environment.</td>
<td></td>
</tr>
<tr>
<td>Refer to sections 6.1, 6.2 and 6.3 which relate to contamination,</td>
<td></td>
</tr>
<tr>
<td>surface water drainage and flooding, and waste and resource</td>
<td></td>
</tr>
<tr>
<td>management respectively.</td>
<td></td>
</tr>
<tr>
<td><strong>k. Any reduction in the range of beneficial uses of the environment?</strong></td>
<td>Proposal and finished site: Neutral impact</td>
</tr>
<tr>
<td>The proposal would not reduce the range of beneficial uses of the</td>
<td></td>
</tr>
<tr>
<td>environment.</td>
<td></td>
</tr>
<tr>
<td>Benefits of the proposal relating to future use of the Site are</td>
<td></td>
</tr>
<tr>
<td>further discussed in <strong>Chapter 2 (Needs and options considered)</strong>,</td>
<td></td>
</tr>
<tr>
<td>and section 6.11.</td>
<td></td>
</tr>
<tr>
<td>Factor</td>
<td>Impact</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>I. Any pollution of the environment?</td>
<td>Proposal and finished site: Non-significant, short term, negative impact</td>
</tr>
</tbody>
</table>

The Site is known to contain various contaminants of concern at various concentrations. Contamination is present in the stockpiles, ballast and fill/soil at the Site. The key potential impacts relate to mobilising contamination during ground disturbance works (eg removing ballast) and surface water flows interacting with exposed contamination and transporting it off-site.

To manage potential pollution impacts associated with the contamination of surface water flows and the spread of contaminated dust and other material (eg asbestos), a suite of safeguards and mitigation measures have been identified.

To reduce the magnitude of impacts associated with ground disturbance works, the Site would be progressively disturbed or excavated in a staged manner. The amount of disturbance would depend on the ground conditions (including likely contamination) and likely weather conditions (eg works would not take place if heavy rain was expected).

To avoid impacts related to the contamination of surface water flows, temporary and permanent stormwater controls would be installed to manage surface water flows. These controls would include the installation of drainage channels and sediment basins to capture surface water flows. Equally the Site would be progressively stabilised after exposure with an appropriate surface cover. This surface cover would be seeded and would help ensure that surface water flows did not erode the soils at the Site or interact with contamination in the residual soil/fill.

A suite of additional controls has also been identified to manage a number of related potential impacts. These include additional investigations and ensuring that a soil conservation consultant and a contamination expert are employed throughout the works to advise on the design of specific controls, the stabilisation approach and the content of the management plans.

Provided measures and safeguards are implemented, pollution impacts would be unlikely.

Refer to sections 6.1, 6.2, 6.3 and 6.9 which relate to contamination, surface water drainage and flooding, waste and resource management, and air quality respectively.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>m. Any environmental problems associated with the disposal of waste?</td>
<td>Proposal: Non-significant, short term, negative impact</td>
</tr>
<tr>
<td></td>
<td>Finished site: Neutral impact</td>
</tr>
<tr>
<td>A number of the waste streams produced by the proposal would have</td>
<td></td>
</tr>
<tr>
<td>specific controls and handling requirements. Equally some of the</td>
<td></td>
</tr>
<tr>
<td>volumes of waste could be quite large. Nevertheless, established</td>
<td></td>
</tr>
<tr>
<td>controls and procedures for storing, transporting and disposing of</td>
<td></td>
</tr>
<tr>
<td>waste are established to manage potential risks.</td>
<td></td>
</tr>
<tr>
<td>After completion of the works, no impacts related to waste are</td>
<td></td>
</tr>
<tr>
<td>expected.</td>
<td></td>
</tr>
<tr>
<td>Further detail relating to the management and disposal of waste at the</td>
<td></td>
</tr>
<tr>
<td>Site is provided in section 6.3.</td>
<td></td>
</tr>
<tr>
<td>n. Any increased demands on resources (natural or otherwise) that</td>
<td>Proposal and finished site: Neutral impact</td>
</tr>
<tr>
<td>are, or are likely to become, in short supply</td>
<td></td>
</tr>
<tr>
<td>The relatively small amounts of resources required for the proposal</td>
<td></td>
</tr>
<tr>
<td>and the finished site are unlikely to put excessive stress on local</td>
<td></td>
</tr>
<tr>
<td>supply or cause supply or service problems for the local community.</td>
<td></td>
</tr>
<tr>
<td>Further detail relating to resource management at the Site is provided</td>
<td></td>
</tr>
<tr>
<td>in section 6.3.</td>
<td></td>
</tr>
<tr>
<td>o. Any cumulative environmental effect with other existing or likely</td>
<td>Proposal: Non-significant, short term, negative impact</td>
</tr>
<tr>
<td>future activities?</td>
<td>Finished site: Neutral impact</td>
</tr>
<tr>
<td>The site management works could potentially have a cumulative noise</td>
<td></td>
</tr>
<tr>
<td>or traffic effect with the Central Business District (CBD) and South</td>
<td></td>
</tr>
<tr>
<td>East Light Rail Project (CSELR) which is located to the west of the</td>
<td></td>
</tr>
<tr>
<td>Site; however this effect is unlikely to be significant. A mitigation</td>
<td></td>
</tr>
<tr>
<td>measure has been recommended which requests that the contractor and</td>
<td></td>
</tr>
<tr>
<td>the contractor in charge of the CSELR project communicate on a regular</td>
<td></td>
</tr>
<tr>
<td>basis to help ensure that works do not result in cumulative effects.</td>
<td></td>
</tr>
<tr>
<td>Cumulative effects resulting from other developments being carried out</td>
<td></td>
</tr>
<tr>
<td>in vicinity of the Site are also unlikely to be significant.</td>
<td></td>
</tr>
<tr>
<td>After completion of the works, no cumulative effects are expected.</td>
<td></td>
</tr>
<tr>
<td>Cumulative effects are assessed in further detail in section 6.13.</td>
<td></td>
</tr>
<tr>
<td>p. Any impact on coastal processes and coastal hazards, including</td>
<td>Nil</td>
</tr>
<tr>
<td>those under projected climate change conditions?</td>
<td></td>
</tr>
<tr>
<td>The proposal would not impact on coastal processes or increase coastal</td>
<td></td>
</tr>
<tr>
<td>hazards.</td>
<td></td>
</tr>
</tbody>
</table>
Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to help in determining whether the proposal should be referred to the Australian Government Department of the Environment and Energy.

A referral is not required for proposed actions that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. Impacts on these matters are still assessed as part of the REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Any impact on a World Heritage property?</td>
<td>Nil</td>
</tr>
<tr>
<td>There are no World Heritage properties in the area.</td>
<td></td>
</tr>
<tr>
<td>b. Any impact on a National Heritage place?</td>
<td>Nil</td>
</tr>
<tr>
<td>There are no National Heritage Places in the area.</td>
<td></td>
</tr>
<tr>
<td>c. Any impact on a wetland of international importance?</td>
<td>Nil</td>
</tr>
<tr>
<td>There are no wetlands of international importance in the area.</td>
<td></td>
</tr>
<tr>
<td>d. Any impact on a listed threatened species or communities?</td>
<td>Not significant</td>
</tr>
<tr>
<td>The relevant MNES for the proposal include listed threatened species,</td>
<td></td>
</tr>
<tr>
<td>namely the Grey-headed Flying-fox which likely forages at the Site on</td>
<td></td>
</tr>
<tr>
<td>occasion and the Green and Golden Bell Frog which is highly unlikely</td>
<td></td>
</tr>
<tr>
<td>to occur at the Site. EPBC Assessments of Significance have been</td>
<td></td>
</tr>
<tr>
<td>completed for both these species (refer to Appendix F) and both</td>
<td></td>
</tr>
<tr>
<td>assessments have concluded that the proposed works are not considered</td>
<td></td>
</tr>
<tr>
<td>likely to have a significant impact on these species.</td>
<td></td>
</tr>
<tr>
<td>e. Any impacts on listed migratory species?</td>
<td>Nil</td>
</tr>
<tr>
<td>Ten migratory species were identified within the study area. None would</td>
<td></td>
</tr>
<tr>
<td>be impacted by the proposal.</td>
<td></td>
</tr>
<tr>
<td>f. Any impact on a Commonwealth marine area?</td>
<td>Nil</td>
</tr>
<tr>
<td>No Commonwealth marine area occurs in the area.</td>
<td></td>
</tr>
<tr>
<td>g. Does the proposal involve a nuclear action (including uranium mining)?</td>
<td>Nil</td>
</tr>
<tr>
<td>No.</td>
<td></td>
</tr>
<tr>
<td>Additionally, any impact (direct or indirect) on Commonwealth land?</td>
<td>Nil</td>
</tr>
<tr>
<td>No impact on Commonwealth land.</td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Potential impact</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Stormwater</td>
<td>Are the works likely to have a substantial impact on the stormwater management services which are provided by council?</td>
</tr>
<tr>
<td>Traffic</td>
<td>Are the works likely to generate traffic to an extent that will strain the existing road system in a local government area?</td>
</tr>
<tr>
<td>Sewerage system</td>
<td>Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of any part of the system?</td>
</tr>
<tr>
<td>Water usage</td>
<td>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?</td>
</tr>
<tr>
<td>Temporary structures</td>
<td>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?</td>
</tr>
<tr>
<td>Road &amp; footpath excavation</td>
<td>Will the works involve more than minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?</td>
</tr>
</tbody>
</table>
### Local heritage items

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential impact</th>
<th>Yes/No</th>
<th>If ‘yes’ consult with</th>
<th>ISEPP clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local heritage</td>
<td>Is there is 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 <em>minor</em> or <em>inconsequential</em>?</td>
<td>No</td>
<td>N/A</td>
<td>ISEPP cl.14</td>
</tr>
</tbody>
</table>

### Flood liable land

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential impact</th>
<th>Yes/No</th>
<th>If ‘yes’ consult with</th>
<th>ISEPP clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood liable land</td>
<td>Are the works located on flood liable land? If so, will the works change flood patterns to more than a <em>minor</em> extent?</td>
<td>Works on flood liable land; however the works would not change flood patterns to more than a minor extent</td>
<td>N/A</td>
<td>ISEPP cl.15</td>
</tr>
</tbody>
</table>

### Public authorities other than councils

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential impact</th>
<th>Yes/No</th>
<th>If ‘yes’ consult with</th>
<th>ISEPP clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>National parks and reserves</td>
<td>Are the works adjacent to a national park or nature reserve, or other area reserved under the <em>National Parks and Wildlife Act 1974</em>?</td>
<td>No</td>
<td>N/A</td>
<td>ISEPP cl.16(2)(a)</td>
</tr>
<tr>
<td>Marine parks</td>
<td>Are the works adjacent to a declared marine park under the <em>Marine Parks Act 1997</em>?</td>
<td>No</td>
<td>N/A</td>
<td>ISEPP cl.16(2)(b)</td>
</tr>
<tr>
<td>Aquatic reserves</td>
<td>Are the works adjacent to a declared aquatic reserve under the <em>Fisheries Management Act 1994</em>?</td>
<td>No</td>
<td>N/A</td>
<td>ISEPP cl.16(2)(c)</td>
</tr>
<tr>
<td>Sydney Harbour foreshore</td>
<td>Are the works in the Sydney Harbour Foreshore Area as defined by the <em>Sydney Harbour Foreshore Authority Act 1998</em>?</td>
<td>Yes</td>
<td>Property NSW (Sydney Harbour Foreshore Authority) 18</td>
<td>ISEPP cl.16(2)(d)</td>
</tr>
</tbody>
</table>

---

18 The Sydney Harbour Foreshore Authority functions have been consolidated with Government Property NSW under the new name Property NSW.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential impact</th>
<th>Yes/No</th>
<th>If ‘yes’ consult with</th>
<th>ISEPP clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush fire prone land</td>
<td>Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?</td>
<td>No</td>
<td>N/A</td>
<td>ISEPP cl.16(2)(f)</td>
</tr>
</tbody>
</table>