



**Transport  
for NSW**

# **Rooty Hill Station Upgrade and Commuter Car Park Review of Environmental Factors**

**Transport Access Program  
Ref – 5,894,749**

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## Abbreviations

| Term                       | Meaning  |
|----------------------------|--|
| <b>AHIMS</b>               | Aboriginal Heritage Information Management System                            |
| <b>ASA</b>                 | Asset Standards Authority (refer to Definitions)                             |
| <b>ASS</b>                 | Acid Sulfate Soils   |
| <b>BCA</b>                 | Building Code of Australia   |
| <b>BTS</b>                 | Bureau of Transport Statistics   |
| <b>CBD</b>                 | Central Business District  |
| <b>CCTV</b>                | Closed Circuit TV  |
| <b>CEMP</b>                | Construction Environmental Management Plan                                   |
| <b>CLM Act</b>             | <i>Contaminated Land Management Act 1997 (NSW)</i>                           |
| <b>CNVMP</b>               | Construction Noise and Vibration Management Plan                             |
| <b>CPTED</b>               | Crime Prevention Through Environmental Design                                |
| <b>DBH</b>                 | Diameter Breast Height   |
| <b>DDA</b>                 | <i>Disability Discrimination Act 1992 (Cwlth)</i>                            |
| <b>DoE</b>                 | Commonwealth Department of the Environment                                   |
| <b>DP&amp;E</b>            | NSW Department of Planning and Environment                                   |
| <b>DSAPT</b>               | <i>Disability Standards for Accessible Public Transport (2002)</i>           |
| <b>DSI</b>                 | Detailed Site Investigation (Phase II Contamination Investigation)           |
| <b>ECM</b>                 | Environmental Controls Map   |
| <b>EMS</b>                 | Environmental Management System  |
| <b>EPA</b>                 | Environment Protection Authority   |
| <b>EP&amp;A Act</b>        | <i>Environmental Planning and Assessment Act 1979 (NSW)</i>                  |
| <b>EP&amp;A Regulation</b> | <i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>           |
| <b>EPBC Act</b>            | <i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i> |
| <b>EPI</b>                 | Environmental Planning Instrument  |
| <b>EPL</b>                 | Environment Protection Licence   |
| <b>ESD</b>                 | Ecologically Sustainable Development (refer to Definitions)                  |

| Term                       | Meaning   |
|----------------------------|---|
| <b>ETS</b>                 | Electronic Ticketing System   |
| <b>FM Act</b>              | <i>Fisheries Management Act 1994 (NSW)</i>  |
| <b>Heritage Act</b>        | <i>Heritage Act 1977 (NSW)</i>  |
| <b>HV</b>                  | High Voltage  |
| <b>ICNG</b>                | <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2000). |
| <b>Infrastructure SEPP</b> | <i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>                            |
| <b>LEP</b>                 | Local Environmental Plan  |
| <b>LGA</b>                 | Local Government Area   |
| <b>NES</b>                 | National Environmental Significance   |
| <b>Noxious Weeds Act</b>   | <i>Noxious Weeds Act 1993 (NSW)</i>   |
| <b>NPW Act</b>             | <i>National Parks and Wildlife Act 1974 (NSW)</i>   |
| <b>NSW</b>                 | New South Wales   |
| <b>OEH</b>                 | NSW Office of the Environment and Heritage  |
| <b>OHWS</b>                | Overhead Wiring Structure   |
| <b>OOHW</b>                | Out of hours works  |
| <b>PDP</b>                 | Public Domain Plan  |
| <b>POEO Act</b>            | <i>Protection of the Environment Operations Act 1997 (NSW)</i>                                    |
| <b>PMF</b>                 | Probable Maximum Flood  |
| <b>RailCorp</b>            | (former) Rail Corporation of NSW  |
| <b>RAP</b>                 | Remediation Action Plan   |
| <b>RBL</b>                 | Rating Background Level   |
| <b>REF</b>                 | Review of Environmental Factors (this document)   |
| <b>Roads Act</b>           | <i>Roads Act 1993 (NSW)</i>   |
| <b>Roads and Maritime</b>  | NSW Roads and Maritime Services (formerly Roads and Traffic Authority)                            |
| <b>SEPP</b>                | State Environmental Planning Policy   |
| <b>SHI</b>                 | State Heritage Inventory  |
| <b>SHR</b>                 | State Heritage Register   |

| Term              | Meaning   |
|-------------------|---|
| <b>SoHI</b>       | Statement of Heritage Impact                                |
| <b>TCP</b>        | Traffic Control Plan  |
| <b>TfNSW</b>      | Transport for NSW   |
| <b>TMP</b>        | Traffic Management Plan                                     |
| <b>TPZ</b>        | Tree Protection Zone  |
| <b>TSC Act</b>    | <i>Threatened Species Conservation Act 1995 (NSW)</i>       |
| <b>TT&amp;AIA</b> | Traffic, Transport and Access Impact Assessment             |
| <b>TVM</b>        | Ticket Vending Machine                                      |
| <b>UDP</b>        | Urban Design Plan   |
| <b>WARR Act</b>   | <i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i> |

# Definitions

| Term  | Meaning   |
|---|---|
| <b>Average Recurrence Interval</b>                          | The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as the 100-year ARI flood will occur on average once every 100-years.  |
| <b>Asset Standards Authority</b>                            | The ASA is an independent body within TfNSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets.<br><br>Design Authority functions formerly performed by RailCorp are now exercised by ASA.  |
| <b>Concept design</b>                                       | The concept design is the preliminary design presented in this REF, which would be refined by the construction contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).  |
| <b>Design and Construct Contract</b>                        | A method to deliver a project in which the design and construction services are contracted by a single entity known as the construction contractor. The construction contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to TfNSW acceptance). The construction contractor is therefore responsible for all work on the project, both design and construction. |
| <b>Detailed design</b>                                      | Detailed design broadly refers to the process that the construction contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).   |
| <b>Disability Standards for Accessible Public Transport</b> | The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> ("Transport Standards") (as amended), authorised under the Commonwealth <i>Disability Discrimination Act 1992</i> (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.                                 |
| <b>Ecologically Sustainable Development</b>                 | As defined by clause 7(4) Schedule 2 of the EP&A Regulation.<br><br>Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.   |
| <b>Feasible</b>   | A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.  |

| Term                            | Meaning   |
|---------------------------------|---|
| <b>Interchange</b>              | Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.   |
| <b>Noise sensitive receiver</b> | In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches). |
| <b>Opal</b>                     | The integrated ticketing system in use for all NSW public transport services.   |
| <b>Out of hours works</b>       | Defined as works <i>outside</i> standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).  |
| <b>Probable Maximum Flood</b>   | The probable maximum flood is the largest flood that could conceivably occur within a particular catchment, and is a very rare and unlikely event.  |
| <b>Proponent</b>                | A person or body proposing to carry out an activity under Part 5 of the EP&A Act - in this instance, TfNSW.   |
| <b>Rail Possession</b>          | A Rail Possession is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.  |
| <b>Reasonable</b>               | Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.   |
| <b>Sensitive receivers</b>      | Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.   |
| <b>Sydney Trains</b>            | From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.  |
| <b>Tactiles</b>                 | Tactile tiles or Tactile Ground Surface Indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.   |
| <b>The Proposal</b>             | The construction and operation of the Rooty Hill Station Upgrade and Commuter Car Park.   |

| Term                           | Meaning  |
|--------------------------------|--|
| <b>Vegetation Offset Guide</b> | <p>The TfNSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 111 of the EP&amp;A Act.</p> <p>The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.</p> |
| <b>Wayfinding</b>              | <p>New signage provides consistent and easy-to-follow visual messages to make public transport easier for customers to use, particularly when changing modes and taking unfamiliar journeys.</p>   |

# Executive summary

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## Overview

Transport for NSW (TfNSW) is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Rooty Hill Station Upgrade and Commuter Car Park (the Proposal).

The Proposal is part of the Transport Access Program (TAP), a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

## Description of the Proposal

The Proposal is located in the suburb of Rooty Hill, New South Wales approximately 40 kilometres west of the Sydney Central Business District (CBD). The Proposal involves upgrades to the station infrastructure, including the northern and southern interchange facilities (the Station Upgrade) and construction of a commuter car park on the northern side of the station between the rail corridor and the adjacent Blacktown City Council depot (the Commuter Car Park).

The key features of the Proposal are summarised as follows:

### Station Upgrade

- installation of new lifts at station entrances and platforms
- improvements to the accessible pathways between station entrance and platform
- improvements to the accessible pathways between station entrance and surrounding streets / interchange facilities
- installation of a family accessible toilet and ambulant cubicles in male and female toilets within the existing station platform buildings
- installation of new signage to improve wayfinding
- provision of 20 undercover bicycle racks across the northern and southern side of the station interchange areas
- provision of additional kiss and ride spaces for commuters at the northern and southern side of the station interchanges areas
- ancillary works, including services diversion and/or relocation, minor drainage works, adjustments to lighting, installation of handrails and balustrades, improvements to station communication systems with new infrastructure (including additional CCTV cameras).

### Commuter Car Park

- provision of a four level, multi-storey commuter car park on the northern boundary of the rail corridor with parking for approximately 500 vehicles (an addition of approximately 300 spaces). The commuter car park would be serviced by a lift and stairs to provide access between parking levels, and also include an accessible path to the northern interchange of the station



- ancillary works, including services diversion and/or relocation, minor drainage works, installation of lighting, installation of handrails and balustrades, with new infrastructure (including CCTV cameras)
- new landscaping along Station Street.

Subject to approval, construction is expected to commence in early 2018 with the Station Upgrade estimated to be completed in 2020, while the Commuter Car Park is estimated to be completed in 2019. A detailed description of the Proposal is provided in Chapter 3 of this REF.

## Need for the Proposal

Improving transport customer experience is the focus of the NSW Government transport initiatives. Transport interchanges, train stations and commuter car parks are important gateways to the transport system and as such play a critical role in shaping the customer experience and perception of public transport.

The proposed upgrades are designed to drive a stronger customer experience outcome, to deliver improved travel to and between modes, encourage greater public transport use and better integrate interchanges with the role and function of town centres. The Proposal would also assist in responding to forecasted growth in the region and as such would support growth in commercial and residential development.

Rooty Hill Station is currently not compliant with the requirements of *Disability Standards for Accessible Public Transport (2002)* (DSAPT) and the existing platforms are only accessible via stairs thus it does not provide suitable access for people with disabilities, with limited mobility and parents with prams.

The Proposal fulfils the NSW Government's TAP objectives by seeking to provide:

- a station precinct that is accessible to those with a disability, limited mobility, the ageing and parents/carers with prams and customers with luggage
- modern buildings and facilities for all modes of transport that meet the needs of a growing population
- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- improved access across the rail corridor, and pedestrian links between the surrounding road network, public transport facilities and private vehicle parking facilities
- safety improvements including additional lighting, help points, fences and security measures for the station, interchanges and car parks
- improved customer experience and amenity (weather protection, better interchange facilities and visual appearance)
- improved wayfinding in and around the station achieve signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- improvements and maintenance such as painting, new fencing and roof replacements.

In September 2015, the NSW Government announced a series of State Priorities as part of *NSW: Making It Happen* (NSW Government, 2015). One of the 12 priorities identified as part of *NSW: Making It Happen* relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.

The Proposal assists in meeting the priority by improving accessibility to public transport and encouraging greater use of public transport.

The Proposal would also ensure that Rooty Hill Station and Commuter Car Park would meet legislative requirements under DSAPT.

## **Design options considered**

AECOM were engaged by TfNSW in 2015 to prepare a Concept Design Report for the Rooty Hill Station Upgrade and the Commuter Car Park. The development of the Concept Design Report included identification and evaluation of a number of potential options for the Station Upgrade and Commuter Car Park as described below.

### Station Upgrade

Four initial design options were developed by the AECOM design team as follows:

- Option A – This option involves the retention of the existing footbridge, ramps and stairs and widening of a section of the footbridge to provide ticketing and passenger information facilities. The option also includes the provision of four new lifts, and improvements to interchange facilities on both the northern and southern sides of the station
- Option B – This option involves the demolition of the existing footbridge, ramps and stairs and provision of a new footbridge and overhead station concourse in the same location. The option also includes the provision of four new lifts and improvements to interchange facilities on the northern and southern sides of the station
- Option C – This option involves the demolition of the existing footbridge, ramps and stairs, and provision of a new footbridge, overhead station concourse and stairs in a new location to the east of the existing footbridge. The option also includes the provision of four new lifts with accessible paths and improvements to interchange facilities on the northern and southern sides of the station
- Option D - 'do-nothing' option.

### Commuter Car Park

Four options were similarly developed by AECOM for the provision of additional commuter parking, as follows:

- Option 1 – This option would provide a multi-storey car park located on vacant NSW State Government owned land approximately 250m south east of the station, between the rail corridor and Mavis Street
- Option 2 – This option would provide a multi-storey car park located on the existing commuter car park, east of Station Street approximately 80m north east of the station, between the rail corridor and the Blacktown City Council Depot
- Option 3 – This option would provide a multi-storey car park located on the existing commuter car park off Station Street approximately 50m north of the station, between Station Street and Rooty Hill Road North.
- The 'do-nothing' option.

The respective design options for the Station Upgrade and Commuter Car Park were subsequently evaluated as part of a series of workshops with TfNSW, relevant stakeholders and the AECOM design team.

The design options were assessed in a multi-criteria analysis that included consideration of factors such as customer experience, accessibility, engineering constraints, modal integration and value for money to select a preferred option.

Option C for the Station Upgrade component achieved the highest overall score in the multi-criteria analysis and was selected as the preferred option to be progressed as part of the Accessibility Upgrade component of the project.

Option 3 for the Commuter Car Park component for the Rooty Hill Station Precinct was selected as the preferred option based on the outcome of the multi-criteria analysis. Option 3 received the best score, scoring the highest in customer experience, accessibility, urban form and land-use integration, engineering constraints and facility operation and maintenance.

These preferred options for the respective Station Upgrade and Commuter Car Park components of the proposal would help to provide for future station access and parking demands with less community impact. These options were chosen in part as they do not involve a significant change in land use and present fewer constructability issues. The multi-criteria analysis process and detailed results are available for review in the AECOM (2015) Concept Design Report for the Rooty Hill Station Upgrade and the Commuter Car Park.

## **Statutory considerations**

The EP&A Act provides for the environmental impact assessment of development in NSW. Part 5 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under the EP&A Act.

The *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development and is the key environmental planning instrument which determines that this Proposal is permissible without consent and therefore is to be assessed under Part 5 of the EP&A Act.

Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land. Clause 78 defines 'rail infrastructure facilities' as including elements such as 'railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms', 'public amenities for commuters' and 'associated public transport facilities for railway stations'.

As TfNSW is a public authority and the proposed activity falls within the definition of rail infrastructure facilities under the Infrastructure SEPP, the Proposal is permissible without consent. Consequently, the environmental impacts of the Proposal have been assessed by TfNSW under Part 5 of the EP&A Act.

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

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

Chapter 6 of this REF presents the environmental impact assessment for Rooty Hill Station Upgrade and Commuter Car Park, in accordance with these requirements.

## **Community and stakeholder consultation**

Figure 1 presents an overview of the consultation and planning process and the current status of the Proposal.



**Figure 1 Planning approval and consultation process for the Proposal.**

The REF will be placed on public display for a period of approximately two weeks. During this period the REF would also be available for viewing at the following locations:

- Blacktown City Council Customer Service Centre, 62 Flushcombe Road, Blacktown
- Blacktown City Council Library at the Mount Druitt Hub, Ayres Grove, Mt Druitt
- Transport for NSW Office, Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood.

Community consultation activities for the Proposal would be undertaken during the public display period of this REF and would include the following:

- direct notification to community stakeholders including businesses and residences within 500 metres of the Station precinct
- two pop up stalls at Rooty Hill Station to invite feedback from commuters and locals and to provide opportunity to ask questions of the project team
- provision of information sent via project web page found at <https://yoursay.transport.nsw.gov.au/rootyhill>
- email notification to key stakeholder groups
- advertisements in local newspapers.

The REF would also be available to download from the [TfNSW website](http://www.transport.nsw.gov.au/projects-tap)<sup>1</sup> and the [yoursay page](http://yoursay.transport.nsw.gov.au/rootyhill)<sup>2</sup>. Enquiries by members of the public can be made via the Project Infoline (1800 684 490) or email address – [projects@transport.nsw.gov.au](mailto:projects@transport.nsw.gov.au). TfNSW would review and assess all feedback received during the public display period, prior to determining whether or not to proceed with the Proposal.

Further information about these specific activities is included in Chapter 5 of this REF.

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period.

## Environmental impact assessment

This REF identifies the potential environmental benefits and impacts of the Proposal and outlines the mitigation measures to reduce the identified impacts.

The following key impacts have been identified should the Proposal proceed:

- temporary amenity impacts during construction including loss of parking, increased noise and vibration impacts to surrounding receivers during construction, potential reduction in air quality and visual impacts
- temporary loss of parking during construction of the multi-storey car park
- removal of existing non-compliant ramps
- minor delays on the local road network during construction
- temporary changes to access arrangements (including pedestrian diversions) during construction
- removal of vegetation
- a minor increase in local traffic movements
- longer term benefits of the Proposal include provision of additional commuter parking spaces, improved accessibility to the station and improved interchange facilities.

Further information regarding these impacts is provided in Chapter 6 of the REF.

## Conclusion

This REF has been prepared having regard to sections 111 and 112 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The detailed design of the Proposal would also be undertaken in accordance with the *Infrastructure Sustainability Rating Scheme (v1.2)* taking into account the principles of Ecologically Sustainable Development (ESD).

Should the Proposal proceed, any potential associated adverse impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF, and the Conditions of Approval imposed in the Determination Report. This would ensure the Proposal is delivered to maximise benefit to the community and minimise any adverse impacts on the environment.

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<sup>1</sup> <http://www.transport.nsw.gov.au/projects-tap>

<sup>2</sup> <http://yoursay.transport.nsw.gov.au/rootyhill>

In considering the overall potential impacts and proposed mitigation measures outlined in this REF, the Proposal is unlikely to significantly affect the environment including critical habitat or threatened species, populations, ecological communities or their habitats.



# 1 Introduction

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Transport for NSW (TfNSW) was established in 2011 as the lead agency for integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Rooty Hill Station Upgrade and Commuter Car Park (the Proposal), to be delivered by the Infrastructure and Services Division.

## 1.1 Overview of the Proposal

### 1.1.1 The need for the Proposal

The NSW Government is committed to facilitating and encouraging the use of public transport, such as trains, by making stations more accessible, providing and upgrading car parks, and improving interchanges around stations with other modes of transport such as cars and bicycles.

Rooty Hill Station is currently the 92<sup>nd</sup> busiest railway station in the Sydney Trains network with approximately 5,520 customer trips recorded at the station on an average weekday (Bureau Transport Statistics, 2014). This is predicted to increase to 7,860 trips per day by 2036. This represents an increase of approximately 42% with consequent increases in the demand for on-street and off-street commuter parking.

The existing station layout does not meet the *Disability Standards for Accessible Public Transport 2002* (DSAPT) or *Disability Discrimination Act 1992* (DDA) requirements and therefore does not currently allow for equitable access to the station platforms. Existing ramps leading to the footbridge are steep, and stairs are the only method of gaining access to the platform from the footbridge.

The Proposal has been planned to assist in addressing current and future customer demand at Rooty Hill Station through the provision of improved infrastructure and facilities to meet the requirements of the DDA and DSAPT and to increase the number of commuter car parking to approximately 500 parking spaces (around 300 additional spaces).

Rooty Hill Station was identified for upgrade as part of the Transport Access Program (TAP) to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

The Proposal fulfils the objectives of the NSW Government's Transport Access Program through the provision of:

- a station precinct that is accessible to those with a disability, limited mobility, the ageing and parents/carers with prams and customers with luggage
- modern buildings and facilities for all modes of transport that meet the needs of a growing population
- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- improved access across the rail corridor, and pedestrian links between the surrounding road network, public transport facilities and private vehicle parking facilities
- safety improvements including additional lighting, help points, fences and security measures for the station, interchanges and car parks
- improved customer experience and amenity (weather protection, better interchange facilities and visual appearance)

- improved wayfinding in and around the station achieve signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- improvements and maintenance such as painting, new fencing and roof replacements.

### **1.1.2 Key features of the Proposal**

The Proposal involves upgrades to the northern and southern station interchange facilities for the Station Upgrade and construction of a multi-storey commuter car park on the site of the existing at-grade car park on the northern side of the station between the rail corridor and the Blacktown City Council depot on Station Street.

The key features and provisions of the Proposal are summarised below:

#### **Station Upgrade**

- installation of new lifts at station entrances and platforms
- improvements to the accessible pathways between station entrance and platform
- improvements to the accessible pathways between station entrance and surrounding streets / interchange facilities
- installation of family accessible toilet and ambulant cubicles in male and female toilets within the existing station platform buildings
- installation of new signage to improve wayfinding
- provision of 20 undercover bicycle racks across the northern and southern side of the station interchange areas
- provision of additional kiss and ride spaces for commuters at the northern and southern station entrances
- ancillary works, including services diversion and/or relocation, minor drainage works, adjustments to lighting, installation of handrails and balustrades, improvements to station communication systems with new infrastructure (including additional CCTV cameras).

#### **Commuter Car Park**

- provision of a multi-storey commuter car park (four levels) on the northern boundary of the rail corridor with parking for approximately 500 vehicles (an addition of approximately 300 spaces). The commuter car park would be serviced by a lift and stairs to provide access between parking levels and also include a new accessible path to the northern interchange of the station
- ancillary works, including services diversion and/or relocation, minor drainage works, installation of lighting, installation of handrails and balustrades, with new infrastructure (including CCTV cameras).
- new landscaping along Station Street.

Subject to approval, construction is expected to commence in early 2018 with the Station Upgrade estimated to be completed in 2020, while the Commuter Car Park is estimated to be completed in 2019.

A detailed description of the Proposal is provided in Chapter 3 of this Review of Environmental Factors (REF).



## 1.2 Location of the Proposal

The Proposal is located in the suburb of Rooty Hill, New South Wales approximately 40 kilometres west of the Sydney Central Business District (CBD) within the Blacktown City Council Local Government Area (LGA). The location of the Proposal is shown in Figure 2. The railway station is located on the T1 Western Line and provides services to Western Sydney and the Sydney CBD.

Key features of the study area are shown in Figure 3.

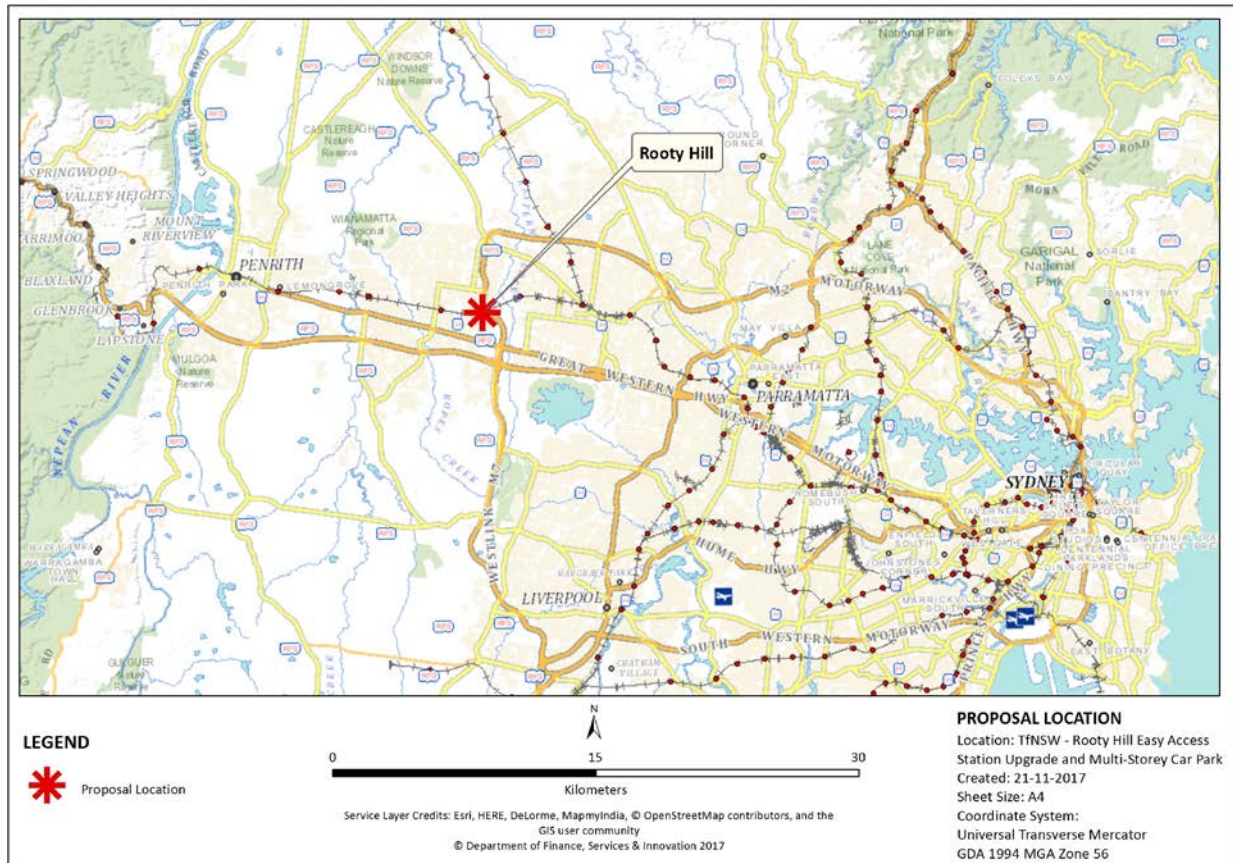
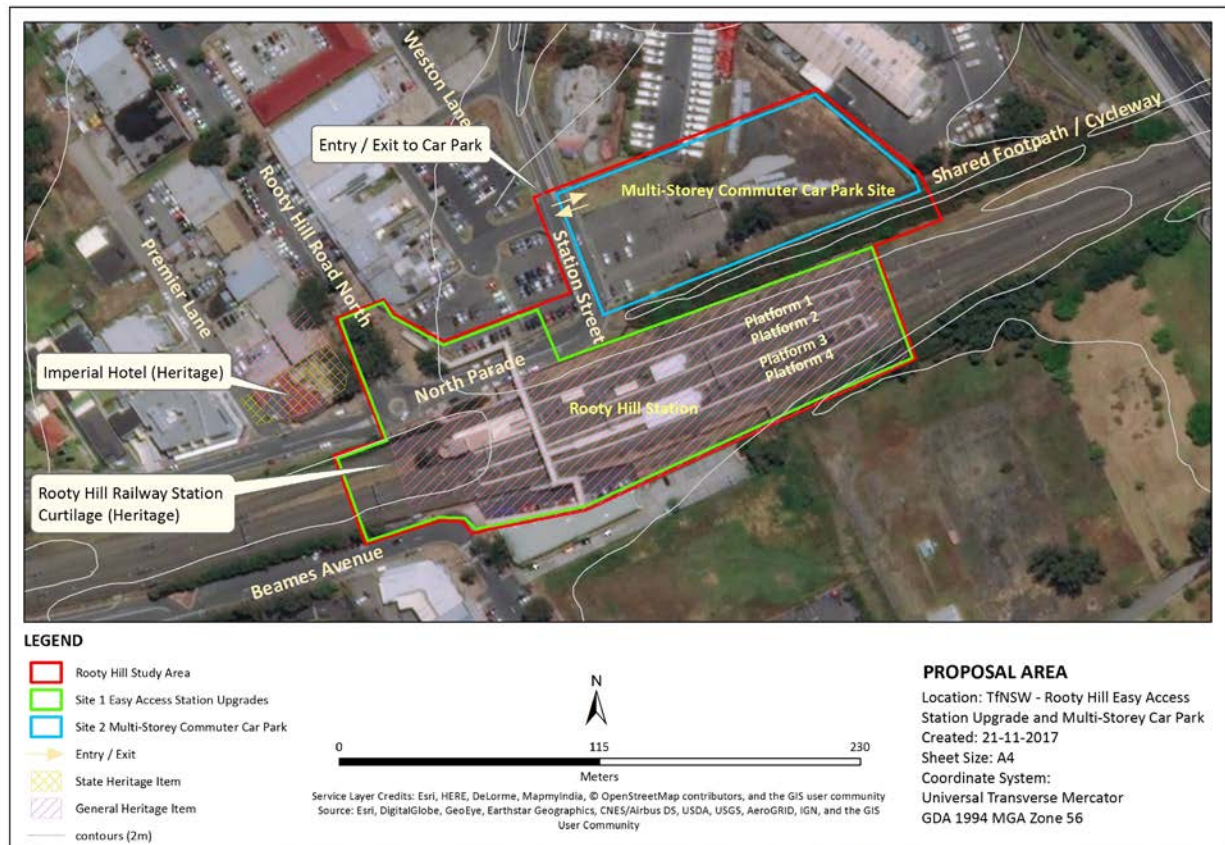


Figure 2 Regional Context Map



**Figure 3 Site Locality Map**

The Station Upgrade component of the Proposal spans several land parcels as follows:

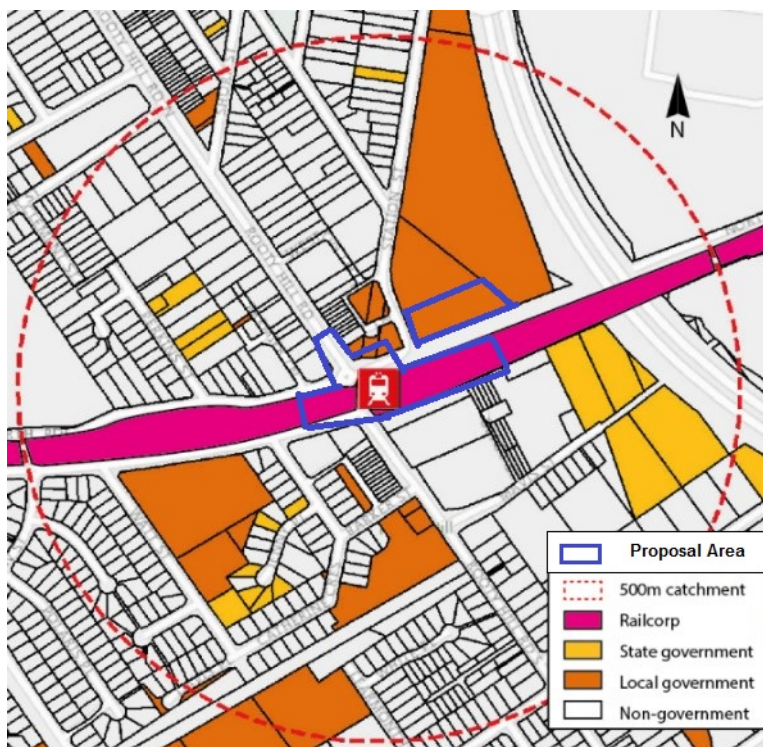
- the existing rail corridor (Lot 90 DP 1208183) (owned by RailCorp)
- Beames Avenue road corridor on the Southern side of the Proposal area as detailed in Appendix C (owned by Blacktown City Council)
- North Parade road corridor on the Northern side of the Proposal area as detailed in Appendix C (owned by Blacktown City Council)
- a section of the commuter car park beneath the existing pedestrian access ramp on the northern side of the Proposal area (Lot 34 DP 237180) (owned by Blacktown City Council).

The Commuter Car Park component of the Proposal is similarly located across multiple parcels, including:

- the existing Blacktown City Council commuter car park bordered by Station Street to the west, the rail corridor to the south, and the skate park and Blacktown City Council depot to the north (Lot 2 DP 1046244)
- the existing shared cycleway and pedestrian pathway between the open air vegetated stormwater drain and the existing Blacktown City Council commuter car park (owned by RailCorp).

Details of land ownership surrounding the Rooty Hill Station are illustrated in Figure 4.





**Figure 4 Land Ownership Surrounding Rooty Hill Station (courtesy: AECOM 2015)**

### 1.3 Existing infrastructure and land uses

The key features of the existing infrastructure and land uses within and surrounding the Proposal area are described below. Refer to Section 4.4 for additional information.

Key existing land uses of the Proposal and surrounds are as follows:

- The Imperial Hotel is located approximately 30 metres to the north west of the station, on the corner of North Parade and Rooty Hill Road North
- the land adjoining the southern side of the rail corridor is zoned R4 (High Density Residential) and B2 (Local Centre) under the *Blacktown Local Environmental Plan 2015* (Blacktown LEP)
- a Blacktown City Council depot is located to the north east of the station
- an existing retail centre is located immediately to the north (along Rooty Hill Road North)
- there are three existing at grade commuter car parks (two on the north, one to the south) with approximately 200 spaces (collectively)
- pedestrian access is via existing pedestrian footpaths to the north and south of the station
- an existing unsealed pedestrian and cycle access way connects to the south-eastern corner of the north-eastern car park.

Photographs of the study area are provided in Figure 5 to Figure 12.



**Figure 5 View from the southern entrance to the existing southern interchange car park looking west along Beames Avenue**



**Figure 6 View from the Station entrance to the existing southern interchange car park looking east from Beames Avenue**





**Figure 7 View looking east along Station Platform 1/2 and Platform 3/4 from the existing pedestrian footbridge**



**Figure 8 View looking south-east from North Parade across to existing pedestrian crossing and northern interchange**



**Figure 9 View from Station Platform 1/2 looking north-west to existing North Parade pedestrian crossing and pedestrian footpaths**



**Figure 10 View from the southern corner of the northern interchange commuter car park towards Rooty Hill Station and corner of Station Street**





**Figure 11 View from Station Street to existing northern interchange commuter car park**



**Figure 12 View from the corner of Station Street and North Parade looking east along the alignment of the overhead wires, street lighting and open air stormwater drainage system.**

## 1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the Rooty Hill Station Upgrade and Commuter Car Park. For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of section 111 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (the EP&A Regulation).

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Biodiversity Conservation Act 2016* (BC Act), *Fisheries Management Act 1994* (FM Act) and the *Roads Act 1993* (Roads Act).

Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to have a significant impact on matters of National Environmental Significance (NES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of Environment for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.



## 2 Need for the Proposal

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Chapter 2 discusses the need and objectives of the Proposal, having regard to the objectives of the Transport Access Program and the specific objectives of the Proposal. This chapter also provides a summary of the options that have been considered during development of the Proposal and why the preferred option has been chosen.

### 2.1 Strategic justification

#### 2.1.1 Overview

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport interchanges and train stations are the important gateways to the transport system and as such play a critical role in shaping the customer's experience and perception of public transport.

The Rooty Hill Station Upgrade and Commuter Car Park, the subject of this REF, forms part of the Transport Access Program. This program is designed to drive a stronger customer experience outcome to deliver seamless travel to and between modes, encourage greater public transport use and better integrate station interchanges with the role and function of town centres within the metropolitan area and developing urban centres in regional areas of NSW.

In September 2015, the NSW Government announced a series of State Priorities as part of *NSW: Making It Happen* (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. *NSW: Making it Happen* focuses on 12 key 'priorities' to achieve the NSW Government's commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services.

One of the 12 priorities identified as part of *NSW: Making It Happen* relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.

The Proposal assists in meeting the priority by improving accessibility to public transport and encouraging greater use of public transport.

The NSW Government has developed a Draft Future Transport Strategy which is a vision for how transport can support growth and the economy of NSW over the next 40 years. This strategy is underpinned by the *Draft Regional Services and Infrastructure Plan* and the *Draft Greater Sydney Services and Infrastructure Plan* as well as a number of supporting plans including Road Safety and Tourism.

One of the six outcomes for the State as outlined in the plan is Accessible Services.

Data forecasts indicate that there would be significant growth in population and employment from 2006 up to 2036 in the area within the station catchment. The Proposal accommodates the forecast Sydney Trains patronage growth (inclusive of a 15 per cent contingency) and changing travel patterns.

The *Disability Action Plan 2012-2017* (TfNSW, 2012b) was developed by TfNSW, in consultation with the Accessible Transport Advisory Committee, which is made up of representatives from peak disability and ageing organisations within NSW. The Plan discusses the challenges, the achievements to date, and the considerable undertaking that is required to finish the job and provide a solid and practical foundation for future progress over the next five years. The Proposal has been developed in consideration of the objectives outlined in this Plan.

Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal. Further details of the application of NSW Government policies and strategies are discussed in Section 4.5 of this REF.

### **2.1.2 Objectives of the Transport Access Program**

The Transport Access Program is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. The program aims to provide:

- stations that are accessible to those with a disability, the ageing and parents/carers with prams
- modern buildings and facilities for all modes of transport that meet the needs of a growing population
- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- safety improvements including extra lighting, lift alarm, fences and security measures for car parks and interchanges, including stations, bus stops and wharves
- signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- other improvements and maintenance such as painting, new fencing and roof replacements.

### **2.1.3 Objectives of the Proposal**

The specific objectives of the Proposal are to:

- provide a station precinct that is accessible to those with a disability, the ageing and parents/carers with prams and customers with luggage
- develop modern buildings and facilities for all modes of transport that meet the needs of a growing population
- generate modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- maintain and improve existing cross corridor access and pedestrian links between the surrounding road network, public transport facilities and private vehicle parking facilities
- provide safety improvements including extra lighting, lift alarm, help points, fences and security measures for car parks and interchanges, including stations, bus stops and wharves
- improve customer experience and amenity (weather protection, better interchange facilities and visual appearance)
- improve wayfinding in around the station and signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- provide other improvements and maintenance such as painting, new fencing and roof replacements
- minimise pedestrian conflict and crowding points

- respond to the heritage values of the site.

## 2.2 Design development

AECOM was engaged by TfNSW to develop a Concept Design Report (AECOM, 2015) for upgrading station precinct accessibility and providing additional commuter car parking that would encourage the use of public transport and meet key architectural, urban and engineering objectives. Following a design and construct tender process; the concept design will be refined by the preferred construction contractor.

Rooty Hill Station is currently the 92<sup>nd</sup> busiest railway station in the rail network with approximately 5,520 entry and exit passenger movements during a typical weekday (Bureau Transport Statistics, 2014). Station patronage is predicted to increase by 42% by 2036.

The Concept Design Report also considered improvements to connections between the northern and southern interchange facilities of the station and the broader Rooty Hill area in order to maximise the improvements in connectivity with the surrounding suburb.

The AECOM report assessed the commuter car parking arrangements in 2015 and identified a total of 200 formal parking spaces are currently available to commuters. It also notes that there are two vacant parcels of land which are used as informal parking areas to the north of the station and there are two unrestricted off-street parking areas that are used as informal commuter parking spaces to the south of the station while a significant amount of unrestricted on-street parking spaces surround the station on North Parade, Beames Avenue and Station Street.

The Proposal would provide approximately an additional 300 spaces within the Commuter Car Park, subject to detailed design and approval, and would support the growth in public transport use for existing and future users of the station.

These needs and opportunities for Rooty Hill Station Precinct were considered in the development of options for the concept design (refer to Section 2.3).

## 2.3 Alternative options considered

Investigations were undertaken to identify the potential location for station access upgrades and additional commuter car parking near Rooty Hill Station. A Concept Design Report (AECOM, 2015) for these works identified multiple options for the location and design of the station access upgrades and additional commuter car parks.

### Station Upgrade

Four concept design options were developed following a succession of workshops with TfNSW, relevant stakeholders and the AECOM design team. The options included:

- Option A – This option involves the retention of the existing footbridge, ramps and stairs and widening of a section of the footbridge to provide ticketing and passenger information facilities. The option also includes the provision of four new lifts, and improvements to interchange facilities on both the northern and southern sides of the station
- Option B – This option involves the demolition of the existing footbridge, ramps and stairs and provision of a new footbridge and overhead station concourse in the same location. The option also includes the provision of four new lifts and improvements to interchange facilities on the northern and southern sides of the station
- Option C – This option involves the demolition of the existing footbridge, ramps and stairs, and provision of a new footbridge, overhead station concourse and stairs in a new location to the east of the existing footbridge. The option also includes the

provision of four new lifts with accessible paths and improvements to interchange facilities on the northern and southern sides of the station

- Option D - 'do-nothing' option.

### Commuter Car Park

Four options were similarly developed by AECOM for the provision of additional commuter parking, as follows:

- Option 1 – This option would provide a multi-storey car park located on vacant NSW State Government owned land approximately 250m south east of the station, between the rail corridor and Mavis Street
- Option 2 – This option would provide a multi-storey car park located on the existing commuter car park, east of Station Street approximately 80m north east of the station, between the rail corridor and the Blacktown City Council Depot
- Option 3 – This option would provide a multi-storey car park located on the existing commuter car park off Station Street approximately 50m north of the station, between Station Street and Rooty Hill Road North.
- The 'do-nothing' option.

The outcomes from the assessment of the identified options are detailed in Section 2.4 below.

#### **2.3.1 The 'do-nothing' option**

Under a 'do-nothing' option, existing access to Rooty Hill Station and commuter car park would remain the same and there would be no changes to the way the Rooty Hill Station and commuter car park currently operates.

The NSW Government has identified the need for improving the accessibility of transport interchanges, train stations and commuter car parks across NSW as a priority under the Transport Access Program.

The 'do nothing' option was not considered a feasible alternative as it is inconsistent with NSW Government objectives and would not help encourage the use of public transport and would not meet the needs of the Rooty Hill community.

## **2.4 Justification for the preferred option**

The respective options for the Station Upgrade and Commuter Car Park were subsequently evaluated as part of a series of workshops with TfNSW, relevant stakeholders and the AECOM design team.

The design options were assessed in a multi-criteria analysis that included consideration of factors such as customer experience, accessibility, engineering constraints, modal integration and cost to select a preferred option.

Option C for the Station Upgrade component achieved the highest overall score in the multi-criteria analysis and was selected as the preferred option to be progressed as part of the Accessibility Upgrade component of the project.

Option 3 for the Commuter Car Park component was selected as the preferred option based on the outcome of the multi-criteria analysis undertaken through a Stakeholder Working Group Workshop with TfNSW, relevant stakeholders and the AECOM design team. Option 3 received the highest score, scoring the highest in customer experience, accessibility, urban form and land-use integration, engineering constraints and facility operation and maintenance.

These preferred options for the respective Station Upgrade and Commuter Car Park components of the Proposal would help to provide for future station access and parking

demands with less community impact and costs. These options were chosen as they do not involve a significant change in land use, are relatively free of site constraints and utilities and present fewer constructability issues.

## 3 Description of the Proposal

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Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities. The description of the Proposal is based on the concept design and is subject to detailed design.

### 3.1 The Proposal

As described in Section 1.1, the Proposal involves upgrades to the northern and southern station interchange facilities for the Station Upgrade and construction of a new multi-storey commuter car park over the existing car park on the northern side of the station between the rail corridor and the Blacktown City Council Depot on Station Street. The proposed works are part of the Transport Access Program which seeks to improve accessibility and amenities for customers.

The Proposal would include the following key elements:

#### Station Upgrade

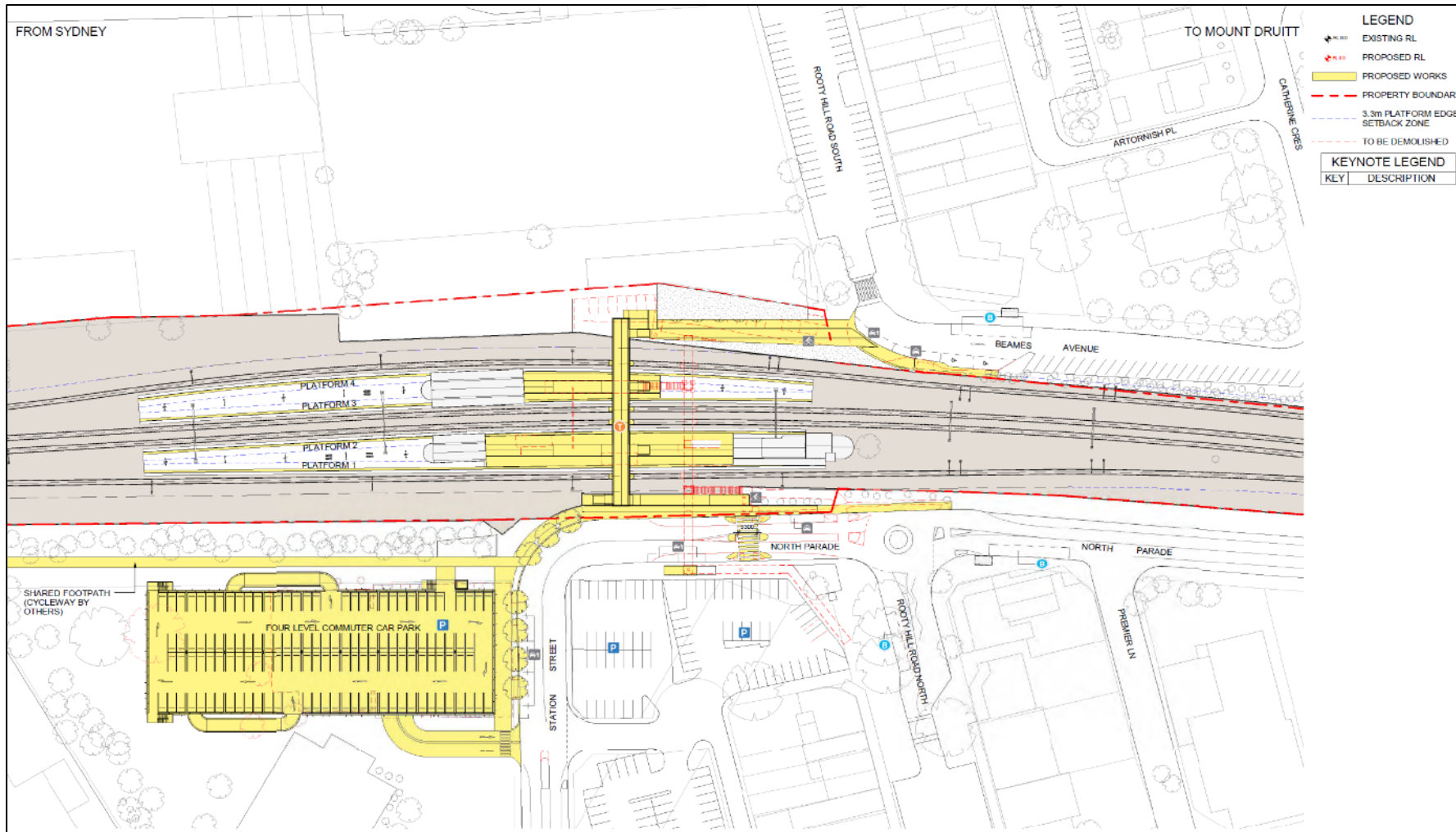
- installation of new lifts at station entrances and platforms
- improvements to the accessible pathways between station entrance and platform
- improvements to the accessible pathways between station entrance and surrounding streets / interchange facilities
- installation of family accessible toilet and ambulant cubicles in male and female toilets within the existing station platform buildings
- installation of new signage to improve wayfinding
- provision of 20 undercover bicycle racks across the northern and southern side of the station interchange areas
- provision of additional kiss and ride spaces for commuters at the northern and southern station entrances
- ancillary works, including services diversion and/or relocation, minor drainage works, adjustments to lighting, installation of handrails and balustrades, improvements to station communication systems with new infrastructure (including additional CCTV cameras).

#### Commuter Car Park

- provision of a four level, multi-storey commuter car park on the northern boundary of the rail corridor with parking for approximately 500 vehicles (an addition of approximately 300 spaces). The commuter car park would be serviced by a lift and stairs to provide access between parking levels and also include an accessible path to the northern interchange of the station
- ancillary works, including services diversion and/or relocation, minor drainage works, installation of lighting, installation of handrails and balustrades, with new infrastructure (including CCTV cameras).
- new landscaping along Station Street.

Figure 13 to Figure 16 shows the concept design general layout and elevation details of key elements for the Proposal.





**Figure 13 Station Upgrade and Commuter Car Park Concept (Indicative only, subject to detailed design)**

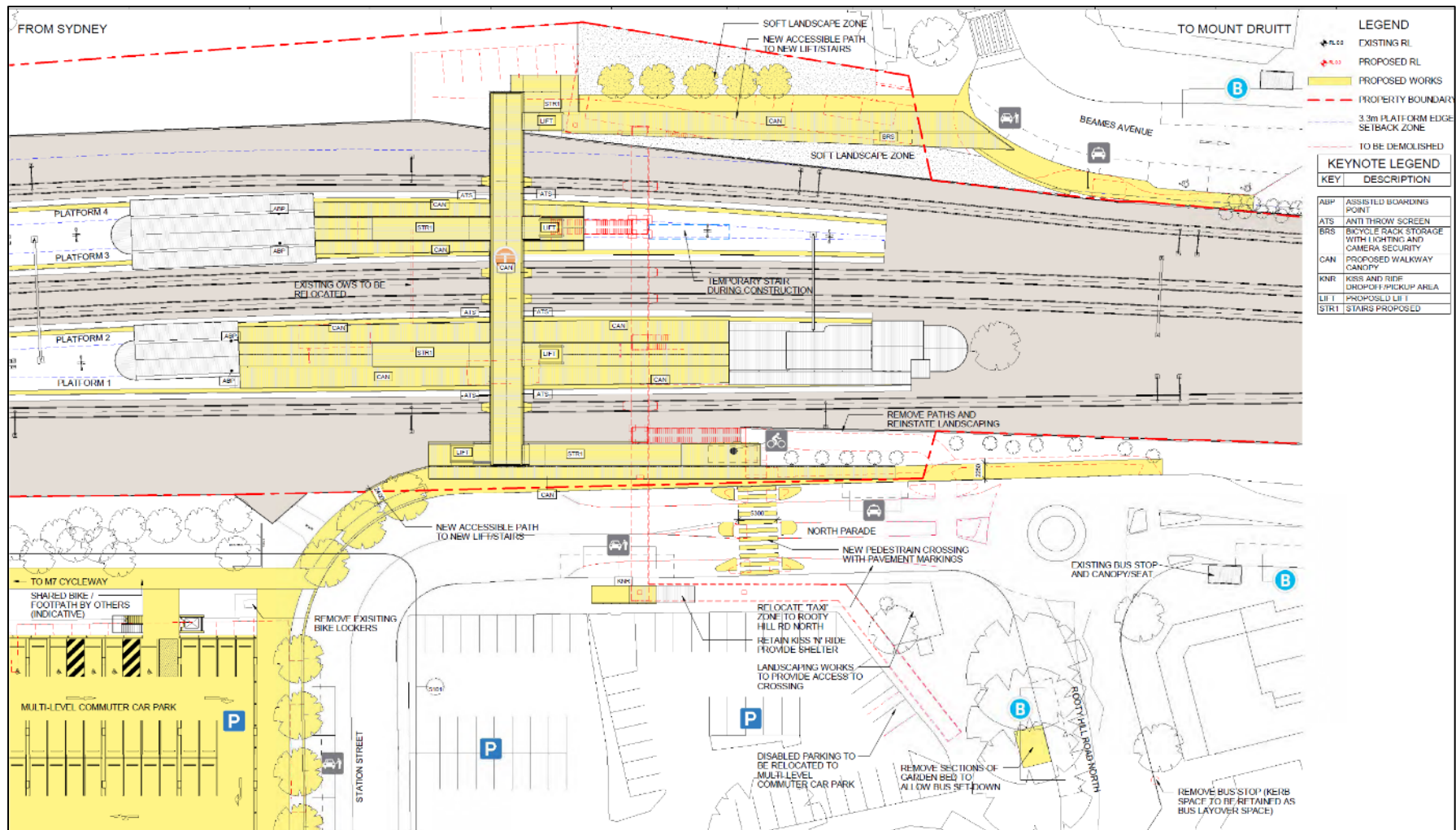


Figure 14 Station Upgrade and Commuter Car Park Concept (Indicative only, subject to detailed design)



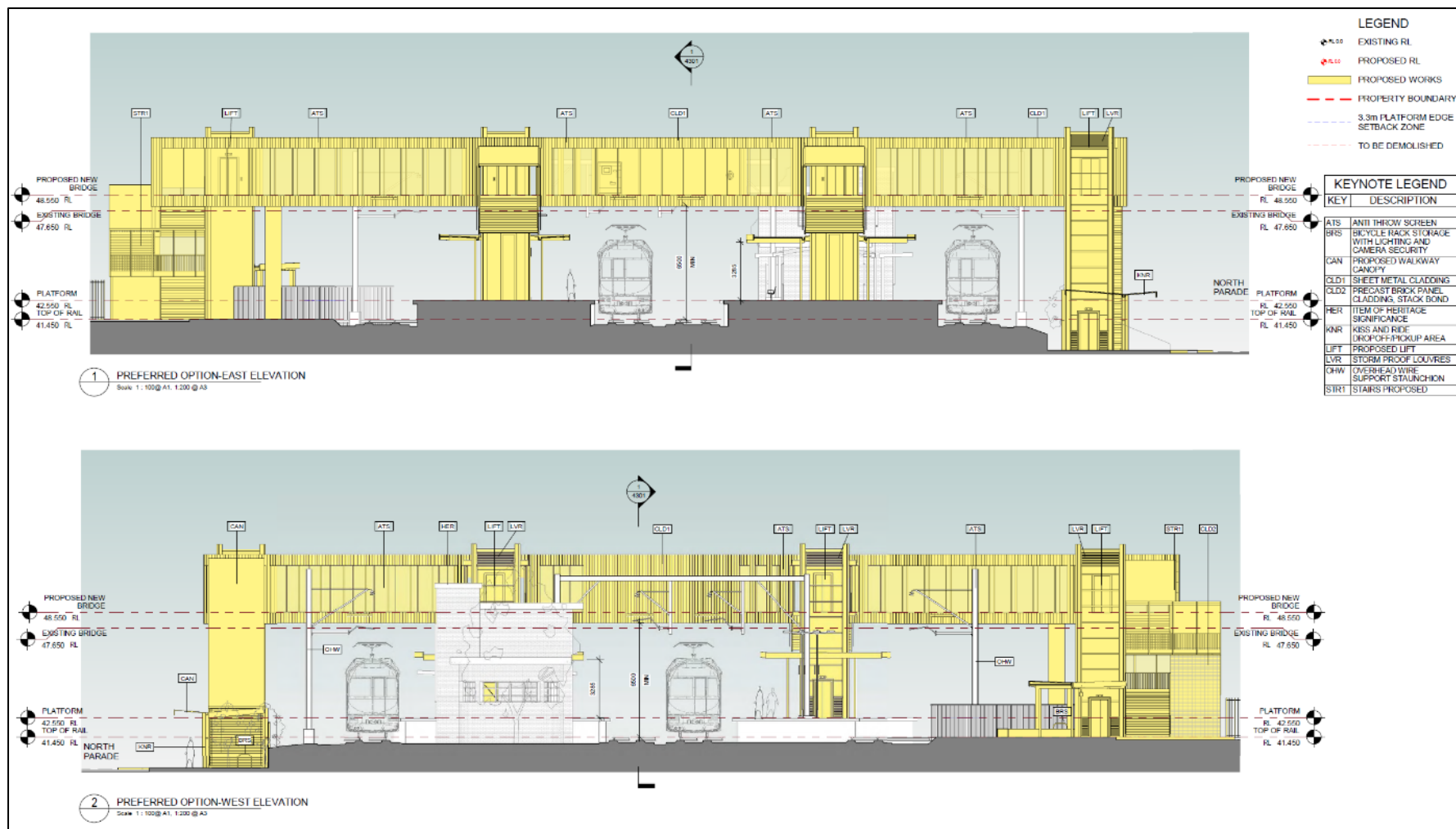
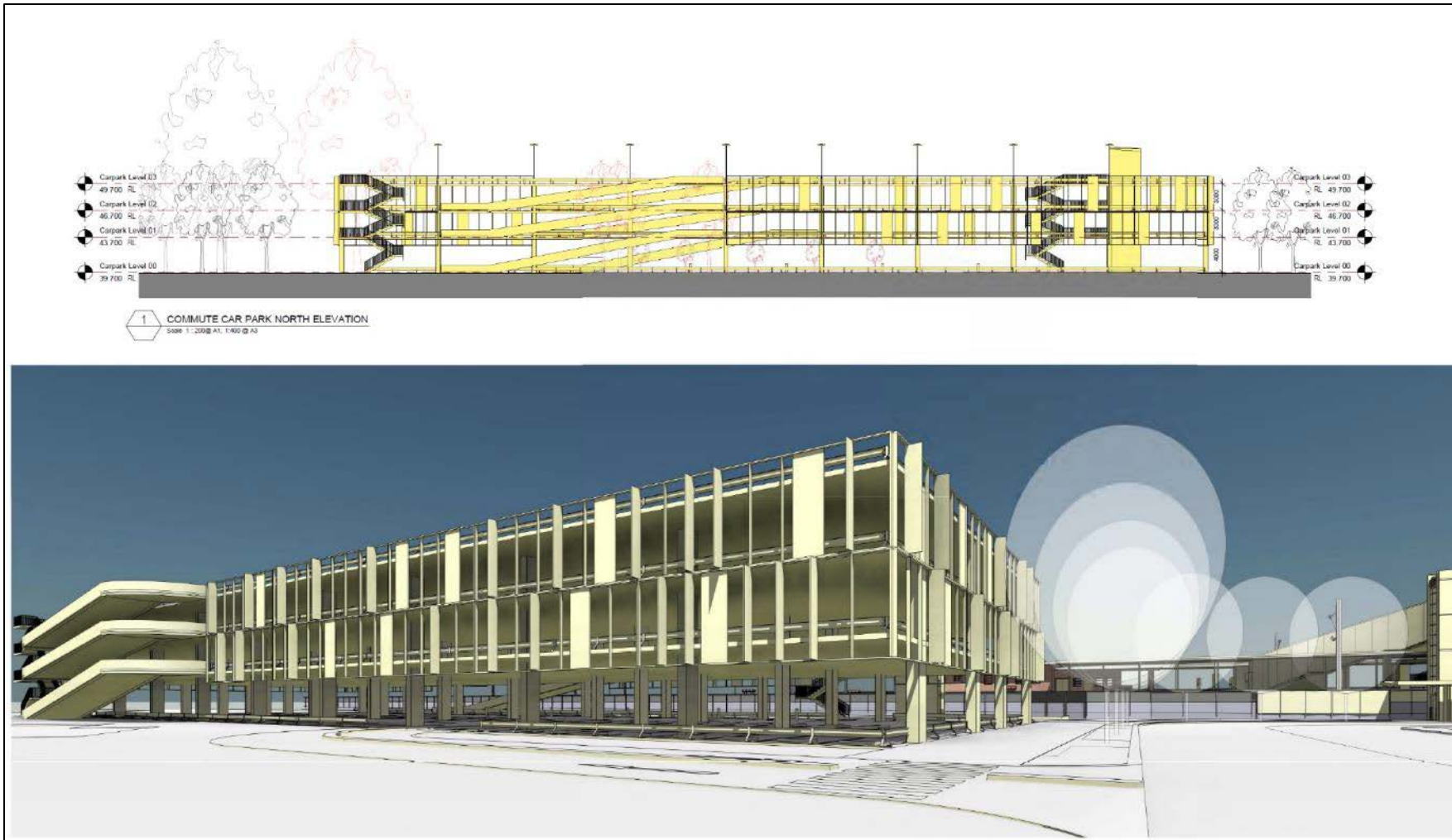


Figure 15 Station Upgrade Concept – Elevations



**Figure 16 Commuter Car Park Concept – Elevations**

### **3.1.1 Scope of works**

#### **Station Upgrade**

Details of the proposed works to take place at the station to improve accessibility for customers include but are not necessarily limited to:

- demolition of the existing footbridge, ramps and stairs on the northern and southern side of the rail corridor
- construction of a new footbridge and station concourse (new location to the east) with ticketing and passenger information facilities
- construction of four new sets of stairs and lifts at station entrances and platforms
- removal of existing seating and shelter on Platform 1/2
- new canopy coverage from stairs to station building on Platform 1/2
- accessible pathways to station entrance lifts from Beames Avenue (southern side) and North Parade (northern side)
- accessible pathways between the station entrances, surrounding streets / interchange facilities and Platform 1/2 and Platform 3/4
- new Family Accessible Toilet and ambulant cubicles in male and female toilets within the existing station buildings on both platforms
- revised platform to train transfer to provide safe train transfer for commuters
- installation of wayfinding signage
- undercover bicycle rack storage spaces spread across the northern and southern side of the station interchange areas to accommodate approximately 20 bicycles
- additional kiss and ride drop off/pick up zones on both sides of North Parade and taxi zone
- improvements in CCTV coverage around the station precinct
- new pedestrian crossing across North Parade
- removal of garden beds at northern interchange to create wider footpaths around existing garden bed, and the eastern side of Rooty Hill Road North to allow set-down of bus passengers
- planting of new soft landscaping.

#### **Commuter Car Park**

Details of the proposed works to increase commuter parking capacity and improve accessibility and customer service include but are not necessarily limited to:

- installation of a new four level commuter car park to provide approximately 500 parking spaces (more than 300 new) of which includes a reserved allocation for accessible parking
- installation of a new vehicle access way from Station Street to the commuter car park
- extension of footpaths and cycleway connections to Rooty Hill Station Precinct
- planting of new soft landscaping.

## Materials and finishes

Materials and finishes for the Proposal have been selected based on the criteria of durability, low maintenance and cost effectiveness, to accord with heritage requirements, to minimise visual impacts, and to be aesthetically pleasing.

Availability and constructability are also important criteria to ensure that materials are readily available and the structure can be built with ease and efficiency. Materials are also selected for their application based on their suitability for meeting design requirements.

Each of the upgraded or new facilities would be constructed from a range of different materials, with a different palette for each architectural element. Subject to detailed design, the Proposal would include the following:

- proposed footbridge, lifts and stairs – precast concrete and glass with mesh throw screens, decorative cladding and louvres and steel handrails and balustrade
- pedestrian concourse – wall cladding, glazing, steel structure, steel roofing/downpipes/flashing and door frames, concrete flooring and precast concrete tactiles
- platforms 1 to 4 station buildings – make good existing external elements, paint, doors and windows, floor coverings (ceramic tiling, vinyl, carpet tile)
- kerbs and gutters – to match existing local council infrastructure
- car park façade will be finished with approved materials and colours
- footpaths – concrete non-slip textured finish.

The design would be submitted to TfNSW's Urban Design and Sustainability Review Panel at various stages for comment before being accepted by TfNSW. An Urban Design Plan (UDP) and/or Public Domain Plan (PDP) would also be prepared by the construction contractor, prior to finalisation of detailed design for endorsement by TfNSW.

### 3.1.2 Design standards

The Proposal would be designed having regard to the following:

- *Disability Standards for Accessible Public Transport 2002* (issued under the Commonwealth *Disability Discrimination Act 1992*)
- Building Code of Australia
- relevant Australian Standards
- Asset Standards Authority standards
- Sydney Trains standards
- *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a)
- Infrastructure Sustainability Rating Scheme (v1.2)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008).
- Crime Prevention Through Environmental Design (CPTED) principles
- other TfNSW policies and guidelines
- council standards for construction activities within council lands and assets where relevant.

### 3.1.3 Sustainability in design

The development of the concept design for the Proposal has been undertaken in accordance with the project targets identified in TfNSW's Environmental Management System (EMS) and the *NSW Sustainable Design Guidelines - Version 3.0* (TfNSW, 2013a) which are divided into seven themes:

- energy and greenhouse gases
- climate resilience
- materials and waste
- biodiversity and heritage
- water
- pollution control
- community benefit.

Within each theme, potential initiatives are prioritised into two categories of requirements:

1. Compulsory – the initiative is required to be implemented when applicable to the project as they refer to a corporate target, or are fundamental to the delivery of sustainable assets)
2. Discretionary – the initiative has benefits to be implemented, however may not be the most appropriate.

A shortlist of compulsory initiatives has been developed by TfNSW specifically for Transport Access Program projects, which includes the Rooty Hill Station Upgrade and Commuter Car Park. These compulsory initiatives have been reviewed and incorporated into the concept design.

During the detailed design process, the Proposal will be reviewed against the Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability (IS) Rating Scheme (v1.2). The rating scheme provides an independent and consistent methodology for the application and evaluation of sustainability outcomes in large scale infrastructure projects. The IS Rating Scheme can be grouped into six key themes:

- management and governance
- using resources
- emissions, pollution and waste
- ecology
- people and place
- innovation.

These sustainability themes are divided into 15 performance categories, against which the Proposal will be independently assessed and assigned a rating level of commended, excellent or leading.

## 3.2 Construction activities

### 3.2.1 Work methodology

Subject to approval, construction is expected to commence in early 2018 with the Station Upgrade estimated to be completed in 2020, while the Commuter Car Park is estimated to be completed in 2019.

The construction methodology would be further developed during the detailed design of the Proposal by the nominated construction contractor in consultation with TfNSW.

The proposed construction activities for the Proposal are identified below:

- site establishment and preparation
- removal of vegetation
- relocation of services and preparation of substructure
- demolition of existing structural elements and site clearing
- construction of foundations, floor slabs, columns and walls
- installation of new station infrastructure
- road way and pedestrian infrastructure modifications
- installation of lifts, fixtures, fittings, lighting, CCTV cameras
- construction of external cladding
- installation of wayfinding signage, landscaping and other completion works.

It is noted that the staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the construction contractor's preferred methodology, program and sequencing of work.

### 3.2.2 Plant and equipment

The plant and equipment likely to be used during construction includes:

- |                  |                            |                                  |
|------------------|----------------------------|----------------------------------|
| • Trucks         | • Grinder                  | • Balloon wheel dump trucks      |
| • Generator      | • Piling rig               | • Rattle gun                     |
| • Bobcat         | • Concrete truck and pump  | • Nail gun                       |
| • Hand tools     | • 200 tonne crane          | • Vibratory roller               |
| • Mulcher        | • Scissor lift             | • Paving machine                 |
| • Chainsaw       | • Fork lift                | • Rail accessible motor vehicles |
| • Excavator      | • Small mobile crane       | • Concrete coring machine        |
| • Demolition saw | • Hand held soil compactor |                                  |
| • Jack hammer    |                            |                                  |



- Lighting towers

### 3.2.3 Working hours

The majority of works required for the Proposal would be undertaken during standard (NSW) Environment Protection Authority (EPA) construction hours, which are as follows:

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

To ensure continued operation of the Rooty Hill Station interchange, certain works may need to occur outside standard hours and would include night works and works during scheduled Sydney Trains “track possessions” which are scheduled track maintenance closures that would occur regardless of the Proposal when part of the rail network is temporarily closed and trains are not operating.

Out of hours works may also be scheduled outside rail possession periods. Approval from TfNSW would be required for any out of hours work and the affected community would be notified as outlined in TfNSW’s *Construction Noise Strategy* (TfNSW, 2016) (refer to Section 6.3 for further details).

Out of hours works are required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers; and to ensure the safety of railway workers and operational assets.

### 3.2.4 Earthworks

Earthworks would generally be required for the following:

#### Station Upgrade

- installation of foundations for the new footbridge, lifts and stairs
- construction of new pedestrian footpaths and walkways
- removal of sections of garden beds on Rooty Hill Road North for new bus set-down area.

#### Commuter Car Park

- piling and excavation for car park foundations
- tie in works in relation to existing roads and pathways
- other minor civil works, including drainage/stormwater works, and trenching activities for underground service adjustments and relocations.

Excavated material would be reused onsite where possible or classified and disposed of in accordance with relevant legislative requirements. Waste management is discussed further in Section 6.11.

### 3.2.5 Source and quantity of materials

The source and quantity of materials that would be used in the course of the Proposal would be determined during the detailed design phase, and procurement decisions would be made in consideration of the requirements of the Infrastructure Sustainability Rating Scheme (v1.2). Materials would be sourced from local suppliers (Western Suburbs – Blacktown,



Penrith or/and Campbelltown) where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

Materials required in large quantities would include concrete, steel, bitumen. In total, approximately 2,000 tonnes of concrete is expected to be required. Bridge components would be prefabricated off-site and delivered to site for assembly whereas the car park would be constructed in-situ,

### **3.2.6 Traffic access and vehicle movements**

Traffic and transport impacts associated with the Proposal are assessed in Section 6.1 of this REF. The potential traffic and access impacts expected during the construction of the Proposal include:

- temporary displacement of 20 parking spaces in the existing southern interchange commuter car park
- temporary displacement of 160 parking spaces within the existing commuter car park on Station Street
- temporary displacement of parking on and closure of North Parade/Station Street to vehicles between Rooty Hill Road North and Kalunga Lane
- temporary changes to the existing bus layover area / mail zone and the kiss-and-ride zones at the southern and northern interchange
- construction vehicle movements and access arrangements which may temporarily interrupt and add to traffic flow on Beames Avenue and Rooty Hill Road South to the south of the Proposal.
- construction vehicle movements and access arrangements which may temporarily interrupt traffic flow on and Station Street, North Parade and Rooty Hill Road North to the north of the Proposal.
- minor disruptions to pedestrian/cyclist movements in and around the station and car parks.

In addition to periodic, routine construction material deliveries, concrete deliveries would occur as follows:

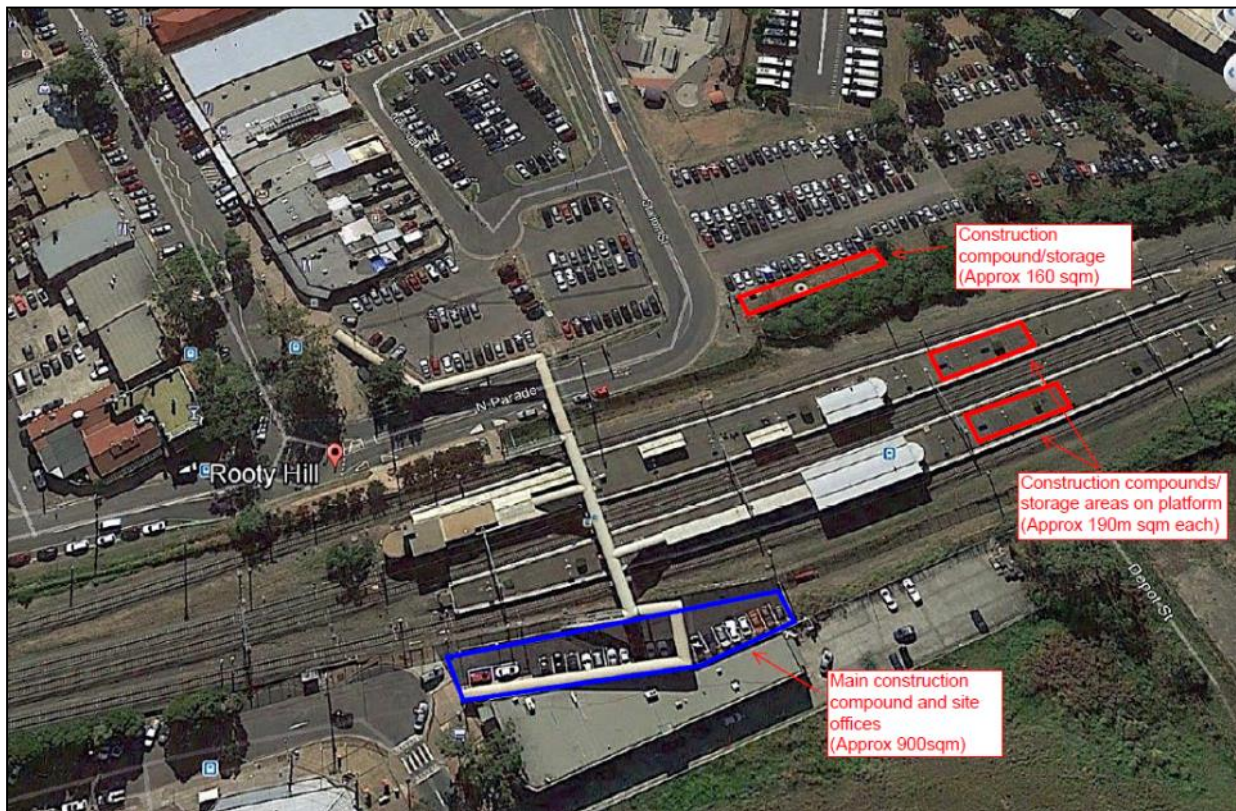
- three to four truck deliveries would occur in the first week of construction with approximately two concrete deliveries every week for the remainder of the first month
- 42 truck deliveries would occur at the start of the third month for the floor of the car park, repeated every fourth week after that until the car park floors are complete.

### **3.2.7 Ancillary facilities**

A temporary construction compound (approx. 900m<sup>2</sup>) would be required to accommodate a site office, amenities, laydown and storage area for materials. An area for a construction compound for the Proposal is located within the footprint of the existing southern commuter car park (refer Figure 17). The area nominated for the compound is on land owned by RailCorp. Impacts associated with utilising this area have been considered in this environmental impact assessment including requirements for rehabilitation.

Additional locations for use as construction compound and storage areas are also nominated on Platforms 1/2 and Platforms 3/4 (approx. 190m<sup>2</sup> each) and within the grassed verge between the existing commuter car park and the open air vegetated stormwater drain

(approx. 160m<sup>2</sup>). These areas would be used primarily for the storage of construction plant, equipment and materials required to facilitate construction of the Proposal.



**Figure 17 Indicative location of the site compound and storage zones (TfNSW, 2016)**

### **3.2.8 Public utility adjustments**

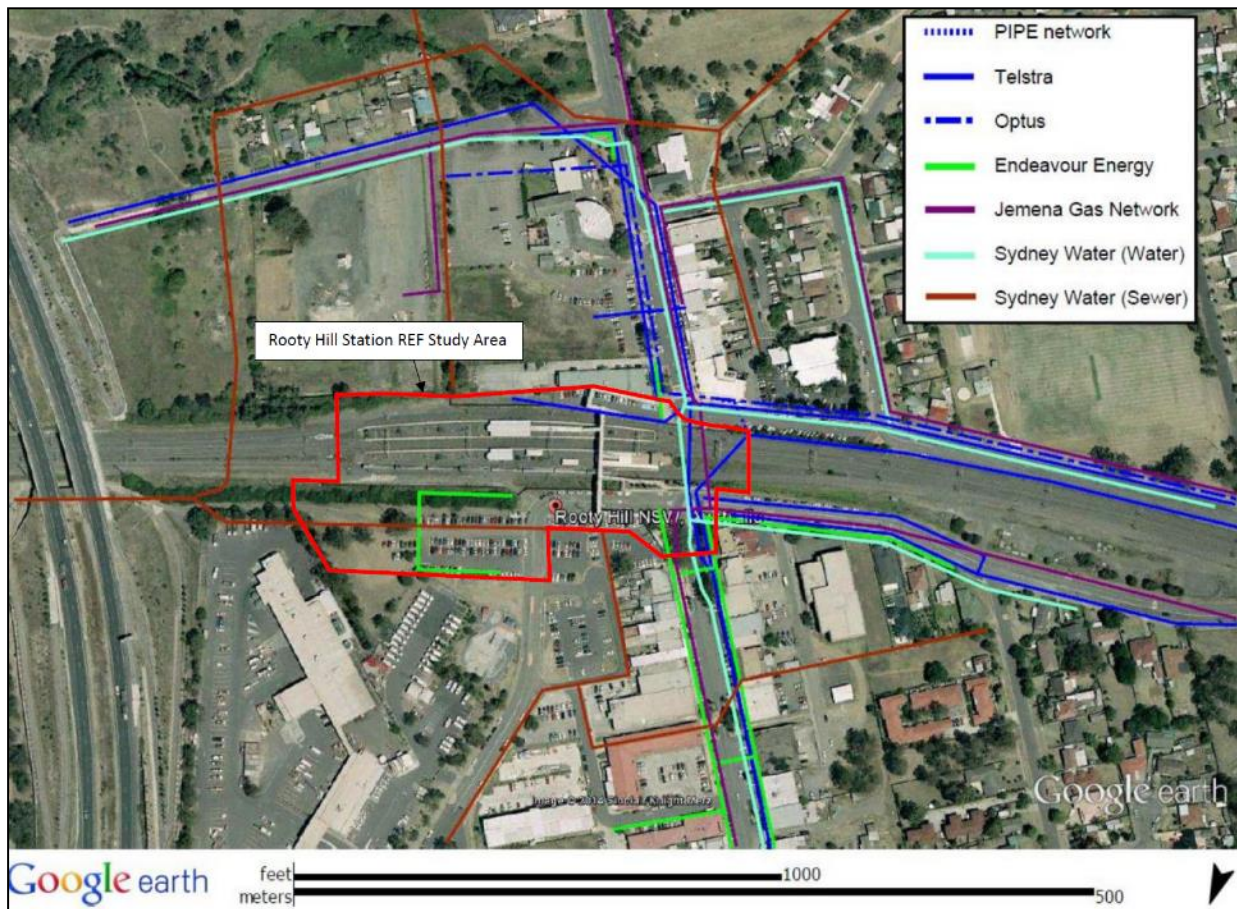
The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. It is likely some services may require relocation but such relocation is unlikely to occur outside of the footprint of the works assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

The following utilities have been identified by AECOM as occurring within, or within the vicinity of the Proposal boundaries (refer Figure 18):

- PIPE Networks - telecommunications
- Telstra – telecommunications
- Optus – telecommunications
- Endeavour Energy – electrical
- Jemena – gas network
- Blacktown City Council – stormwater assets
- Westlink Motorway – services
- Sydney Water Corporation (SWC) – water and sewerage
- Sydney Trains – communications.



Stormwater assets under the management of Blacktown City Council are also present in the area but were not identified in the AECOM report.



**Figure 18 Overview of services search (AECOM, 2015)**

Telecommunication cable ducts which may carry Telstra, Optus and Pipe Networks Fibre Optic cables and Sydney Water (water mains) were identified in the following locations:

- within the Beames Avenue road corridor
- along the rail corridor boundary and the southern interchange car park
- running perpendicular to the rail corridor between Beames Avenue and Rooty Hill Road North
- running parallel with the western side of the Rooty Hill Road North road corridor.

Endeavour Energy electrical services exist within the Proposal boundary at the entrance to the southern interchange commuter car park and within the Rooty Hill Road North road corridor including at the site of the proposed bus set-down location. Endeavour Energy services also exist within the existing car park.

Jemena gas mains exist in the area and run perpendicular to Beames Avenue, the rail corridor along the western extent of the Station and the northern side of the Rooty Hill Road North road corridor.

A Sydney Water (sewer main) service exists within the Proposal footprint across Station Street and parallel with the southern extent of the existing commuter car park.

The Proposal concept has been designed to avoid relocation of services where feasible, however further investigation and relocation may be required. In the event that works would

be required outside of this footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

### **3.3 Property acquisition**

#### Station Upgrade

The majority of the land required for the Station Upgrade component of the Proposal is owned by RailCorp, and is operated and maintained by Sydney Trains. Sydney Trains will continue to operate and maintain the station following project completion.

Some of the Proposal scope requires construction activities to be conducted outside of the RailCorp property boundary as illustrated in Figure 13 and Figure 14. This includes upgrades to the accessible parking spaces at the southern interchange to on-street accessible parking spaces and upgraded pedestrian pathways on Beames Avenue.

Activities required outside the RailCorp property boundary for the Northern Interchange include but are not limited to demolition of the existing footbridge and ramps, upgrading accessible pathways, installation of a new pedestrian crossing on North Parade, provision of shelters for kiss & ride zones on both sides of North Parade and the taxi zone.

A license agreement would be negotiated with Blacktown City Council to enable construction works to commence in these locations.

#### Commuter Car Park

The entire scope of work for the Commuter Car Park is located outside the RailCorp property boundary. As such the following arrangements, would be implemented to facilitate construction, operation and maintenance of the assets.

*1. Car park construction and operation:*

A license agreement would be negotiated with Blacktown City Council to enable construction works to commence.

Operation of the car park will be managed through a long-term lease with Blacktown City Council.

*2. Car park operation and maintenance:*

Sydney Trains will be responsible for the operation and maintenance of the car park once operational.

TfNSW does not propose to acquire any property for the Proposal.

### **3.4 Operation management and maintenance**

The future operation and maintenance of the upgraded Rooty Hill Station and new Commuter Car Park is subject to further discussions with Sydney Trains, TfNSW and Blacktown City Council. Structures constructed under this Proposal would be maintained by Sydney Trains. However, it is expected that adjacent garden/landscape areas would continue to be maintained by Blacktown City Council.

## 4 Statutory considerations

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Chapter 4 provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government policies/strategies, NSW legislation (particularly the EP&A Act), environmental planning instruments, and Commonwealth legislation.

### 4.1 Commonwealth legislation

#### 4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The (Commonwealth) EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, wetlands protected by international treaty, water resources and heritage places - defined in the EPBC Act as 'matters of National Environmental Significance (NES)'. The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix A.

The Proposal would not impact on any matters of NES or on Commonwealth land. Therefore, a referral to the Commonwealth Minister for the Environment is not required.

### 4.2 NSW legislation and regulations

#### 4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Part 5 of the EP&A Act. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under Part 4 of the Act.

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

Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) defines the factors which must be considered when determining if an activity assessed under Part 5 of the EP&A Act has a significant impact on the environment. Chapter 6 of the REF provides an environmental impact assessment of the Proposal in accordance with clause 228 and Appendix B specifically responds to the factors for consideration under clause 228.

#### 4.2.2 Other NSW legislation and regulations

Table 1 provides a list of other relevant legislation applicable to the Proposal.

**Table 1 Other legislation applicable to the Proposal**

| Applicable legislation  | Considerations   |
|---|--|
| <i>Contaminated Land Management Act 1997</i> (CLM Act) (NSW)              | <p>Section 60 of the CLM Act imposes a duty on landowners to notify the Office of Environment and Heritage (OEH), and potentially investigate and remediate land if it is considered likely to be contaminated.</p> <p>The site has not been notified to the EPA as a potentially contaminated site, nor regulated under the CLM Act as being significantly contaminated (refer Section 6.8).</p>  |
| <i>Crown Lands Act 1987</i> (NSW)   | The Proposal does not involve works on any Crown land.   |
| <i>Disability Discrimination Act 1992</i> (DDA Act) (Cwlth)               | The Proposal would be designed having regard to the requirements of this Act.  |
| <i>Heritage Act 1977</i> (Heritage Act) (NSW)                             | <ul style="list-style-type: none"> <li>Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted</li> <li>Sections 139 and 140 (permit) where relics are likely to be exposed</li> <li>Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted.</li> </ul> <p>The proposed Station Upgrade is located within and directly adjacent to Rooty Hill Station Group, which is listed on RailCorp's Section 170 Heritage and Conservation Register and on the <i>Blacktown Local Environmental Plan 2015</i>.</p> <p>The archaeological assessment concluded that there is a low risk of exposing historical archaeological relics during construction and that no archaeological approvals under the Heritage Act would be required. A Statement of Heritage Impact and archaeological review have been undertaken for the Proposal and are summarised in Section 6.5.</p> |
| <i>National Parks and Wildlife Act 1974</i> (NPW Act) (NSW)               | <p>Sections 86, 87 and 90 of the NPW Act require consent from OEH for the destruction or damage of Indigenous objects. The Proposal is unlikely to disturb any Indigenous objects (refer Section 6.4).</p> <p>However, if unexpected archaeological items or items of Indigenous heritage significance are discovered during the construction of the Proposal, all works would cease and appropriate advice sought.</p>  |
| <i>Biosecurity Act 2015</i> (NSW)   | There is one (1) noxious weed identified in the Proposal area <i>Cestrum parqui</i> (Green Cestrum). Appropriate management methods would be implemented during construction (refer Section 6.7).  |
| <i>Protection of the Environment Operations Act 1997</i> (POEO Act) (NSW) | The Proposal does not involve a 'scheduled activity' under Schedule 1 of the POEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the POEO Act, TfNSW would notify the EPA of any pollution incidents that occur in the course of the project that cause or threaten material environmental harm. This would be managed in the CEMP to be prepared and implemented by the construction contractor.   |



| Applicable legislation   | Considerations  |
|--|---|
| <i>Roads Act 1993</i> (Roads Act) (NSW)                                | <p>Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads.</p> <p>The Proposal would involve works on Beames Avenue, Station Street, North Parade and Rooty Hill Road North which are local roads under the control of Blacktown City Council. Consent under the Roads Act is not required however Road Occupancy Licence/s would be obtained from Blacktown City Council for temporary road closures. Refer to Section 6.1 for more information.</p> <p>Any operational changes (such as changes to pedestrian crossings, parking/kiss and ride changes, bus zones, signage etc.) to these roads would be undertaken with approval from the appropriate road authority.</p> |
| <i>Sydney Water Act 1994</i> (NSW)                                     | <p>The Proposal would involve discharge to sewer following installation of new Family Accessible Toilet and ambulant cubicles in male and female toilets within the existing station buildings on both platforms. Consultation would be undertaken with Sydney Water to permit the new sewer connection.</p>  |
| <i>Biodiversity Conservation Act 2016</i> (BC Act) (NSW)               | <p>The site contains native vegetation that forms suitable habitat for some listed threatened fauna species or community however given the relatively low condition of the community, its removal is unlikely to have a significant impact on any threatened species or community (refer Section 6.7).</p>  |
| <i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act) (NSW) | <p>TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.</p>   |
| <i>Water Management Act 2000</i> (NSW)                                 | <p>The Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management works, drainage or flood works, controlled activities or aquifer interference.</p>  |

## 4.3 State Environmental Planning Policies

### 4.3.1 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of the Proposal and which part of the EP&A Act an activity or development may be assessed.

Clause 79 of the Infrastructure SEPP allows for the development of ‘rail infrastructure facilities’ by or on behalf of a public authority without consent on any land (i.e. assessable under Part 5 of the EP&A Act). Clause 78 defines ‘*rail infrastructure facilities*’ as including elements such as ‘*railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms*’, ‘*public amenities for commuters*’ and ‘*associated public transport facilities for railway stations*’.

Consequently, development consent is not required for the Proposal which is classified as a rail infrastructure facility, however the environmental impacts of the Proposal have been assessed under the provisions of Part 5 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other agencies prior to the commencement of certain types of



development. Section 0 of this REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP.

It is noted that the Infrastructure SEPP prevails over all other environmental planning instruments except where *State Environmental Planning Policy (Major Development) 2005*, *State Environmental Planning Policy No 14 – Coastal Wetlands* or *State Environmental Planning Policy No 26 – Littoral Rainforest* applies. The Proposal does not require consideration under these SEPPs and therefore do not require further consideration as part of this REF.

#### **4.3.2 State Environmental Planning Policy 55 – Remediation of Land**

SEPP 55 provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. While consent for the Proposal is not required, the provisions of SEPP 55 have still been considered in the preparation of this REF.

Section 6.8 of this REF contains an assessment of the potential contamination impacts of the Proposal. It is unlikely that any large-scale remediation (Category 1) work would be required as part of the Proposal. The proposed land use does not differ to the existing use. As such the risks posed by the presence of any potential undocumented contaminants that exist within the rail corridor or adjoining lands on the site are expected to be unchanged as a result of the Proposal.

### **4.4 Local environmental planning instrument and development controls**

The Proposal is located within the Blacktown LGA. The provisions of the Infrastructure SEPP mean that Local Environmental Plans (LEPs), prepared by councils for an LGA, do not apply. However, during the preparation of this REF, the provisions of the following LEPs were considered:

- *Blacktown Local Environmental Plan 2015*

#### **4.4.1 Blacktown Local Environmental Plan 2015**

The *Blacktown Local Environmental Plan 2015* (Blacktown LEP) is the governing plan for the Blacktown LGA, including Rooty Hill. Table 2 summarises the relevant aspects of the Blacktown LEP applicable to the Proposal. Figure 20 shows the relevant section of the zoning map from the Blacktown LEP, with the indicative location of the Proposal.

**Table 2 Relevant provisions of the Blacktown LEP**

| Provision description  | Relevance to the Proposal  |
|--|--|
| Land Use Zone B2 Mixed Use, SP2 Rail Infrastructure Facility, SP2 Depot Facility | <p>The Proposal is located in land zoned B2 Mixed Use, SP2 Infrastructure (Rail Facility) and SP2 Infrastructure (Depot Facility).</p> <p>The land use objectives within the B2 zone include:</p> <ul style="list-style-type: none"> <li>• to provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area</li> <li>• to encourage employment opportunities in accessible locations</li> <li>• to maximise public transport patronage and encourage walking and cycling</li> <li>• to encourage the development of an active local centre that is commensurate with the nature of the surrounding area</li> </ul> <p>The land use objectives within the SP2 zone include:</p> <ul style="list-style-type: none"> <li>• to provide for infrastructure and related uses</li> <li>• to prevent development that is not compatible with or that may detract from the provision of infrastructure</li> <li>• to ensure that development does not have an adverse impact on the form and scale of the surrounding neighbourhood.</li> </ul> <p>The Proposal is consistent with the objectives of the B2 zone and SP2 zones as it would be utilised for public purposes. A commuter car park adjacent to the Rooty Hill Station maximises public transport and supports infrastructure related uses, and therefore is a use consistent with a town centre and rail infrastructure and depot facility.</p> |
| Clause 5.10<br>Heritage Conservation   | <p>The objectives of the Blacktown Conservation clause (clause 5.10) is:</p> <ul style="list-style-type: none"> <li>• to conserve the environmental heritage of Blacktown</li> <li>• to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,</li> <li>• to conserve archaeological sites,</li> <li>• to conserve Aboriginal objects and Aboriginal places of heritage significance.</li> </ul> <p>The Proposal areas are either within or directly adjacent to the heritage at Rooty Hill Railway Station and buildings. Heritage items identified within the vicinity of the Proposal are described in Section 6.5. This section also identifies measures to minimise impacts on these heritage items.</p>  |
| Clause 7.1<br>Flooding Planning  | <p>The objectives of this clause are:</p> <ul style="list-style-type: none"> <li>• to minimise the flood risk to life and property associated with the use of land</li> <li>• to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change</li> <li>• to avoid significant adverse impacts on flood behaviour and the environment.</li> </ul> <p>The Proposal is not located within areas determined by Blacktown City Council to not be within the 1% AEP extent. Further hydrological assessment would be undertaken during detailed design to ensure that the Proposal would not be impacted by flooding and would not worsen local flooding patterns.</p>   |

## Provision description

## Relevance to the Proposal

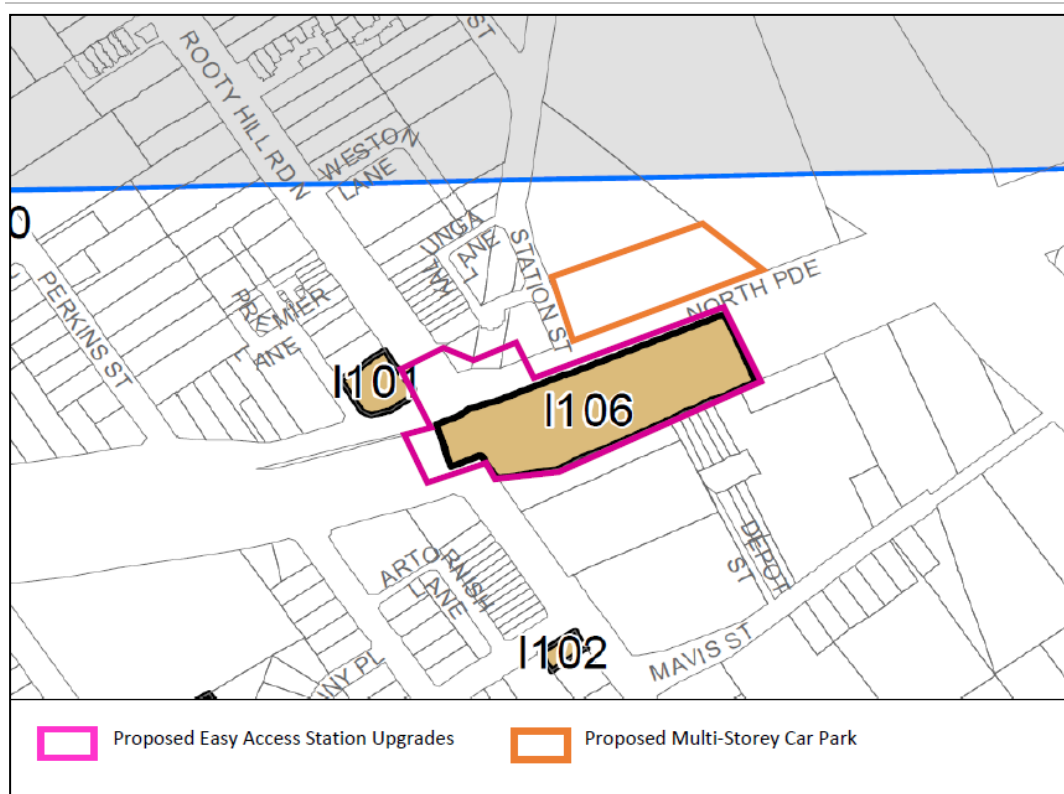
### Clause 7.2 Terrestrial Biodiversity

The objective of this clause is to maintain terrestrial and aquatic biodiversity by:

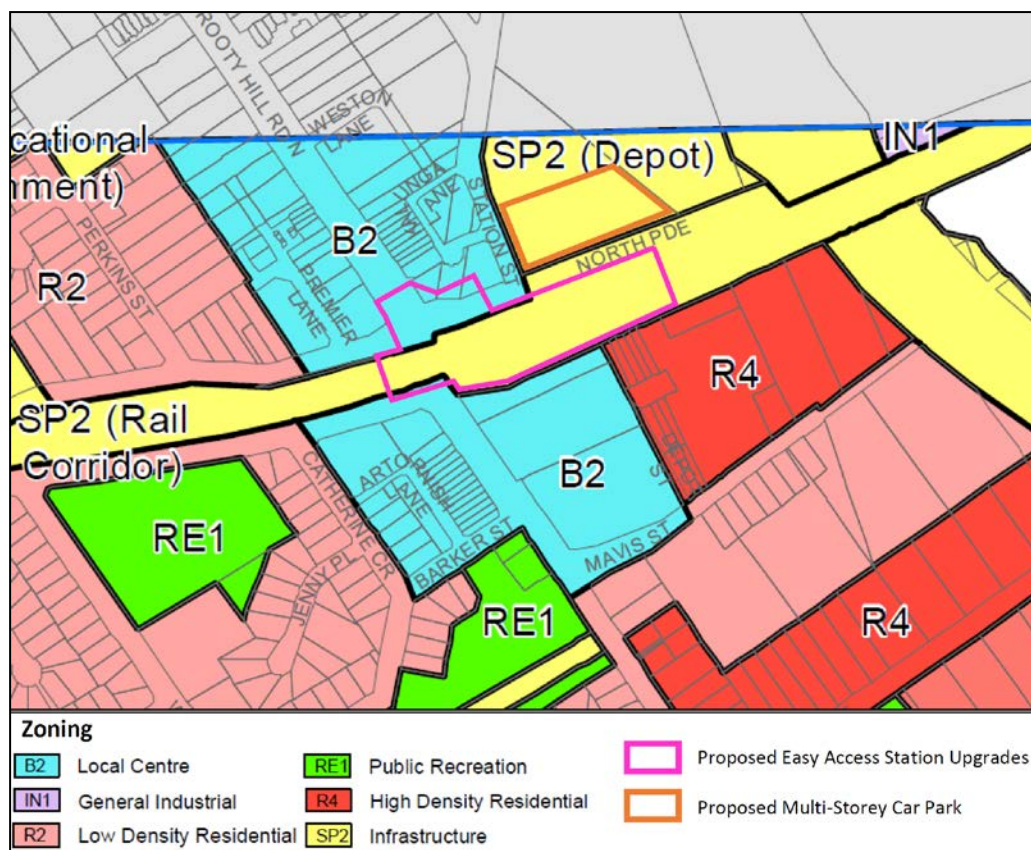
- protecting native fauna and flora
- protecting the ecological processes necessary for their continued existence
- encouraging the conservation and recovery of native fauna and flora and their habitats.

Details of the Ecological Assessment conducted for the Proposal are detailed in Section 6.7. The Proposal would require the removal of native flora with the potential to provide refuge for native fauna.

Based upon the assessment undertaken in this report, no significant impact is expected to occur to threatened species, populations or communities as a result of the Proposal and hence is consistent with the intent of this clause.



**Figure 19 Blacktown Local Environmental Plan (LEP) Local Heritage Listings.**



**Figure 20 Blacktown LEP 2015 zoning map**

## 4.5 NSW Government policies and strategies

Table 3 provides an overview of other NSW Government policies and strategies relevant to the Proposal.

**Table 3 NSW Government policies and strategies applicable to the Proposal**

| Policy/Strategy   | Commitment  | Comment  |
|---|---|--|
| <b><i>Disability Action Plan 2012-2017</i></b><br>(TfNSW, 2012b)                            | <p>The <i>Disability Action Plan 2012-2017</i> was developed by TfNSW in consultation with the Accessible Transport Advisory Committee, which is made up of up of representatives from peak disability and ageing organisations within NSW.</p> <p>The Disability Plan discusses the challenges, the achievements to date, the considerable undertaking that is required to finish the job, and provides a solid and practical foundation for future progress over the next five years.</p> | The Proposal has been developed with consideration of the objectives outlined in this Plan and seeks to improve and provide equitable access to public transport facilities.   |
| <b><i>Sydney's Walking Future - Connecting people and places</i></b><br>(TfNSW, 2013b)      | <p><i>Sydney's Walking Future</i> outlines the NSW government's efforts to:</p> <ul style="list-style-type: none"> <li>• promote walking for transport</li> <li>• connect people to places through safe walking networks around activity centres and public transport interchanges.</li> </ul>  | The Proposal would facilitate walking by removing physical barriers to accessible public transport and by providing accessible cross-corridor access, hence contributing a relative reduction in local trips via private cars.   |
| <b><i>Sydney's Cycling Future - Cycling for everyday transport</i></b><br>(TfNSW, 2013c)    | <i>Sydney's Cycling Future</i> outlines the NSW government's commitment to a safe and connected network of bicycle paths as an important part of Sydney's integrated transport system. The government wants to make bike riding a convenient and enjoyable option by improving access to towns and centres, and investing in bicycle facilities at transport hubs.  | The Proposal supports the government's Bike and Ride initiative that better integrates bicycle riding with other modes of transport, making it convenient to ride to transport hubs, park bicycles securely and transfer to public transport as part of longer transport journeys. |
| <b><i>Rebuilding NSW – State Infrastructure Strategy 2014</i></b><br>(NSW Government, 2014) | <p><i>Rebuilding NSW</i> is a plan to deliver \$20 billion in new productive infrastructure to sustain productivity growth in our major centres and regional communities.</p> <p>Rebuilding NSW will support overall population growth in Sydney and NSW.</p>   | The Proposal supports investment in rail infrastructure, and aligns with the reservation of \$8.9 billion for urban public transport to support Sydney's population, that is expected to reach almost six million by 2031.   |



| Policy/Strategy   | Commitment  | Comment   |
|---|---|---|
|   | Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal.   |   |
| <b><i>A Plan for Growing Sydney</i></b><br>(Department of Planning and Environment, 2014) | <p><i>A Plan For Growing Sydney</i> superseded the draft <i>Metropolitan Strategy for Sydney 2036</i>. The Plan provides information on the strategies to accommodate an additional 664,000 homes and 689,000 jobs by 2031, which in part will be helped by a more integrated transport network.</p> <p>The Proposal is located in the West Central subregion and the priorities relevant for the West Central area include:</p> <ul style="list-style-type: none"> <li>• a competitive economy</li> <li>• accelerate housing supply, choice and affordability and build great places to live</li> <li>• protect the natural environment and promote its sustainability and resilience</li> </ul>   | <p>The Proposal would be consistent with the aims of the following directions by providing more accessibility to the Rooty Hill Station and to the suburb centre:</p> <ul style="list-style-type: none"> <li>• Direction 1.4: Transform the productivity of Western Sydney through growth and investment</li> <li>• Direction 1.11: Deliver infrastructure</li> <li>• Direction 3.1: Revitalise existing suburbs</li> </ul> |
| <b><i>NSW: Making It Happen</i></b><br>(NSW Government, 2015)                             | <p>In September 2015, the NSW Government announced a series of State Priorities as part of <i>NSW: Making It Happen</i> (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. <i>NSW: Making it Happen</i> focuses on 12 key 'priorities' to achieve the NSW Government's commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services.</p> <p>One of the 12 priorities identified as part of <i>NSW: Making It Happen</i> relates to investment in building infrastructure. The ongoing development and</p> | <p>The Proposal assists in meeting the priority by providing approximately 300 additional car parking spaces to commuters at Rooty Hill Station. The Proposal would also make public transport more accessible and encourage the use of public transport.</p>   |

| Policy/Strategy  | Commitment   | Comment  |
|--|--|--|
|  | investment in transport infrastructure is identified as part of the wider building infrastructure priority.  |  |
| <b><i>Future Transport Strategy 2056 (Draft)</i></b><br>(NSW Government, 2016)   | The Draft Future Transport Strategy is a vision for how transport can support growth and the economy of NSW over the next 40 years. This strategy is underpinned by the <i>Draft Regional Services and Infrastructure Plan</i> and the <i>Draft Greater Sydney Services and Infrastructure Plan</i> as well as a number of supporting plans including Road Safety and Tourism.   | The Proposal supports the vision of the <i>Draft Future Transport Strategy</i> by providing accessible services for people who find it difficult to access public transport services.<br><br>Lifts and a compliant ramp will provide a physically accessible network allowing more choice for people with mobility constraints. Greater accessibility will also mean better connections to places and opportunities for employment, education, business and enjoyment.   |
| <b><i>Draft Greater Sydney Region Plan</i></b> and the <b><i>Draft Central City District Plan</i></b><br>(Greater Sydney Commission, 2017) | The <i>Draft Greater Sydney Region Plan</i> outlines how Greater Sydney will manage growth and change and guide infrastructure delivery. It sets the vision and strategy for Greater Sydney, to be implemented at a local level through the <i>Draft Central City District Plan</i> . The Plans have been prepared in conjunction with the NSW Government's <i>Future Transport 2056 Strategy</i> and informs Infrastructure NSW's <i>State Infrastructure Strategy</i> providing full integration of land use, transport and infrastructure planning. | The Proposal would assist in meeting the objectives of the <i>Draft Greater Sydney Region Plan</i> and the <i>Draft Central City District Plan</i> by providing greater accessibility to public transport. The provision of lifts and a compliant ramp would provide easy access to trains and busses. Additional bike racks will aid in making cycling to other modes of transport more convenient.<br><br>The improved access and additional bike racks at Rooty Hill Station as well as additional car parking spaces will provide greater connectivity between public transport to town centres, open spaces and public places which is in line with the priority of a city supported by infrastructure. |

## 4.6 Ecologically sustainable development

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

- the precautionary principle – If there are threats of serious or irreversible damage, a lack of full scientific uncertainty should not be used as a reason for postponing measures to prevent environmental degradation
- intergenerational equity – the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- conservation of biological diversity and ecological integrity – the diversity of genes, species, populations and their communities, as well as the ecosystems and habitats they belong to, should be maintained or improved to ensure their survival
- improved valuation, pricing and incentive mechanisms – environmental factors should be included in the valuation of assets and services.

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the Rooty Hill Station Upgrade and Commuter Car Park. Section 3.1.3 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

## 5 Community and stakeholder consultation

Chapter 5 discusses the consultation undertaken to date for the Proposal and the consultation proposed for the future. This chapter discusses the consultation strategy adopted for the Proposal.

### 5.1 Stakeholder consultation during concept design

Consultation was undertaken with Blacktown City Council, RailCorp and Sydney Trains during the development of design options and confirmation of the preferred option. Consultation with these stakeholders would continue through the detailed design and construction of the Proposal.

### 5.2 Consultation requirements under the Infrastructure SEPP

Part 2, Division 1 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Clauses 13, 14, 15 and 16 of the Infrastructure SEPP require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

Table 4 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Consultation with Blacktown City Council, RailCorp and Sydney Trains would continue through the detailed design and construction of the Proposal.

**Table 4 Infrastructure SEPP consultation requirements**

| Clause  | Clause particulars   | Relevance to the Proposal   |
|---|--|---|
| <b>Clause 13   Consultation with Councils – development with impacts on council related infrastructure and services</b> | <p>Consultation is required where the Proposal would result in:</p> <ul style="list-style-type: none"><li>substantial impact on stormwater management services</li><li>generating traffic that would place a local road system under strain</li><li>involve connection to or impact on a council owned sewerage system</li><li>involve connection to and substantial use of council owned water supply</li><li>significantly disrupt pedestrian or vehicle movement</li><li>involve significant excavation to a road surface or footpath for which Council has responsibility.</li></ul> | <p>The Proposal includes works that would:</p> <ul style="list-style-type: none"><li>require connections or impacts the stormwater system</li><li>disrupt pedestrian and vehicle movements</li><li>impact on road pavements under Council's care and control</li><li>impact on Council-operated footpaths.</li></ul> <p>Consultation with Blacktown City Council has been undertaken and would continue throughout the detailed design and construction phases.</p> |
| <b>Clause 14   Consultation with Councils – development with impacts on local heritage</b>                              | <p>Where railway station works:</p> <ul style="list-style-type: none"><li>substantially impact on local heritage item (if not also a State heritage item)</li><li>substantially impact on a heritage conservation area.</li></ul>  | <p>The Rooty Hill Station Upgrade and Commuter Car Park project would result in a moderate physical impact and a moderate visual impact to the Blacktown City Council LGA heritage listed Rooty Hill Railway Station.</p> <p>Accordingly, consultation with Council is required. Refer to Section 6.5.</p>  |

| Clause  | Clause particulars   | Relevance to the Proposal  |
|---|--|--|
| <b>Clause 15   Consultation with Councils – development with impacts on flood liable land</b> | Where railway station works: <ul style="list-style-type: none"> <li>impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual: the management of flood liable land</i>.</li> </ul>  | The Proposal is located on land that is susceptible to flooding. Accordingly, consultation with Blacktown City Council is required in regard to this aspect. Refer to Section 6.9.   |
| <b>Clause 16   Consultation with public authorities other than Councils</b>                   | For <i>specified development</i> , which includes consultation with the OEH for development that is undertaken adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> , and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult with could include: <ul style="list-style-type: none"> <li>Roads and Maritime</li> <li>Sydney Trains</li> <li>Sydney Water</li> <li>OEH.</li> </ul> | The Proposal is not located adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> . Accordingly, consultation with the OEH on this matter is not required. |

### 5.3 Consultation strategy

The consultation strategy for the Proposal was developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and the project team. The consultation strategy was developed, having regard to the requirements of the planning process and ensures that stakeholders, customers and the community are informed of the Proposal and have the opportunity to provide input.

The objectives of the consultation strategy are to:

- provide accurate and timely information about the Proposal and REF process to relevant stakeholders
- raise awareness of the various components of the Proposal and the specialist environmental investigations
- ensure that the directly impacted community are aware of the REF and consulted where appropriate
- provide opportunities for stakeholders and the community to express their view about the Proposal
- understand and access valuable local knowledge from the community and stakeholders
- record the details and input from community engagement activities
- build positive relations with identified community stakeholders
- ensure a comprehensive and transparent approach.



## 5.4 Public display

The REF display strategy adopts a range of consultation mechanisms, including:

- public display of the REF at various locations
- distribution of a project newsletter at the station, and to local community (500 metre radius of the Proposal area) and rail customers, outlining the Proposal and inviting feedback on the REF
- advertisement of the REF public display in local newspapers details for where to find further information and how to provide feedback
- project information available on the TfNSW website, including a summary of the Proposal and information on how to provide feedback
- doorknocking adjacent properties and local businesses
- two pop-up stalls to be held at the station to allow customers and community members to speak with the project team
- consultation with Blacktown City Council and Sydney Trains.

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The display period of the REF would be advertised in the week that the public display commences. The REF will be displayed for a period of two weeks at the following locations:

- Blacktown City Council Customer Service Centre, 62 Flushcombe Road, Blacktown
- Blacktown City Council's Our Library @ The Mount Druitt Hub, Ayres Grove, Mt Druitt
- Transport for NSW Office, Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood.

The community will have the opportunity to speak directly with TfNSW representatives at a pop-up stall to be held during the REF public display period. Dates and times for the stall will be advertised to the local community.

The REF would also be available on the [TfNSW website](http://www.transport.nsw.gov.au/projects-tap)<sup>3</sup>. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by [email](mailto:projects@transport.nsw.gov.au)<sup>4</sup>. During this time feedback is invited. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

## 5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the area covered by the Proposal plus a 200m radius, on 12 October 2017. The search did not identify any Aboriginal sites recorded in or near the subject location, and no Aboriginal places have been declared in or near the subject location.

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<sup>3</sup> <http://www.transport.nsw.gov.au/projects-tap>

<sup>4</sup> [projects@transport.nsw.gov.au](mailto:projects@transport.nsw.gov.au)

The extensive landscape modification that has occurred across the Proposal area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the Proposal area. Similarly, the high level of disturbance would suggest that the archaeological potential of the area is low.

Due to the disturbed nature of the area covered by the Proposal and no items being identified during the search, consultation with the Local Aboriginal Land Council (LALC) or other aboriginal stakeholders has not been undertaken. Further detail on the assessment of the potential impacts on aboriginal heritage are outlined in Section 6.4 including relevant mitigation measures.

## 5.6 Ongoing consultation

At the conclusion of the public display period for this REF, TfNSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by TfNSW before determining whether to proceed with the Proposal (refer **Error! Reference source not found.**).

Should TfNSW determine to proceed with the Proposal, the Determination Report would be made available on the TfNSW website and would summarise the key impacts identified in this REF, demonstrate how TfNSW considered issues raised during the public display period, and include a summary of mitigation measures proposed to minimise the impacts of the Proposal.

Should TfNSW determine to proceed with the Proposal, the project team would keep the community, councils and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of the Proposal. The interaction with the community would be undertaken in accordance with a Community Liaison Plan to be developed prior to the commencement of construction.

## 6 Environmental impact assessment

Chapter 6 of the REF provides a detailed description of the likely environmental impacts associated with the construction and operation of the Proposal. For each likely impact, the existing environment is characterised and then an assessment is undertaken as to how the Proposal would impact on the existing environment.

This environmental impact assessment has been undertaken in accordance with clause 228 of the EP&A Regulation. A checklist of clause 228 factors and how they have been specifically addressed in this REF is included at Appendix B.

### 6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment (TT&AIA) was undertaken by SECA Solutions in October 2017 (SECA, 2017) (See Appendix C).

The assessment and report outlined:

- an assessment of potential impacts on the local road network during construction and operation
- an assessment of any impact the additional parking may generate during construction and operation
- a review of the access arrangements at and around the Proposal site
- the general transport impacts that may arise from the project.

The results of the TT&AIA are summarised below.

#### 6.1.1 Existing environment

##### Road network

###### *Station Upgrade*

The Station Upgrade component of the Proposal is located primarily within the existing rail corridor for the T1 Western Line which is owned by RailCorp and operated by Sydney Trains. Some elements of the Proposal would be conducted within the adjoining road corridors which provide access to the southern and northern station interchanges as illustrated in Figure 3.

Immediately to the south of the southern interchange is the junction of Rooty Hill South Road and Beames Avenue. Rooty Hill South Road and Beames Avenue provide vehicular access to the Rooty Hill Station entrance and commuter car park as well as connectivity for pedestrian and cycleway traffic to and from the southern interchange.

Beames Avenue is a local road that runs along the southern perimeter of the rail corridor, aligned in an east-west direction. The east most portion of Beames Avenue is one way (westbound only) up to Catherine Crescent, after which this intersection then becomes a two-way road. Some on-street parking is provided on both sides of the one-way portion of Beames Avenue, with angled parking on the northern side and parallel parking on the southern side. The sign posted speed limit is 50 km/h.

Rooty Hill Road South is located on the southern side of the station, aligned in a north-south direction. From the junction of Beames Street to the junction of Barker Street, for a length of approximately 100 metres, rear to kerb parking is provided on both sides with one traffic lane in each direction. A reduced sign-posted speed limit of 40 km/h and traffic calming measures such as speed humps have also been implemented for this section of the road.

### Commuter Car Park

Aspects of the Proposal would be conducted within the local road network adjacent to the northern interchange of the station which includes North Parade, Rooty Hill Road North and Station Street. The Commuter Car Park site is exclusively accessed to and from Station Street to the west of the Proposal site.

North Parade runs along the northern perimeter of the rail corridor and functions as a local road, aligned in an east-west direction with one traffic lane in each direction. The speed limit is signposted as 40 km/h in the vicinity of the station due to high pedestrian activity. Kiss and ride zones and a taxi zone are located on North Parade. A commuter car park is present on the northern side of the road, however there is no direct vehicle access to or from North Parade. A pedestrian footbridge over North Parade provides direct access from the commuter car park to the northern entrance of Rooty Hill Station.

Rooty Hill Road North is located on the northern side of the station, aligned in a north-south direction. Similar to Rooty Hill Road South, rear to kerb parking is provided on both sides for a length of approximately 200 metres, rear to kerb parking is provided on both sides with one traffic lane in each direction. A reduced sign-posted speed limit of 40 km/h and traffic calming measures such as speed humps have also been implemented for this section of the road. The segment of the road nearest to the station from North Parade to Woodstock Avenue is categorised as a local road.

Station Street functions as a local road and runs in a north-south direction, with one traffic lane in each direction. The southern end of the road leads to North Parade, on the northern perimeter of the rail corridor. An off-street commuter car park is present with access from either side of Station Street near North Parade. The section of Station Street, approximately 250 metres from Rooty Hill Station, has a 'No Stopping' restriction. North of this point, on-street parking is unrestricted on both sides of Station Street. The sign-posted speed limit is 50 km/h.

### Traffic

Traffic surveys were conducted on 12 October 2017 to review the current road operation and quantify the existing traffic volumes along both Station Street, and within each of the commuter car parks.

Surveys were completed over a typical weekday (Thursday 12<sup>th</sup> October 2017) during both the morning (6:30am to 9:30 am) and evening (4:00pm to 6:30pm) to assess peak commuter periods and determine the potential traffic increases associated with construction of the new commuter car park. A summary of the peak hour traffic flows is shown in Table 5.

**Table 5 Surveyed peak hour traffic volumes**

| Location                                  | Time | Two-way | Northbound | Southbound |
|---|------|---------|------------|------------|
| Station Street<br>(south of Kalunga Lane) | AM   | 399     | 160        | 239        |
|   | PM   | 359     | 160        | 199        |
| Station Street<br>(north of Kalunga Lane) | AM   | 404     | 139        | 265        |
|   | PM   | 334     | 176        | 158        |

Traffic surveys indicate the road network to the north of the train station being North Parade and Rooty Hill Road North, currently operate well with minimal delays or congestion during the day. North Parade can experience minor delays at the front of the station where vehicles may be reversing into car parking spaces or using the kiss and ride facility. Delays or

queuing is minimal and the congestion quickly clears when the vehicle has completed its manoeuvre. Other intersections in the vicinity and existing car park access driveways operate to a good standard with minimal disruptions.

The intersection of Rooty Hill Road and North Parade experience a high level of pedestrian activity adjacent to the railway station which can sometimes create some minor delays and congestion, but the overall operation is acceptable. The assessment survey showed that during the morning peak, 471 passengers entered or exited the Station on the northern side of the rail corridor.

Surveys demonstrate the car park is generally full by approximately 7:30am-7:45am with a small number of vehicles accessing the car park after this time. Prior to this, 67 vehicles entered the car park with 15 of these vehicles exiting due to not being able to locate a parking space. All vehicles which entered the site later in the morning also exited the site. It is of note that the peak demand for the car park occurs earlier than the peak usage on the local road network.

In the evening, departures are spread out across the hour in line with trains arriving at Rooty Hill Station. Departures occur consistently throughout the entire survey period and a maximum of 53 vehicles left the site between 5:30pm and 6:30pm.

## **Parking**

Parking opportunities to the south of the station are restricted to a small car park that adjoins the station perimeter at the end of Beames Avenue. This is limited to approximately 20, 90-degree angle parking spaces. On the south side of the station further commuter parking is available on-street, along Beames Avenue (time restricted), Catherine Crescent and Rooty Hill Road South.

There is a significant demand for unrestricted parking due to rail commuters. The existing commuter car parking spaces were found to be completely occupied by 7.30am and overflow demand was found to spill over onto unrestricted on street spaces within walking distance on the southern side of the station.

Currently parking in the north of the precinct consists of approximately 160 untimed car parking opportunities.

There is a significant number of on street (commuter) parking spaces available along North Parade, to the west of the station platform. This parking is located parallel to the road way and has no time restriction for use. There is further unrestricted kerbside parking available in the locality along Station Street to the north of Kalunga Lane. Time restricted parking is available along Rooty Hill Road North, with 90-degree angle parking on both sides of the road designated as one hour parking.

There is high demand for on street commuter parking spaces along Station Street to the north of the station. Parking opportunities are heavily utilised with the local parking observed to reach full capacity by 7.30am on weekday mornings.

### *Motorcycle parking*

There are no formal motorcycle parking spaces in the general locality of Rooty Hill Station or within the vicinity of the proposed parking on Station Street.

## **Public Transport**

### *Rail*



Rooty Hill Station is located approximately 40 kilometres west from Central Station and is serviced by the T1 Western Line. The T1 train lines provide both express and all stops trains to the Sydney CBD.

Rooty Hill Station is currently ranked the 92nd busiest railway station on the Sydney Trains network, recording approximately 5,500 customer trips during a typical weekday (Bureau of Transport Statistics, 2014). Most demand occurs during typical peak periods for commuter trips between 6:00am and 9:00am, and between 3:00pm and 6.30pm.

### *Bus*

Bus services to the southern side of the station utilise Beames Avenue. Buses on the north of the station arrive and depart from existing bus stops on Rooty Hill Road North servicing surrounding areas including Mt Druitt and Blacktown. These bus routes include:

- Route 728 Mt Druitt to Blacktown
- Route 738 Mt Druitt to Horsley Park
- Route 756 Mt Druitt to Blacktown
- Route 757 Mt Druitt to Riverstone

### *Taxi and informal kiss and ride*

There is a taxi zone and kiss and ride drop off zone located on Beames Place to the south of the Station. The same facilities are located on North Parade and Rooty Hill Road North to the north of Rooty Hill Station.

## **Pedestrian access**

### *Southern side of Station*

The streets within the vicinity of the southern side of the railway station provide a good network of pedestrian pathways which connect the town centre and the railway station. There is a marked zebra crossing to the west along Beames Avenue which provides access to the pedestrian footpath that accesses the south side of the Station. Access to the platforms from this side is via either a staircase or a steep non-compliant ramp that links with the Station overpass. Access to each platform is via stair cases with no wheelchair access at present.

### *Northern Side of Station*

Currently there are no footpaths on Station Street or North Parade to accommodate pedestrian demands between the existing at grade commuter car park and Rooty Hill Station. Pedestrians currently walk along Station Street to access the front of the train station. The pre-existing smaller commuter car park which is located adjacent to the north of Rooty Hill shopping precinct is linked to the station via a covered ramp and this is only accessible from within the car park.

North Parade has constructed pedestrian access along both the northern and southern sides with two access points crossing the street to allow commuters access to gateways in the station fence which provide access from street level.

Morning pedestrian movements on North Parade occur between 6:30am and 9:00am. In the evening, there is a distinct peak of pedestrian movements between 5:30pm and 6:30pm.

## **Bicycles**

Bicycle lockers are located next to the pedestrian ramp on Rooty Hill Road with additional lockers provided next to the commuter car park on Station Street. Bike racks are also provided at the bus stop on Rooty Hill Road.

The Rooty Hill precinct has limited cycling paths with no formal connection to the Rooty Hill Station. Cyclists either use the existing road network or ride on the constructed footpaths where they are present.

### **6.1.2 Potential impacts**

#### **a) Construction phase**

##### **Road network**

Construction traffic will be able to access the sites via a number of routes. Heavy construction traffic inbound and outbound will be via North Parade – Sherbrooke Street – Railway Street – Luxford Road – Carlisle Avenue to connect to the Great Western Highway / M7 / M4.

Traffic can access the locality via the arterial road network (i.e. Great Western Highway and M4 Western Motorway and Westlink M7) with all the traffic movements controlled by traffic signals or roundabouts to control traffic movements in a safe and appropriate manner.

Traffic entering and exiting Station Street to access the site will access via a right turn and egress via left turn out. Temporary road closures may be required for short periods during construction to facilitate works (such as kerb and gutter works), alternative access arrangements will be detailed as part of the Traffic Management Plan.

##### **Traffic**

Construction of the Proposal would result in a minor temporary increase in traffic as a result of the movement of construction workers, delivery of construction materials, equipment and machinery and spoil removal.

The volume of construction traffic movements during the morning and afternoon peak periods would likely be minimal. The majority of construction traffic movements are generated by staff accessing the site using light vehicles, and these movements are typically generated prior to the peak traffic movements in the morning and in the afternoon.

Heavy vehicle construction movements, including materials and concrete deliveries, would be likely distributed throughout the day. Movements would be scheduled to avoid local traffic peaks as part of a Construction Traffic Management Plan (CTMP) that would be prepared prior to construction commencing.

##### *Station Upgrade*

The volume of heavy vehicles for the Station Upgrade component is expected to be up to 50 per day during major construction periods, and 15 per day outside of these periods. The volume of light vehicles used by construction workers is anticipated to be 20 vehicles per day during major construction periods and 15 outside of these periods. This is an estimate as construction workforce numbers were not known at the time of assessment.

##### *Commuter Car Park*

The volume of heavy vehicles accessing the Commuter Car Park site is expected to be up to 10 per day during major construction periods, with fewer vehicles accessing the site outside of these periods. The volume of light vehicles used by construction workers is anticipated to be five vehicles per day during major construction periods and three outside of these periods.

##### **Parking**

The closure of the existing Rooty Hill Station at grade car park for the duration of the construction work would result in the loss of 160 timed and untimed parking spaces and

require vehicles that would have used these spaces to park in other locations in the general vicinity of the subject site, which is already at capacity.

The existing parking on the southern side of the station will be temporarily removed to allow for a temporary site office, and construction of the new lift and stairs.

The impact of this loss of parking could be reduced through implementation of alternative parking options, which could include:

- use of vacant land along the southern boundary of the site prior to redevelopment
- temporary removal of some of the on-street parking controls within the immediate locality of the railway station to allow for all day commuter parking.

Opportunities for temporary alternative commuter and casual car parking in the immediate vicinity of the Proposal would be investigated in consultation with Blacktown City Council during the detailed design stage.

Overall, the loss of parking during the construction phase would be a short-term impact and temporary in nature. Upon completion of the Proposal, both commuters and the general community would benefit from the provision of additional unrestricted parking and improved amenity within the vicinity of the railway station.

## **Pedestrians**

The pedestrian footpath on the south side of the station along Beames Avenue would need to be closed at times to pedestrian and bicycle traffic and controlled during construction to ensure safe access for pedestrians, and separation of construction plant and equipment from public traffic and pedestrians. Access to the station would be maintained at all times it is operational.

There is no pedestrian path adjacent to the site on Station Street and with the car park closed, there will be limited demand for pedestrians along the site frontage. As part of the Traffic Control Plan, pedestrians will be diverted to the opposite side of Station Street during the construction works.

During the construction of the car park, pedestrian controls would be implemented to direct pedestrians safely around the work site.

Overall, there would be minimal disruption to pedestrian activity during the construction phase. Any measures required for pedestrian safety during the construction phase would be detailed in the construction Traffic Management Plan.

## **Cyclists**

Bike lockers on Station Street would not be able to be accessed during the construction work. These lockers may require temporary relocation to a more suitable location in the vicinity of the station. The extent of demand would be determined during the detailed design stage of the Proposal and temporary lockers provided to satisfy this demand. Construction of the Proposal would generally have minimal impacts on cycling.

## **Bus, taxi and kiss and ride**

The construction work on both the northern and southern sides of the station are expected to have a minimal effect on existing bus routes, with the impact being limited to sharing of the roadway with delivery vehicles entering the sites to drop off construction materials. This would be a minor impact and with normal road rules applying there would be minimal delays for the existing bus services.

This would also be addressed as part of the Traffic Management Plan and after consultation with Blacktown City Council.

The existing taxi zones and kiss and ride facilities will remain operational on Beames Avenue, while the zones on Station Street will continue to operate except for the possession periods on several weekends when this section of road will be closed.

### **Property access**

Construction works are not expected to require any access changes to nearby properties. Access to all private properties and businesses adjacent to the works would be maintained, unless otherwise agreed with the relevant property owners.

## **b) Operational phase**

### **Vehicle access**

On the southern side of the station there would be no change to current entry/exit arrangements on Beames Avenue with the majority of work as detailed taking place on the northern side of the Rooty Hill Station. Vehicle access will be maintained after construction and the kiss and ride and taxi zones will operate as normal.

On the northern side of the station access to the existing parking area is via two separate driveways off Station Street. Both these driveways will be removed and a single combined entry/exit driveway further to the north on Station Street will be constructed.

By relocating the access further to the north along Station Street sight lines for vehicles entering or exiting the site will be improved as they are currently restricted by a 90-degree bend at the corner of Station Street and North Parade. This will provide an overall improvement for safety at the site compared to the existing situation. All traffic will enter and exit the car park via a single entry and exit driveway from Station Street. The design of the car park will allow for circulation of vehicles in a clockwise direction through each level with separated ramps providing access up or down to each parking level. Vehicles will enter and exit the car park in a forward direction.

### **Traffic generation and parking demand**

The taxi and kiss and ride zones will continue to be used in Beames Avenue with traffic numbers remaining relatively static.

For commuters travelling in private vehicles to the northern side of the station, during the morning peak period most vehicles are expected to arrive at the car park between 6:00am and 8:00am, which is consistent with existing travel patterns (the existing car park fills up by around 7:45am with several vehicles continuing to enter the car park in search of a parking space).

With an overall increased capacity of approximately 500 spaces it is estimated that the new car park would receive approximately 250 inbound vehicles per hour (consistent with the existing situation where less than 50 per cent of the capacity enters the site during the absolute peak). This would represent an increase of 170 vehicle movements compared to the operation of the existing commuter car park.

Assuming the afternoon peak generally occurs between 5:15pm and 7:15pm, it is estimated that approximately 250 vehicles would exit the car park per hour, an increase of approximately 200 vehicles when compared with the operation of the existing car park.

Car parks are generally not traffic generators but rather represent the end point for vehicle movements associated with a generator of traffic. No additional traffic generation is anticipated. The broader road network will not experience significant change, as the vehicles parking in the new facilities would otherwise be parked on-street, having already entered the broader road network.

Potential traffic impacts for Rooty Hill have therefore been assessed by the application of the Austroads guidelines, to determine the need for a detailed traffic analysis (e.g. Table 2.4

Austrroads Guide) as well as consideration of the existing signalised intersection for the current Rooty Hill Commuter Car Park exit. Based on these guidelines, the need to undertake detailed (SIDRA) modelling is not considered necessary, and this is supported by a peer review of similar assessments of traffic impacts for other similar commuter car parks.

### **Pedestrians and cyclists**

Pedestrian access to the southern interchange would not be expected to increase as a result of the works associated with Beames Avenue. Existing pedestrian access would be maintained and commuter cyclists would continue to be catered for nearer the train station.

There would be a high demand for pedestrian movements between the new commuter car park on the northern side of Rooty Hill Station during the morning and evening, with reduced demands during the day. Assuming a car occupancy rate of 1.2 persons per vehicle, the expanded commuter car park would result in approximately 300 people moving between the car park and station each hour during peak times. This would represent an increase of approximately 240 movements over the existing movements from the current car park. It should be noted however that these increases would likely replace existing pedestrian movements elsewhere within the road network at Rooty Hill.

The increase in numbers would be accommodated through the construction of the new accessible footpath on Station Street and North Parade, and the improved accessibility to the station precinct.

Commuter cyclists will have access to bike lockers along Station Street and closer to the station and cycling commuters would not be expected to utilise this new parking facility.

### **Public transport**

Access to buses and taxis would be maintained in a similar form to present conditions. Overall access to public transport would be maintained.

### **Property access**

No access changes to nearby properties would be required for the Proposal.

#### **6.1.3 Mitigation measures**

The following mitigation measures are proposed to manage traffic, transport and access impacts:

- alternative parking options to offset the temporary loss of commuter parking during construction would be investigated and reported on during detailed design and construction planning, in consultation with the relevant authorities and the local community
- consult with relevant authorities during detailed design to determine appropriate controls for the minor anticipated impacts to the bus, taxi and kiss and ride zones during construction and operation
- a Traffic Management Plan (TMP) and Traffic Control Plan (TCP) will be devised and provided to control traffic, pedestrian and cyclist movements to maintain safety during the construction works
- construction traffic movements would be scheduled at every opportunity to avoid local traffic peaks
- access to all private properties and businesses adjacent to the works would be maintained during construction, unless otherwise agreed by relevant property owners

Refer to Table 23 for a full list of proposed mitigation measures.



## 6.2 Urban design, landscape and visual amenity

A Visual Impact Assessment (VIA) was undertaken by Envisage for the Proposal (Envisage, 2017) (see Appendix D). The findings of this assessment are summarised in this section.

### 6.2.1 Existing environment

#### *Landscape character*

The dominant character within the immediate vicinity and surrounding area of Rooty Hill Station and commuter car park is comprised of commercial shopping precincts (both north and south of Rooty Hill Station), large areas of car parking, a skate park, a waste depot, and residential areas. There are also attractive heritage buildings, including the 1940s heritage buildings on the Station platform and the Imperial Hotel building on the corner of North Parade and Rooty Hill Road North.

The T1 Western Line railway corridor bisects the Rooty Hill commercial precinct. Residential properties are located in the vicinity of the station with an approximate offset of 150 metres to the south at the closest point, however they are shielded from the character at the station by the features mentioned above.

The station precinct is rapidly changing with a new four storey development already under construction adjacent to the southern interchange of the station. The locality is zoned to permit a maximum building height of 14 metres.

The area surrounding the southern side of the station is visually dominated by the existing overhead covered pedestrian walkway and ramps. These structures, and the adjoining expanse of hard paved car parks either side of the station, overshadow the more attractive architectural features of the station, and detract from the area's pedestrian friendliness.

The area surrounding the proposed commuter car park location is visually separated from the station by the adjoining railway corridor, the waste depot and skate park. The area features two mature native trees within the existing car parking area, and several smaller native trees along the fringes of the car park. The trees provide amenity within the extensive hard-paved car park area.

#### *Visual receivers*

The Proposal has a relatively confined area of visibility due to the flat nature of the surrounding landform. With the exception of the Rooty Hill Station and the M7 motorway (130 metres east of the existing commuter car park), there are no opportunities for elevated views at ground level. Even from these elevated locations, views are limited. Future views from The Rooty Hill Station would be hindered by the four-storey development being constructed adjacent to the Station; and barricades, vegetation and buildings limit the outlook from the M7 motorway.

Potential viewpoints at ground level are confined to close locations. Due to existing structures, buildings and vegetation, available views are within approximately 250m from the station (see Figure 21).



**Figure 21 Site visual analysis and key viewpoints**

Photomontages have been prepared to illustrate the changes and the anticipated view following construction at locations 2, 4, 5, 6a and 6b. Photomontages from these viewpoints are provided in Figure 22 to Figure 29.

## 6.2.2 Potential impacts

### a) Construction phase

A construction compound would be established on the existing station platforms for the Station Upgrade works and along the southern perimeter of the existing commuter car park as illustrated in Figure 17. Typical elements would include temporary fencing, stockpiling of materials and construction equipment and these sites would be fenced/screened off and public access prevented during that time. These changes would be temporary and therefore not have a long term visual impact.

On the southern side of the station, the construction footprint would affect a large area of publicly accessible space. During construction, car parking spaces would temporarily be reduced. Behind the fenced off construction area, it is likely that cranes and heavy machinery would be visible. Local roads would be affected by delivery trucks and road diversions.

The magnitude of change to landscape character during construction is rated as moderate. There would be:

- a large extent of area affected
- construction would be the dominant feature of the scene
- visual effects would be temporary and reversible.

Access to the existing car park on the northern side of the station would be prevented for the duration of the construction period. During this phase, plant and equipment would be visible to surrounding receivers. It is proposed that two mature native trees, and a number of smaller native trees along the edges of the car park site would be removed. Station Street may be affected by delivery trucks and temporary road controls may be in place.

The magnitude of change to landscape character during construction is rated as moderate. There would be:

- a relatively large area would be affected
- construction which would be the dominant feature of the scene
- removal of the trees which would be an immediate visual change.

## **b) Operational phase**

### *Landscape character*

The Station Upgrade components of the Proposal would not result in a change to the landscape character. The form and function of the Rooty Hill Station Precinct would not be significantly altered. Station infrastructure and facilities would be modified to meet the objectives outlined in Section 2.1 and not result in a fundamental change to the existing landscape character.

The overall effect would be compatible with the already substantially urban character and not of a high contrast. In general, there would be a low magnitude of change to the landscape character associated with the Proposal.

The Commuter Car Park component of the Proposal would replace the existing at-grade car park with a structure of three additional parking levels, which would be within the maximum height limit of 14m currently zoned for the area and similar in scale to the new development adjacent to the southern interchange of the Rooty Hill Station.

The Proposal would introduce a larger scale built element than the existing car park, however the existing land use would remain the same and not result in a fundamental change to the landscape character. The proposed Commuter Car Park area has been assessed as having a low sensitivity ranking for landscape character. The predicted magnitude of change to the landscape character as a result of the Commuter Car Park during operation has been assessed as moderate-low.

### *Visual impacts*

Rooty Hill Station would be more visually open as a result of the Proposal, with the removal of the overhead ramps and replacement of the pedestrian footbridge with a sleeker structure. The heritage architecture of the station would be more noticeable and entrances on both sides of the station would be more inviting, featuring wider footpaths, landscaping, shelter and seating.

Photos of the existing views and a photomontage showing the altered views due to the Proposal are provided in Figure 22 and Figure 23, respectively (views to the south) and Figure 24 and Figure 25 (views to the north).

It is anticipated that the Proposal would provide positive visual attributes and, overall, lead to significant visual improvement of the station precinct due to the more open views of the



Station and new platform infrastructure. In addition, an improved pedestrian experience would be created with widened footpaths, new shelters, garden beds and new pedestrian crossing.

The Commuter Car Park would be a new and visually distinct element in the area. However, at four-storeys in its proposed location next to the Blacktown City Council depot, it would be in scale with new development adjacent to the southern interchange of the station. The impact to viewpoints during operation ranges from moderate to low.

The Commuter Car Park, while located in an area that is not visually prominent, would result in the loss of up to four existing trees which would be determined during detailed design. It is understood the two existing tall trees within the proposed car park site would be removed however it should be noted that these trees provide much needed amenity within the large hard-paved area.

Photos of the existing views and a photomontage showing the altered views due to the Proposal are provided in Figure 26 and Figure 27, respectively (views to the south) and Figure 28 and Figure 29 (views to the north).



**Figure 22 - View of existing Rooty Hill Station (Northern Interchange) from Station Street, looking south**



**Figure 23 – Photomontage view towards the Proposal from Station Street, looking south**





**Figure 24 - View of existing Rooty Hill Station (Southern Interchange) from Beames Avenue, looking north**



**Figure 25 – Photomontage view towards the Proposal from Beames Avenue, looking north**



**Figure 26 - View of existing at grade commuter car park (left) from Station Street, looking south-east**



**Figure 27 – Photomontage view towards the Proposal from Station Street, looking south-east**





**Figure 28 - View of existing at grade commuter car park from North Parade, looking north**



**Figure 29 Photomontage view towards the Proposal from North Parade, looking north**

## Lighting

The Proposal would include the installation of lighting for operational, safety, security and maintenance purposes on an as needs basis. It is anticipated that night lighting would include building and pole mounted directional spot lighting and pole mounted pedestrian lighting.

For the Station Upgrade component of the Proposal, the majority of areas impacted by the works would be unlikely to require additional lighting, or lighting that would result in a direct line of sight from surrounding view locations. Installation of lighting would be in accordance with the *AS 4282:1997 Control of the Obtrusive Effects of Outdoor Lighting*, and would avoid light spill to adjoining road corridors and residential areas.

The potential impacts associated with lighting of the Commuter Car Park would need to be determined during development of the detailed design report. New lighting would be installed at elevations above that of the existing car park for items such as security and rooftop lighting on the top deck of the commuter car park. These lighting outputs would also need to be assessed in accordance with *AS 4282:1997 Control of the Obtrusive Effects of Outdoor Lighting*.

### 6.2.3 Mitigation measures

The Proposal, including detailed design elements, would be undertaken with reference to the recommendations included in the VIA (Envisage, 2017), including:

#### Design

- consideration of designing less intrusive structures and complimenting the existing heritage structures in vicinity of the Proposal
- an Urban Design Plan (UDP) would be prepared by the construction contractor at the 30 per cent design stage of detailed design, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design
- a Public Domain Plan (PDP) would be prepared by the construction contractor at the 30 per cent design stage of detailed design, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design
- assess consistency with the design objectives of the Blacktown Development Control Plan (DCP) (Sections 1.4 and 4.4.2).

#### Construction

- worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations
- light spill from the construction area into adjacent visually sensitive properties would be minimised by:
  - directing construction lighting into construction areas and ensuring the site is not over-lit
  - the sensitive placement and specification of lighting to minimise any potential increase in light pollution
  - design and installation of all lighting in accordance with the requirements of *AS4282 Control of the Obtrusive Effects of Outdoor Lighting*.

- retaining and protecting existing trees where practicable including consultation with a qualified arborist to minimise impact on the long-term health of any nearby trees that could be or are planned to be retained
- rehabilitation of disturbed areas
- installation of way-finding signage as per TfNSW guidelines
- removal of temporary hoardings, barriers, traffic management and signage when no longer required
- during construction and operation graffiti would be removed in accordance with TfNSW's standard mitigation measures
- protect existing trees to be retained prior to commencement of construction in accordance with Australian Standard *Protection of trees on development sites* AS4970-2009 and TfNSW's *Vegetation Management (Protection and Removal) Guideline*, 2015 (*Vegetation Management*, TfNSW, 2015)
- undertake replacement planting to address proposed tree loss in accordance with *Vegetation Management*, TfNSW, 2015
- plant tall native trees between the skate park and the proposed car park to soften and reduce the visual bulk of the car park when viewed from Station Street
- plant tall native trees (where possible in consideration of pedestrian/vehicular sightlines, safety and surveillance issues) along the Station Street interface with the car park.

Measures to mitigate visual impacts during construction would be included in a CEMP for the Proposal. Refer to Table 23 for a full list of proposed mitigation measures.

### 6.3 Noise and vibration

An environmental Noise and Vibration Impact Assessment (NVIA) was undertaken by Muller Acoustic Consulting (MAC) in October 2017 for the Proposal (MAC, 2017) (see Appendix E). The findings of this assessment are summarised below.

The assessment included:

- identifying sensitive noise receivers
- undertaking attended and unattended background noise monitoring
- establishing the noise and vibration assessment criteria
- establishing construction vibration criteria
- predicting the noise and vibration impacts from the proposed upgrade works to representative sensitive receivers
- assessing potential construction noise and vibration impacts by comparing predictions with established criteria
- providing recommended mitigation measures to minimise noise and vibration impacts.

This Noise and Vibration Impact Assessment has been conducted with due regard to and in accordance with the following key policy and guidelines:

- NSW Department of Environment and Climate Change – NSW Interim Construction Noise Guideline (ICNG), July 2009;



- NSW Department of Environment and Conservation – NSW Environmental Noise Management Assessing Vibration: A Technical Guideline (the NSW Vibration Guideline), February 2006;
- NSW Government – Transport for NSW (TfNSW) Construction Noise Strategy (CNS), Version 3 dated July 2016;
- NSW Department of Environment, Climate Change and Water – NSW Road Noise Policy (RNP), March 2011; and
- NSW Environment Protection Authority – NSW Environmental Noise Management – Industrial Noise Policy (INP), January 2000 and relevant application notes. This has been superseded by the Noise Policy for Industry (2017) and transitional arrangements are in place and will be applicable.

### 6.3.1 Existing environment

#### Noise sensitive receivers

The following land uses surround the Proposal:

##### *Station Upgrade:*

- commercial premises to the north, south and west
- Blacktown City Council owned and operated car parks and depots immediately to the north with residential receivers located at a greater offset distance.
- residential receivers are located to the north (250 metres), west (130 metres) and south (140 metres)
- existing rail corridor extends to the east and west
- a new residential multi-storey building located immediately south (approximately 100 metres) is currently under construction
- Rooty Hill Railway Station buildings and platforms are located within, and are considered to be sensitive to potential vibration impacts due to its close proximity to the proposed construction.

##### *Commuter Car Park:*

- surrounded by the Blacktown City Council depot and public skate park to the north,
- bounded to the east and south by the rail corridor
- Blacktown City Council commuter car park and commercial premises to the west.

The study area for the NVIA was separated into northern and southern noise catchments for the purpose of this assessment. One residential receiver location was selected for background monitoring in each catchment to act as representative receivers due to their proximity to the Proposal as detailed in Table 6.

These locations do not represent all receptors within the noise catchments for the Proposal although are selected as they are representative of locations that may experience the highest noise level impacts. A full list of sensitive receiver locations surrounding the Proposal are provided in Appendix E.

Figure 30 shows the nearest sensitive receivers to the Proposal and the attended noise monitoring locations used for the NVIA.



The unattended noise monitoring survey was conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, “Acoustics - Description and Measurement of Environmental Noise” and the EPL. Noise measurements were carried out using two Svantek Type 1, 977 noise analysers from Tuesday 10 October 2017 to Wednesday 18 October 2017

Monitoring Location L1 (noise sensitive receiver ID – N02) is located approximately 190 metres to the north-west of the Proposal boundary at the closest point to the Commuter Car Park and is representative of receivers in the northern noise catchment.

Monitoring Location L2 (noise sensitive receiver ID – S16) is located approximately 200 metres to the south-west of the Proposal boundary at the closest point to the Station Upgrade activities and is representative of receivers in the southern noise catchment.

From observations whilst on site, the noise environment at existing residential receptors is best described as ‘urban’ in accordance with the INP, being an area with an acoustical environment that:

- is dominated by ‘urban hum’ or industrial source noise
- has through traffic with characteristically heavy and continuous traffic flows during peak periods
- is near commercial districts or industrial districts
- has any combination of the above, where ‘urban hum’ means the aggregate sound of many unidentifiable, mostly traffic-related sound sources.

The results of unattended long-term monitoring at location L1 and L2 are provided in Table 7. The table gives the RBLs for standard periods, daytime, evening and night time periods.

**Table 7 Existing background and ambient noise levels**

| Monitoring Location      | Time    | Rating Background Level (L <sub>A90</sub> ) | Ambient noise level (L <sub>Aeq</sub> ) |
|--------------------------|---------|---|---|
| L1<br>(Rooty Hill North) | Day     | 45  | 55                                      |
|                          | Evening | 45  | 55                                      |
|                          | Night   | 38  | 50                                      |
| L2<br>(Rooty Hill South) | Day     | 42  | 57                                      |
|                          | Evening | 42  | 56                                      |
|                          | Night   | 37  | 54                                      |

*Note: Daytime 7am–6pm (or 8am–6pm Sundays and public holidays), Evening 6–10pm and Night 10pm–7am (or 10pm–8am Sundays and public holidays).*

As the largest potential for increase in road traffic as described in the Road Traffic Impact Assessment (AECOM February 2015) is expected to occur along Hartington Street and Station Street, from the ingress of additional vehicles to the proposed commuter car park, road traffic noise was assessed at noise monitoring location L1 – 138 Hartington Street.

Existing road traffic noise levels along Hartington Street and Station Street are summarised in Table 8.

**Table 8 Existing Road Traffic Noise Levels**

| Monitoring Location      | Period <sup>1</sup>     | Existing Road Traffic Noise | RNP Assessment Criteria |
|--------------------------|-------------------------|-----------------------------|-------------------------|
| L1<br>(Rooty Hill North) | Day $L_{Aeq,15hr}$ dBA  | 53.9                        | 55                      |
|                          | Night $L_{Aeq,9hr}$ dBA | 49.6                        | 50                      |

Note: Daytime 7am–6pm; Night 10pm to 7am.

## Construction noise criteria

### Residential criteria

Noise Management Levels (NMLs) in the NVIA were determined for the nearest receivers consistent with the NSW *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change, 2000). The ICNG provides a framework to consider the impacts of construction noise on residences and other sensitive land uses.

Table 9 provides the ICNG recommended  $L_{Aeq(15min)}$  NMLs and how they are to be applied.

**Table 9 ICNG Recommended Noise Management Level (NML)**

| Time  | Management Level<br>$L_{Aeq(15min)}$ <sup>1</sup> | How to Apply  |
|---|---|---|
| Recommended standard hours:<br><ul style="list-style-type: none"> <li>Monday to Friday 7am to 6pm</li> <li>Saturday 8am to 1pm</li> <li>No work on Sundays or public holidays.</li> </ul> | Noise affected<br>RBL + 10 dB.                    | <ul style="list-style-type: none"> <li>The noise affected level represents the point above which there may be some community reaction to noise.</li> <li>Where the predicted or measured <math>L_{Aeq(15min)}</math> is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>The proponent should also inform all potentially impacted residents of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.</li> </ul>   |
|   | Highly noise affected 75 dBA                      | <ul style="list-style-type: none"> <li>The highly noise affected level represents the point above which there may be strong community reaction to noise.</li> <li>Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account times identified by the community when they are less sensitive to noise (such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences; and if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ul> |



| Time                               | Management Level<br>$L_{Aeq}(15min)^1$ | How to Apply   |
|------------------------------------|--|--|
| Outside recommended standard hours | Noise affected<br>RBL + 5 dB           | <ul style="list-style-type: none"> <li>A strong justification would typically be required for work outside the recommended standard hours.</li> <li>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>Where all feasible and reasonable practices have been applied and noise is more than 5 dBA above the noise affected level, the proponent should negotiate with the community.</li> <li>For guidance on negotiating agreements see section 7.2.2 of the ICNG.</li> </ul> |

*Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the construction noise management levels for noise assessment purposes and is the median of the ABL's.*

The ICNG recommendations were subsequently applied to the RBLs obtained from the unattended monitoring to determine the NMLs to be applied to construction of the Proposal as detailed in Table 10.

**Table 10 Construction Noise Management Level (NML)**

| Location  | Assessment Period       | RBL, dBA | NML $L_{Aeq}(15min)$ dBA |
|---|-------------------------|----------|--------------------------|
| Residential Receptors<br>(Rooty Hill North)   | Day (Standard Hours)    | 45       | 55 (RBL+10dBA)           |
|   | Evening (OOHW Period 1) | 45       | 50 (RBL+5dBA)            |
|   | Night (OOHW Period 2)   | 38       | 43 (RBL+5dBA)            |
| Residential Receptors<br>(Rooty Hill South)   | Day (Standard Hours)    | 42       | 52 (RBL+10dBA)           |
|   | Evening (OOHW Period 1) | 42       | 47 (RBL+5dBA)            |
|   | Night (OOHW Period 2)   | 37       | 42 (RBL+5dBA)            |
| Industrial Premises<br>Council Workshop/ Depot  | When in use             | N/A      | 75 (external)            |
| Commercial - offices, retail<br>Council Workshop Offices<br>Rooty Hill North and South<br>retail premises | When in use             | N/A      | 70 (external)            |
| School classrooms<br>School of the Arts   | When in use             | N/A      | 45 (external)            |
| Active recreation areas<br>Angus Park Sports Field<br>Rooty Hill South                                    | When in use             | N/A      | 65 (external)            |



### Non-residential criteria

The noise management levels from the TfNSW's *Construction Noise Strategy* (CNS) are the same as for the ICNG. The ICNG has the following recommended NMLs for commercial and industrial premises:

- industrial premises: external  $L_{Aeq(15\text{minute})}$  75 dBA
- offices, retail outlets: external  $L_{Aeq(15\text{minute})}$  70 dBA
- School classrooms: external  $L_{Aeq(15\text{minute})}$  45 dBA
- Active recreation areas: external  $L_{Aeq(15\text{minute})}$  65 dBA

The CNS recommends providing regular updates to neighbouring businesses to inform them of the construction schedule.

### Sleep disturbance criteria

Operations during the night have the potential to disturb people's sleep patterns. The *Industrial Noise Policy* (INP) (EPA, 2000) refers to the *Road Noise Policy* (RNP) (EPA, 2013), with both documents discussing criteria for the assessment of sleep disturbance.

The RNP suggests a screening level of  $L_{1,1\text{min}}$  dBA, equivalent to the RBL + 15 dB, below which sleep disturbance is unlikely. Where this level is exceeded, further analysis should be carried out. Furthermore, Section 5.4 of the RNP states that:

- maximum internal noise levels below 50 to 55 dBA would be unlikely to result in people's sleep being disturbed
- if the noise exceeds 65 to 70 dBA once or twice each night the disturbance would be unlikely to have any notable health or wellbeing effects.

Based on the above, the sleep disturbance criteria are shown in Table 11.

**Table 11 Sleep disturbance screening criteria,  $L_{A1,1\text{min}}$ , dBA**

| Receiver | Night Time (10pm–7am)<br>RBL+15dBA |
|----------|------------------------------------|
| R1       | 53                                 |
| R2       | 52                                 |

### Standard working hours

The ICNG recommends that, as far as practicable, construction activities are undertaken between the standard hours of work. All works required for the Proposal would be undertaken during standard construction hours, as far as practicable. Standard construction hours are:

- Monday to Friday 7am–6pm
- Saturday 8am–1pm
- No work on Sundays or Public Holidays.

Where out-of-hours work is required, and noise levels exceed the RBL (defined for residential receivers as the rating background level (RBL) + 5 dBA in accordance with the ICNG), then separate TfNSW approvals (via TfNSW's Out-of-Hours Work Application Form) would need to be obtained.

## Road Traffic Noise Criteria

The road traffic noise criteria are provided in the RNP. The 'local road' category, as specified in the RNP, has been adopted for Hartington Street and Station Street for this assessment. Table 12 presents the road traffic noise assessment criteria reproduced from the RNP relevant for this road category.

**Table 12 Traffic Noise Assessment Criteria for Residential Land Uses**

| Road Traffic Noise Assessment Criteria for Residential Land Uses |  |                                  |                                  |
|--|--|----------------------------------|----------------------------------|
| Road category  | Type of project/development  | Assessment Criteria - dBA        |                                  |
|  |  | Day (7am to 10pm)                | Night (10pm to 7am)              |
| Local roads  | Existing residences affected by additional traffic on local roads generated by land use developments | 55dBA,<br>L <sub>Aeq</sub> (1hr) | 50dBA,<br>L <sub>Aeq</sub> (1hr) |

## Operational Noise Criteria

Operational noise criteria are provided in the EPA Industrial Noise Policy (INP). The urban environment, as specified in the INP, has been adopted for the area surrounding the Proposal as outlined in Table 13.

**Table 13 Operational Noise Criteria**

| Period           | RBL | Intrusive Criteria | Amenity Level | Project Specific Noise Level |
|------------------|-----|--------------------|---------------|------------------------------|
| Rooty Hill North |     |                    |               |                              |
| Day              | 45  | 50                 | 60            | 50                           |
| Evening          | 45  | 50                 | 50            | 50                           |
| Night            | 38  | 43                 | 45            | 43                           |
| Rooty Hill South |     |                    |               |                              |
| Day              | 42  | 47                 | 60            | 47                           |
| Evening          | 42  | 47                 | 50            | 47                           |
| Night            | 37  | 42                 | 45            | 42                           |

## Construction Vibration Criteria

When assessing vibration, there are two categories of vibration criteria. One is related to the impact of vibration to human comfort and one is related to the impact on building structures (cosmetic damage). The safe working distances for vibration producing construction equipment are provided in Table 14. These are based on the planned equipment that would be used during each construction phase, and based on CNS recommendations.

**Table 14 CNS recommendations for safe working distances for vibration-intensive plant**

| Plant Item              | Rating / Description              | Cosmetic Damage (BS 7385) | Human Response (OH&E Vibration Guideline) |
|-------------------------|-----------------------------------|---------------------------|---|
| Vibratory Roller        | < 50 kN (typically 1-2 tonnes)    | 5m                        | 15m – 20m                                 |
| Vibratory Roller        | < 100 kN (typically 2-4 tonnes)   | 6m                        | 20m                                       |
| Vibratory Roller        | < 200 kN (typically 4-6 tonnes)   | 12m                       | 40m                                       |
| Vibratory Roller        | < 300 kN (typically 7-13 tonnes)  | 15m                       | 100m                                      |
| Vibratory Roller        | > 300 kN (typically 13-18 tonnes) | 20m                       | 100m                                      |
| Vibratory Roller        | > 300 kN (> 18 tonnes)            | 25m                       | 100m                                      |
| Small Hydraulic Hammer  | (300kg – 5-12t Excavator)         | 2m                        | 7m  |
| Medium Hydraulic Hammer | (900kg – 12-18t Excavator)        | 7m                        | 23m                                       |
| Large Hydraulic Hammer  | (1,600kg – 18-34t Excavator)      | 22m                       | 73m                                       |
| Vibratory Pile Driver   | Sheet piles                       | 2m – 20m                  | 20m                                       |
| Pile Boring             | ≤ 800mm                           | 2m (nominal)              | N/A                                       |
| Jackhammer              | Hand held                         | 1m (nominal)              | Avoid contact with structure              |

### 6.3.2 Potential impacts

#### a) Construction phase

##### Noise

##### *Predicted noise levels*

A computer model was developed by Muller Acoustics to determine the noise impact from activities on the project site during standard construction hours and Out of Hours Works (OOHW) periods at nearby receptors to the project.

The construction activities and scenarios considered to potentially have the greatest noise impacts on nearby receptors, forming the basis of this assessment are summarised in Table 15 Construction Works and Activities – Construction Scenarios. Each scenario has the potential to occur during standard hours, OOHW Period 1 and OOHW Period 2 and have been assessed against the NMLs for each period. They are intended to provide a means by which representative worst-case emissions can be assessed and the recommendations provided can be applied via the project Noise Management Plan.

**Table 15 Construction Works and Activities – Construction Scenarios**

| Scenario                | Description       | Summary of Works and Activities                                    |
|-------------------------|-------------------|--|
| 1 - Station Upgrade     | 1A Enabling Works | Site establishment and services relocation                         |
|                         | 1B Demolition     | Demolition of existing stairs and station canopies                 |
|                         |                   | Excavation for new overbridge and lift footings                    |
|                         | 1C Main works     | Services installation and construct suspended slab                 |
| 2 - MSCP Upgrade        | Main works        | Site clearing and general construction of the car park             |
| 3 - Interchange Upgrade | Main works        | Construction of external roadworks, car park, lifts and footpaths. |

Table 16 gives the NML and the predicted range of noise that each of the representative receivers at adjacent to the Station Upgrade works would experience during construction. Predicted noise levels were the same for construction during standard hours and outside standard hours (excluding night).

**Table 16 NMLs and predicted noise levels (LAeq,15min dBA) during construction**

| Receptor | NMLNML         |               |               | Scenario |    |    |    |    |
|----------|----------------|---------------|---------------|----------|----|----|----|----|
|          | Standard Hours | OOHW Period 1 | OOHW Period 2 | 1A       | 1B | 1C | 2  | 3  |
| N01      | 55             | 50            | 43            | 50       | 64 | 56 | 63 | 68 |
| N01-1    | 55             | 50            | 43            | 50       | 64 | 57 | 63 | 68 |
| N02 (L1) | 55             | 50            | 43            | 41       | 54 | 47 | 49 | 55 |
| N03      | 55             | 50            | 43            | 48       | 63 | 55 | 61 | 66 |
| N04      | 55             | 50            | 43            | 48       | 62 | 54 | 60 | 65 |
| N05      | 55             | 50            | 43            | 47       | 62 | 54 | 59 | 65 |
| N06      | 55             | 50            | 43            | 47       | 61 | 53 | 59 | 64 |
| N07      | 55             | 50            | 43            | 46       | 61 | 53 | 58 | 64 |
| NC01     | 70             | 70            | 70            | 55       | 69 | 62 | 67 | 81 |
| NC02     | 70             | 70            | 70            | 57       | 68 | 62 | 63 | 76 |
| NC03     | 70             | 70            | 70            | 54       | 65 | 58 | 53 | 71 |
| NC04     | 70             | 70            | 70            | 53       | 65 | 58 | 55 | 71 |
| NC05     | 70             | 70            | 70            | 51       | 62 | 55 | 53 | 64 |

| Receptor | NML            |               |               | Scenario |    |    |    |    |
|----------|----------------|---------------|---------------|----------|----|----|----|----|
|          | Standard Hours | OOHW Period 1 | OOHW Period 2 | 1A       | 1B | 1C | 2  | 3  |
| NC06     | 70             | 70            | 70            | 51       | 61 | 54 | 53 | 64 |
| N-IND1   | 75             | 75            | 75            | 54       | 69 | 61 | 72 | 74 |
| N-IND2   | 75             | 75            | 75            | 53       | 69 | 62 | 72 | 69 |
| NW02     | 55             | 50            | 43            | 54       | 65 | 59 | 50 | 63 |
| NW03     | 55             | 50            | 43            | 53       | 62 | 56 | 48 | 54 |
| NW04     | 55             | 50            | 43            | 52       | 61 | 55 | 48 | 53 |
| NW05     | 55             | 50            | 43            | 52       | 61 | 54 | 49 | 54 |
| NW06     | 55             | 50            | 43            | 45       | 57 | 50 | 49 | 56 |
| NW07     | 55             | 50            | 43            | 46       | 57 | 50 | 49 | 56 |
| NW08     | 55             | 50            | 43            | 47       | 57 | 50 | 49 | 57 |
| NW09     | 55             | 50            | 43            | 47       | 57 | 50 | 48 | 58 |
| S01A     | 52             | 47            | 42            | 64       | 72 | 65 | 59 | 67 |
| S01B     | 52             | 47            | 42            | 59       | 70 | 63 | 65 | 65 |
| S02      | 52             | 47            | 42            | 49       | 57 | 51 | 49 | 59 |
| S03      | 52             | 47            | 42            | 49       | 58 | 51 | 49 | 57 |
| S04      | 52             | 47            | 42            | 49       | 56 | 49 | 49 | 55 |
| S05      | 52             | 47            | 42            | 48       | 55 | 48 | 49 | 54 |
| S06      | 52             | 47            | 42            | 47       | 55 | 48 | 48 | 54 |
| S07      | 52             | 47            | 42            | 60       | 64 | 58 | 54 | 64 |
| S08      | 52             | 47            | 42            | 58       | 64 | 58 | 54 | 62 |
| S09      | 52             | 47            | 42            | 54       | 64 | 57 | 53 | 62 |
| S10      | 52             | 47            | 42            | 49       | 61 | 55 | 52 | 61 |
| S11      | 52             | 47            | 42            | 44       | 58 | 52 | 50 | 59 |
| S12      | 52             | 47            | 42            | 46       | 58 | 50 | 51 | 55 |
| S13      | 52             | 47            | 42            | 45       | 56 | 50 | 51 | 56 |
| S14      | 52             | 47            | 42            | 46       | 55 | 49 | 49 | 56 |
| S15      | 52             | 47            | 42            | 46       | 56 | 49 | 49 | 56 |



| Receptor | NML            |               |               | Scenario |    |    |    |    |
|----------|----------------|---------------|---------------|----------|----|----|----|----|
|          | Standard Hours | OOHW Period 1 | OOHW Period 2 | 1A       | 1B | 1C | 2  | 3  |
| S16 (L2) | 52             | 47            | 42            | 45       | 56 | 49 | 49 | 55 |
| S17      | 52             | 47            | 42            | 49       | 61 | 54 | 58 | 59 |
| S18      | 52             | 47            | 42            | 48       | 61 | 55 | 58 | 59 |
| S19      | 52             | 47            | 42            | 49       | 61 | 54 | 58 | 59 |
| S20      | 52             | 47            | 42            | 51       | 61 | 54 | 58 | 59 |
| S21      | 52             | 47            | 42            | 50       | 61 | 54 | 58 | 59 |
| S22      | 52             | 47            | 42            | 52       | 61 | 54 | 58 | 59 |
| S23      | 52             | 47            | 42            | 52       | 60 | 54 | 58 | 58 |
| S24 Arts | 52             | 47            | 42            | 52       | 60 | 53 | 52 | 58 |
| S-AR1    | 52             | 47            | 42            | 56       | 61 | 55 | 52 | 59 |
| SC01     | 70             | 70            | 70            | 69       | 66 | 59 | 55 | 64 |
| SC02     | 70             | 70            | 70            | 63       | 62 | 55 | 51 | 62 |
| SC03     | 70             | 70            | 70            | 56       | 61 | 54 | 52 | 60 |
| SC04     | 70             | 70            | 70            | 55       | 65 | 57 | 57 | 62 |

Table 17 provides a summary and assessment of the number of compliances and non-compliances with the relevant NMLs for each construction scenario detailed above, for standard and out of hours periods.

**Table 17 NML Compliance Summary**

| NML Compliance Summary |                         |    |    |                         |    |    |                         |    |    |                        |    |    |                        |    |    |
|------------------------|-------------------------|----|----|-------------------------|----|----|-------------------------|----|----|------------------------|----|----|------------------------|----|----|
| No of Receptors        | Scenario 1A Unmitigated |    |    | Scenario 1B Unmitigated |    |    | Scenario 1C Unmitigated |    |    | Scenario 2 Unmitigated |    |    | Scenario 3 Unmitigated |    |    |
|                        | Std                     | P1 | P2 | Std                     | P1 | P2 | Std                     | P1 | P2 | Std                    | P1 | P2 | Std                    | P1 | P2 |
| Comply with NML        | 29                      | 14 | 56 | 13                      | 13 | 56 | 14                      | 13 | 56 | 21                     | 13 | 56 | 9                      | 9  | 54 |
| Do not comply with NML | 27                      | 42 | 0  | 43                      | 43 | 0  | 42                      | 43 | 0  | 35                     | 43 | 0  | 45                     | 45 | 0  |
| Highly Noise Affected  | 0                       | 0  | 0  | 0                       | 0  | 0  | 0                       | 0  | 0  | 0                      | 0  | 0  | 2                      | 2  | 2  |
| No of Receptors        | Scenario 1A Mitigated   |    |    | Scenario 1B Mitigated   |    |    | Scenario 1C Mitigated   |    |    | Scenario 2 Mitigated   |    |    | Scenario 3 Mitigated   |    |    |
|                        | Std                     | P1 | P2 | Std                     | P1 | P2 | Std                     | P1 | P2 | Std                    | P1 | P2 | Std                    | P1 | P2 |
| Comply with NML        | 55                      | 52 | 44 | 49                      | 25 | 13 | 54                      | 50 | 28 | 55                     | 43 | 33 | 44                     | 28 | 12 |
| Do not comply with NML | 1                       | 4  | 12 | 7                       | 31 | 43 | 2                       | 6  | 28 | 1                      | 13 | 23 | 12                     | 28 | 44 |
| Highly Noise Affected  | 0                       | 0  | 0  | 0                       | 0  | 0  | 0                       | 0  | 0  | 0                      | 0  | 0  | 0                      | 0  | 0  |

Std\* Standard Working Hours – 7:00am – 6:00pm Monday to Friday, 8:00pm – 1:00pm Saturday

P1 – Period 1 OOH – 6:00pm – 10:00pm Monday to Friday, 7:00am – 8:00am and 1:00pm – 10:00pm Saturday and 8:00am – 6:00pm Sunday and Public Holidays

P2 – Period 2 OOH – 10:00pm to 7:00am Monday to Friday, 10:00pm – 8:00am Saturday and 6:00pm – 7:00am Sunday and Public Holidays

The ICNG recognises that by necessity construction works must sometimes be undertaken outside of the standard recommended hours. More stringent noise goals apply during out-of-hours works. If out-of-hours work is required, a separate approval would be applied for through TfNSW and further mitigation measures considered in accordance with the Construction Noise Strategy (CNS).

A list of the standard TfNSW Additional Mitigation Measures (AMMs) are provided in Table 18. A full description of each measure is provided in Appendix C of the CNS and would be applied in conjunction with the suite of standard mitigation measures detailed in Table 23.

**Table 18 TfNSW Additional Mitigation Measures**

| Measure                        | Abbreviation |
|--------------------------------|--------------|
| Alternative Accommodation      | AA           |
| Monitoring                     | M            |
| Individual briefings           | IB           |
| Letter box drops               | LB           |
| Project specific respite offer | RO           |
| Phone calls                    | PC           |

| Measure                | Abbreviation |
|------------------------|--------------|
| Specific notifications | SN           |

Predicted noise levels, compliance and determination of AMMs in accordance with the CNS for each construction scenario is detailed in the discussion on the results of noise modelling for each construction scenario below.

#### Scenario 1A Station Upgrade - Enabling Works

The activities required for Scenario 1A are most likely to be conducted during standard hours. Predicted noise levels generally comply with the relevant NMLs and additional mitigation measures are not required for standard hours (unless the proposed aged care facility is completed prior to the project at which point further assessment would be undertaken).

Where tasks are required to be conducted during OOHW Period 1 or 2, the application of AMM, reasonable and feasible work practices should be considered and applied to reduce noise impacts to the community.

#### Scenario 1B Station Upgrade - Demolition

The activities required for Scenario 1B are most likely to be conducted during standard hours and OOHW. Predicted noise levels exceed the NMLs at most receptors (approx. 75%) and are less than 10dB above the daytime RBL. Additional mitigation measures (LB, M) will be required during standard hours for six receptor locations without the application of reasonable and feasible work practices.

Where tasks are required to be conducted during OOHW Period 1 or 2, the application of AMM, reasonable and feasible work practices should be considered and applied to reduce noise impacts to the community.

#### Scenario 1C Station Upgrade – Main Works

The activities required for Scenario 1C are most likely to be conducted during standard hours and OOHW. Predicted noise levels exceed the NMLs at most receptors (approx. 40%) but are generally less than 10dB above the RBL. Additional mitigation measures are not required during standard hours (unless the proposed aged care facility is completed prior to the project at which point further assessment would be undertaken) without the application of reasonable and feasible work practices.

Where tasks are required to be conducted during OOHW Period 1 or 2, the application of AMM, reasonable and feasible work practices should be considered and applied to reduce noise impacts to the community.

#### Scenario 2 MSCP Upgrade – Main Works

The activities required for Scenario 2 are most likely to be conducted during standard hours and OOHW. Predicted noise levels exceed the NMLs at most receptors (approx. 40%) but are generally less than 10dB above the RBL. Additional mitigation measures are not required during standard hours (unless the proposed aged care facility is completed prior to the project at which point further assessment would be undertaken) without the application of reasonable and feasible work practices which should be considered and applied to reduce noise impacts to the community for all proposed OOHW periods.

#### Scenario 3 Interchange Upgrade – Main Works

The activities required for Scenario 3 are most likely to be conducted during standard hours and OOHW. Predicted noise levels exceed the NMLs at most receptors (approx. 75%) and are less than 10dB above the daytime RBL. Additional mitigation measures (LB, M) will be

required during standard hours for seven receptor locations and 38 receptor locations during OOHW Period 1 without the application of reasonable and feasible work practices.

Predicted noise levels indicate that two commercial receptor locations (NC01 and NC02) will be highly noise affected.

Predicted noise levels exceed the NMLs at most receptors (approx. 80%) for OOHW Period 2. Additional mitigation measures are likely to be required with the application of reasonable and feasible work practices, to reduce the number of affected receptor locations.

## **Vibration**

### *Predicted vibration*

The major potential sources of construction vibration include piling and compaction by vibratory rollers/plates.

Generally, compactors would be used for creating any hard standings or storage areas such as offices, compounds and stockpiles. Piling is required to install the foundations of the new footbridge. Peak levels of vibration from rolling typically occurs as the roller stops to change direction and a resonance is created as the roller (and vibrator) is stationary. Vibrating rollers typically generate vibration emissions between 10 - 50Hz. Therefore, the relevant vibration criteria for rolling is between 5mm/s and 15mm/s for standard type building structures.

For works other than those requiring vibratory rollers or hydraulic hammers, vibration levels are predicted to be below the criteria for human comfort at all receivers. No activity would cause vibration likely to cause building damage at residential or commercial receivers.

For work using a hydraulic hammer or vibratory roller, work may cause vibration levels exceeding the criterion for continuous vibration at residential receivers. In general, any work near a receiver would be temporary and intermittent.

The structure associated with the Rooty Hill Station has been assessed against the building damage criteria for heritage buildings. Special attention should therefore be given to any construction works to be undertaken within 18 metres from the façade of any heritage-listed station buildings. If hydraulic hammers or vibratory rollers are to be used within 18 metres, vibration monitoring should be undertaken. In addition, the following plant items must be used:

- vibratory roller no greater than 50 kN (typically 1-2 tonnes)
- small hydraulic hammer no greater than 300kg (5-12 tonne excavator).

Regarding "Human Response" the use of some items listed in Table 14 may exceed the criteria for human comfort. Based on a consideration of the safe working distances in Table 14, the following equipment is recommended to be used so as to minimise the risk of human discomfort being caused by certain activities:

- Station Upgrade (southern interchange): vibratory roller no greater than 50 kN (typically 1-2 tonnes) and small hydraulic hammer no greater than (300kg – 5-12t excavator).
- Station Upgrade (northern interchange): vibratory roller no greater than 200 kN (typically 4-6 tonnes) and medium hydraulic hammer no greater than (900kg – 12-18t excavator).
- Commuter Car Park: vibratory roller no greater than 200 kN (typically 4-6 tonnes) and medium hydraulic hammer no greater than (900kg – 12-18t excavator).

With the above equipment, predicted vibration levels remain below the criteria for human comfort. If it proves impractical to use this equipment, the additional mitigation measures listed in the CNS would be undertaken. Monitoring is recommended at the closest identified

receiver for work using a hydraulic hammer or vibratory roller to ensure limits for human comfort are not exceeded.

## **b) Operational phase**

### **Noise**

Operational noise was assessed for two scenarios:

- general use of the car park including car movement and engine noise with a sound power level of 73dBA adopted
- transient noise events including car door slams and horn emissions with a sound power level of 85dBA adopted.

#### *Vehicle Noise*

The predicted operational noise levels for general use of the car park at the representative receivers comply with the noise criteria at all times. For non-residential receptors, noise levels are below 40dBA at all times and for residential receptors below 35dBA at all times.

#### *Transient Noise*

The predicted maximum noise emissions associated with transient noise events within the car park comply with the noise criteria during the night period. For all residential receptors, noise levels are below 35dBA during the night period.

#### *Sleep disturbance*

The predicted noise levels as outlined above comply with the sleep disturbance noise criteria at all times.

### **Vibration**

The use of the new road infrastructure upgrades and commuter car park as detailed in Section 3, would result in a negligible vibration impact during operation.

## **6.3.3 Mitigation measures**

The following mitigation measures would be implemented:

- prior to commencement of construction works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Construction Noise Strategy* (TfNSW, 2012c) and the Noise and Vibration Impact Assessment (MAC, 2017). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable and implementing mitigation and management in accordance with the CNS.
- surveys of nearby sensitive buildings would be carried out in order to assess the potential for increased susceptibility to building damage from vibration. Should these buildings be considered more susceptible to vibration, reduced vibration criteria levels may be applicable and subsequently adopted during the selection process for suitable equipment to be used in the vicinity of these buildings
- a noise monitoring program would be carried out for the duration of the construction works in accordance with the CNVMP prepared for the Proposal, and any approval and licence conditions



- vibration monitoring would be undertaken at the nearest sensitive receiver for work using a hydraulic hammer or vibratory roller to ensure limits for human comfort are not exceeded.
- during construction, suitable measures would be put in place to ensure the retained heritage elements are protected from damage. Measures may include hoardings, use of spotters during the movement of equipment and other measures as necessary.
- to effectively mitigate potential impacts of vibration on the Rooty Hill Railway Station heritage building, activities that cause vibration would be managed in accordance with the heritage specification in German Standard *DIN 4150 – Part 3 (DIN 1999)*. Real time vibration monitoring would be conducted at commencement of relevant works to confirm compliance with German Standard DIN 4150. If vibration levels approach the determined trigger level, then the construction activity would cease and the heritage structure would be assessed and alternative construction methodologies developed, where practicable, before construction recommences.
- following commencement of operation, noise monitoring will be undertaken to verify the predicted operational noise levels. Operational monitoring shall be determined by an independent acoustic engineer accredited by the Association of Australian Acoustic Consultants (AAAC) or environmental specialist acceptable to TfNSW. All reasonable and feasible additional noise mitigation or management measures that are necessary to reduce noise levels or minimise impacts would be undertaken.

Refer to Table 23 for a full list of proposed mitigation measures.

## 6.4 Indigenous heritage

### 6.4.1 Existing environment

A search of OEH's AHIMS Web Services (Aboriginal Heritage Information Management System) was undertaken on 27 October 2017. This search indicated that no Aboriginal sites are recorded in or near the Proposal area within 200 metres, and no Aboriginal places have been declared in or near the Proposal.

The Proposal is located in an area that has been highly modified for a range of uses. Previous construction and use of the area for the existing rail corridor and Rooty Hill Station Precinct, car park, road reserves and infrastructure would have resulted in significant disturbance to the site.

The work area is located approximately 200 metres north from Angus Creek and 1200 metres west of Eastern Creek. This landscape does not constitute a sensitive landscape as defined in the Due Diligence Code of Practice for the Protection of Aboriginal Objects.

### 6.4.2 Potential impacts

#### a) Construction phase

No Aboriginal sites have been recorded within or in the vicinity of the work area and the work area is not located within a landscape feature likely to indicate the presence of Aboriginal objects in accordance to the Due Diligence Code.

The site has low archaeological potential and therefore it is considered unlikely that any Indigenous heritage items would be located in the vicinity of the Proposal, due to the past history of disturbance.

The Proposal is considered unlikely to affect Indigenous heritage during construction.

### 6.4.3 Mitigation measures

The following mitigation measures are proposed to manage impacts to indigenous heritage:

- all construction staff would undergo an induction in the recognition of Aboriginal cultural heritage material. This training would include information such as the importance of indigenous cultural heritage material and places to both the Indigenous and Non-indigenous community, as well as the legal implications of removal, disturbance and damage to any indigenous cultural heritage material and sites
- if unforeseen Indigenous objects are uncovered during construction, the procedures contained in TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) would be followed, and works within the vicinity of the find would cease immediately. The construction contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the OEH and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.

Refer to Table 23 for a full list of proposed mitigation measures.

## 6.5 Non-Indigenous heritage

Artefact Heritage (Artefact) prepared a Statement of Heritage Impact (SoHI) in October 2017 (Artefact, 2017) to identify heritage items that may be impacted by the Proposal, determine the level of heritage significance of each item, assess any potential impacts to those items and recommend mitigation measures to reduce the level of heritage impact (see Appendix F). The SoHI was prepared consistent with the NSW Heritage Office's *NSW Heritage Manual* and related document *Statements of Heritage Impact* (OEH, 2002). A site inspection by a qualified heritage specialist was conducted on 26 October 2017.

### 6.5.1 Existing environment

#### Listed heritage items

A search of all relevant heritage registers was undertaken in October 2017. The results are displayed in Table 19 and Table 20, and the curtilages of identified items are provided in Figure 31.

Rooty Hill Station is listed as a heritage item in two statutory registers, namely the RailCorp s170 Register as "Rooty Hill Railway Station Group", (State Heritage Inventory (SHI) Item No. 4801932) and the Blacktown LEP 2015 as Rooty Hill Railway Station", LEP (Item No. 106).

The Imperial Hotel (1 Rooty Hill road North) is located approximately 30m to the north of the Proposal boundary at the closest point. The Imperial Hotel is listed on the NSW State Heritage Register (SHR) (Item No. 00114) and Blacktown LEP 2015 (Item No. I101).

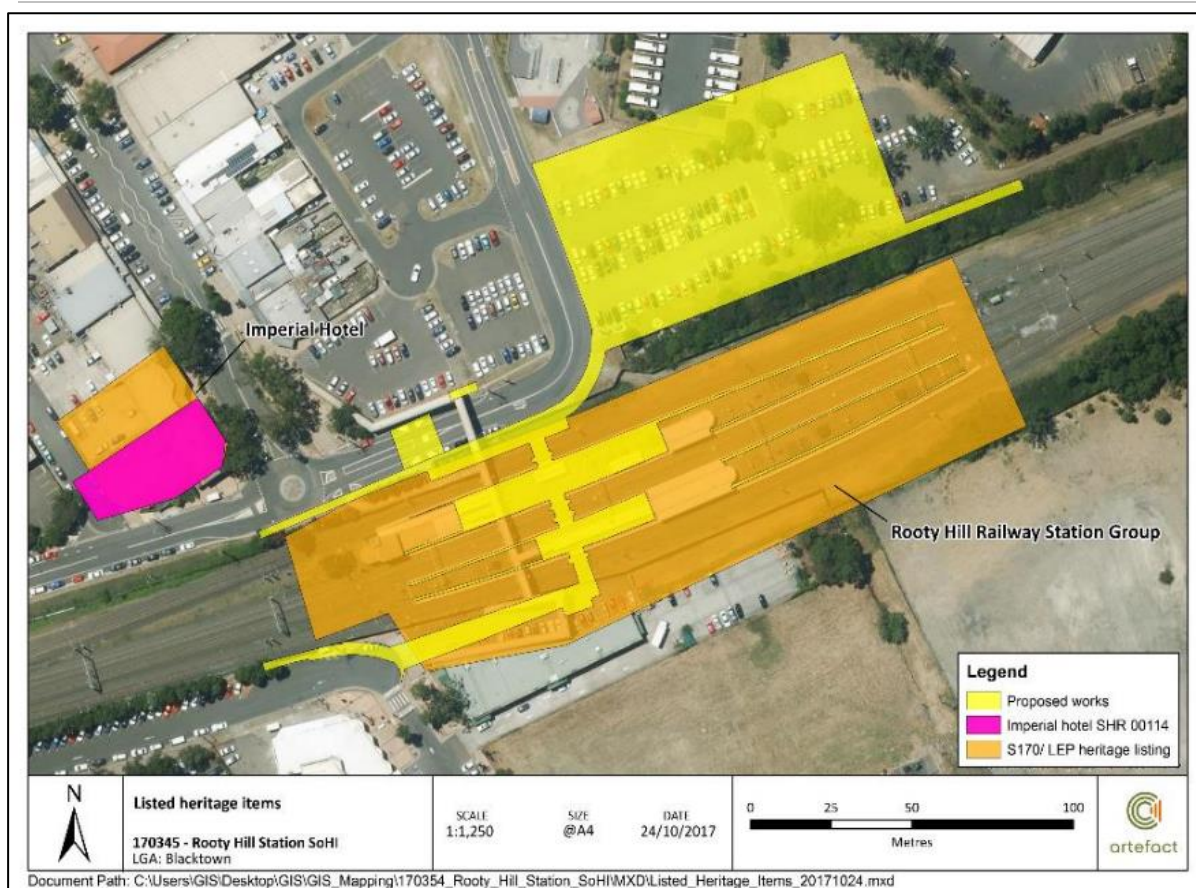
**Table 19 Historic register search for Rooty Hill Station**

| Register  | Listing (and number) |
|---|----------------------|
| Register of the National Estate (non-statutory) | No                   |
| National Heritage List                          | No                   |

| Register   | Listing (and number) |
|--|----------------------|
| Commonwealth Heritage List                       | No                   |
| State Heritage Register                          | No                   |
| RailCorp s170 Heritage and Conservation Register | Yes (4801932)        |
| Blacktown LEP 2015                               | Yes (I06)            |

**Table 20 Details of other listed heritage items in proximity to the Proposal**

| Suburb     | Item name      | Address                             | Property description | Significance | Item listing number                           |
|------------|----------------|-------------------------------------|----------------------|--------------|---|
| Rooty Hill | Imperial Hotel | 1 Rooty Hill Road North, Rooty Hill | Lot 91, DP 865716    | State        | SHR (Item No. 00114) LEP 2015 (Item No. I101) |



**Figure 31 Listed heritage items adjacent and in proximity to the site**

## Historical background

A summary of the historical land use of Rooty Hill Station is provided in Table 21 below.

**Table 21 Summary of historical land use of Rooty Hill Station**

| Phase   | Discussion  |
|---|---|
| <b>Phase 1:<br/>First Rooty Hill Station<br/>(1863 – 1943)</b>  | <p>By 1863, the original Rooty Hill Station was established to service the Main Western Railway Line, which was opened through the area as a single line. Historical photographs show that the first Rooty Hill Station was a side platform of stone construction, featuring a single storey booking office and single storey weatherboard station building.</p>  |
|   | <p>In 1886, the Main Western Line was duplicated. Historical drawings of the station indicate that following duplication works, a second platform was established, which featured a station building and other platform furniture and landscaping including garden beds, bubblers, water taps and lighting poles. A goods siding, including an associated platform and goods shed, is seen in photographs to have been established to the south of the southern island platform by the early decades of the 20<sup>th</sup> century.</p>  |
|   | <p>Following the expansion of the railway through Rooty Hill, the area underwent substantial development consolidation in the ensuing decades, involving subdivisions of large early estates and commercial development in the vicinity of the station precinct. In 1919, an early steel pedestrian footbridge was added to the first Rooty Hill Station, which is noted on a construction drawing as having been the old Sydenham footbridge.</p>  |
|   | <p>Plans of Rooty Hill Station prepared in 1930 indicate that by this time, drainage channels had been established alongside what is now Rooty Hill Road (North), which featured associated overbridge.</p> <p>Plans of Rooty Hill Station prepared in 1941 show the planned demolition of existing station buildings and features associated with the first Rooty Hill Station in preparation for the quadruplication of the Main Western Railway Line.</p>  |
| <b>Phase 2:<br/>Second Rooty Hill Station<br/>(1943 – 1980)</b> | <p>The current Rooty Hill Station platforms and station buildings were constructed in 1943. This includes two island platforms of concrete and steel post construction, two single storey masonry passenger buildings designed in the Inter-War Railway Functionalist style, and a two-storey masonry former signal box building with tower designed in the Inter-War Railway Functionalist style.</p>  |
|   | <p>At this time, a level pedestrian and vehicular level crossing was established across the rail corridor to link Windsor Road (now Rooty Hill Road (North) and Rooty Hill Road (South). The level crossing featured boom gates, which were installed at the northern and southern entry points to the crossing.</p>  |
|   | <p>In 1944, a new steel pedestrian footbridge and stairs were added to the station precinct, allowing access to the station platforms from North Parade and Beames Avenue. This 1944 footbridge replaced the earlier steel footbridge that had been added to the station in 1919, and was located further east than the previous location. Drawings indicate that the 1919 footbridge was removed as part of the suite of works to establish the second Rooty Hill Station.</p> <p>Plans of the station and historical aerial photography indicate that by the 1960s, the north-most overbridge associated with the drainage channel alongside what is now Rooty Hill Road (North) had been replaced by culverts, and the drainage channel removed. The south-most overbridge associated with the former drainage channel appears to have been removed between 1970 and 1982.</p> |



| Phase  | Discussion  |
|--|---|
|  | During the 1980s, a series of modifications were carried out at Rooty Hill Station. This included the introduction of curved roof canopies to the steel footbridge and construction of associated concrete ramps, and construction of covered walkways connecting from the footbridge stairs to the former signal box building and passenger building on Platform 3/4.  |
| <b>Phase 3: Modifications and station renovations (1980 – present)</b> | <p>In 1980, the level crossing over the rail corridor was converted for pedestrian use only, before being decommissioned in 1981. Around this time, the commuter car park was established near Station Street. In 1995, the signal box at Rooty Hill Station was closed.</p> <p>In 2000, refurbishments were carried out to strengthen the steel pedestrian footbridge, involving reinforcements to the underside of the footbridge deck. In 2001, awnings were placed on all platforms, and two platform canopies were constructed on Platform 1/2 to provide shelter for commuters.</p> <p>During this phase, alterations and modifications have been carried out to the interior spaces of the station buildings, the original furnishings and finishings of which have been largely altered or otherwise removed.</p> |

## Heritage significance

### *Rooty Hill Railway Station Group*

Rooty Hill Railway Station Group is listed on the RailCorp s170 register and Blacktown LEP 2015 as having local significance. Rooty Hill Railway station is of local historical significance for its role in the region's local defence history. The second Rooty Hill Station was one of several stations constructed as part of the quadruplication of the line from St Marys to Lidcombe in 1944 to provide maximum track capacity for the transport of ammunition during World War II. The site provides physical evidence of the activities and development that occurred in Rooty Hill railway precinct, and marks an important phase in the evolution of railway operations in Sydney's west (Artefact, 2017).

### *Imperial Hotel*

The Imperial Hotel is a good example of a late Victorian filigree style hotel featuring cast iron lacework to the verandah, face brickwork with decorative banding and a pedimented corner. Occupying a corner location near the railway station, it is an important element in the local townscape. The Imperial Hotel relates to the early development of the Rooty Hill and Plumpton area for orcharding and to the Woodstock Coursing Ground.

The Imperial Hotel has been a meeting point for members of the local community for much of the twentieth century (Artefact, 2017). Although the Imperial Hotel is listed on the State Heritage Register (SHR), it is located outside the Proposal footprint with a buffer of approximately 30 metres at the closest point and would not be impacted by works related to the Proposal.

## Archaeological potential

There is potential for remains relating to the evolution of Rooty Hill Station, which would reflect the architectural configuration of the original station and associated rail infrastructure that was developed during the late-19<sup>th</sup> century and early-20<sup>th</sup> century.

Archaeological remains relating to the first Rooty Hill Station would demonstrate the development and consolidation of the broader Rooty Hill district as part of the western agricultural expansion of the colony, and the overall evolution of railway technologies that took place at this time.

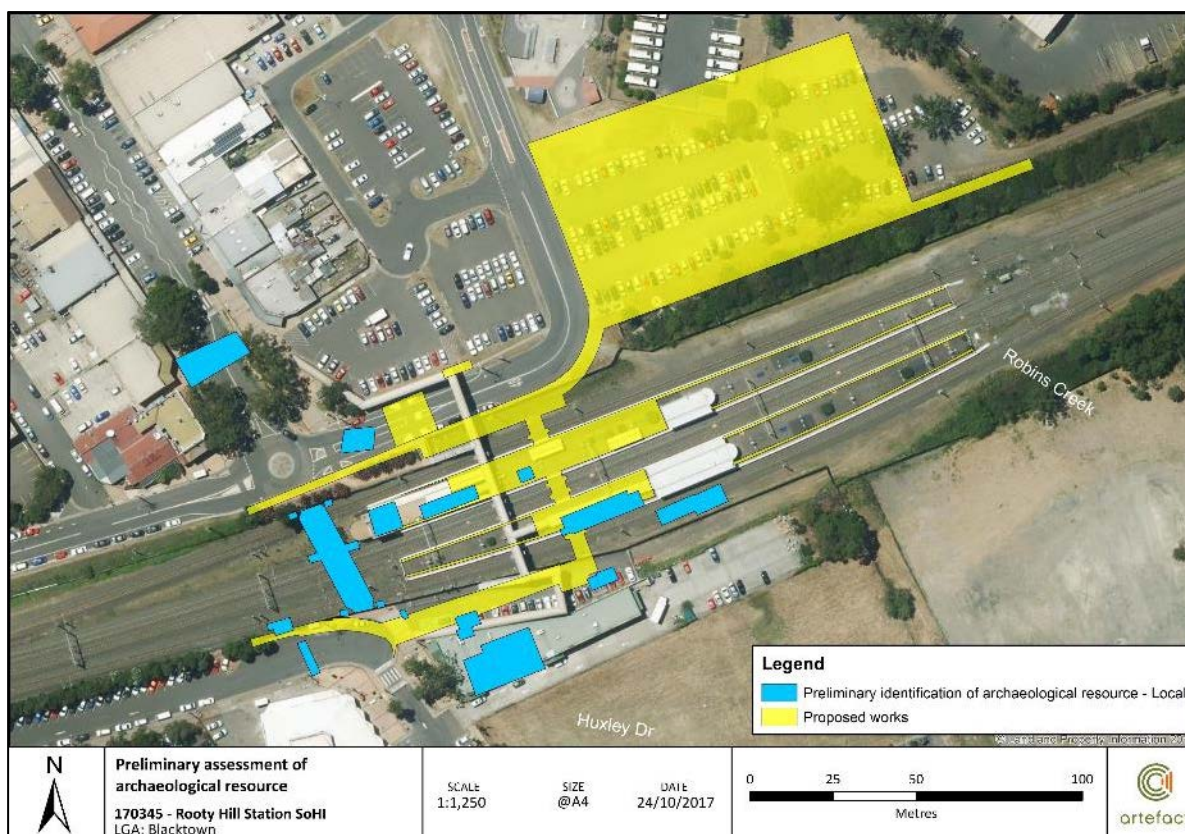


The archaeological remains relating to the second Rooty Hill Station, which was constructed as part of the quadruplication of the Main Western Railway Line to service the munitions factories in the area, would demonstrate the military associations of the local district during WWII.

A summary of the archaeological potential and significance of archaeological remains at Rooty Hill Station is provided in Table 22 and illustrated in Figure 32.

**Table 22 Summary of archaeological potential and significance of Rooty Hill Station**

| Phase                              | Potential remains  | Arch. potential      | Significance  |
|------------------------------------|--|----------------------|---|
| <b>Phase 1:<br/>1863 – 1943</b>    | Original alignment of Main Western Railway Line, single track rail line – rail beams, sleepers and ballast.  | <b>Low-Moderate</b>  | <b>Local</b>  |
|                                    | First Rooty Hill Station – former platform structures, building footings, underfloor deposits, drainage and lavatory services, evidence of landscape features and garden beds, and isolated artefact deposits. |                      |   |
|                                    | Former goods siding to south of the platform 3/4 – rail buffer stop footings, rail beams, sleepers and rail ballast.   |                      |   |
| <b>Phase 2:<br/>1943 – 1980</b>    | Deposits associated with platform furnishings and landscaping including garden beds, lighting pole footings, signage post footings, and isolated artefact deposits.  | <b>Moderate</b>      | <b>Local</b>  |
|                                    | Former pedestrian/vehicular level crossing over rail corridor linking Rooty Hill Road (South) and Rooty Hill Road (North) (formerly Windsor Road).   |                      |   |
| <b>Phase 3:<br/>1980 - Present</b> | Deposits associated with platform furnishings, lighting pole footings, signage post footings and isolated artefact deposits.   | <b>Moderate-high</b> | <b>Would not reach threshold for local significance</b> |



**Figure 32 Listed heritage items adjacent and in proximity to the site**

The station platforms may potentially contain sub-ground relics relating to the former station including stone and brick footings of early buildings and structures, drainage systems, landscape features associated with garden beds, footings of signage and lighting posts, and evidence of the earlier alignments of the platforms themselves. Archaeological remains relating to the first Rooty Hill Railway station would be of local heritage significance.

The area of the proposed Commuter Car Park has been previously disturbed by modern development with the construction of the current car parking facility. This is evident in that the elevation of the car park is generally below the surrounding ground level, and the presence of a stormwater drain running along the southern perimeter of the site. Accordingly, the Commuter Car Park site has nil-low archaeological potential.

## 6.5.2 Potential impacts

### a) Construction phase

The Station Upgrade works are located directly within the Rooty Hill Station Heritage Curtilage. The potential heritage impacts associated with the scope of works for the Proposal within the Rooty Hill Railway Station Group have been assessed as follows:

- the removal of the existing footbridge, and construction of a new footbridge, stairs and station concourse would result in a moderate physical impact
- modification to platform furniture, provision of additional signage and lighting, and modifications to existing plantings would result in a minor physical impact
- modifications and interior reconfigurations to the station buildings would result in a moderate physical impact
- the proposed interchange upgrades would result in a negligible physical impact

- installation and use of the temporary construction compounds are not anticipated to result in any direct physical impacts.

During construction, the use of plant and equipment in close proximity to the existing built heritage structures to be retained would have the potential to cause structural damage.

For the Commuter Car Park works, parts of the asphalt surface of the existing car park would be removed and replaced. The new commuter car park would involve ground works to allow for the construction of the foundations, services, lift shaft and car park access road and would be excavated across the site. Given the low archaeological potential at this site, the proposed works are not anticipated to have an archaeological impact.

Mitigation measures that would be implemented to manage construction vibration impacts on this heritage items are outlined in Table 23.

## **b) Operational phase**

### *Direct impacts*

The proposed footprint for the Station Upgrade component of the Proposal is located within and immediately adjacent to the s170 curtilage for 'Rooty Hill Railway Station Group. However, all identified heritage impacts for the proposal are attributable only to the construction phase. The proposed design does not present any direct risks to non-indigenous heritage during the operation of the Proposal. As detailed above, the Commuter Car Park site has not been identified as having any heritage significance and has nil-low archaeological potential, and would therefore not result in a direct heritage impact during the operation of the Proposal.

### *Indirect impacts*

Visual changes to the landscape associated with the Proposal are considered to have the greatest potential for indirect impacts to non-indigenous heritage. The potential visual impacts resulting from each new element within the Rooty Hill Railway Station Group have been assessed as follows:

- the construction of a new footbridge, stairs and station concourse would result in a moderate visual impact
- proposed landscaping and furnishing modifications would result in a negligible visual impact
- proposed modifications and interior reconfigurations to the station buildings would result in a minor visual impact
- interchange upgrades would result in a negligible visual impact
- the temporary construction compound would result in a temporary negligible impact to the heritage significance during operation.

There is limited visual connection between the Commuter Car Park and the heritage features of the Rooty Hill Railway Station Group due to its visual separation from the station by the adjoining railway corridor, the Blacktown City Council depot and skate park. The proposed Commuter Car Park would introduce a slightly larger scale built element than the existing car park, however the elevated section of the car park would not obstruct significant views onto the platform buildings nor detract from the character and setting of the station.

Further detail on visual impacts is outlined in Section 6.2.

### 6.5.3 Mitigation measures

Potential impacts to non-Indigenous heritage during construction would be managed through the implementation of the CEMP prepared by the construction contractor that would map the nearby non-Indigenous heritage item and prescribe management measures to ensure the item is not affected.

The CEMP would specify the following requirements:

- a heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction
- in the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in the Unexpected Heritage Finds Guideline (TfNSW, 2015a) would be followed, and works within the vicinity of the find would cease immediately. The construction contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and OEH. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location. Potential vibration impacts would be managed in accordance with the measures outlined in Section 7.
- the external construction, façades and interior fittings of the Rooty Hill Station platform buildings are elements of high heritage significance. The original fabric of these buildings should be retained wherever possible and materials used during modifications should be congruent with the character of the station
- the design and materials used for the construction of new access stairs and lift shafts should be as sympathetic as possible to the existing character of the station with the aim of minimising visual impacts
- the collection of moveable heritage items within the passenger building on Platform 3/4 should be conserved and consideration given to their use for interpretive purposes as part of the proposed upgrade of the station
- during detailed design, consideration would be given to avoiding ground disturbing impacts to areas of identified archaeological potential
- prior to commencement of proposed works, a Photographic Archival Recording (PAR) should be prepared, recording areas of Rooty Hill Station to be affected by the proposal
- a heritage conservation architect should provide ongoing heritage advice during the detailed design and construction phases of the proposal, and should ensure that the above material and design options advice is enacted
- preliminary archaeological assessment has identified the potential for impacts to archaeological resources of local significance. Further identification of the archaeological resource at Rooty Hill Station, and potential impacts from the proposed works, should be prepared as part of an archaeological research design (ARD). The ARD would be submitted to Heritage Division with a Section 140 permit application for archaeological investigation of, and impacts to, areas where archaeological resources of local significance may be impacted by the proposed works
- as the proposal, has been assessed as potentially resulting in a moderate physical impact and moderate visual impact to the s170 and locally listed Rooty Hill Railway Station Group, consultation with Blacktown City Council would be required under the ISEPP.



Refer to Table 23 for a full list of proposed mitigation measures

## **6.6 Socio-economic impacts**

### **6.6.1 Existing environment**

The Site is located at Rooty Hill, a suburb within the Blacktown City Council area which lies approximately 40 kilometres west of the Sydney CBD. According to the report, “*A Plan For Growing Sydney*”, the West Central Subregional area which includes the local government areas of Auburn, Bankstown, Blacktown, Holroyd, Paramatta and the Hills will be areas of significant focus for infrastructure investment and intensive growth over the next 20 years.

A growing and prosperous Blacktown City Council LGA will be supported by a network of centres that provide jobs and services closer to home for many of the residents of this area. The improvements to the Station Precinct and improved accessibility will improve the liveability for local residents and contribute to strong, resilient communities throughout the subregion.

Rooty Hill town centre is bisected by the rail line and includes two retail shopping centres and a variety of services and other small businesses. Works associated with the Station Upgrade are located between these two commercial precincts. The Commuter Car Park component of the Proposal is located to the north of the railway line and is adjacent to the northern section of the Rooty Hill retail precinct.

Hotels, day care facilities and religious facilities in Rooty Hill and in the vicinity of the Proposal include:

- The Imperial Hotel located at 1 Rooty Hill Road North, Rooty Hill (30 metres to the west)
- an aged care facility currently under construction on Mavis Street, Rooty Hill
- Rooty Hill School of Arts located at 32 Rooty Hill Road South, Rooty Hill (130 metres to the south)
- Lone Pine Tavern located at 13 Mavis Street, Rooty Hill (80 metres to the south)

### **6.6.2 Potential impacts**

#### **a) Construction phase**

The Proposal has the potential to impact commercial, residential and other uses within the vicinity of the works through:

- noise and vibration impacts
- temporary displacement of parking
- minor delays on the adjacent road network
- changes to traffic and pedestrian arrangements and transport e.g. buses.

Construction activities would predominantly be confined within each site and the adjoining roadway. Residents, businesses, Blacktown City Council and Sydney Trains would be notified of the works and where practicable consulted with regards to staging and timing, road closures and any required detours.

Construction would require the temporary closure of the existing car park at the railway station, resulting in the temporary displacement of commuter parking and Blacktown City Council timed parking spaces. The potential disruption to parking could have an impact upon nearby businesses with shoppers not being able to find parking spaces as close to the retail outlets and other facilities, however any such impact would be temporary and minor.



Temporary lane closures on Beames Avenue to the south, and Station Street, North Parade and Rooty Hill Road North to the north of the site could potentially cause minor traffic delays. These impacts would only be temporary while certain works are being undertaken such as the demolition of redundant infrastructure, movement of building materials to and from the site and excavation for footings.

Targeted consultation with adjacent businesses and the Blacktown City Council will be undertaken to ensure any potential impacts to traffic flow are kept to a minimum. Signage would be provided with suitable notification to alert commuters and customers that access would be maintained to local commercial premises and trading would be as normal.

Access for emergency services would be maintained at all times. It is not anticipated that access to residential properties would be significantly affected during construction of the Proposal. No temporary acquisitions would be required for the construction stage of the Proposal. Any changes to property access would be temporary and as agreed with property owners.

#### **b) Operational phase**

The proposed new Commuter Car Park to the north of the site would result in the gaining of approximately 300 new commuter parking spaces.

The longer term social and economic impacts of the Proposal would be positive for both residents and businesses of Rooty Hill, and particularly for commuters who frequent Rooty Hill Station. There would be an improvement in the accessibility of Rooty Hill Station for commuters as well as an improvement in safety and access. It is likely that such initiatives would help to encourage more people to use public transport. As a result, it is expected that the Proposal would have a positive impact on nearby businesses.

No property acquisition would be required as a result of the Proposal.

#### **6.6.3 Mitigation measures**

Mitigation of potential socioeconomic impacts can be considered in line with mitigation of key aspects including traffic, transport, visual and noise. Refer to Sections 6.1, Section 6.2 and Section 6.3 for discussion of these potential impacts and associated mitigation measures. Table 23 identifies a number of environmental safeguards to minimise these potential impacts.

In addition, the following mitigation measures would be adopted:

- sustainability criteria for the Proposal would encourage the construction contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
- a Community Liaison Plan would identify all potential stakeholders and the methods for consultation with these groups during construction and community notification requirements which can range from letter box drops and phone calls through to offers of alternative accommodation depending on the level of impact.  
  
The plan would also encourage feedback through the submissions process and facilitate opportunities for the community and stakeholders to have input into the Proposal, where possible.
- the community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed by the construction contractor prior to construction.

- contact details for a 24-hour construction response line, project infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.

Refer to Table 23 for a full list of proposed mitigation measures.

## 6.7 Biodiversity

An ecological assessment was undertaken by Cumberland Ecology in October 2017. The assessment included desktop research along with site investigations.

A field investigation was undertaken to determine if any ecological constraints including threatened biota exists within the Proposal sites, and whether the area supports suitable habitat for threatened biota potentially occurring in the vicinity. Vegetation within the study area was surveyed using the random meander technique.

The purpose of the assessment was to determine the current biodiversity values of the site and to assess any potential impacts the proposal may have on native flora and fauna in accordance with the BC Act and the EPBC Act. The objectives of the assessment and accompanying report were as follows:

- describe the vegetation communities on the subject site
- describe fauna habitats and fauna usage of the subject site
- identify any threatened species, populations or ecological communities (as listed under the BC Act and/or EPBC Act) existing on the subject site
- assess the likelihood of occurrence of threatened species, populations or communities (as listed under the BC Act and/or EPBC Act) within the subject site
- assess the potential impact of the project on threatened communities, flora and fauna, including the completion of Assessments of Significance under Section 5A of the EP&A Act
- where relevant, recommend mitigation measures to reduce the impacts of the proposed works on biodiversity values.

### 6.7.1 Existing environment

#### Vegetation

The subject site is approximately 1.44 hectares in area and has been extensively developed as part of an urban environment with substantial modifications including landscaping, garden beds, concrete, bitumen and rail infrastructure. Only small sections of native vegetation currently remain and these too have been highly modified.

The OEH conducted broad scale mapping of the wider area in 2013 and a review of this mapping indicates that the site and wider Rooty Hill Station area are currently unmapped.

The survey by Cumberland Ecology identified the following vegetation communities present within the Proposal site:

- Cumberland Plain Woodland (only canopy species) – approximately 0.04 ha
- Urban Native/Exotic Vegetation – approximately 0.34 ha
- Exotic Grassland – approximately 0.16 ha.

The only remaining remnant native vegetation community within the subject area is the small area of Cumberland Plain Woodland (CPW), with the only remaining part of this community's

structure being the canopy. The canopy species within the subject site are four mature *Eucalyptus moluccana*. These trees are present over concrete areas and planted gardens.

Urban Native/ Exotic Vegetation is the dominant vegetation type within the subject site and includes planted native canopy species such as *Eucalyptus amplifolia* subsp. *amplifolia* (Cabbage Gum) and *Melaleuca decora* located within the existing commuter car park, and are evidently recent plantings.

Vegetation located along the drainage line along the southern boundary of the subject site is dominated by a canopy of exotic and non-endemic native species including *Erythrina cristagalli* (Cockspur Coral Tree), *Quercus robur* (English Oak), *Morus alba* (White Mulberry) and *Grevillea robusta* (Silky Oak), with some native endemic species present. Generally, this area of vegetation is dominated by weeds.

Urban Native/ Exotic Vegetation located on Rooty Hill Road North comprises of species such as the native canopy species *Casuarina cunninghamiana* (River Oak) directly adjacent to the pedestrian footbridge, and exotic *Lagerstroemia indica* (Crepe Myrtle) over *Agapanthus praecox* subsp. *orientalis* (African Lily). Exotic Grassland is present throughout a total of 0.16 ha within the subject site. Groundcover is dominated by exotic species such as *Eragrostis curvula* (African Lovegrass), *Stenotaphrum secundatum* (Buffalo Grass) and *Cynodon dactylon* (Couch).

Cumberland Ecology recorded 76 flora species across the site, approximately 83% being exotic species and 17% native species. A vegetation map of the Proposal Area is provided in Figure 33.

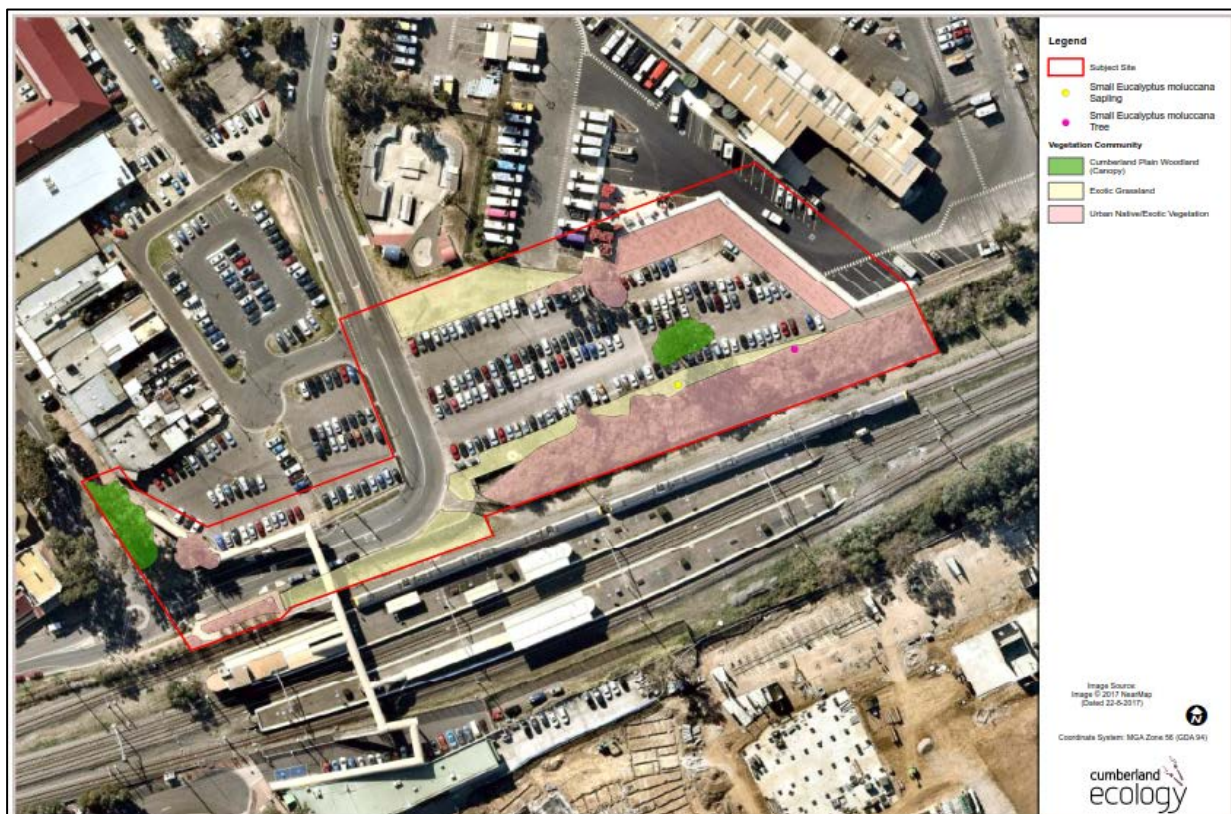


Figure 33 Vegetation map of the of the Proposal area

### Threatened flora species and communities

The results of the database searches (using a 5 kilometre search radius around the Proposal site) identified 21 threatened flora species listed under the BC Act/EPBC Act that have been previously recorded or with potential to occur in the locality of the Proposal.

During the survey, no threatened flora species were recorded or are likely to occur due to the highly disturbed and modified nature of the site. It is unlikely that any threatened flora species naturally occur within the subject site as it is highly disturbed. Areas of grassland have been continually mown short and the majority of the subject site is paved car park.

Cumberland Plain Woodland is listed as a Critically Endangered Ecological Community (CEEC) under both the TSC Act and EPBC Act. The community at this site is in a highly-modified form as it is composed of canopy trees with no understory species present. The majority of groundcover in the area consists of hard pavement and garden beds planted to predominantly exotic species.

### Priority weeds

The Biosecurity Act 2015 applies to problematic weeds. The subject site is located within the Priority region for Greater Sydney. There is one species listed within the subject site as a priority weed – *Cestrum parqui* (Green Cestrum). This species is not listed as a Weed of National Significance.

### Threatened fauna and habitats

Background searches were conducted to investigate threatened biota listed under the EPBC Act and/or the BC Act which have been recorded within a five kilometre radius of the study area. The database searches reported 47 threatened fauna species and one endangered population listed under the BC Act, FM Act and/or EPBC Act; and 13 migratory species listed under the EPBC Act.

From the desktop assessment and subsequent site inspections, ten threatened fauna species are considered as having potential to occur within the subject site. An additional two migratory species listed under the EPBC Act have the potential to forage aerially above the subject site. These potentially occurring fauna species are highly mobile and are expected to move between areas of remaining habitat within the immediate vicinity of the subject site and the wider area. These species are therefore not considered dependent upon the degraded habitats present within the subject site.

The subject site provides moderate value habitat for many fauna species, mainly within the denser vegetation located along the manmade drainage line. There is some highly marginal potential habitat for tree hollow-dependent fauna as one tree present potentially contains small hollows. Although there are some exotic flora species within the subject site, these can provide potential foraging resources for nectivorous mammals and birds that may use the subject site from time to time as part of a larger foraging range.

The drainage line provides potential, albeit degraded habitat for native frog species although none were heard during the site inspection.

Six bird and two reptile species were recorded during the site inspection. It is likely that other common urban adapted species would also occur on occasion such as the Rainbow Lorikeet (*Trichoglossus haematodus*) and Australian Magpie (*Cracticus tibicen*). No threatened fauna were recorded on the Proposal site.



## 6.7.2 Potential impacts

### a) Construction phase

The primary impact to vegetation communities and habitat resulting from the Proposal is the clearing of vegetation and associated habitat within the subject site. Depending on the final design and construction methodology, it has been assumed that the estimated 0.04 ha of CPW (canopy) that is present on the subject site, will all be removed. There is the potential for some of the trees to be retained. The CPW present within the subject site is highly modified, with canopy trees existing over a predominantly exotic groundcover and paved areas. No characteristic understorey or groundcover CPW species were recorded. An Assessment of Significance of the impacts to this community was undertaken and concluded that the proposed upgrade works are not likely to result in a significant impact to this community.

Other vegetation to be removed comprises of up to 0.34 ha of Urban Native/ Exotic Vegetation and 0.16 ha of Exotic Grassland. Currently, all of this vegetation is proposed to be removed, however it is likely that some will be retained depending on the final development footprint.

In addition to the clearance of broad habitats within the subject site, a number of specific habitat features will be removed, including nectar-producing trees; one hollow-bearing tree; and bird nests.

The proposed works have the potential to indirectly impact remaining vegetation and habitats in a number of ways, including through habitat fragmentation; edge effects; alteration to hydrological regimes; increased sedimentation and erosion; and spread of weeds and introduction of feral animals.

Specific impacts to flora species were assessed. No threatened flora species are present in the subject site or are likely to occur. There would be no impact on threatened flora. The project has the potential to result in a number of direct and indirect impacts to flora species in general within the subject site. A number of mitigation measures are proposed to minimise impacts to vegetation communities and flora and are presented below.

The proposed works have the potential to result in a number of direct and indirect impacts to fauna species within the subject site. In addition to the direct removal and modification of vegetation within the subject site, potential indirect impacts to fauna species include habitat disturbance during the construction phase of the project (e.g. changes in noise levels); runoff, erosion and sedimentation; and increased pollution.

A number of other threatened fauna species are considered to have the potential to occur within the subject site. The subject site provides foraging opportunities for these threatened fauna but is unlikely to exclusively support a local population of any threatened fauna species. These species may forage on or near the subject site from time to time as part of a much larger range. Assessments of Significance for potentially impacted threatened fauna species were undertaken and concluded the project will not significantly impact these species. The Assessments of Significance are provided in the biodiversity assessment report by Cumberland Ecology (Appendix G).

Likewise, any migratory birds are unlikely to utilise the subject site and surrounding vegetation for roosting or feeding, as they are highly mobile, aerial species. Therefore, the proposed works are not considered likely to have a significant impact on any migratory fauna species.

TfNSW has prepared a *Vegetation Offset Guide* (TfNSW, 2016d) to assist in meeting the biodiversity sustainability target and to provide a framework for a consistent approach to offset impacts to vegetation on applicable TfNSW projects.

The following ratios for the provision of replacement trees would be applied:

- eight trees for every tree with a diameter at breast height (DBH) greater than 60cm



- four planted trees for every tree with a DBH of 15cm-60cm
- two trees for every tree with a DBH less than 15cm.

The Vegetation Offset Guide would be applied to the Proposal during detailed development of the landscape plan to identify any potential to offset within the bounds of the site. Additional offset vegetation planting would be planted at an alternative site in consultation with Blacktown City Council.

The Proposal is unlikely to significantly impact any threatened species, populations, ecological communities or their habitats.

## **b) Operational phase**

Neither threatened flora or fauna, nor suitable habitat for such biota was found to be present within the Proposal area.

Operational activities are not proposed to significantly change, and as a result there would be no increased risk to biodiversity.

### **6.7.3 Mitigation measures**

The following mitigation measures are proposed to manage impacts to biodiversity:

- to avoid unnecessary removal or damage to any adjoining vegetation outside of the subject site, the clearing area should be clearly demarcated and signed.
- pre-clearing surveys are to be undertaken prior to staged clearing, aimed at identifying key habitat features and providing opportunity for resident fauna to relocate outside the impact area prior to clearing. An ecologist should be present while clearing to rescue animals injured during the clearance operation.
- weed control measures, consistent with TfNSW's *Weed Management and Disposal Guideline* (TfNSW, 2015f), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the *Noxious Weeds Act*.
- erosion and sediment controls should be implemented around the works area and any associated stockpiles to avoid impacts to waterways via stormwater runoff
- offsets and/or landscaping would be undertaken in accordance with TfNSW's Vegetation Offset Guide (TfNSW, 2013d) and in consultation with the relevant Council, and/or the owner of the land upon which the vegetation is to be planted. Any additional tree clearing required beyond that assessed in this REF would also require additional assessment, TfNSW approval, and tree offset planting. Any revegetation should incorporate species typical of CPW including canopy, shrubs and groundcovers.

Refer to Table 23 for a full list of proposed mitigation measures.

## **6.8 Contamination, landform, geology and soils**

A geotechnical investigation was carried out by AURECON in June 2010 to provide a preliminary targeted assessment of engineering properties including soil and groundwater conditions for the Proposal site. The AURECON report was supplemented with supporting reports developed by AECOM Pty Ltd in October 2015 which included geotechnical, contamination and service location reports.

The results of the reports are discussed below.

## **6.8.1 Existing environment**

### **Soils and geology**

The Soil Landscape Series, Sheet for Penrith (Soil Landscape Series Sheet 9030, Scale 1:100,000/1989) was reviewed to determine the prevailing soil types across the site. This indicates the site is located within the South Creek Landscape Grouping, consisting of quaternary alluvium derived from Wianamatta Group shales and Hawkesbury Sandstone.

The soils of this area are generally described as a brown sandy loam to sandy loam clay commonly with apedal single-grained structure and a porous earthy fabric. These can be moderately acidic (pH 5.5) and generally vary from strongly acidic (pH 4.5) to slightly acidic (pH 6.5). Small angular or rounded gravels may also occur and roots are quite frequent in the surface layers.

The Site does not have any surface water features present due to its previously developed nature. The nearest surface water body to the Site is Angus Creek located approximately 200m to the south of site. This creek flows towards Eastern Creek which is located approximately 2 km east of the Site.

A review of the NSW Natural Resource Atlas (NRAtlas) did not identify the occurrence of Acid Sulphate Soil Risk at the site. Furthermore, the Australian Soil Resource Information System (ASRIS) developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) indicates that the site is in an area of 'extremely low probability/low confidence' for these occurring here.

### **Groundwater**

During the drilling and augering of test bores, groundwater was encountered in all the boreholes and the recorded groundwater level ranged from 1.3 m to 5 m below ground level. Within the rail corridor, water was generally encountered at approximately 3 m and within around 0.5 m to 1 m above the transition zone between fill and underlying natural occurring materials. This groundwater could be a perched water table which is restricted to the soils above the lower permeability alluvium.

### **Contamination**

A review of the NSW EPA contaminated land registers and the POEO Act public register indicates the Proposal site is not listed as a contaminated site, nor has the site been subject to any regulation under the Contaminated Land Management Act 1997.

The Geotechnical investigations and desktop contamination review did not identify any obvious soil contamination issues or potential soil contamination sources. Borehole investigations did not encounter any odours or obvious fragments of potential asbestos containing materials (ACM).

Based on the laboratory results from both sites, it is considered that the concentrations of contaminants in soil at the borehole locations do not pose a potential risk to human health for the proposed development.

## **6.8.2 Potential impacts**

### **a) Construction phase**

The Proposal would require excavation work for foundations and footings and pits for lift shafts. Other trenching, excavation or grading would be required for installing services, drainage works, new paving, and tree removal.

## **Soil disturbance**

Excavation and other earthworks such as trenching and stockpiling activities, if not adequately managed, could result in the following impacts:

- erosion of exposed soil and stockpiled materials
- dust generation from excavation and vehicle movements over exposed soil
- an increase in sediment loads entering the stormwater system and/or local runoff.

These impacts are considered to be minor due to the relatively flat terrain and it is expected that erosion risks will be adequately managed through the implementation of standard measures as outlined in the 'Blue Book' - Managing Urban Stormwater: Soils and Construction (Landcom, 2004) plus the Construction Environmental Management Plan (CEMP) and Erosion and Sediment Control Plan will ensure suitable erosion control measures are put in place and maintained correctly during construction.

## **Salinity**

Laboratory results from the geotechnical assessment do not indicate high levels of chloride (an indicator of salinity). The works involve relatively minor levels of excavation and are not anticipated to alter groundwater drainage patterns. The works are therefore not expected to impact on or increase salinisation in the local area.

## **Acid sulphate soils**

OEH have produced a series of risk maps that predict the distribution of acid sulphate soils and these are based on landform assessment, field work and laboratory testing.

A review of the OEH risk assessment maps indicates the proposed works would not impact on Acid Sulphate Soils, as Acid sulphate soils are generally not found in this area. Acid sulphate soils are found in every coastal estuary in NSW and because of their estuarine origin, they are usually found at elevations less than 1 metre above sea level.

The Proposal involves excavation but would not directly impact on Potential Acid Sulphate Soils (PASS), which are not identified as likely to occur on the Site. The works are not expected to cause the water table to be lowered in adjacent areas and minimal impact on groundwater levels is anticipated.

## **Contamination**

Given the proximity to the rail corridor, excavation has the potential to expose contaminants which are regularly associated with railway lines. If these are not appropriately managed they can present a health risk to construction workers and the community. Contaminants could also pose an environmental risk if they were to enter nearby waterways through the stormwater infrastructure. As there is potential for onsite contamination, chemical testing and visual characterisation would be undertaken to confirm the composition and nature of excavated material. Where spoil is classified as unsuitable for reuse it would be transferred to an appropriately licensed offsite facility.

There is also potential for activities to result in the contamination of soil through accidental fuel or chemical spills from construction plant and equipment. In order to minimise potential risks designated fuelling areas will be established and contractors will be informed of correct fuelling techniques and proper handling techniques for potential contaminating materials. Fuelling areas and chemical storage areas will be equipped with spill kits.

### **b) Operational phase**

There would be no operational risks to geology and soils as a result of the Proposal.

### 6.8.3 Mitigation measures

The following mitigation measures would be implemented:

- prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction
- an environmental risk assessment would be undertaken prior to construction and must include a section on contamination as per the TfNSW Environmental Risk Assessment Procedure (3TP-PR-206/3.0)
- an appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements
- a Waste Management Plan would be developed as part of the CEMP and would at a minimum:
  - identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities
  - detail other onsite management practices such as keeping areas free of rubbish
  - specify controls and containment procedures for hazardous waste and asbestos waste
  - outline the reporting regime for collating construction waste data
  - all waste would be managed in accordance with relevant legislation
- any surface water or groundwater dewatering would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and the TfNSW *Water Discharge and Reuse Guideline* (TfNSW, 2015b).

Refer to the Table 23 for a full list of proposed mitigation measures.

## 6.9 Hydrology and water quality

### 6.9.1 Existing environment

#### Surface water

The nearest watercourse is Angus Creek, which is located approximately 200 metres to the south of the station. This creek originates further to the west and flows in an easterly direction where it connects to Eastern Creek. There are no other natural watercourses in the vicinity of the site and the predominant form of drainage in the immediate area is the local road network and associated storm water drains and pipes.

Surface runoff within the vicinity of the Proposal is managed by the trunk drainage systems owned by Blacktown City Council. The stormwater drainage system in the vicinity of the Proposal consists mainly of at-grade stormwater pits, connected to an underground pipe network.

## Flooding

Section 7.10 of the AECOM (2010) report states that no areas in either site were identified as being within the 100-year flood extent however, areas to the east of Rooty Hill Road North and Rooty Hill Road South are within the identified low flood risk precinct, which indicate these areas could be subject to flooding during Probable Maximum Flood (PMF) storm events.

To determine possible impacts from flooding the Blacktown City Council “Webspatial” database was consulted. The Blacktown City Council database provides a flood map that delineates three categories of flood risk being high, moderate and low.

The mapping indicates that the site is located out of the primary flooding zone and is mapped as low risk for flooding potential (see Figure 34). The mapping also shows that Angus Creek and its fringes are mapped as high risk. Flooding in this area directly relates to build up of storm water during and after high intensity rainfall events. Angus Creek flows into Eastern Creek approximately 2 kilometres from the Proposal and it is similarly subject to flooding after substantial rainfall events.

The potential for the ground level of the future car park to be inundated would be determined during detailed design however the likelihood of flooding would be minimal given that Angus Creek is at a substantially lower elevation than the Proposal site.

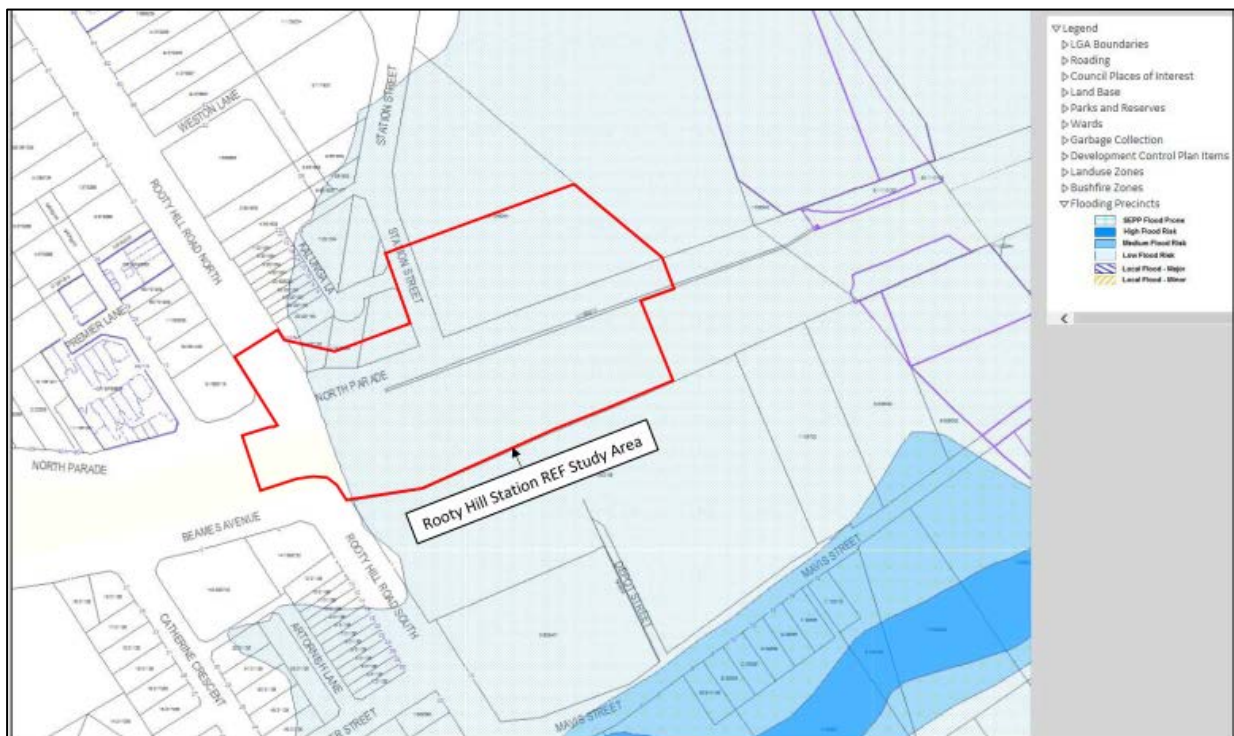


Figure 34 Flood Risk Mapping for Rooty Hill Station Precinct

### 6.9.2 Potential impacts

#### a) Construction phase

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains and Angus Creek. A range of mitigation measures to reduce the incidence of water quality impacts are proposed below and in Chapter 7.

Activities which would disturb soil during construction work (such as tree removal, excavation for footings, and realignment of kerbing) have the potential to impact upon local water quality



as a result of erosion and sedimentation. There is also potential to contaminate local water quality as a result of incidental spills or inadequate fuel and chemical storage practices.

In an extreme rainfall event, flooding may impact on construction activities. Moderate to heavy wet weather events may cause localised flooding which could increase the potential for soil erosion and sedimentation impacts.

Mitigation measures have been provided below to minimise the potential for these impacts.

#### **b) Operational phase**

Works for the Station Upgrade would be unlikely to impact upon the hydrology of the surrounding area. However, this needs to be confirmed through further hydrological assessment. The detailed design would take stormwater management into consideration. The new design does not result in a significant increase in impervious areas as it existing Station facilities.

The Commuter Car Park would increase the impervious surface area in the vicinity of the site and stormwater and drainage systems would be designed in accordance with the relevant Sydney Trains, Sydney Water and Blacktown City Council standards and requirements. This should ensure that the works do not adversely impact upon Blacktown City Council's drainage infrastructure.

Further hydrological assessment would be undertaken during detailed design to ensure that the Proposal would not be impacted by flooding and would not worsen local flooding patterns.

#### **6.9.3 Mitigation measures**

The following flood mitigation measures are to be considered during detailed design:

- further hydrological assessment would be undertaken to ensure that the Proposal would not be impacted by flooding and would not worsen local flooding patterns
- opportunities to employ Water Sensitive Urban Design (WSUD) would be investigated and reported on, along with identification of options to reduce the runoff burden to the existing drainage system
- Blacktown City Council would be consulted in relation to detailed drainage design
- adequate measures are to be provided to reduce flood risks. The potential impacts of climate change on flooding shall be considered as part of this assessment to ensure safe access to the station is maintained
- prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction
- should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2015b)
- adequate water quality and hazardous material procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW Chemical Storage and Spill Response Guidelines (TfNSW, 2015g) during the construction phase. All

staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.

- should dewatering of the excavation be required then a Groundwater Management Plan would also be required to identify discharge consents required and manage the storage, discharge and / or disposal of groundwater
- temporary scour protection and energy dissipation measures would be designed and implemented to protect receiving environments from erosion.

Refer to Table 23 for a full list of mitigation measures.

## **6.10 Air quality**

### **6.10.1 Existing environment**

Based on a review of the existing land uses surrounding the proposal, the existing air quality is considered to be characteristic of an urban environment, with particular industrial and transport emission influences.

OEH undertakes air quality monitoring across NSW. The site is located within the Sydney north-west monitoring region with air quality monitored at fixed sites. Prospect is the closest monitoring site to the Proposal. A search of the daily regional air quality index for the Sydney north-west region for the month of August 2015 showed that the region generally experienced 'Good' air quality values with some outlying values of 'Poor' and 'Hazardous'.

A search of the National Pollutant Inventory database (NPI) 20152/16 data within Rooty Hill (postcode 2766) indicates that there are 3 businesses in the vicinity of the Site that are monitored for air quality. The closest of these is approximately one kilometre away and is a metal producing industry. Other sites are located further away from the site and one of these is involved in the concrete / cement industry.

Other sources of localised air pollution within proximity of Rooty Hill Station precinct would be car/truck exhaust fumes and diesel locomotives.

Potentially affected receptors within the vicinity of the site include the following:

- users of the adjacent commercial and recreational areas
- local residents
- pedestrians and commuters within the Rooty Hill Station Precinct.

### **6.10.2 Potential impacts**

#### **a) Construction phase**

An increase in greenhouse gas emissions, primarily carbon dioxide, would be expected during construction of the Proposal. Much of this would be from embedded energy within materials, followed by plant/equipment use. The greatest opportunities for reducing greenhouse gas emissions associated with the Proposal are likely to be in material selection.

During construction, air quality impacts would be associated with the generation of dust and emissions from stationary and moving on-site machinery and associated vehicular traffic.

Particulate emissions would be associated with a number of stationary and mobile sources as well as potential wind erosion of areas of exposed soil.

Anticipated sources of dust and dust generating activities include:

- loading and transfer of material from trucks

- stockpiling activities
- excavation and preparation of the columns and footings, lift pits, tree removal, drainage works and road works
- demolition of redundant facilities
- general construction works.

The total amount of dust generated would depend on the properties of the demolition and soil material (silt and moisture content), the activities undertaken and the prevailing meteorological conditions.

The Proposal would have a minimal impact on air quality as it would not involve extensive excavation or other land disturbance with the potential to generate significant quantities of dust. Appropriate measures would be established to manage dust emissions from demolition works.

The operation of plant, machinery and trucks may also lead to increases in exhaust emissions in the local area, however these impacts would be minor and short-term.

The likely airborne dust load generated during a typical construction day would be small and therefore would be unlikely to result in reduced local air quality at the nearest potentially affected receptors, given the relatively small construction footprint, and with the implementation of proposed control measures.

## **b) Operational phase**

Modelling indicates that during the AM peak the proposed commuter car park is expected to generate an additional 170 arrivals between 7:00am–8:00am. The proposed commuter car park is expected to generate an additional 200 departures during the evening peak hour (5:50–6:50pm).

Conversely, increased patronage of the rail system would likely reduce commuter vehicle movements on local roads and therefore reduce vehicle emissions in the long term, which would have some beneficial effects on local and regional air quality.

Overall impacts of air quality during the operation of the Proposal are considered minimal as the Proposal would not result in a significant change in land use. The provision of additional parking spaces will increase the number of vehicles operating within the immediate vicinity of the Proposal. In the context of the local environment and existing vehicle patterns and number, however, this change is expected to be minimal.

### **6.10.3 Mitigation measures**

Table 23 provides a list of mitigation measures that are proposed to manage air quality issues during construction. They are aimed around maintaining and operating plant and equipment efficiently and implementing measures for dust suppression including watering, covered loads and appropriate management of tracked dirt or mud on vehicles. Such measures would be included in the CEMP to be prepared for the Proposal.

## **6.11 Other impacts**

### **6.11.1 Waste**

Construction of the Proposal would generate the following wastes:

- excavated soil, sediment and rock
- vegetation mulched native and exotic vegetation including weeds

- asphalt and concrete
- surplus building materials
- building wastes including metals, timbers, plastics, concrete, packaging, etc.
- general waste, including food, glass, plastic, paper and other wastes generated by construction workers.

The primary forms of waste generated by the proposal are anticipated to be spoil from:

- excavation of piling holes, foundation footings and lift shaft bases
- waste concrete and metal from demolition of the exiting pedestrian footbridge, ramps and stairs.

The type of landfill for disposal of spoil materials will be determined by the occupational hygienist reports developed during the detailed design and construction phases of the Proposal. Indicative volumes of spoil have been estimated at least one hundred and fifty (150) cubic metres which represents 30 cubic metres of spoil for each of the five lifts shafts.

One potential disposal location for the spoil from the Proposal has been identified at a licenced waste facility off-site at Elizabeth Drive, Liverpool, NSW. Locations will be finalised prior to commencement of construction and generation of waste requiring disposal.

The quantities and types of wastes expected to be generated, are not likely to pose any unusual or problematic waste management issues.

### **Mitigation measures**

Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). A Waste Management Plan would be prepared that would identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping areas free of rubbish.

The application of the *Infrastructure Sustainability Rating Scheme (v1.2)* would also result in waste management targets to be developed for the Proposal and would include reuse and recycling.

Refer to Table 23 for a list of proposed mitigation measures.

## **6.12 Cumulative impacts**

Cumulative impacts occur when two or more projects are carried out concurrently and in close proximity to one another. The impacts may be caused by both construction and operational activities and can result in a greater impact to the surrounding area than would be expected if each project was undertaken in isolation. Multiple projects undertaken at a similar time/similar location may also lead to construction fatigue, particularly around noise, traffic and air quality impacts, if not appropriately managed.

A search of the Department of Planning and Environment's Major Projects Register, Sydney West Joint Regional Planning Panel Development and Planning Register and the Blacktown City Council Development Application Register in October 2017 indicates there is not currently any major development applications listed in the Rooty Hill for approval at this time.

A new development is currently under construction in Mavis Street to the south of the Rooty Hill Station precinct. This is a multi-purpose residential aged care facility and includes the following components.

- one four-storey mixed use building and 52 at-grade car parking spaces

- one three-storey residential care facility above one level of basement parking containing 24 car spaces
- four four-storey in-fill self-care housing with three residential levels above 120 car spaces at ground level
- one single storey communal facility building
- associated landscaping, fencing, path paving and site works.

Construction at this site has been underway for several months with the footings, foundations and ground level walls being complete at the time of the site inspection. It is anticipated that construction of this facility should be nearing completion prior to the commencement of works at Rooty Hill Station.

During construction of the Proposal, the works would be coordinated with any other construction activities in the area where required. Consultation and liaison would occur with Blacktown City Council, Roads and Maritime Services, RailCorp/Sydney Trains, and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

Traffic associated with the construction work has the potential to have a minor impact on the surrounding road network, particularly during the construction of the new car park when existing car parking numbers will be reduced temporarily. The temporary lane closures occur on Beames Avenue, Station Street, North Parade and Rooty Hill Road North will also have a minor impact on traffic in the area. This impact will only be temporary and for the duration of construction with the area being better equipped to cater for increased patronage after construction is complete.

Operational traffic will have a minimal impact on the performance of the surrounding road network.

Noise during construction will also be managed to ensure there is no cumulative impacts. All noise generating activities on site will be subject to the noise section of the Construction Environmental Management Plan.

Based on this assessment, it is anticipated that the cumulative impacts would be negligible, provided that consultation with relevant stakeholders and mitigation measures in Chapter 7 are implemented.

The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed and implemented as appropriate.

## 6.13 Climate change and sustainability

### 6.13.1 Greenhouse gas emissions

An increase in greenhouse gas emissions, primarily carbon dioxide, would be expected during construction of the Proposal due to exhaust emissions from construction machinery and vehicles transporting materials and personnel to and from site.

The detailed design process would undertake an AS 14064-2 (Greenhouse Gases - project level) compliant carbon foot printing exercise in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects* (TfNSW, 2013e). The carbon footprint would be used to inform decision making in design and construction.

Due to the small scale of the Proposal and the short term temporary nature of the individual construction works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions



generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Table 23.

It is anticipated that, once operational, the Proposal may result in an increase in use of public transport and a relative decrease in use of private motor vehicles by commuters to travel to and from Rooty Hill and the surrounding area. A modal shift in transport usage may reduce the amount of fuel consumed by private motor vehicles with a corresponding relative reduction in associated greenhouse gas emissions in the Sydney region.

### **6.13.2 Climate change**

The dynamic nature of our climate system indicates a need to focus attention on how to adapt to the changes in climate and understand the limitation of adaptation. The effects of climate on the Sydney region can be assessed in terms of weather changes, storm intensity, flooding and increased risk of fire.

Within urban areas, localised warming can occur through the development over natural areas and establishment of other sources of heat including people, equipment and vehicles. Paved and dark coloured surfaces such as roads and buildings absorb and store solar heat energy. Impervious surfaces increase runoff and remove moisture that would otherwise be retained in the ground and contribute to cooling by evapotranspiration. Urban heat impacts can be minimised through the use of light coloured surfaces to increase reflectivity, increasing tree cover and minimising energy usage.

The Proposal provides improved access for commuters to public transport which in turn would minimise private vehicle usage, a significant contributor to anthropogenic heating. A small amount of vegetation would be removed to facilitate the Proposal, but this loss would be offset through vegetation planting in accordance with TfNSW's *Vegetation Offset Guide* (TfNSW, 2016). A number of sustainability measures are also being considered during detailed design to maximise energy efficiency of the Proposal.

Climate change could lead to an increase in the intensity of rainfall events, whereby the rainfall expected to occur in a 100-year average recurrence interval flood event would occur more frequently. A detailed hydrological assessment would be undertaken to ensure that the proposed infrastructure would not worsen the existing flooding known to occur within the Proposal area, and would reduce the potential impacts of climate change. For more information on flooding, refer to Section 6.9.

Climate change could lead to an increase in frequency and severity in bushfires. The Proposal is not situated on land mapped as bush fire prone, but would be designed with appropriate fire protection measures.

A Climate Change Assessment would be undertaken at detailed design to understand potential future climate impacts, asset vulnerabilities and typical control measures for adaptation. Climate change projections readily available for the Sydney metropolitan area would be used and considered as appropriate for the site.

### **6.13.3 Sustainability**

The design of the Proposal would be based on the principles of sustainability, including the incorporation of the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a), the Infrastructure Sustainability Rating Scheme (v1.2) and the TfNSW *Environmental Management System* (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.1.3 for more information regarding the application of these guidelines.

Further positive impacts in relation to climate change and sustainability associated with the Proposal include encouraging a reduction in private vehicle use and increase the accessibility of public transport services.

## 7 Environmental management

This chapter of the REF identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures. Section 7.2 lists the proposed mitigation measures for the Proposal to minimise the impacts of the Proposal identified in Chapter 6.

### 7.1 Environmental management plans

A CEMP for the construction phase of the Proposal would be prepared in accordance with the requirements of TfNSW's EMS. The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP would incorporate as a minimum all environmental mitigation measures identified below in Section 7.2, any conditions from licences or approvals required by legislation, and a process for demonstrating compliance with such mitigation measures and conditions.

### 7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 23. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

**Table 23 Proposed Mitigation Measures**

| No.            | Mitigation measure   |
|----------------|--|
| <b>General</b> |  |
| 1.             | A Construction Environmental Management Plan (CEMP) would be prepared by the construction contractor in accordance with the relevant requirements of <i>Guideline for Preparation of Environmental Management Plans</i> , Department of Infrastructure, Planning and Natural Resources, 2004) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction. |
| 2.             | A project risk assessment including environmental aspects and impacts would be undertaken by the construction contractor prior to the commencement of construction and documented as part of the CEMP.   |
| 3.             | An Environmental Controls Map (ECM) would be developed by the construction contractor in accordance with TfNSW <i>Guide to Environmental Controls Map</i> (TfNSW, 2015c) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.  |
| 4.             | Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.   |
| 5.             | Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.   |
| 6.             | Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.   |

| No.                            | Mitigation measure   |
|--------------------------------|--|
| 7.                             | Any modifications to the Proposal, if approved, would be subject to further assessment and approval by TfNSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.   |
| <b>Traffic and site access</b> |  |
| 8.                             | Alternative parking options to offset the temporary loss of commuter parking during construction would be investigated and reported on during detailed design and construction planning, in consultation with the relevant authorities and the local community.  |
| 9.                             | Consult with relevant authorities during detailed design to determine appropriate controls for impacts to the bus, taxi and kiss and ride zones during construction and operation.   |
| 10.                            | <p>Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum:</p> <ul style="list-style-type: none"> <li>ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised</li> <li>maximising safety and accessibility for pedestrians and cyclists</li> <li>ensuring adequate sight lines to allow for safe entry and exit from the site</li> <li>ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made)</li> <li>managing impacts and changes to on and off street parking and requirements for any temporary replacement provision</li> <li>parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance</li> <li>routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses</li> <li>details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired</li> <li>measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP</li> <li>Consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.</li> </ul> |
| 11.                            | Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.   |
| 12.                            | Construction traffic movements would be scheduled to avoid local traffic peaks.  |
| 13.                            | Road Occupancy Licences for temporary road closures would be obtained, where required.   |
| 14.                            | Access to all private properties and businesses adjacent to the works would be maintained during construction, unless otherwise agreed by relevant property owners.  |

| No.   | Mitigation measure  |
|---|---|
| 15.   | <p>Relevant authorisation(s) from the appropriate road authority would be obtained for the proposed operational changes, such as operational changes to the bus zone, parking, pathways, and signage etc., as necessary.</p>  |
| <b>Urban design, landscape and visual amenity</b> |   |
| 16.   | <p>An Urban Design Plan (UDP) would be prepared by the construction contractor, in consultation with Blacktown City Council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The UDP, at a minimum, would address the following:</p> <ul style="list-style-type: none"> <li>• the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns (including consideration of Crime Prevention Through Environmental Design principles). This is to include but not be limited to: <ul style="list-style-type: none"> <li>◦ connectivity with surrounding local and regional movement networks including street networks, other transport modes and active transport networks. Existing and proposed paths of travel for pedestrians and bicycles should be shown</li> <li>◦ integration with surrounding local and regional open space and or landscape networks. Existing and proposed open space infrastructure/landscape elements should be shown</li> <li>◦ integration with surrounding streetscape including street wall height, active frontages, awnings, street trees, entries, vehicle cross overs etc.</li> <li>◦ integration with surrounding built form (existing or desired future) including building height, scale, bulk, massing and land-use</li> </ul> </li> <li>• design detail that is sensitive to the amenity and character of heritage items located within or adjacent to the Proposal site.</li> </ul> |
| 17.   | <p>A Public Domain Plan (PDP) would be prepared by the construction contractor, in consultation with the Blacktown City Council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The PDP, at a minimum, would address the following:</p> <ul style="list-style-type: none"> <li>• materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences</li> <li>• location and design of pedestrian and bicycle pathways, street furniture including relocated bus and taxi facilities, bicycle storage (where relevant), telephones and lighting equipment</li> <li>• landscape treatments and street tree planting to integrate with surrounding streetscape</li> <li>• opportunities for public art created by local artists to be incorporated, where considered appropriate, into the Proposal</li> <li>• total water management principles to be integrated into the design where considered appropriate</li> <li>• design measures included to satisfy requirements of Infrastructure Sustainability Rating Tool (v1.2)</li> <li>• identification of design and landscaping aspects that will be open for stakeholder input, as required.</li> </ul>  |



| No. | Mitigation measure   |
|-----|--|
| 18. | <p>Assess consistency with the design objectives from Blacktown Development Control Plan (DCP) (Sections 1.4 and 4.4.2) in tender documents for the car park design:</p> <ul style="list-style-type: none"> <li>• Encourage high quality development that contributes to the existing or desired future character of the area, with particular emphasis on the integration of buildings with a landscaped setting</li> <li>• Protect and enhance the public domain</li> <li>• Encourage a high standard of aesthetically pleasing and functional development that sympathetically relates to adjoining and nearby developments</li> <li>• Ensure that development does not adversely affect the heritage significance of heritage items, heritage groups or archaeological sites as well as their settings, distinctive streetscape, landscape and architectural styles</li> <li>• Ensure that development in the vicinity of a heritage item is responsive and respectful in terms of height, setback, form and overall design.</li> <li>• New Station canopies should have a shallow pitch, typical of the roof lines of the heritage Station buildings.</li> <li>• The colour of the new canopies should be recessive, to reduce their visual dominance.</li> <li>• Use a common palette of materials to provide consistency across the precinct upgrade.</li> <li>• Use a common theme/style for new site elements like seating, paving, signage and lights, which is complementary to the heritage architecture of the Station</li> <li>• New pedestrian infrastructure (concourse, platform canopy, stairs etc.) to be designed complementary with the heritage architecture of the Station:</li> <li>• Design elements to reflect elegant simplicity of the 1940s Station buildings character</li> <li>• Design with an appropriate human scale.</li> </ul> |
| 19. | <p>All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to <i>AS 1158 Road Lighting</i> and <i>AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting</i>.</p>  |
| 20. | <p>The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.</p>   |
| 21. | <p>Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.</p>   |
| 22. | <p>Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.</p>   |
| 23. | <p>Retaining and protecting existing trees where practicable including consultation with a qualified arborist to minimise impact on the long-term health of any nearby trees that could be or are planned to be retained.</p>  |
| 24. | <p>Protect existing trees to be retained prior to commencement of construction in accordance with Australian Standard Protection of trees on development sites AS4970-2009 and TfNSW's Vegetation Management (Protection and Removal) Guideline, 2015 (Vegetation Management, TfNSW, 2015).</p>  |
| 25. | <p>Undertake replacement planting to address proposed tree loss in accordance with <i>Vegetation Management</i>, TfNSW, 2015.</p>  |
| 26. | <p>Rehabilitate disturbed areas</p>  |

| No.                        | Mitigation measure   |
|----------------------------|--|
| 27.                        | Plant tall native trees between the skate park and the proposed car park to soften and reduce the visual bulk of the car park when viewed from Station Street.   |
| 28.                        | Plant tall native trees (where possible in consideration of pedestrian/vehicular sightlines, safety and surveillance issues) along the Station Street interface with the car park.   |
| 29.                        | Installation of way-finding signage as per TfNSW guidelines.   |
| 30.                        | <p>Light spill from the construction area into adjacent visually sensitive properties would be minimised by:</p> <ul style="list-style-type: none"> <li>directing construction lighting into construction areas and ensuring the site is not over-lit</li> <li>the sensitive placement and specification of lighting to minimise any potential increase in light pollution</li> <li>design and installation of all lighting in accordance with the requirements of <i>AS4282 Control of the Obtrusive Effects of Outdoor Lighting</i>.</li> </ul>  |
| 31.                        | <p>During construction and operation, graffiti would be removed in accordance with TfNSW's Standard Requirements. Hoardings, site sheds, fencing, acoustic walls around the perimeter of the site and any structures built as part of the Project are to be maintained free of graffiti and advertising not authorised by the Proponent during the construction period. Graffiti and unauthorised advertising will be removed or covered within the following timeframes:</p> <ul style="list-style-type: none"> <li>Offensive graffiti will be cleaned or covered within 24 hours</li> <li>Highly visible yet non-offensive graffiti will be cleaned or covered within 1 week</li> <li>Graffiti that is neither offensive nor highly visible will be cleaned or covered during normal operations within one month.</li> </ul> <p>Any advertising material will be removed or covered within 24 hours.</p> |
| <b>Noise and vibration</b> |  |
| 32.                        | Surveys of nearby sensitive buildings would be carried out in order to assess the potential for increased susceptibility to building damage from vibration. Should these buildings be considered more susceptible to vibration, reduced vibration criteria levels may be applicable and subsequently adopted during the selection process for suitable equipment to be used in the vicinity of these buildings.  |
| 33.                        | Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Construction Noise Strategy</i> (TfNSW, 2012c) and the Noise and Vibration Impact Assessment for the Proposal (Muller Acoustic, 2017). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.  |

| No. | Mitigation measure   |
|-----|--|
| 34. | <p>The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:</p> <ul style="list-style-type: none"> <li>regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise</li> <li>avoiding any unnecessary noise when carrying out manual operations and when operating plant</li> <li>ensuring spoil is placed and not dropped into awaiting trucks</li> <li>avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable</li> <li>switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded</li> <li>avoiding deliveries at night/evenings wherever practicable</li> <li>no idling of delivery trucks</li> <li>keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site</li> <li>minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.</li> </ul> |
| 35. | <p>The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:</p> <ul style="list-style-type: none"> <li>maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances</li> <li>using the most suitable equipment necessary for the construction works at any one time and substituting large vibratory items with smaller units or alternative compaction methods where possible</li> <li>directing noise-emitting plant away from sensitive receivers</li> <li>regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc.</li> <li>using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works</li> <li>use of quieter and less vibration emitting construction methods where feasible and reasonable.</li> </ul>  |

| No. | Mitigation measure   |
|-----|--|
| 36. | <p>The CNVMP would include measures to consult with and notify potentially impacted receivers and the surrounding community with regard to:</p> <ul style="list-style-type: none"> <li>Informing affected residents and other sensitive land use occupants the levels of impacts, the associated duration of each activity and what is being adopted at the project to minimize noise impacts to the community. This information should be provided to the community seven days before commencement</li> <li>Provide information to neighbours before and during construction through media such as letterbox drops, meetings or individual contact. In some areas, the proponent will need to provide notification in languages other than English. A website could also be established for the project to provide information</li> <li>Implement a site information board at the front of the site with the name of the organisation responsible for the site and their contact details, hours of operation and regular information updates. This signage should be clearly visible from the outside and include standard and after hours emergency contact details</li> <li>Maintain good communication between the community and project staff</li> <li>Appoint a community liaison officer where required to maintain good communications between community and staff</li> <li>Provide a readily accessible contact point, for example, through a 24-hour toll-free information and complaints line and give complaints a fair hearing</li> <li>Have a documented complaints process, including an escalation procedure so that if a complainant is not satisfied there is a clear path to follow</li> <li>Records of all community complaints will be maintained on an up-to-date complaint register.</li> </ul> |
| 37. | <p>Works would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any works outside these hours may be undertaken if approved by TfNSW and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the construction contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.</p>  |
| 38. | <p>A noise monitoring program would be carried out for the duration of the works in accordance the CNVMP prepared for the Proposal, and any approval and licence conditions.</p>   |
| 39. | <p>Where the <math>L_{Aeq}</math> (15minute) construction noise levels are predicted to exceed 75 dBA and/or 30 dBA above the Rating Background Level at nearby affected sensitive receivers, respite periods would be observed, where practicable, and in accordance with the TfNSW <i>Construction Noise Strategy</i> (TfNSW, 2012c). This would include restricting the hours that very noisy activities can occur.</p>   |
| 40. | <p>To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (Muller Acoustic, 2017) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.</p>   |
| 41. | <p>Vibration monitoring would be undertaken at the nearest sensitive receiver for work using a hydraulic hammer or vibratory roller to ensure limits for human comfort are not exceeded.</p>   |

| No.                        | Mitigation measure   |
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| 42.                        | <p>Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with:</p> <ul style="list-style-type: none"> <li>for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 <i>Structural Vibration in Buildings: Effects on Structures</i> and British Standard BS 7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i></li> <li>for human exposure to vibration the acceptable vibration - values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>.</li> </ul> |
| 43.                        | <p>Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 18 metres from the works. All heritage listed buildings and other sensitive structures would need to be assessed through additional assessment to ensure they are not likely to be adversely affected by the finalised work plan.</p>   |
| 44.                        | <p>Affected schools and other identified sensitive receivers would be consulted in relation to noise mitigation measures to identify any noise sensitive periods, e.g. exam periods. Noise intensive construction works in the vicinity of affected educational buildings are to be minimised as much as reasonably possible.</p>  |
| 45.                        | <p>To effectively mitigate potential impacts of vibration on the Rooty Hill Railway Station heritage building, activities that cause vibration would be managed in accordance with German Standard DIN 4150 – Part 3 (DIN 1999) heritage specifications. Real time vibration monitoring would be conducted at commencement of relevant works to confirm compliance with the German Standard DIN 4150. If vibration levels approach the determined trigger level, then the construction activity would cease and the heritage structure would be assessed and alternative construction methodologies developed, where practicable, before construction recommences.</p>   |
| 46.                        | <p>During construction, suitable measures would be put in place to ensure the retained heritage elements are protected from damage. Measures may include hoardings, use of spotters during the movement of equipment and other measures as necessary.</p>  |
| 47.                        | <p>Following commencement of operation, noise monitoring will be undertaken to verify the predicted operational noise levels. Operational monitoring shall be determined by an independent acoustic engineer accredited by the Association of Australian Acoustic Consultants (AAAC) or environmental specialists acceptable to TfNSW. All reasonable and feasible additional noise mitigation or management measures that are necessary to reduce noise levels or minimise impacts would be undertaken.</p>   |
| <b>Indigenous heritage</b> |  |
| 48.                        | <p>All construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to the Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites.</p>   |



| No. | Mitigation measure |
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| 49. | If unforeseen Indigenous objects are uncovered during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2015a) would be followed, and works within the vicinity of the find would cease immediately. The construction contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the OEH and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location. |
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### Non-Indigenous heritage

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| 50. | In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2015a) would be followed, and works within the vicinity of the find would cease immediately. The construction contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and OEH. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location. Potential vibration impacts would be managed in accordance with the measures outlined in Section 7.  |
| 51. | <p>The external construction and façades fittings of the Rooty Hill Station platform buildings are an element of high heritage significance. The original fabric of these buildings should be retained wherever possible and materials used during modifications should be congruent with the character of the station, including the following recommendations:</p> <ul style="list-style-type: none"> <li>the proposal should be revised to avoid infilling the curved walkway within the former signal box building on Platform 1/2. The walkway should remain open, with consideration given to use of this architectural feature for interpretive purposes</li> <li>the fitout of the proposed family accessible toilet within the passenger building on Platform 3/4 should utilise existing doorways and window openings wherever possible to avoid altering the original design of the station buildings</li> <li>any new doors or windows added to the platform buildings should be designed with sympathetic materials and colour schemes, and in a form that responds to the original scale and configuration of existing openings</li> <li>consideration should be given during the detail design phase for the retention and conservation of the metal grate boot scrapers located at the entry steps to the station buildings, which contribute to the integrity and intactness of the station precinct as a whole. In instances where these have been partially covered by intrusive asphalt resurfacing, the metal grate boot scrapers should be exposed and conserved.</li> </ul> |
| 52. | The internal structure and interior fittings of the Rooty Hill Station platform buildings are an element of moderate heritage significance, due to renovations since their original construction which has altered the integrity and overall intactness of the fabric. The original fabric of these interiors should be retained wherever possible and materials used during modifications should be congruent with the character of the station. Any modification of the internal configuration of the station building, such as repainting, installing new fixtures and service connections inside the buildings should be sympathetic to the historical and aesthetic character of the station and installation should minimise impacts to original fabric.   |

| No. | Mitigation measure   |
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| 53. | The design and materials used for the construction of new access stairs and lift shafts should be as sympathetic as possible to the existing character of the station with the aim of minimising visual impacts. The design should use unobtrusive, modern, lightweight materials, which would reduce the visual bulk of new development. Anti-throw screens should be constructed of the least obtrusive material possible to reduce visual impacts to Rooty Hill Station and preserve views from the footbridge and stairs over the station and wider Rooty Hill township.   |
| 54. | The collection of moveable heritage items within the passenger building on Platform 3/4 should be conserved and consideration given to their use for interpretive purposes as part of the proposed upgrade of the station. These items should be kept in a safe and secure location during works. Should the items not be considered for interpretation at the station, options for their transfer to Sydney Trains or the Australian Railway Historical Society could be explored.  |
| 55. | During detailed design, consideration would be given to avoiding ground disturbing impacts to areas of identified archaeological potential. Should ground disturbing works be designated in areas of archaeological potential, an archaeological research design, approvals from Heritage Division and potential archaeological excavation may be required.  |
| 56. | Prior to commencement of proposed works, a Photographic Archival Recording (PAR) would be prepared, recording areas of Rooty Hill Station to be affected by the proposal. The PAR should include photographs of the stations buildings and the overall setting of the station, including a record of views that would be modified by the proposal. The recording should be undertaken in accordance with the guidelines for <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> prepared by the NSW Office of Environment & Heritage. The PAR would be submitted to Blacktown City Council, and copies would be retained as per the standards. Consideration should be given to including a 3D scan of all structures to be removed as part of the archival recording process. |
| 57. | A heritage conservation architect should provide ongoing heritage advice during the detailed design and construction phases of the proposal, and should ensure that the above material and design options advice is enacted.   |
| 58. | A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.  |
| 59. | Consideration should be given to the provision of interpretation as part of the proposal, which would outline the history, associations and significance of the Rooty Hill Railway Group and wider Rooty Hill area. Interpretative measures could involve interpretive signage, panels or displays at entry/exit points to the station, including the proposed stair and lift shaft locations.   |
| 60. | Preliminary archaeological assessment has identified the potential for impacts to archaeological resources of local significance. Further identification of the archaeological resource at Rooty Hill Station, and potential impacts from the proposed works, should be prepared as part of an archaeological research design (ARD). The ARD would be submitted to Heritage Division with a Section 140 permit application for archaeological investigation of, and impacts to, areas where archaeological resources of local significance may be impacted by the proposed works.  |
| 61. | As the proposal, has been assessed as potentially resulting in a moderate physical impact and moderate visual impact to the s170 and locally listed Rooty Hill Railway Station Group, consultation with Blacktown City Council would be required under the ISEPP.  |

## Socio-economic

| No.                 | Mitigation measure   |
|---------------------|--|
| 62.                 | Sustainability criteria for the Proposal would be established to encourage the construction contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.   |
| 63.                 | Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.   |
| 64.                 | A Community Liaison Plan would identify all potential stakeholders and the methods for consultation with these groups during construction and community notification requirements which can range from letter box drops, phone calls to offers of alternative accommodation depending on the level of impact. The plan would also encourage feedback through the submissions process and facilitate opportunities for the community and stakeholders to have input into the project, where possible. |
| 65.                 | Contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.  |
| 66.                 | The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.   |
| <b>Biodiversity</b> |  |
| 67.                 | Construction of the Proposal must be undertaken in accordance with TfNSW's <i>Vegetation Management (Protection and Removal) Guideline</i> (TfNSW, 2015d) and TfNSW's <i>Fauna Management Guideline</i> (TfNSW, 2015e).  |
| 68.                 | All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.  |
| 69.                 | Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Ecological Assessment (Cumberland Ecology, 2017) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below.  |
| 70.                 | To avoid unnecessary removal or damage to any adjoining vegetation outside of the subject site, the clearing area should be clearly demarcated and signed.   |
| 71.                 | Pre-clearing surveys are to be undertaken prior to staged clearing, aimed at identifying key habitat features and providing opportunity for resident fauna to relocate outside the impact area prior to clearing. An ecologist should be present while clearing to rescue animals injured during the clearance operation.  |
| 72.                 | Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Ecological Assessment (Cumberland Ecology, 2017). Tree protection would be undertaken in line with <i>AS 4970-2009 Protection of Trees on Development Sites</i> and would include exclusion fencing of TPZs.  |
| 73.                 | In the event of any tree to be retained becoming damaged during construction, the construction contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.  |

| No.                    | Mitigation measure  |
|------------------------|---|
| 74.                    | Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the construction contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval.   |
| 75.                    | Weed control measures, consistent with TfNSW's <i>Weed Management and Disposal Guideline</i> (TfNSW, 2015f), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the <i>Biosecurity Act 2016</i> .   |
| 76.                    | For new landscaping works, mulching and watering would be undertaken until plants are established.  |
| 77.                    | Erosion and sediment controls should be implemented around the works area and any associated stockpiles to avoid impacts to waterways via stormwater runoff.  |
| 78.                    | Offsets and/or landscaping would be undertaken in accordance with TfNSW's <i>Vegetation Offset Guide</i> (TfNSW, 2013d) and in consultation with the relevant Council, and/or the owner of the land upon which the vegetation is to be planted. Any additional tree clearing required beyond that assessed in this REF would also require additional assessment, TfNSW approval, and tree offset planting.  |
| <b>Soils and water</b> |   |
| 79.                    | Blacktown City Council would be consulted in relation to detailed drainage design.  |
| 80.                    | Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' <i>Managing Urban Stormwater: Soils and Construction Guidelines</i> (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction. |
| 81.                    | An environmental risk assessment would be undertaken prior to construction and must include a section on contamination as per the TfNSW's Environmental Risk Assessment Procedure (3TP-PR-206/3.0).   |
| 82.                    | An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements.  |
| 83.                    | Erosion and sediment controls should be implemented around the works area and any associated stockpiles to avoid impacts to waterways via stormwater runoff.  |
| 84.                    | Temporary scour protection and energy dissipation measures would be designed and implemented to protect receiving environments from erosion.  |
| 85.                    | Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.   |

| No. | Mitigation measure   |
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| 86. | Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.  |
| 87. | All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and TfNSW's <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2015g).  |
| 88. | <p>A Waste Management Plan would be developed as part of the CEMP and would at a minimum:</p> <ul style="list-style-type: none"> <li>• identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities</li> <li>• detail other onsite management practices such as keeping areas free of rubbish</li> <li>• specify controls and containment procedures for hazardous waste and asbestos waste</li> <li>• outline the reporting regime for collating construction waste data</li> <li>• all waste would be managed in accordance with relevant legislation</li> </ul> |
| 89. | Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2015g) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.   |
| 90. | In the event of a pollution incident, works would cease in the immediate vicinity and the construction contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.  |
| 91. | The existing drainage systems would remain operational throughout the construction phase.  |
| 92. | Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the <i>Waste Classification Guidelines</i> (EPA, 2014) and TfNSW's <i>Water Discharge and Reuse Guideline</i> (TfNSW, 2015b).   |
| 93. | Should dewatering of the excavation be required then a Groundwater Management Plan will also be required to identify discharge consents required and manage the storage, discharge and / or disposal of groundwater.   |
| 94. | Any surface water or groundwater dewatering would be managed in accordance with the requirements of the <i>Waste Classification Guidelines</i> (EPA, 2014) and TfNSW's <i>Water Discharge and Reuse Guideline</i> (TfNSW, 2015b).  |
| 95. | Opportunities to employ Water Sensitive Urban Design (WSUD) would be investigated and reported on, along with identification of options to reduce the runoff burden to the existing drainage system.   |



| No.                            | Mitigation measure   |
|--------------------------------|--|
| 96.                            | <p>The following flood mitigation measures are to be considered during detailed design:</p> <ul style="list-style-type: none"> <li>• further hydrological assessment would be undertaken to ensure that the Proposal would not be impacted by flooding and would not worsen local flooding patterns</li> <li>• adequate measures are to be provided to reduce flood risks. The potential impacts of climate change on flooding shall be considered as part of this assessment to ensure safe access to the station is maintained</li> <li>• flood mitigation measures and a maintenance strategy would be developed for the lift</li> <li>• if any flood mitigation is proposed, flood modelling would be undertaken to confirm that the Proposal and any flood mitigation would achieve a neutral flood impact on upstream and downstream properties</li> </ul> <p>adequate measures are to be adopted to ensure impacts from flooding on landscaping design are factored into the PDP.</p> |
| <b>Air quality</b>             |  |
| 97.                            | <p>Air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's <i>Air Quality Management Guideline</i> (TfNSW, 2015h).</p>   |
| 98.                            | <p>Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.</p>  |
| 99.                            | <p>Plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling.</p>  |
| 100.                           | <p>Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.</p>  |
| 101.                           | <p>To minimise the generation of dust from construction activities, the following measures would be implemented:</p> <ul style="list-style-type: none"> <li>• apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces)</li> <li>• cover stockpiles when not in use</li> <li>• appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading</li> <li>• prevent mud and dirt being tracked onto sealed road surfaces.</li> </ul>   |
| <b>Waste and contamination</b> |  |
| 102.                           | <p>Waste management would be undertaken in accordance with the <i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act). A Waste Management Plan would be prepared that would identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping areas free of rubbish.</p>   |

| No.                                      | Mitigation measure   |
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| 103.                                     | <p>The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:</p> <ul style="list-style-type: none"> <li>identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities</li> <li>detail other onsite management practices such as keeping areas free of rubbish</li> <li>specify controls and containment procedures for hazardous waste and asbestos waste</li> <li>outline the reporting regime for collating construction waste data.</li> </ul>    |
| 104.                                     | <p>An environmental risk assessment would be undertaken prior to construction and must include a section on contamination as per the TfNSW's Environmental Risk Assessment Procedure (3TP-PR-206/3.0).</p>   |
| 105.                                     | <p>An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements.</p>  |
| 106.                                     | <p>All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.</p>  |
| 107.                                     | <p>All spoil and waste must be classified in accordance with the <i>Waste Classification Guidelines Part 1: Classifying waste</i> (EPA, 2014) prior to disposal.</p>   |
| 108.                                     | <p>Any concrete washout would be established and maintained in accordance with TfNSW's <i>Concrete Washout Guideline</i> – draft (TfNSW, 2015i) with details included in the CEMP and location marked on the ECM.</p>  |
| <b>Climate change and sustainability</b> |  |
| 109.                                     | <p>Detailed design of the Proposal would be undertaken in accordance with the <i>Infrastructure Sustainability Rating Tool</i> (v1.2).</p>   |
| 110.                                     | <p>The detailed design process would involve the development of a climate change impact assessment in compliance with the Climate Change Impacts and Risk Management: A Guide for Business and Government (Department of the Environment and Heritage, 2006) and the ISCA Guidelines for Climate Change Adaptation (AGIC, 2011) to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc. would be considered in the design.</p> |
| 111.                                     | <p>The detailed design process would include a Greenhouse Gases (project level) compliant carbon foot printing exercise in accordance with AS14064-2 and TfNSW's Greenhouse Gas Inventory Guide for Construction Projects (TfNSW, 2013e). The carbon footprint would then be used to inform decision making in design and construction.</p>  |
| <b>Cumulative impacts</b>                |  |
| 112.                                     | <p>The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP, and implemented as appropriate.</p>  |

## 8 Conclusion

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This REF has been prepared in accordance with the provisions of section 111 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal would provide the following benefits:

- provision of approximately 300 new commuter parking spaces (approximately 500 in total) including additional disabled car parking spaces, additional kiss and ride spaces and undercover bicycle rack spaces
- improved accessibility for customers at Rooty Hill Station providing an accessible route to the station platforms through the provision of new footbridge, lifts and stairs from the northern and southern station interchanges and commuter car park
- potential increased use of public transport to and from Rooty Hill
- additional amenity facilities with the addition of new family accessible toilet and ambulant cubicles and ticketing facilities
- improvements to security through additional lighting, CCTV and wayfinding.

The likely key impacts of the Proposal are as follows:

- temporary amenity impacts during construction including loss of parking, increased noise and vibration impacts to surrounding receivers during construction, reduced air quality and visual impacts
- minor delays on the adjacent road network during construction
- temporary changes to access arrangements (including pedestrian diversions) during construction
- removal of vegetation
- a minor increase in local traffic movements
- Longer term benefits of the Proposal include provision of additional commuter parking spaces, improved accessibility to the station and improved interchange facilities.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act (refer to Chapter 6, Appendix A and Appendix B). Based on the assessment contained in this REF, it is considered that the Proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an EIS is not required, nor is the approval of the Minister for Planning.

The Proposal would also take into account the principles of ESD (refer to Section 3.1.3 and Section 4.6). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

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TfNSW, 2015i, *Concrete Washout Guideline - draft*, Sydney

TfNSW, 2016, *Vegetation Offset Guide*, Sydney

TfNSW, 2017, *NSW Sustainable Design Guidelines - Version 4.0*, Sydney



## Appendix A      Consideration of matters of National Environmental Significance

The table below demonstrates TfNSW's consideration of the matters of NES under the EPBC Act to be considered in order to determine whether the Proposal should be referred to Commonwealth Department of the Environment.

| Matters of NES  | Impacts |
|---|---------|
| <b>Any impact on a World Heritage property?</b><br>There are no World Heritage properties within 1km of the Proposal.   | Nil     |
| <b>Any impact on a National Heritage place?</b><br>There are no National Heritage places within 1km of the Proposal.  | Nil     |
| <b>Any impact on a wetland of international importance?</b><br>There are no wetlands of international importance within 1km of the Proposal.  | Nil     |
| <b>Any impact on a listed threatened species or communities?</b><br>It is unlikely that the development of the Proposal would significantly affect listed threatened species or communities.  | Nil     |
| <b>Any impacts on listed migratory species?</b><br>It is unlikely that the development of the Proposal would significantly affect any listed migratory species.   | Nil     |
| <b>Does the Proposal involve a nuclear action (including uranium mining)?</b><br>The Proposal does not involve a nuclear action.  | Nil     |
| <b>Any impact on a Commonwealth marine area?</b><br>There are no Commonwealth marine areas in the vicinity of the Proposal.   | Nil     |
| <b>Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources?</b><br>The Proposal is for a rail infrastructure facility and is not related to coal seam gas or coal mining. | Nil     |
| <b>Additionally, any impact (direct or indirect) on Commonwealth land?</b><br>The Proposal would not be undertaken on or near any Commonwealth land.  | Nil     |

## Appendix B Consideration of clause 228

The table below demonstrates TfNSW's consideration of the specific factors of clause 228 of the EP&A Regulation in determining whether the Proposal would have a significant impact on the environment.

| Factor   | Impacts |
|--|---------|
| <p><b>(a) Any environmental impact on a community?</b></p> <p>There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. The temporary closure of the existing Station Street car park would be an inconvenience to commuters, local shoppers, and owners of commercial premises. Mitigation measures outlined in Table 23 would be implemented to manage and minimise adverse impacts.</p>  | Minor   |
| <p><b>(b) Any transformation of a locality?</b></p> <p>The Proposal would include the introduction of new visible elements in the landscape through the construction of a new multi-storey car park that replaces the existing at-grade commuter car park on Station Street as well as removing the highly dominant visible footbridge, ramp and stair structures within the Rooty Hill Station.</p> <p>The impact is considered to be minor as the proposed height of the car park would be in scale with surrounding redevelopment and the impact to viewpoints during operation ranges from moderate to low.</p> <p>Minor vegetation removal will be required to facilitate the development of the Proposal and will be subject to offsetting in accordance with the TfNSW <i>Vegetation Offset Guide</i> (9TP-ST-149/2.0).</p> <p>The Proposal would have a positive contribution to the locality by helping to address the high demand for car parking spaces for both commuter and commercial parking within Rooty Hill. The Proposal also provides infrastructure that supports potential growth and provides improved public transport facilities.</p> | Minor   |
| <p><b>(c) Any environmental impact on the ecosystem of the locality?</b></p> <p>Minor vegetation removal will be required and will be subject to offsetting in accordance with the TfNSW <i>Vegetation Offset Guide</i> (9TP-ST-149/2.0). The Proposal is unlikely to impact the local ecosystem as discussed in Section 6.</p>  | Nil     |
| <p><b>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</b></p> <p>There would be some temporary impacts during construction particularly in relation to noise, traffic and access and visual amenity.</p> <p>The potential impacts to aesthetic values are detailed in item (b) and would not result in a significant reduction of aesthetic quality or value of a locality.</p> <p>Minor vegetation removal will be required and will be subject to offsetting in accordance with the TfNSW <i>Vegetation Offset Guide</i> (9TP-ST-149/2.0).</p>   | Minor   |

| Factor   | Impacts |
|--|---------|
| <p><b>(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?</b></p> <p>The Proposal would have a positive contribution to the locality by improving accessibility and capacity of car parking for commuters and local shoppers.</p> <p>The Proposal would have minor visual impacts on a heritage item listed under the Blacktown LEP and RailCorp s170 Heritage Conservation Register. Impacts to heritage would be minimised through the implementation of the mitigation measures provided in this REF.</p> <p>An archaeological assessment has been undertaken which determined that there is a low-moderate risk of encountering archaeological items and that the Proposal is unlikely to expose historical archaeological relics.</p> | Minor   |
| <p><b>(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</b></p> <p>The Proposal is unlikely to have any impact on the habitat of protected fauna. Minor vegetation will be removed to facilitate construction of the Proposal. An ecological assessment has confirmed that this vegetation does not provide habitat for protected fauna likely to occur in the locality.</p>   | Nil     |
| <p><b>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</b></p> <p>The Proposal has the potential to result in the removal of approximately 0.04 ha of Cumberland Plain Woodland (canopy species) as detailed in Section 6.7. An Assessment of Significance of the impacts to this community was undertaken and concluded that the proposed upgrade works are not likely to result in a significant impact to this community.</p> <p>Specific management measures would be implemented to manage the potential for the proposal to have any impact on endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.</p>  | Minor   |
| <p><b>(h) Any long-term effects on the environment?</b></p> <p>The Proposal is unlikely to have any long-term effects on the environment.</p>  | Nil     |
| <p><b>(i) Any degradation of the quality of the environment?</b></p> <p>The Proposal has the potential to require the removal and/or trimming of some native and exotic vegetation to facilitate construction as detailed in Section 6.7. Vegetation would be removed in accordance with the specified management measures as required.</p> <p>As a result the Proposal is unlikely to have any degradation on the quality of the environment.</p>   | Minor   |

| Factor   | Impacts |
|--|---------|
| <p><b>(j) Any risk to the safety of the environment?</b></p> <p>Construction of the Proposal would be managed in accordance with the mitigation measures outlined in this REF and a CEMP. The Proposal is unlikely to cause risks to the safety of the environment provided the recommended mitigation measures are implemented. Specific management measures would be implemented to manage asbestos and other hazardous materials that may be encountered during construction and demolition works.</p>  | Nil     |
| <p><b>(k) Any reduction in the range of beneficial uses of the environment?</b></p> <p>The Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.</p>  | Nil     |
| <p><b>(l) Any pollution of the environment?</b></p> <p>The Proposal is unlikely to cause any pollution to the environment provided the recommended mitigation measures are implemented.</p>  | Nil     |
| <p><b>(m) Any environmental problems associated with the disposal of waste?</b></p> <p>The Proposal is unlikely to cause any environmental problems associated with the disposal of waste. Hazardous waste and special waste may be generated from the Proposal. Waste would be classified and disposed of at a licensed waste facility.</p> <p>All waste would be managed and disposed of in accordance with a site-specific Waste Management Plan prepared as part of the CEMP. Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.</p> | Minor   |
| <p><b>(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</b></p> <p>The Proposal is unlikely increase demands on resources that are or are likely to become in short supply.</p>  | Nil     |
| <p><b>(o) Any cumulative environmental effect with other existing or likely future activities?</b></p> <p>The cumulative effects of the Proposal are described in Section 6.12. Where feasible, environmental management measures would be co-ordinated to reduce any cumulative construction impacts. The Proposal is unlikely to have any significant adverse long-term impacts.</p>   | Nil     |
| <p><b>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</b></p> <p>The Proposal would not affect or be affected by any coastal processes or hazards.</p>   | Nil     |

## **Appendix C      Traffic Impact Assessment**



## **Appendix D      Visual Impact Assessment**

## **Appendix E      Noise and Vibration Impact Assessment**

## **Appendix F      Statement of Heritage Impact**

## **Appendix G      Ecological Assessment**