



Transport
for NSW

Berala Station Upgrade

Review of Environmental Factors





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**Transport Access Program
REF – 4888601**

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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
AHD	Australian Height Datum
ARI	Average Recurrence Interval
ASA	Assets Standards Authority (refer to Definitions)
CBD	Central Business District
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997</i>
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
TMP	Traffic Management Plan
DBH	Diameter Breast Height
DDA	<i>Disability Discrimination Act 1992 (Commonwealth)</i>
DSAPT	Disability Standards for Accessible Public Transport
ECM	Environmental Control Map
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	<i>Fisheries Management Act 1994</i>
Heritage Act	<i>Heritage Act 1977</i>
ICNG	<i>Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)</i>

Term	Meaning
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007</i>
LEP	Local Environmental Plan
LGA	Local Government Area
NES	National Environmental Significance
NML	Noise Management Level
Noxious Weeds Act	<i>Noxious Weeds Act 1993</i>
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
OEH	NSW Office of the Environment and Heritage
PoEO Act	<i>Protection of the Environment Operations Act 1997</i>
RailCorp	Rail Corporation of NSW
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	<i>Roads Act 1993</i>
Roads and Maritime	NSW Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
TfNSW	Transport for NSW
TPZ	Tree Protection Zone
TSC Act	<i>Threatened Species Conservation Act 1995</i>
UDLP	Urban Design and Landscaping Plan
VOC	Volatile organic compound
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>

Definitions

Term	Meaning
Assets Standard Authority	<p>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.</p> <p>Design Authority functions formerly performed by RailCorp are now exercised by ASA.</p>
Concept design	<p>The concept design is the preliminary design presented in the REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).</p> <p>TfNSW contracts a single entity (the Contractor) to further develop the concept design to a level suitable for construction. The Contractor therefore becomes responsible for all work on the project.</p>
Design and construct contract	<p>A method to deliver a project in which the design and construction services are contracted by a single entity known as the Contractor. The Contractor completes the project by refining the Concept Design presented in the REF (subject to TfNSW acceptance) to be suitable for construction. The Contractor is therefore responsible for all work on the project, both design and construction.</p>
Disability Standards for Accessible Public Transport	<p>The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> ("Transport Standards") (as amended) are a set of legally enforceable standards, 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.</p>
Ecologically Sustainable Development	<p>As defined by clause 7(4) Schedule 2 of the EP&A Regulation.</p> <p>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.</p>
Feasible	<p>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.</p>
Interchange	<p>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.</p>
Noise sensitive receiver	<p>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 (such as schools, TAFE colleges), health care facilities (such as nursing homes, hospitals), recording studios and places of worship/religious facilities (such as churches).</p>
Opal card	<p>The integrated ticketing smartcard being introduced by TfNSW.</p>
Overland flooding	<p>Flooding due to runoff from local catchment areas, not inundation due to overflow from creeks and trunk drainage channels.</p>
Proponent	<p>A person or body proposing to carry out an activity under Part 5 of the EP&A Act - in this instance, TfNSW.</p>

Term	Meaning
Proposal site	The immediate location of the Proposal, which is the area that has the potential to be directly disturbed during construction.
Rail possession	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.
Reasonable	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.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Study area	Consists of land in the vicinity of the proposal site, including land that has the potential to be indirectly impacted by the Proposal.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
Tactiles	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.
The Proposal	The construction and operation of the Berala Station Upgrade.
Vegetation Offset Guide	<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&A Act.</p> <p>The guide provides for planting of a minimum of eight trees for each large tree cleared with a diameter at breast height (DBH) of more than 60 centimetres, four trees where the DBH is 15 to 60 centimetres, or two trees where DBH is less than 15 centimetres.</p>

Executive summary

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 Berala Station Upgrade (the Proposal).

The Proposal is part of the Transport Access Program which is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure where it is needed most.

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 key features of the Proposal are summarised as follows:

- installation of a lift from the underpass level to the station platform level
- extension of the existing platform canopy to the new lift
- demolition of the existing ticket office
- refurbishment of existing platform building to include a family accessible toilet and staff facilities and amenities
- provision of interchange facilities along adjacent streets including formal kiss and ride zones, two accessible parking spaces and an upgraded bus shelter
- installation of sheltered bicycle racks at the Campbell Street entrance
- ancillary works including adjustments to lighting and ticketing machines, improvements to station communication systems with new infrastructure (including additional CCTV cameras) and improved wayfinding signage.

Subject to approval, construction is expected to commence in mid 2016 and take approximately 18 months to complete.

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 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.

The Proposal fulfils the program objectives by proposing to provide:

- improved accessibility for customers at Berala Station by providing an accessible route to the station platforms through the provision of a lift
- improved customer amenity and facilities at the station including a family accessible toilet
- improved transport interchange facilities including new formalised kiss and ride areas, accessible car parking spaces and sheltered bicycle facilities on the southern side of the station.

The Proposal is also consistent with planning strategies in NSW, including *NSW 2021 – Making NSW Number One* (Department of Premier and Cabinet, 2011) and the *NSW Long Term Transport Master Plan* (TfNSW, 2012a). The Proposal would also ensure that Berala Station would meet legislative requirements under the Disability Standards for Accessible Public Transport (DSAPT).

Design options considered

Options for improving the access to, and amenity of, Berala Station were developed following a succession of workshops between TfNSW, relevant stakeholders and the project design team.

Two concept design options were developed to address accessibility and customer experience needs and other design principles. Both options included similar interchange improvements. Broadly, these are summarised below:

- Option 1 which involved the provision of a lift from the pedestrian underpass level to the station platform level to improve accessibility; demolition of the existing ticket office and the introduction of interchange facilities for bicycles and kiss and ride. Two derivatives of Option 1 were developed for the location of a family accessible toilet.
- Option 2 which involved the construction of a footbridge from the Campbell Street station entrance to the station platform entrance with lift access on either side of the footbridge; demolition of the ticket office, refurbishment of the existing platform building to include a family accessible toilet and the introduction of interchange facilities for bicycles and kiss and ride.

Option 1 was further refined to include the refurbishment of the existing platform building to include a family accessible toilet, staff facilities and a storage room. The option was considered to be the preferred option with superior customer experience outcomes, design simplicity and cost benefits compared to Option 2. More information on the options assessment and further design refinements are provided in Section 2.3.

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.

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 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 the Berala Station Upgrade, in accordance with these requirements.

Community and stakeholder consultation

Under the Infrastructure SEPP, consultation is required with local councils or public authorities in certain circumstances, including where Council-managed infrastructure is affected. Preliminary consultation has been undertaken with Auburn City Council and Sydney Trains during the development of design options and the preferred option. Consultation with these stakeholders would continue through the detailed design and construction of the Proposal.

TfNSW is also proposing to undertake the following consultation for the Proposal:

- direct notification to community stakeholders
- public display of the REF.

Community consultation activities for the Proposal would be undertaken during the public display period of this REF. The REF would be displayed for a period of two weeks. Further information about these specific activities is included in Section 4.5 of this REF.

During this period, the REF would also be available for viewing at Auburn City Council, Auburn City Library, Regents Park Library, Lidcombe Library and the TfNSW Community Information Centre. The REF would also be available to download from the [TfNSW website](http://www.transport.nsw.gov.au/projects)¹ and a Project Infoline (1800 684 490) would be available for members of the public to make enquiries.

TfNSW would review and assess all feedback received during the public display period, prior to determining whether or not to proceed with the Proposal.

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. Figure 1 presents an overview of the consultation and planning process and the current status of the Proposal.

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



Figure 1 Planning approval and consultation process for the Proposal

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 changes to vehicle and pedestrian movements to and around the station during construction
- temporary noise and vibration impacts during construction
- impacts to heritage listed platform buildings
- introduction of new elements such as the new lift and extended canopy into the visual environment.

Longer term benefits of the Proposal include improved accessibility to the station and improved station and 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 designed in accordance with the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) 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.

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

Transport for NSW (TfNSW) was established in 2011 as the lead agency for the integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Berala Station Upgrade (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, and improving interchanges with other modes of transport such as cars and bicycles.

Berala Station does not currently meet key requirements of the *Disability Standards for Accessible Public Transport* (DSAPT) or the Commonwealth *Disability Discrimination Act 1992* (DDA). Stairs provide the only means of access to the station platform from the underpass with no means of access for people with reduced mobility or parents/carers with prams.

The Berala Station Upgrade (the Proposal) is required to provide safe and equitable access to the station and to improve customer facilities. The improvements would in turn assist in supporting the growth in public transport use and would provide an improved customer experience for existing and future users of the station.

The expected increase in customers has been taken into consideration during design development. The 2014 barrier counts indicated a daily patronage of 4520 trips which is expected to increase by 10 per cent to 4978 by 2036.

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- installation of a lift from the underpass level to the station platform level
- extension of the existing platform canopy to the new lift
- demolition of the existing ticket office
- refurbishment of existing platform building to include a family accessible toilet, staff facilities and amenities
- provision of interchange facilities along adjacent streets including formal kiss and ride zones, two accessible parking spaces and an upgraded bus shelter
- installation of sheltered bicycle racks at the Campbell Street entrance
- ancillary works including adjustments to lighting and ticketing machines, improvements to station communication systems with new infrastructure (including additional CCTV cameras) and improved wayfinding signage.

Subject to planning approval, construction is expected to commence in mid 2016 and is anticipated to take approximately 18 months to complete.

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 Berala and in the Auburn Local Government Area (LGA) approximately 16 kilometres west of Sydney's Central Business District (CBD). The location of the Proposal in the regional context is shown in Figure 2.

Berala Station is serviced by the T3 Bankstown Line and less frequently by the T2 Inner West and South Line providing connections to the metropolitan train network. The station is the 115th busiest station on the Sydney Trains network, with an average weekday patronage of 4520 trips (NSW Bureau of Transport Statistics barrier counts, 2014). Berala Station was originally opened in its current location in 1924, as an extension of the railway from Regents Park to Cabramatta to provide a relief to the West and South lines.

The Proposal includes upgrades to Berala Station and the underpass that provides access to the station which are located on land owned by RailCorp and operated and maintained by Sydney Trains. Minor works would also be undertaken along the footpaths and road reserve of Campbell Street in areas owned and managed by Auburn City Council.

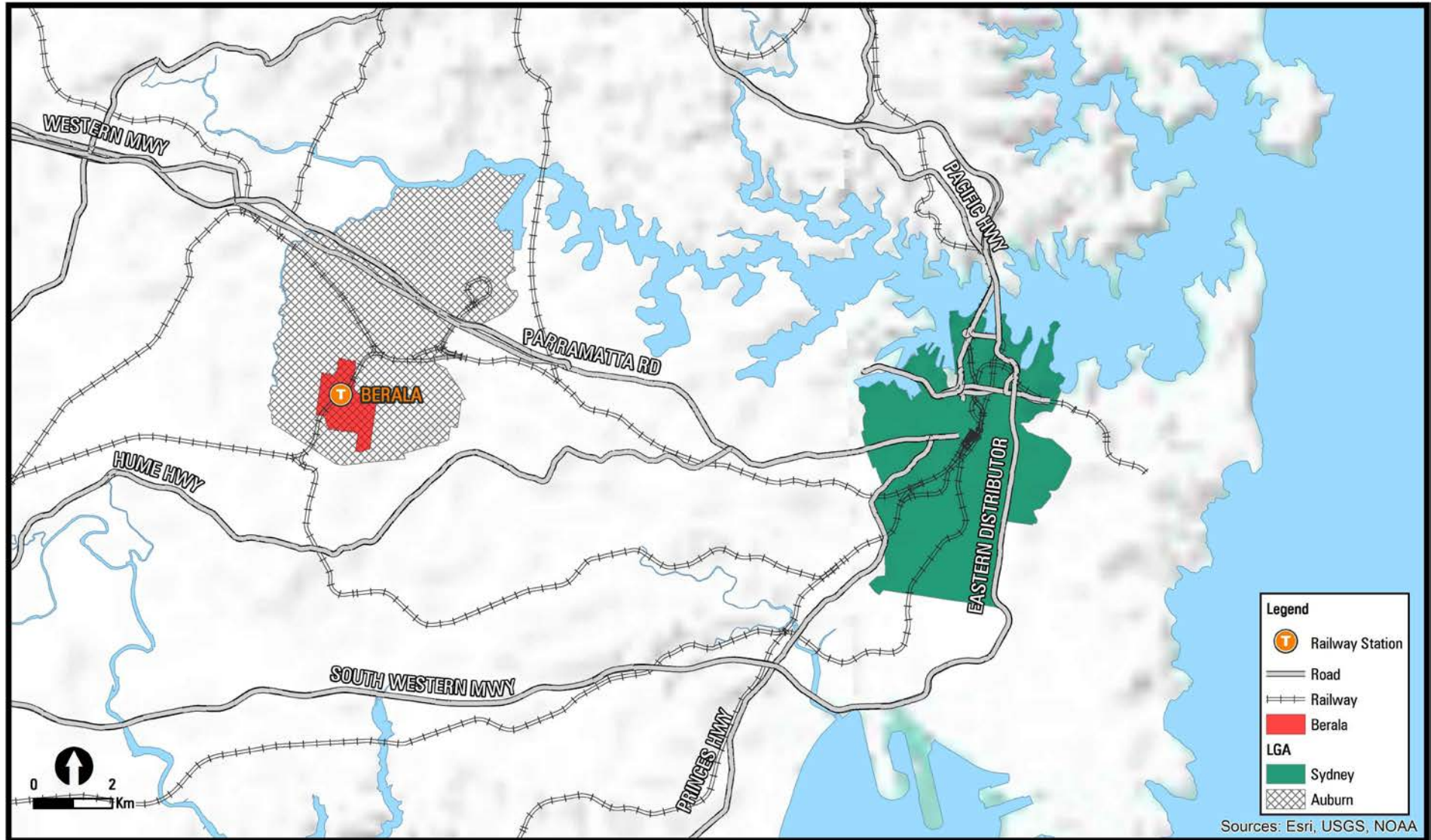


Figure 2 Regional context

1.3 Existing infrastructure and land uses

Land use adjacent to Berala Station comprises commercial and residential uses. The area to the north of the station is characterised by commercial uses including the Berala town centre and medium to high density residential dwellings. The area to the south of the station includes a small commercial area to the immediate south of the station and medium to low density residential dwellings to the south-east and south-west of the station.

Educational and religious facilities in the broader area include:

- St James Anglican Church which is situated approximately 170 metres north-west of the proposal site
- Berala Public School which is situated approximately 420 metres north-west of the proposal site
- Lingyen Mountain Temple Australia which is situated approximately 150 metres north-east of the proposal site.

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

Berala Station consists of a single island platform with Platform 1 (on the northern side) providing services to Lidcombe and Platform 2 (on the southern side) providing services to Liverpool and the Sydney CBD.

The station consists of two main buildings on the platform level - a platform building and a ticket office. The platform building is located towards the centre of the platform and was constructed in 1924. The building consists of a waiting room which remains locked, communications room and female and male amenities on the western side of the building.

The ticket office, which was constructed several years after the original platform building, is located approximately 2.95 metres in front of the top landing of the stairs, creating a pedestrian constraint point on the platform.

Existing customer facilities within the station include a ticket vending machine, retail vending machines, female and male toilets (non-accessible), seating, a public telephone and an extended canopy for weather protection. Opal card readers are located on the underpass level at the northern and southern underpass entrances.

The station is accessible via a pedestrian underpass that provides access between Woodburn Road (to the north of the station) via a shopping plaza (which consists of Woolworths, BWS and a coffee shop) and Campbell Street (to the south of the station). Stairs provide the only means of access from the underpass to the station platforms.

A bicycle rack with the capacity for 10 bicycles is provided on the southern side of the station on Campbell Street. No bicycle parking is provided on the northern side of the station.

There are no formal kiss and ride facilities at the station. No parking zones provided on both Woodburn Road (four spaces) and Campbell Street (two spaces) are used as informal drop off areas. Two accessible parking spaces are provided on Woodburn Road. The distance from these spaces to the station platform is approximately 114 metres. There are no designated accessible car parking spaces on Campbell Street. There are also two designated taxi waiting spaces on Woodburn Road. There are no designated taxi waiting spaces on Campbell Street.

Pedestrian crossing facilities (zebra crossings) are located on Campbell Street (south) and Woodburn Road (north) providing direct access to the station underpass.



Figure 3 Key features of the study area

A car park with unrestricted parking for 80 vehicles is available approximately 60 metres north-west of the proposal site on Woodburn Road. Unrestricted on-street parking is also provided along Elizabeth Street and on both sides of Campbell Street, Burke Avenue and Berala Street. Photographs of the existing station are provided in photos 1 to 4.

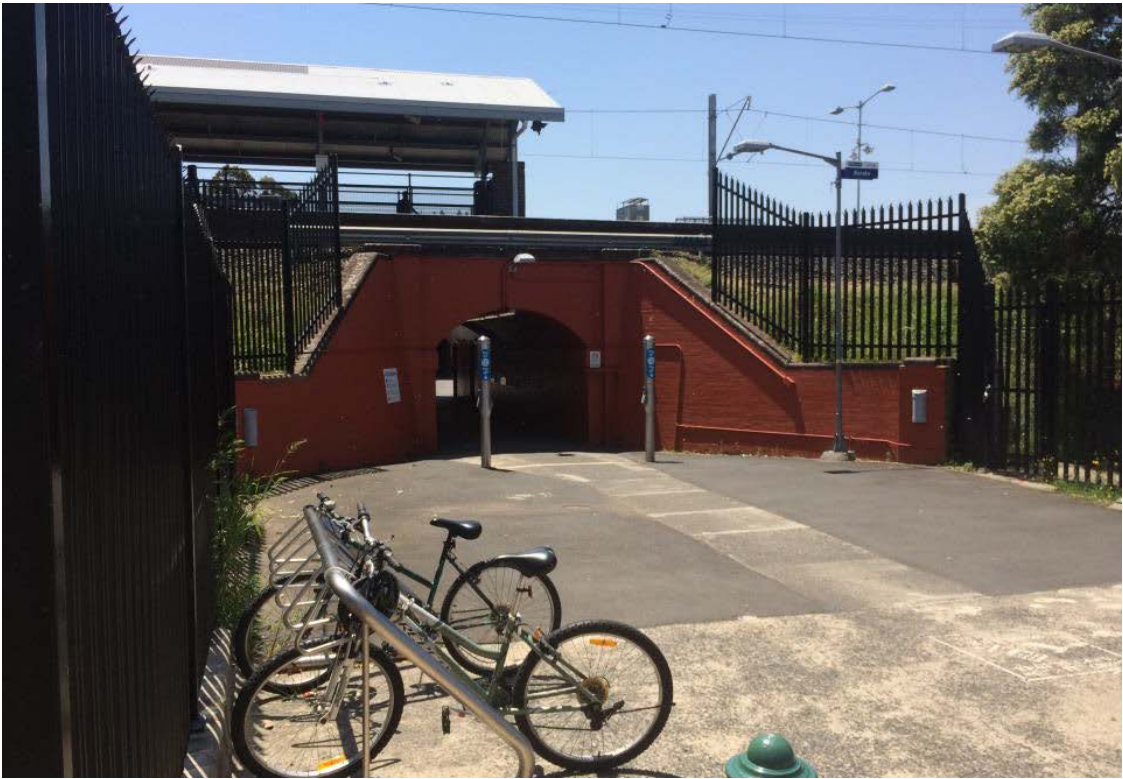


Photo 1 View towards Berala Station from the Campbell Street underpass entrance



Photo 2 View towards the station from the Woodburn Road underpass entrance



Photo 3 View towards existing platform building looking south-west



Photo 4 View towards ticket office and top of stairs looking north-west

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the Proposal. 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 *Threatened Species Conservation Act 1995* (TSC 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 the Environment for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.

2 Need for the Proposal

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 selected.

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 Berala Station Upgrade, 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.

The Proposal is consistent with the NSW Government's commitment to deliver an efficient and effective transport system around Sydney and NSW as detailed in *NSW 2021 – A Plan to Make NSW Number One* (Department of Premier and Cabinet, 2011).

NSW 2021 is the NSW Government's ten year plan to guide budget and decision making in NSW. NSW 2021 includes the following goals, targets and priority actions relevant to the Proposal:

- reduce travel times
- minimise public transport waiting times for customers
- improve co-ordination and integration between transport modes
- grow patronage on public transport
- improve public transport reliability
- improve customer experience with transport services.

The NSW Government has developed a *Long Term Transport Master Plan* (TfNSW, 2012a). This plan provides a comprehensive strategy for all modes of transport across NSW over the next 20 years, while also delivering on current commitments.

Data forecasts indicate that there would be significant growth in population and employment from 2016 up to 2036 within the Berala Station catchment and the proposed upgrade would help to accommodate this growth 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 Disability Action 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. 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 disabilities, the ageing and parents/carers with prams
- modern buildings and facilities for all modes 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 alarms, 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 that is accessible to those with mobility impairments and parents/carers with prams
- improve interchanges facilities with other modes of transport
- accommodate potential for growth in patronage and changing travel patterns
- improve customer experience and amenity through reduced congestion, access to ticketing, and the provision of a DDA compliant and family accessible toilet
- minimise impacts to heritage features
- improve customer safety.

2.2 Design development

Cardno was engaged by TfNSW to develop a concept design for an upgrade at Berala Station that would improve accessibility in and around the station, and meet key architectural, engineering and urban design objectives. The design development also accommodated the forecast Sydney Trains patronage growth (which is the estimated 2036 daily customer patronage + 15 per cent).

An assessment of Berala Station and surrounds was undertaken to identify key deficiencies and opportunities with regards to accessibility and customer experience. The assessment identified the following deficiencies with the existing station:

- lack of an accessible path of travel to the station platforms
- lack of DDA compliant and family accessible toilet amenities

- non-compliant platform levels and cross falls
- non-DDA compliant stairs
- lack of clear wayfinding signage
- restricted space between existing top of stairs, ticket office and ticket vending machine resulting in restricted pedestrian access
- inadequate covered waiting area on the platform
- insufficient bicycle facilities
- lack of interchange facilities (no formalised kiss and ride area).

In addition to these deficiencies, general customer experience issues identified included potential to improve adjacent bus stop facilities, lack of sheltered bicycle parking and poor condition of pavement at the Campbell Street entrance.

The needs and opportunities for Berala Station were then considered in the development of options for the concept design (refer to Section 2.3).

2.3 Alternative options considered

Options for improving the access to Berala Station were developed following a succession of workshops with TfNSW, relevant stakeholders (including Sydney Trains) and the project design team.

Two concept design options were developed to address accessibility and customer experience needs and other design principles. There were improvements which were common to both options including formal kiss and ride zones, improved wayfinding signage, additional bicycle parking facilities, provision of accessible parking on Campbell Street and the demolition of the ticket office.

The following options were considered to provide equitable access to the station platforms:

- Option 1 which involved the construction of a new lift from the existing pedestrian underpass to the platform level (on the eastern side of the platform); extension of the canopy on the platform level to include the new lift shaft area; and refurbishment of the platform building to include a staff facilities and amenities. The following two derivatives of Option 1 were considered for the DDA and family accessible toilet to minimise impact on the heritage listed buildings:
 - Option 1a building works – would involve the replacement of the existing male toilets within the platform building with a family accessible toilet. This would require the construction of a ramp and additional shelter.
 - Option 1b building works – would involve a new family accessible toilet opposite the proposed new lift. This would require an extended platform canopy to the new toilet.
- Option 2 which involved the construction of a pedestrian footbridge from the Campbell Street entrance to the platform level with lifts on either side; a new set of stairs for emergencies; refurbishment of the platform building to include a family accessible toilet, amenities for staff and a storage room.

2.3.1 The 'do-nothing' option

Under a 'do-nothing' option, existing access to the station and other transport modes would remain the same and there would be no changes to the way the station and interchange areas currently operate.

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 Berala community.

2.3.2 Assessment of identified options

The concept design options were assessed against a range of criteria including customer experience outcomes, constructability, land-use integration, engineering constraints, cost and environmental impacts. Following the review and stakeholder consultation, only one option (Option 1) was considered suitable for further development.

2.4 Justification for the preferred option

Option 2 was considered to have higher visual and heritage impacts in comparison to Option 1 and would result in a poorer customer experience for customers accessing the station from the northern side of the station (Woodburn Road).

Option 1 was considered to be the preferred option due to its simplicity, minimal visual impact and customer experience outcome. The option would provide the most direct lift access from both sides of the station to the platform level.

Option 1 was further refined to minimise impacts to the heritage fabric of station. The refinements resulted in the former waiting room in the existing platform building being segregated into both a storage room and family accessible toilet. This eliminated the requirement to provide an additional sheltered area at the rear of the platform building where the family accessible toilet was formerly proposed. As the waiting room is built on a raised wooden floor, there is the opportunity to lower the floor and therefore eliminate the requirement for an access ramp. The refinement also resulted in the benefit of a segregated accessible staff toilet being provided within the proposed station office.

A description of the Proposal (Option 1 including design refinements) is presented in Chapter 3.

3 Description of the Proposal

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.

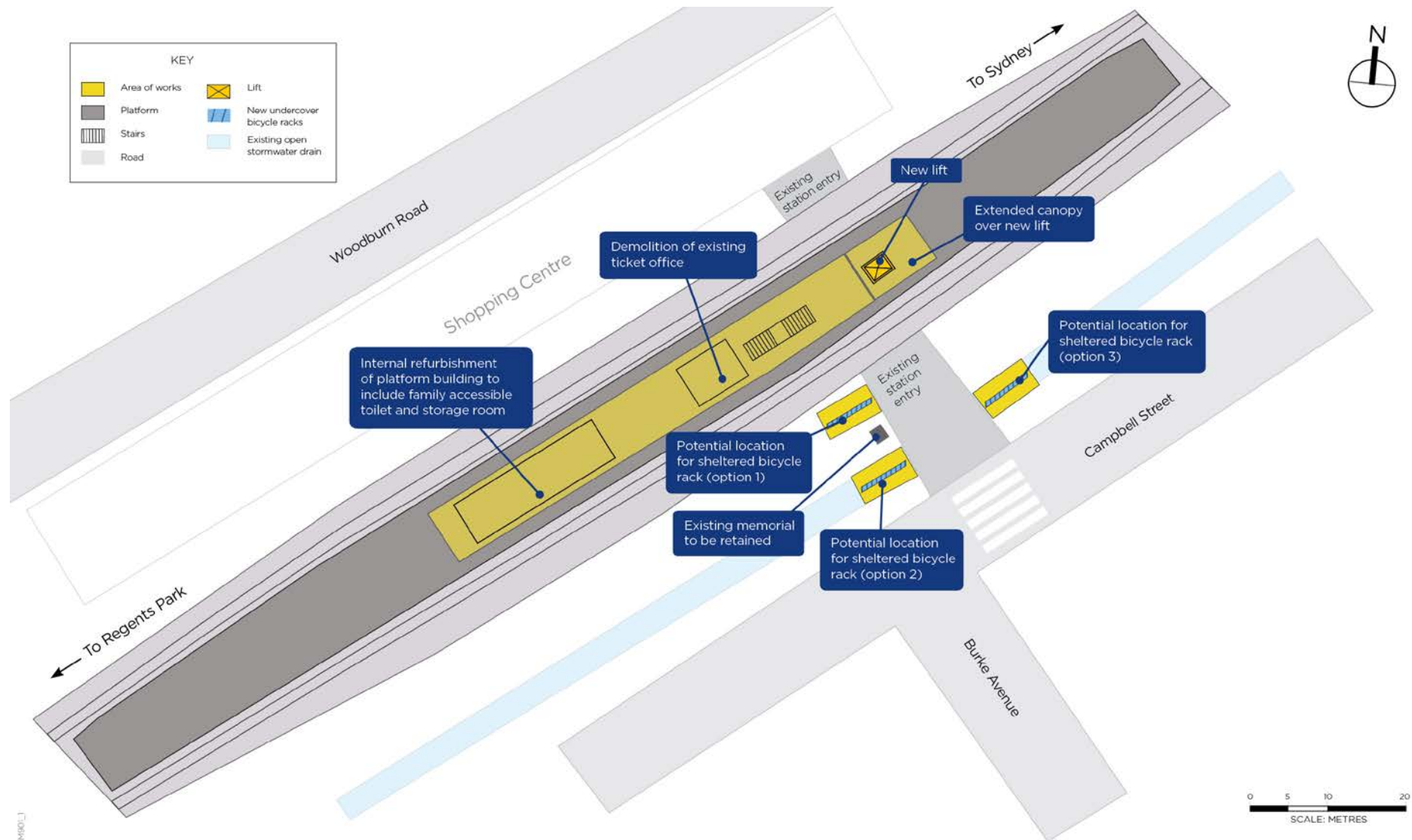
3.1 The Proposal

As described in Section 1.1, the Proposal involves an upgrade of Berala Station as part of the Transport Access Program, which would improve accessibility and amenities for customers.

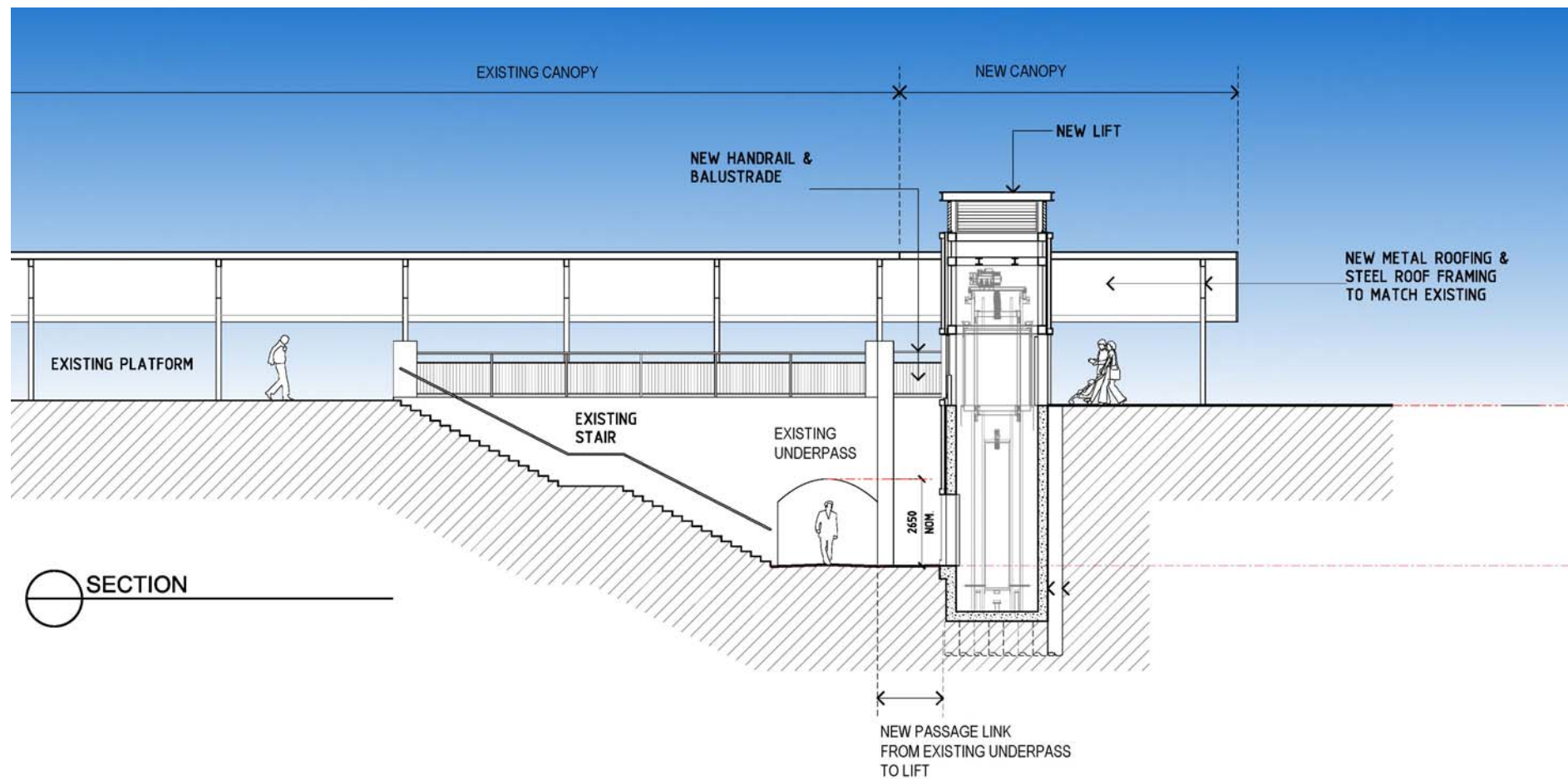
The Proposal would provide a number of improved features to provide an accessible station and improved interchange facilities. The Proposal would include the following key elements:

- installation of a lift from the underpass level to the station platform level
- extension of the existing platform canopy to the new lift
- demolition of the existing ticket office
- refurbishment of existing platform building to include a family accessible toilet, staff facilities and amenities
- provision of interchange facilities along adjacent streets including formal kiss and ride zones, two accessible parking spaces and an upgraded bus shelter
- installation of sheltered bicycle racks adjacent to the Campbell Street entrance
- ancillary works including adjustments to lighting and ticketing machines, improvements to station communication systems with new infrastructure (including additional CCTV cameras) and improved wayfinding signage.

The key elements of the Proposal are shown in Figure 4. Figure 5 shows a cross section of the proposed lift and canopy structure.



Indicative only, subject to detailed design
Figure 4 Key elements of the Proposal



Indicative only, subject to detailed design

Figure 5 Cross section of the proposed lift location

3.1.1 Design features

Station upgrade

Details of the proposed upgrade works at the station to improve accessibility and customer experience include:

- installation of a new lift to the east of the existing stair to provide access from the existing pedestrian underpass to the island station platform
- demolition of a portion of the existing underpass wall to create an entry to the lift at the lower underpass level
- extension of the existing platform canopy to provide shelter around the lift shaft
- demolition of existing 1930s ticket office and glass partition walls on the platform level to improve circulation at the top of the stairs and provide a larger sheltered waiting area
- refurbishment of the platform building including modifications to the room layout, finishes and fit out to provide accessible customer (and staff) areas and facilities including:
 - refurbishment of existing customer toilet facilities
 - segregation of former waiting room to a family accessible toilet and storage room
 - refurbishment of the eastern most room to include an office and amenities for staff
 - installation of required services
 - painting of building exterior with finishes being sympathetic to existing heritage elements
- relocation of existing ticket machines, public telephone and seating
- upgrading the platform levels, if required
- ancillary works including services diversion and/or relocation, station power supply upgrade, minor drainage works, adjustments to lighting, adjustments to tactiles, adjustments to platform furniture, installation of handrails and balustrades, improvements to station communication systems with new infrastructure (including additional CCTV cameras), adjustments to station ticketing facilities and wayfinding signage.

Interchange facilities

Details of the proposed works at the interchanges to improve accessibility and customer experience include:

- provision of formal kiss and ride zones on:
 - Woodburn Road to accommodate three vehicles
 - Campbell Street to accommodate three vehicles
- new paving at the Campbell Street entrance
- upgrade of bus shelter on Campbell Street
- provision of two accessible car parking spaces on Campbell Street (locations to be confirmed during detailed design)
- provision of taxi zone on Campbell Street

- provision of approximately 20 sheltered bicycle racks near the Campbell Street entrance (on the southern side of the station)
- improved wayfinding signage
- ancillary works including landscaping, pavement upgrades, kerb realignment, drainage upgrades, service relocations, new service connections and installation of bollards as required.

Materials and finishes

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

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

The Proposal would be constructed from a range of different materials, with a different palette for each architectural element. Subject to detailed design, these would include:

- lift – precast concrete with predominantly brick face cladding (detailing to be compatible with other existing heritage building elements) and aluminium louvres, glazing and cladding elements
- underpass lift lobby walls – bricks to match existing
- canopy extension – metal roof sheeting (colourbond) to match existing.

The design would be submitted to TfNSW's Design and Sustainability Review Panel for comment, and the Urban Design and Landscaping Plan (UDLP) would need to be accepted by TfNSW prior to finalisation of the design.

3.1.2 Engineering constraints

A number of constraints have influenced the design of the Proposal. These are discussed below.

Existing structures: the placement and integrity of existing structures needed to be considered during the development of the design – these structures included the underpass, platforms and station buildings.

Sydney Trains requirements: modifications for existing structures and new structures within the rail corridor must be designed and constructed with consideration of train impact loads, structural clearances to the track, and safe working provisions.

Utilities: The following utilities in the vicinity of the proposal site were identified from the Dial Before You Dig search:

- electrical services (aboveground) including 33 kV powerlines to the north of the station
- electrical substation on the south-eastern side of the station
- telecommunication services (underground)
- gas
- stormwater
- water and sewer

- rail utilities, including signalling cabling and overhead wiring.

Other considerations:

- Berala Station is heritage listed on RailCorp's Section 170 Heritage and Conservation Register
- the underpass from Campbell Street is located below the five year average recurrence interval (ARI) water level of 21.5 metres Australian height datum (AHD)
- an open stormwater channel runs parallel to the rail corridor on Campbell Street
- access constraints for construction within the underpass
- a large crane would be required to lift equipment to the station from Campbell Street
- limited area available for a construction compound and establishment of a crane
- maintaining pedestrian access to the station via the underpass during construction.

3.1.3 Design standards

The Proposal would be designed with regards 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 Standard Authority standards
- Sydney Trains standards
- *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design (CPTED) principles
- relevant Council codes and standards.

3.1.4 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 groups sustainability 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:

- **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
- **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 Proposal. These compulsory initiatives have been reviewed and incorporated into the concept design (unless otherwise justified) and documented in a Sustainability Checklist that was approved by TfNSW (refer to Appendix C). The Sustainability Checklist and the initiatives contained within would be reviewed again at the detailed design and construction phases, and submitted for approval to TfNSW.

3.2 Construction activities

3.2.1 Work methodology

Subject to approval, construction is expected to commence in mid 2016 and take approximately 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with TfNSW.

The proposed construction activities for the Proposal are listed in Table 1. The proposed methodology is indicative and based on the current preliminary design. The methodology is dependent on the Contractor's preferred methodology, program and sequencing of the work and therefore may be subject to changes prior to construction commencing.

Due to access constraints at the site, an option is being considered to temporarily shut down the station to customers for a period of approximately four weeks. Trains would continue to operate during the shutdown; however trains would not stop at the station. The pedestrian underpass which provides access between Campbell Street and Woodburn Road would remain operational during the station shutdown period. Replacement rail buses would be provided to the community during the shutdown.

The station shutdown would result in a reduction to the construction period by approximately six months, resulting in an overall construction period of approximately 12 months (depending on the Contractor's preferred methodology). The potential station shutdown would be considered further during detailed design and construction planning and would be subject to further consultation with relevant stakeholders and the community.

Construction activities would be undertaken within the study area shown on Figure 3.

Table 1 Indicative construction staging for key activities

Stage	Activities
1 Site establishment and enabling works	<ul style="list-style-type: none"> • establishment of site compound (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas etc.) • establishment of temporary alternative pedestrian access, as required • removal of trees and vegetation • service relocations
2 Lift and platform upgrades	<ul style="list-style-type: none"> • demolition of existing structures as required • platform modifications including piling and foundations for the lift shaft • construction of lift shaft from the underpass to the platform level • construction of columns, fencing and new canopy • installation of lift • installation of fixtures, lighting, signage and CCTV cameras for the station areas • platform resurfacing and regrading (if required)
3 Station building works	<ul style="list-style-type: none"> • reconfiguration of internal platform building to allow for a new communications/equipment room, staff facilities and new family accessible toilet • refresh of platform building including painting works
4 Interchange works	<ul style="list-style-type: none"> • modifications and making good the existing pedestrian underpass including resurfacing, lighting and painting • creation of formal taxi waiting areas, kiss and ride, and accessible car parking spaces on Campbell Street and Woodburn Road • installation of new sheltered bicycle racks on southern side of the station
5 Finalisation	<ul style="list-style-type: none"> • installation of wayfinding signage • upgrade of electrical and power supply • replanting/landscaping and fencing adjustments/bollards
6 Testing and commissioning	

3.2.2 Plant and equipment

Plant and equipment likely to be used during construction includes:

- trucks
- chainsaw
- mulcher
- generator
- bobcat
- excavators
- demolition saw
- jackhammer
- grinder
- concrete pump
- concrete trucks
- mobile crane
- piling rig
- manitou
- scissor lift
- franna crane
- hirail
- vibratory roller
- wacker packer
- coring machine
- rattle gun/nail gun
- hand tools
- lighting towers.

3.2.3 Working hours

The majority of construction works would be undertaken during standard construction hours, in accordance with the *Interim Construction Noise Guidelines* (Department of Environment, Climate Change and Water, 2009) as follows:

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

Certain works may need to occur outside standard hours and would include night works and works during routine track possessions (scheduled 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 are required in some cases to minimise disruptions to customers, pedestrians and motorists; and to ensure the safety of railway workers and operational assets. It is estimated that at least six possessions (likely to be during weekends) would be required to facilitate the following:

- detailed site survey, services investigations and/or geotechnical investigations within and around the tracks
- construction works including site establishment, demolition of existing structures, excavation and installation of lift shafts, stormwater/drainage works, service relocations, platform resurfacing/regrading and trenching in platforms
- testing and commissioning of communications systems and equipment, along with testing and commissioning/cutover of new lifts and upgraded power supply
- movement of heavy equipment/machinery as required by RMS and Council.

Out of hours works may also be scheduled outside possession periods. As discussed in Section 3.2.1, Berala Station may be closed to the community for a period of approximately four weeks. During this period, out of hours works, including night works, would also be undertaken.

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, 2012c) (refer to Section 6.3 for further details).

3.2.4 Earthworks

Excavations and earthworks would generally be required for the following:

- the pit for the proposed lift shaft which would require open cut excavation through the station platform and excavation into soil/fill and sandstone rock to a depth of approximately six metres
- other minor civil works including footings and foundations for structures, drainage/stormwater works, and trenching activities for service adjustments and relocations.

Excavated material would be reused onsite where possible or 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 would be determined during the detailed design phase of the Proposal, and would consider the requirements of the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a). Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

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:

- a minor increase in traffic on the local road network
- temporary traffic diversions and partial road closures
- temporary disruptions to pedestrian movements into the station and on adjacent footpaths
- temporary loss of kerbside parking on adjacent streets.

A detailed construction methodology and associated management plans (such as a Construction Environmental Management Plan (CEMP)) would be developed during the detailed design phase of the Proposal to manage potential traffic and access impacts.

3.2.7 Ancillary facilities

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. The following two locations are being considered for the location of the construction compound:

- Compound 1 - approximately 14 metres south-west of the station platform. The site is primarily on land owned by RailCorp (Lot 2 DP 803675) and partially within the road reserve managed by Auburn City Council
- Compound 2 - approximately 25 metres north-east of the station platform on land owned by RailCorp (Lot 2 DP 803675).

A temporary storage/laydown area may also be required on the station platform.

Impacts associated with utilising the potential areas have been considered in the environmental impact assessment including requirements for rehabilitation. The final compound location would be determined during detailed construction planning.

3.2.8 Public utility adjustments

An upgraded electrical supply is required to accommodate new infrastructure (such as the new lift and lighting). The existing switchboard at the station would need to be replaced with a new electrical distribution board. The arrangement of the upgraded supply would be confirmed during detailed design in consultation with the supply authority.

An open stormwater channel (owned by Sydney Water) runs parallel to the rail corridor on Campbell Street and within the proposal site. The sheltered bicycle rack proposed on the Campbell Street entrance may need to be constructed over the stormwater channel.

Temporary access to Compound 2 would need to be provided over the open stormwater channel. The potential impacts on the channel would be considered during detailed design and construction planning in consultation with Sydney Water and appropriate mitigation measures would be established to ensure the structural integrity of the channel is not impacted.

A range of other utilities are located on or adjacent to the proposal site. A utility investigation has been undertaken during the concept design stage and is discussed in Section 3.1.2.

The Proposal has the potential to impact services through direct impact from excavation activities or operation of other equipment, if services are not appropriately identified and protected or relocated. 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, including existing electrical infrastructure or rail utilities, but such relocations are unlikely to occur outside the study area assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken and additional approvals obtained if required, including any additional mitigation measures. Relocation or other works that may affect services would be undertaken in consultation with the respective utility authorities.

3.3 Property acquisition

No property acquisition is required as part of the Proposal.

3.4 Operation management and maintenance

The future operation and maintenance of the upgraded station and surrounds is subject to further discussions with Sydney Trains, TfNSW and Auburn City Council. Structures directly associated with the station as part of the Proposal would be maintained by Sydney Trains.

It is expected that facilities provided on Campbell Street and Woodburn Road would be maintained by Auburn City Council.

4 Statutory considerations

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 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. Having regard to these provisions, TfNSW has determined that no significant environmental impact is likely, and as a consequence an environmental impact statement is not required, nor is the approval of the Minister for Planning.

Clause 228 of the 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 2 provides a list of other relevant legislation applicable to the Proposal.

Table 2 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 contamination is above NSW EPA guideline levels.</p> <p>The site has not been declared under the CLM Act as being significantly contaminated (refer to Section 6.8).</p>
<i>Crown Lands Act 1987</i> (NSW)	The Proposal does not involve works on Crown land.
<i>Disability Discrimination Act 1992</i> (DDA) (Commonwealth)	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"> Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted. Sections 139 and 140 (permit) where relics are likely to be exposed. Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted. <p>Berala Station is not listed on the State Register, but is listed on RailCorp's section 170 Heritage and Conservation Register and as an archaeological site on the <i>Auburn Local Environmental Plan 2010</i> (Auburn LEP).</p> <p>A heritage assessment and archaeological review have been undertaken for the Proposal and are summarised in Section 6.5.</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.</p> <p>Formal notification is to be provided to the Heritage Council regarding the demolition of the ticket office at least 14 days prior to the demolition of the structure in accordance with section 170A(1)(c) of the Heritage Act.</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>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>Noxious Weeds Act 1993</i> (NSW)	One noxious weed has been identified in the study area. Appropriate management methods would be implemented during construction (refer to Section 6.7).

Applicable legislation	Considerations
<i>Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)</i>	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 of the PoEO Act, TfNSW would notify the EPA of any pollution incidents that occur onsite. This would be managed through the CEMP to be prepared and implemented by the Contractor.
<i>Roads Act 1993 (Roads Act) (NSW)</i>	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. The Proposal would involve works on Campbell Street which is a local road under the control of Auburn City Council. Consent under the Roads Act is not required however Road Occupancy Licence/s would be obtained from Council for road works and any temporary road closures. Refer to Section 6.1 for more information.
<i>Sydney Water Act 1994 (NSW)</i>	The Proposal would not involve discharge of wastewater to the sewer. The Proposal may require works on the Sydney Water stormwater channel. Consultation would be undertaken with Sydney Water during detailed design and construction planning.
<i>Threatened Species Conservation Act 1995 (TSC Act) (NSW)</i>	The site does not contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer to Section 6.7).
<i>Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)</i>	TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site specific Waste Management Plan would be prepared.
<i>Water Management Act 2000 (NSW)</i>	The Proposal would not involve any water use, water management works, drainage, controlled activities or aquifer interference.

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 5.2 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 they do not require further consideration as part 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.

In accordance with Clause 7(1) of SEPP 55, a consent authority must not consent to the carrying out of development on any land unless:

(a) it has considered whether the land is contaminated.

(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or would be suitable, after remediation) for the purpose for which the development is proposed to be carried out.

(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land would be remediated before the land is used for that purpose.'

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 and is, therefore, unlikely to be affected by any potential contaminants that exist within the rail corridor.

4.4 Local environmental planning instrument and development controls

The Proposal is located within the Auburn 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 Auburn LEP were considered.

4.4.1 Local environmental plans

The study area including Berala Station is subject to the Auburn LEP. The station, pedestrian underpass and rail corridor are zoned as SP2 Special Infrastructure under the Auburn LEP. Land to the north of the station is zoned as B2 Local Centre and land to the south of the station is zoned as B2 Local Centre and R3 Medium Density Residential.

Table 3 summarises the relevant aspects of Auburn LEP applicable to the Proposal.

Figure 6 shows the relevant section of the zoning map from the Auburn LEP, with the indicative location of the Proposal.

Table 3 Relevant provisions of the Auburn LEP

Provision description	Relevance to the Proposal
Zone objectives and Land Use Table	The rail corridor is zoned as SP2 Infrastructure - Railway. The Proposal is consistent with the objectives of the SP2 Infrastructure zoning.
Clause 5.9 – Preservation of trees or vegetation	Clause 5.9 of the LEP is aimed at the preservation of trees and development consent is required for tree removal in most instances. However by virtue of clause 5(3) and 79 of the Infrastructure SEPP, the clearing of vegetation for the Proposal is permissible without development consent and would be approved by Part 5 of the EP&A Act. A discussion of potential impacts to vegetation is discussed in Section 6.7.
Clause 5.10 – Heritage conservation	The Auburn LEP aims to conserve heritage significance of heritage items within the LGA. Berala Station is listed as an archaeological site on Schedule 5 of the LEP. A discussion of potential impacts to local heritage is discussed in Section 6.5.

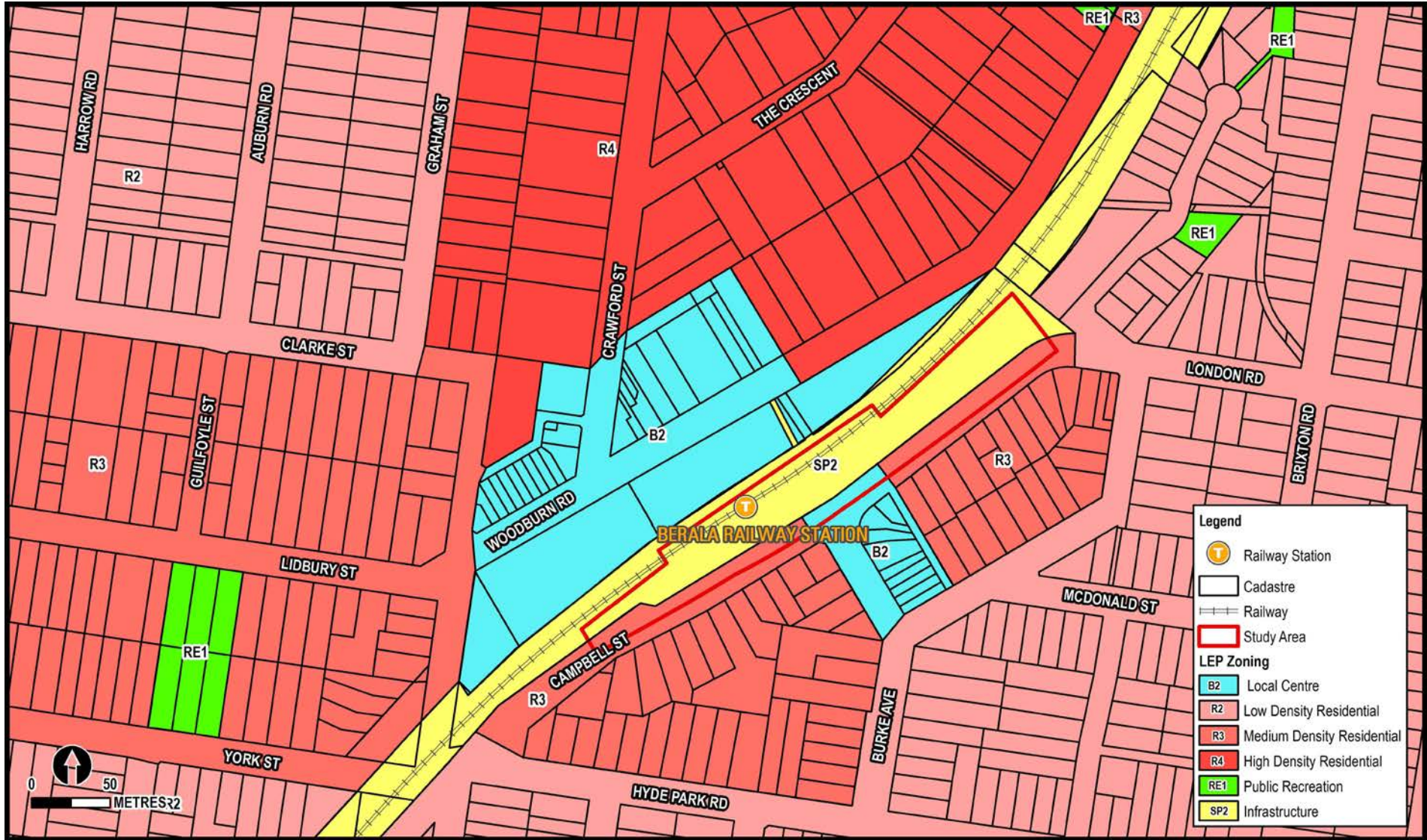


Figure 6 Auburn LEP land zoning

4.5 NSW Government policies and strategies

Table 4 provides an overview of other NSW Government policies and strategies

Table 4 NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Commitment	Comment
<p>NSW 2021 – A Plan to Make NSW Number One (Department of Premier and Cabinet, 2011)</p>	<p><i>NSW 2021 – A Plan to Make NSW Number One</i> is a ten-year plan developed in 2011 and outlines the high level strategic priorities and associated goals for government and its respective agencies.</p> <p>A key aspect in the transport strategy includes:</p> <ul style="list-style-type: none"> the return of quality transport and community services building infrastructure that improves peoples' lives strengthening our local environments. <p>NSW 2021 includes the following goals, targets and priority actions relevant to the Proposal:</p> <ul style="list-style-type: none"> reduce travel times minimise public transport waiting times for customers improve co-ordination and integration between transport modes grow patronage on public transport improve public transport reliability improve customer experience with transport services. 	<p>The Proposal is consistent with the NSW Government's commitment to:</p> <ul style="list-style-type: none"> grow patronage on public transport improve customer experience with transport services. <p>In particular, the Proposal is consistent with <i>Goal 7 – Reduce travel times</i>, and <i>Goal 20 – Build liveable centres</i>.</p> <p>The Proposal also contributes to <i>Goal 14 – Increase opportunities for people with a disability, by improving transport access</i>.</p> <p>The Proposal also supports active transport by contributing to the development of cycle facilities as part of an integrated local network.</p>
<p>Rebuilding NSW – State Infrastructure Strategy 2014 (NSW Government, 2014)</p>	<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><i>Rebuilding NSW</i> will support overall population growth in Sydney and NSW. 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.</p>	<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, which is expected to reach almost six million by 2031.</p>

Policy/Strategy	Commitment	Comment
<p>NSW Long Term Transport Master Plan (TfNSW, 2012a)</p>	<p>The <i>NSW Long Term Transport Master Plan</i> identifies a planned and co-ordinated set of actions to address transport challenges and will guide the NSW Government's transport funding priorities over the next 20 years.</p> <p>The Master Plan would meet a number of challenges to building an integrated transport system for Sydney and NSW, including:</p> <ul style="list-style-type: none"> • customer-focussed integrated transport planning • integrated modes to meet customer needs • getting Sydney Moving Again • sustaining Growth in Greater Sydney. <p>The Master Plan links to NSW 2021, the Metropolitan Strategy for Sydney, the State Infrastructure Strategy, regional and sub-regional strategies, and national plans.</p>	<p>The Proposal implements the following key themes in the Master Plan:</p> <ul style="list-style-type: none"> • improving customers' journey experience • making better use of existing assets • providing accessible transport to help address social exclusion.
<p>A Plan for Growing Sydney (Department of Planning and Environment, 2014)</p>	<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 within the West Central subregion.</p> <p>The Department of Planning and Environment is currently preparing new subregional plans to translate the objectives of the new metropolitan plan for <i>Sydney: A Plan for Growing Sydney</i>.</p> <p>A significant amount of employment and housing growth is projected for this area.</p>	<p>The Proposal is consistent with the objectives of this Plan and would deliver improved and accessible footpath connections from the station to interchange facilities. The Proposal also takes into account potential future growth in the area.</p>
<p>Disability Action Plan 2012-2017 (TfNSW, 2012b)</p>	<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>	<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.</p>

Policy/Strategy	Commitment	Comment
Draft Making Interchange Places (TfNSW, May 2012)	TfNSW's draft <i>Making Interchange Places</i> establishes the strategic design principles to deliver high quality, customer-focused transport interchanges and identifies a core objective: 'to create interchanges that are places for people rather than just facilities for vehicles'. If good conditions are provided for customers, more people will not only use, but enjoy transport interchanges and the broader city.	The Proposal has been developed with consideration of the design principles outlined in the Plan to provide an improved customer-focused interchange between different modes of transport at Berala Station.
Sydney's Walking Future - Connecting people and places (TfNSW, 2013b)	<p><i>Sydney's Walking Future</i> outlines the NSW government's efforts to:</p> <ul style="list-style-type: none"> • promote walking for transport • connect people to places through safe walking networks around activity centres and public transport interchanges. 	The Proposal would facilitate walking by removing physical barriers to accessible public transport.
Sydney's Cycling Future - Cycling for everyday transport (TfNSW, 2013c)	<p><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.</p>	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. Bicycle parking for approximately 20 bicycles is proposed to be provided on the southern side of the station (on Campbell Street).
Berala Village Draft Public Domain Plan, March 2015	The Berala Village Draft Public Domain Plan, developed by Auburn City Council in March 2015 presents potential future improvements to revitalise the Berala Interchange precinct streetscape and aims to improve pedestrian comfort and safety with the addition of traffic calming, improved streetscapes and additional pedestrian infrastructure.	The Proposal is consistent with the objectives of the draft plan and would provide improved access to the station and interchange facilities.

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 Proposal. Section 3.1.4 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 and the results of consultation with the community, relevant government agencies and stakeholders.

5.1 Stakeholder consultation during concept design

As part of the development of concept design options, TfNSW held a number of workshops with stakeholders including Sydney Trains.

A meeting was also held with Auburn City Council on 23 September 2015. The following key issues were raised for consideration during the development of the preferred option:

- the lack of lift access at the station was a major community concern and was also a priority of Council
- Council is considering increasing floorspace and height controls in Berala centre, which could lead to a small increase in patronage at the station
- Council's draft Public Domain Plan includes streetscape improvements for both Woodburn Road and Campbell Street which are proposed to be undertaken in 2016
- there are also plans for kiss and ride, accessible parking, bus and taxi zones on Crawford Street
- Council did not consider that flooding was a significant problem at the station with no recorded flooding of the channel in the past 10 years
- Council supports the inclusion of bike parking.

The preferred option incorporates many of these considerations including access improvements to and within the station. The Proposal would improve the amenity of the local area and complement other proposed upgrades within the locality.

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

Table 5 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
<p>Clause 13 Consultation with Councils – development with impacts on council related infrastructure and services</p>	<p>Consultation is required where the Proposal would result in:</p> <ul style="list-style-type: none"> • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility. 	<p>The Proposal includes works that would:</p> <ul style="list-style-type: none"> • require connections or impacts the stormwater system • disrupt pedestrian and vehicle movements • impact on road pavements under Council’s care and control • impact on Council-operated footpaths. <p>Preliminary consultation with Auburn City Council has been undertaken, and would continue throughout the detailed design and construction phases.</p> <p>Although the Proposal is unlikely to result in substantial impacts to Council infrastructure, consultation with Auburn City Council would be undertaken with regard to clause 13 of the Infrastructure SEPP.</p>
<p>Clause 14 Consultation with Councils – development with impacts on local heritage</p>	<p>Where works:</p> <ul style="list-style-type: none"> • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area. 	<p>Berala Station is listed as an archaeological site on the Auburn LEP.</p> <p>Consultation with Auburn City Council is required with regard to clause 14 of the Infrastructure SEPP.</p> <p>Refer to Section 6.5 for further information on potential heritage impacts.</p>
<p>Clause 15 Consultation with Councils – development with impacts on flood liable land</p>	<p>Where works:</p> <ul style="list-style-type: none"> • impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual: the management of flood liable land</i>. 	<p>The Proposal is located on land that is susceptible to flooding. Accordingly consultation with Auburn City Council is required with regard to clause 15 of the Infrastructure SEPP.</p> <p>Refer to Section 6.9 for further information on potential impacts to flooding.</p>

Clause	Clause particulars	Relevance to the Proposal
Clause 16 Consultation with public authorities other than Councils	<p>For <i>specified development</i> which includes consultation with 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.</p> <p>Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult with could include:</p> <ul style="list-style-type: none"> • Roads and Maritime • Sydney Trains • Sydney Water • OEH. 	<p>The Proposal is not located adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i>. Accordingly, consultation with OEH – National Parks and Wildlife Service Division is not required.</p>

5.3 Consultation strategy

A consultation strategy for the Proposal has been developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and the project team. The consultation strategy that was developed, having regard to the requirements of the planning process, 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 update up to a radius of approximately 500 metres to the station to local community and rail commuters, where appropriate, outlining the Proposal and inviting feedback on the REF
- advertisement of REF public display in local newspapers with a link to the TfNSW website that includes a summary of the Proposal and information on how to provide feedback
- consultation with Auburn City Council, Sydney Trains, and other non-community stakeholders.

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 would be displayed for a period of two weeks.

The REF would be placed on public display at the following locations:

1. Auburn City Council, 1 Susan Street, Auburn
2. Auburn City Library, 1 Susan Street, Auburn
3. Regents Park Library, 1 Amy Street, Regents Park
4. Lidcombe Library, 3 Bridge Street, Lidcombe
5. TfNSW Community Information Centre, Ground Floor, 388 George Street, Sydney.

The REF would also be available on the [TfNSW website](http://www.transport.nsw.gov.au/projects)². Information on the Proposal would be available through the Project Infoline (1800 684 490) or by [email](mailto:projects@transport.nsw.gov.au)³.

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 archaeological assessment was prepared by Umwelt for the Proposal (Umwelt, 2015) which included an extensive Aboriginal Heritage Information Management System (AHIMS) search. The assessment did not identify any sites within or in the vicinity of the proposal site.

The extensive landscape modification that has occurred across the study area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the study area. Similarly, the high level of disturbance would suggest that the archaeological potential of the area is low (Umwelt, 2015). Therefore, consultation with the Aboriginal community was not considered necessary.

² <http://www.transport.nsw.gov.au/projects>

³ projects@transport.nsw.gov.au

5.6 Ongoing consultation

At the conclusion of the public display period for this REF, TfNSW would acknowledge receipt of feedback from each respective respondent. The issues raised by the respondents would be considered by TfNSW before determining whether to proceed with the Proposal (refer to Figure 1).

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, Council 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 by the Contractor to be developed prior to the commencement of construction.

6 Environmental impact assessment

Chapter 6 of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the Proposal. For each potential 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 was prepared by Cardno for the Proposal (Cardno, 2015b). The assessment included a desktop analysis and site inspection. Detailed traffic counts or modelling were not considered necessary as the Proposal is focused on the station area and is unlikely to have major impacts to the surrounding road network. The findings of the assessment are summarised in this section.

6.1.1 Existing environment

Berala Station

Berala Station is serviced by the Bankstown Line (T3) and less frequently by the T2 Inner West and South Line providing connections to the metropolitan train network. Station barrier counts show that Berala Station was ranked the 115th busiest station on the Sydney Trains Network, recording a total of 4520 entry and exit passenger movements during a typical weekday in 2014 (Bureau of Travel Statistics, 2014).

The station consists of a single island platform with Platform 1 (on the northern side) providing services to Lidcombe and Platform 2 (on the southern side) providing services to Liverpool and the Sydney CBD.

Trains on the section of the T3 Line that stop at Berala operate between Lidcombe and the City Circle via Bankstown. When traveling to Sydney CBD stations, it is generally quicker to transfer to an express train at Lidcombe rather than travel to the CBD via Bankstown. Customers travelling south are able to change at Birrong Station for west services to Liverpool or continue east for services to the Sydney CBD.

Train frequencies are generally two trains per hour in each direction throughout the day, during off-peak hours. During the three hour morning and evening peak periods, the number of trains varies between 10 and 11 trains to the City via Bankstown and to Lidcombe with limited services to the City via Lidcombe and to Liverpool.

Road network and traffic

The road network in the vicinity of the proposal site is shown in Figure 3 (Section 1.3) and includes Woodburn Road, Campbell Street and Burke Avenue.

Woodburn Road is a local road with one traffic lane in each direction. It provides access to the Berala town centre and the station from the northern side of the rail corridor. Woodburn Road has a posted speed limit of 50 kilometres per hour.

Campbell Street is a local road with one lane in each direction. It provides access to the southern side of the station, residential properties and a small commercial area. Campbell Street has a posted speed limit of 50 kilometres per hour.

Burke Avenue is a local road with one traffic lane in each direction which provides access to residential properties and a small commercial area. It has a posted speed limit of 50 kilometres per hour.

Site observations indicate that the traffic volumes on Campbell Street are generally low with minimal delays and queues. Longer delays were observed on Woodburn Road and Crawford Street, likely due to the close proximity of the Berala town centre and associated retailers.

Classified roads within proximity to the proposal site include Joseph Street which is located approximately 900 metres east of Berala Station.

Parking

Unrestricted parking is provided on both side of the station as follows:

- on the southern side of the station:
 - 36 spaces on the northern side of Berala Street and 30 spaces on the southern side
 - 15 spaces on the southern section of Burke Avenue (on each side of the road)
 - 49 spaces on the northern side of Campbell Street and 46 spaces on the southern side
- on the northern side:
 - 21 spaces available on the western side of Elizabeth Street (south of the roundabout) and 16 spaces on the eastern side
 - 80 spaces are available in the public car park located on Woodburn Road to the west of the station.

Site observations showed that parking demand was low after the morning peak period.

Taxi waiting areas and kiss and ride facilities

A designated taxi rank with the capacity for approximately two taxis is provided on the northern side of the station on Woodburn Road.

There are currently no formal kiss and ride facilities at Berala Station. The no-parking zones on both sides of Woodburn Road (two spaces on each side) are used for informal kiss and ride areas on the northern side of the station. Similarly, the two no parking, drop-off/pick-up spaces on the northern side of Campbell Street are used for informal kiss and ride areas on the southern side of the station.

Bus operations

Berala Station is serviced by three bus routes during the week which include:

- Route 908 – Bankstown to Merrylands (Transdev)
- N50 NightRide – Liverpool to Central Station
- community access loop – Council Depot (Auburn) to Wentworth Point via Berala, Regents Park and Wentworth Point.

The Route 908 bus stops are located on the southern side of the station on both sides of Campbell Street.

Auburn City Council operates a free bus service for seniors and people with reduced mobility each Thursday between 10am and 4pm. The route forms a loop around the Auburn LGA.

Stops for the service are located on both sides of Woodburn Road near the entrance to the station. The bus stops share the same bus zones with the NightRide services.

Pedestrian facilities

Pedestrian access to Berala Station underpass is provided at two entry points from the shopping plaza entry off Woodburn Road (northern entrance) and Campbell Street (southern entrance). Stairs provide the only means of access from the underpass to the station platforms.

The underpass is used by both commuters entering and exiting the station platforms, as well as a thoroughfare for pedestrians to access facilities on either side of the rail line. Pedestrian counts undertaken in September 2015 concluded that the majority of pedestrians entered and exited the underpass via the northern entrance (from Woodburn Road).

Four pedestrian crossings are provided within the vicinity of the station including three crossings on the northern side of the station (two on Woodburn Road and one on Crawford Street) and a raised pedestrian crossing on the southern side (across Campbell Street).

Bicycle network and facilities

Berala Station is serviced by two on-road bike routes. The first route includes Oxford Street, Woodburn Road, through the underpass to Berala Station, Campbell Street and down Regent Street. A second route runs east of the station via Burke Avenue, Berala Street, McDonald Street, Brixton Road and London Road/ Georges Avenue.

A bicycle rack with the capacity for 10 bicycles is provided on the southern side of the station on Campbell Street. No bicycle parking is currently provided on the northern side of the station.

6.1.2 Potential impacts

Construction

Berala Station

As discussed in Section 3.1, a temporary shutdown of Berala Station may be required for a period of approximately four weeks. Replacement rail buses would be provided during the shutdown with regular services between Berala, Regents Park and Lidcombe stations. The details of the shutdown, if required, would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities and the local community.

Road network

Figure 7 shows the potential construction routes that may be used during construction.

The potential compound locations are situated on the southern side of the rail line (primarily within the rail corridor) and would be accessed from Campbell Street. It is anticipated that access to the proposal site would likely be via Campbell Street, London Road/Georges Ave and Joseph Street as shown in Figure 7.

Joseph Street is listed as an RMS restricted access vehicle B-double route. Heavy vehicles will be generally restricted to semi-articulated vehicles, as B-double vehicles cannot be accommodated along the local road network to the proposal site.

Temporary road closures may be required within the vicinity of the proposal site on Campbell Street for short periods during construction to facilitate works (such as the establishment of a crane to deliver materials and equipment to the station platform). Such works would likely be

undertaken outside standard construction hours with suitable detours established to minimise impacts on the local road network.

Potential impacts on the local road network would be minimised with the implementation of a construction Traffic Management Plan (TMP) and appropriate traffic controls as described in Section 6.1.3.



Figure 7 Potential construction vehicle routes (Cardno, 2015b)

Traffic

Construction of the Proposal would result in a minor temporary increase in traffic as a result of the following:

- delivery of construction materials
- delivery and removal of construction equipment and machinery
- spoil removal
- movement of construction personnel.

The vehicles generated on the road network as a result of the construction works are expected to generally consist of light vehicles from construction workers and minimal heavy vehicle trips for delivery and removal of materials, plants, and equipment when required. Heavy vehicles would generally be restricted to semi-articulated vehicles, as B-Double vehicles cannot be accommodated along the local road network.

Traffic generated during construction is not expected to exceed 10 vehicles per hour (or one vehicle every six minutes). This would result in a minor increase in proportion to the existing traffic levels on the local road network and therefore it is unlikely that the predicted traffic movements would substantially impact on the operation of the road network. Heavy vehicles

would be restricted to non-peak periods and rail possessions where possible, to minimise disruptions to traffic.

Construction personnel would be encouraged to car-pool or utilise public transport to minimise impacts on the local road network.

As described in Section 3.1, the Proposal would also require minor works within the road reserve of Woodburn Road and Campbell Street which may result in temporary partial lane closures and/or traffic diversions.

Road works would be undertaken progressively and in the minimum area required to undertake the activity. Signage would be displayed around work areas to inform the public of any diversions.

Parking

Construction works are likely to result in the temporary loss of some time-restricted car parking spaces on Woodburn Road and Campbell Street to allow for construction works or to maintain traffic flow. The number of parking spaces to be impacted would depend on the nature of the works and would most likely occur during weekend track possessions when major construction works are proposed to be undertaken.

The number of parking spaces to be affected during construction would be confirmed during construction planning and would be minimised as much as practicable. It is expected that on-street parking on other parts of the road network would be sufficient to cater for the temporary loss of parking during construction.

Given that parking is generally in high demand in the area around the station, construction workers would be encouraged to carpool and make use of the available public transport for travel to and from the proposal site.

Property access

Pedestrian access to properties adjacent to the site would be maintained at all times.

Vehicular access to properties along Campbell Street would be disrupted for short periods during the proposed works. Residents and businesses with temporarily restricted vehicular access to their properties would be given notice in advance of the construction works being undertaken in that location.

As noted in Section 3.2, cranes would be required to deliver materials and equipment to the proposal site. The positioning of the cranes would need to be confirmed by the construction Contractor. However cranes would likely be positioned in one of the proposed compounds on Campbell Street to deliver materials and equipment (such as the lift) to the station platforms.

Pedestrian and bicycle access

Construction work is expected to have a minor impact on the pedestrian and bicycle network given the restricted space in which construction works are to be carried out. Construction works proposed to be undertaken in close proximity to the existing footpaths and bicycle facilities would occur infrequently with closures expected to be temporary with safe and suitable detours provided as a part of the traffic control measures.

It is expected that pedestrians would continue to utilise the existing pedestrian network on Woodburn Road and Campbell Street. Minor disruption to the pedestrian network along the streets is anticipated to occur during construction with clear warning signs and suitable detours to be provided for pedestrians accessing the station and/or using the underpass to cross to the other side of the station.

In general, construction works would be short in duration and would result in temporary impacts on local traffic and access. Potential impacts would be minimised with the implementation of management measures provided in Table 20.

Operation

The Proposal would result in positive impacts in terms of contributing towards making railway transport more accessible to the community. A summary of the operational traffic, transport and access impacts is summarised below.

Customer and public access

The Proposal has been designed to cater for a daily patronage of 5725 (which is the estimated 2036 daily patronage + 15 per cent).

To assess the pedestrian level of service (LoS), the Traffic, Transport and Access Impact Assessment adopted Fruin's level of service which is a series of density and flow rate bands that correspond to levels of service between A (best level of service) and F (worst) depending on a particular location.

The LoS for the platforms, station entrances and pedestrian access to the station was calculated. The LoS assessment of the station's critical areas indicated that there is sufficient capacity to accommodate the 2036 +15 per cent customer volumes within the existing layout and overall an average LoS 'C' would be achieved during the busiest morning peak period.

The Proposal would provide equitable access for commuters with reduced mobility and parents/carers with prams to the station platforms. Other access improvements include:

- formalised interchange facilities such as kiss and ride zones on Campbell Street and Woodburn Road and improved wayfinding signage
- new bicycle storage facilities on Campbell Street would provide improved facilities for cyclists.

Traffic

Given that the Proposal would provide a higher level of station accessibility and usability, the improved customer experience and upgraded facilities are likely to attract a higher patronage demand at the station. As a result, traffic activity is likely to marginally increase as a result of the Proposal. The potential traffic increase during operation is anticipated to have a negligible impact on the surrounding road network level of service.

It is anticipated that patronage increase as a part of forecast patronage growth will be from the surrounding precinct due to land use densification. It is projected that the increase in patrons will predominately access the interchange using active transport forms.

Parking

The Proposal is not expected to impact on parking within the vicinity of the station.

Buses

The Proposal is not expected to impact on the bus network or bus stop locations as part of the Proposal. Minor upgrades are proposed to the bus shelter on the northern side of Campbell Street.

Bicycle facilities

The Proposal would not impact on the local bicycle network. The Proposal includes the provision of bicycle storage facilities with capacity for 20 bicycles at the station. This would be adequate to cater for the current and likely future demands.

Property access

The Proposal would not result in impacts on existing access to properties in the vicinity of the station.

6.1.3 Mitigation measures

A construction TMP would be prepared by the Contractor in consultation with TfNSW, Auburn City Council and RMS as required. The construction TMP would be the primary management tool to manage potential traffic impacts associated with construction. The construction TMP, at a minimum, would include a description of:

- procedures for preparing and implementing Traffic Control Plans (TCPs) particularly for detours and traffic control to manage temporary road disruptions on Campbell Street and Woodburn Road
- final construction traffic approach and departure routes, site compound(s) and loading zones
- access routes to and from the local road network and contractor parking
- scheduling of works/deliveries to avoid peak times and generally limiting works in the road carriageway as much as practicable
- measures to:
 - limit temporary parking losses
 - maintain customer access to and from the station
 - to maintain private property access unless otherwise agreed
- details of construction signage, traffic controllers and other community notifications.

Refer to Table 20 in Section 7.2 for a list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

6.2.1 Existing environment

Landscape character

The landscape character surrounding Berala Station is typical of a suburban residential setting with mixed development within a local commercial centre. Residential areas to the south of the station are defined by a mix of single storey detached dwellings with some medium density residential developments.

The station precinct and adjoining road corridors contain mature indigenous and non-indigenous tree plantings which provide some degree of screening within proximity to, and beyond the station. Tree plantings continue along local residential street nature strips and throughout residential garden areas.

Visual receivers

Visual receivers are individuals and/or groups of people whose views may be affected by the Proposal. These include residential dwellings, commercial properties, road corridors and pedestrian footpaths.

The visual landscape of the proposal site is dominated by rail infrastructure (including rail lines, overhead power lines) and the adjoining road network.

Views to the proposal site are available from:

- residences and commercial properties located near the site on the southern side of Campbell Street
- residences and commercial properties located near the site on Burke Avenue

- transient receptors (including motorists and pedestrians) on Campbell Street and Burke Avenue.

Residential receptors on Campbell Street with direct views of the proposal site are considered to be the most sensitive receptors. Views from these receivers to the site are currently dominated by railway infrastructure, the open stormwater channel and the underpass. Views to the site are partially obscured by the site topography (the site slopes up to the rail corridor) and mature vegetation within the rail corridor.

6.2.2 Potential impacts

Construction

During construction, the positioning of the work site and the site compound would result in some short-term impacts on the visual amenity for nearby sensitive receivers.

Temporary features typically introduced during construction include:

- fencing and hoardings
- storage of materials
- road barriers and signage
- cranes and other construction plant
- scaffolding
- temporary site office and amenities.

Some construction activities, such as night works would require temporary lighting for operational, safety and security purposes. Lighting would be placed to avoid light spill to adjoining road corridors and residential areas.

Overall, the potential visual impacts of construction activities are considered to be minimal as the works would be temporary and short-term in nature.

Operation

The concept design for the Proposal has been prepared with regard to urban design and visual considerations. An indicative description of the potential appearance of the Proposal is provided in Section 3.1.

Potential visual impacts relate to the introduction of new elements in the landscape including the construction of a new lift, extended canopy coverage and the installation of a new sheltered bicycle rack in the Campbell Street forecourt area. The appearance of the new elements would be consistent with the existing station elements and are considered to be common features in urban areas.

The demolition of the existing highly modified ticket office would improve views towards the site from Campbell Street. It would also improve visibility for customers on the station platform.

Photomontages of the Proposal are provided in figures 8 to 10. The design elements represented in the photomontages are conceptual and subject to further detailed design.



Note: Design is indicative and subject to detailed design

Figure 8 View towards the Proposal from the southern side of Campbell Street



Note: Design is indicative and subject to detailed design

Figure 9 View towards the proposed lift from the eastern side of the station platform



Note: Design is indicative and subject to detailed design

Figure 10 Artistic impression of the upgraded platform (looking south) with improved visibility

Landscape character

The Proposal would result in the introduction of new visible elements within the surrounding landscape which would result in minor impacts on existing views. The Proposal's visual impact would be positively mitigated through a range of appropriate measures that would be implemented during the detailed design stage such as material selection, as well as minimising the bulk and scale of proposed elements.

The overall magnitude of the Proposal would result in a minor loss and alteration to pre-development views and the introduction of new constructed elements would not be uncharacteristic with existing urban landscape features.

Visual impact assessment

Views towards the station would continue to be visually filtered and partially screened by existing tree plantings adjoining the station precinct as well as by trees within adjoining private properties.

The majority of receiver viewpoints including single storey residential dwellings, commercial buildings and road corridors are expected to result in a low visual impact with regard to the Proposal.

Lighting

The Proposal would include the installation of lighting for operational, safety, security and maintenance purposes. Night lighting would include building and pole mounted directional spot lighting and pole mounted pedestrian lighting. The majority of infrastructure areas associated with the Proposal would be unlikely to require additional lighting, or lighting that would result in a direct line of sight from surrounding view locations. Light installations would be installed in accordance with the *Australian Standard 4282:1997 Controlling the Obtrusive Effects of Outdoor Lighting*, and avoid light spill to adjoining road corridors and residential areas.

6.2.3 Mitigation measures

In order to minimise the visual impact of the Proposal, the following mitigation measures would be considered further during detail design:

- a review of materials and colour finishes for selected components
- further refinement in the design of the lift structure to minimise the bulk and height of the structure
- further refinement to the design of the extended platform canopy and drainage to minimise visual impact
- further consideration of the location of the public telephone and ticket vending machine to minimise clutter on the platform
- tree planting would be considered to compensate for any proposed tree removal.

Measures to mitigate visual impacts during construction would be included in a CEMP for the Proposal and would include measures such as minimising light spill during night works, screening of compounds and minimising tree removal.

Refer to Table 20 in Section 7.2 for a list of proposed mitigation measures.

6.3 Noise and vibration

This section provides a summary of the Noise and Vibration Impact Assessment undertaken by WSP | Parsons Brinkerhoff (2016).

The assessment included:

- identifying sensitive noise receivers
- undertaking attended and unattended day and night-time 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 a number of representative sensitive receivers
- assessing the potential construction noise and vibration impacts by comparing the predictions with the criteria
- providing mitigation measures to minimise noise and vibration impacts.

As operational noise levels are expected to be minimal, no quantitative modelling of potential operational noise impacts was undertaken.

6.3.1 Existing environment

Noise sensitive receivers

Fourteen residential receiver locations and 20 non-residential receiver locations were selected to represent the worst affected receivers of similar background noise levels. These are shown in Figure 11.

The closest residential receivers are located on Campbell Street (R2 and R4) and Burke Street (R3) between 30 and 50 metres from the proposal site. Other nearby residential receivers are located on Woodburn Road and Elizabeth Street.



Figure 11 Noise sensitive receivers (WSP| Parsons Brinckerhoff, 2016)

The closest non-residential receivers include commercial/retail properties on Campbell Street (C1) and Woodburn Avenue (C2) within 25 metres from the proposal site; and a dental clinic on Campbell Street (H2) approximately 25 metres from the proposal site.

Background noise levels

Attended and unattended background noise monitoring was undertaken at two representative receiver locations (BG1 and BG2) as shown in Figure 11.

The attended noise monitoring indicated that the dominant ambient noise source at both monitoring locations was traffic noise from nearby roads. Both monitoring locations were close to local shops, so contributions to ambient noise were made from vehicles parking, and accelerating when moving parked vehicles. General community noise also contributed to the background noise levels.

Unattended monitoring was undertaken for a period of one week between 11 and 18 December 2015. Background noise monitoring data was then used to establish the background noise levels for the day, evening and night time periods (refer Table 6).

Table 6 Existing background and ambient noise levels

Location	Period ¹	Rating background level (L_{A90}) ²	Ambient noise level ($L_{Aeq, 15 \text{ min}}$) ³
BG1 - 2B Elizabeth Street, Berala	Daytime	41 dBA	55 dBA
	Evening	44 dBA	55 dBA
	Night time	35 dBA	49 dBA
BG2 - 30 Campbell Street, Berala	Daytime	46 dBA	60 dBA
	Evening	46 dBA	58 dBA
	Night time	42 dBA	56 dBA

Notes:

1. Daytime period refers to 7am to 6pm (or 8am to 6pm Sundays and public holidays)
Evening period refers to 6pm to 10pm
Night time refers to 10pm to 7am (or 10pm to 8am Sundays and public holidays).
2. The rating background level (RBL) (L_{A90}) represents the noise level exceeded for 90 per cent of the monitoring period.
3. The ambient noise level represents the average noise level over the monitoring period.

Construction noise criteria

The ICNG provides a framework to consider the impacts of construction noise on residences and other sensitive land uses by presenting assessment approaches that are tailored to the scale of construction projects.

The ICNG recommended standard hours for construction are defined as:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- no work on Sundays or public holidays.

Noise management levels for residential receivers for recommended standard hours are defined by the ICNG as follows:

- The 'noise affected level' represents the point above which there may be some community reaction to noise and is calculated based on the rating background level (RBL) + 10 dBA.
- The 'highly noise affected level' represents the point above which there may be strong community reaction to noise and is prescribed as 75 dBA.

The noise management levels for residential receivers outside recommended construction hours are calculated based on the RBL + 5 dBA.

The ICNG also prescribes noise management levels for other non-residential receivers such as commercial, schools and places of worship.

Where works exceed the noise management levels, all reasonable and feasible measures (such as equipment selection and location, construction scheduling and respite periods) should be implemented to reduce noise levels as far as practicable.

The construction noise management levels developed for the Proposal for residential and non-residential sensitive receivers are listed in Table 7 and Table 8 respectively.

Table 7 Construction noise management levels – residential receivers

NCA	Period	RBL	NML ¹ (L _{Aeq, 15 min})	Highly noise affected NML (L _{Aeq, 15 min})
R1-R7, R14 (BG2)	Daytime	46 dBA	56 dBA	75 dBA
	Evening	46 dBA	51 dBA	N/A
	Night time	42 dBA	47 dBA	N/A
R8-R13 (BG1)	Daytime	41 dBA	51 dBA	75 dBA
	Evening	41 dBA	46 dBA	N/A
	Night time	35 dBA	40 dBA	N/A

Note:

1. Noise management level.

Table 8 Construction noise management levels – non-residential receivers

Receiver type	NML- when in use (L _{Aeq, 15 min})
Schools, child care centres, places of worship	55 dBA ¹
Health buildings ²	55 dBA
Active recreation	65 dBA
Commercial premises (including office, retail outlets)	70 dBA

Note:

1. As per the Industrial Noise Policy (EPA, 2000), the difference between internal and external noise levels is typically 10dB with windows open for adequate ventilation.
2. Nearby consulting rooms and dental clinics have been identified as possible sensitive land uses. As per the TfNSW CNS, noise criteria have been set using the 'maximum' noise levels in AS 2107 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors.

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 internal noise levels above 55 dBA, sleep disturbance would be considered likely. Assuming that receivers may have windows partially open for ventilation, a 10 dB outside to inside correction has been adopted as indicated in the ICNG. Therefore a sleep disturbance screening criterion of L_{max} 65 dBA has been adopted.

Traffic noise criteria

For traffic noise, the criterion applied on public roads generated during the construction phase of a project is an increase in existing road traffic noise of no more than 2 dBA.

Construction vibration criteria

When assessing vibration there are two categories of vibration criteria: one related to the impact of vibration to human comfort and one relating to the impact on building structures (cosmetic damage).

Human comfort

Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) provides vibration criteria for human comfort. Table 9 presents the limits (vibration dose values) above which there is considered to be a risk that the amenity and comfort of people occupying buildings would be affected by construction work.

Table 9 Vibration limits (human exposure)

Receiver type	Period	Preferred value $\text{m/s}^{1.75}$	Maximum value $\text{m/s}^{1.75}$
Critical areas	Day or night time	0.1	0.2
Residences	Daytime ¹	0.2	0.4
	Night time ²	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night time	0.4	0.8
Workshops	Day or night time	0.8	1.6

Note:

1. Daytime period is defined as 7am – 10pm under BS 6472-1992 *Guide to Evaluation of Human Exposure to Vibration in Buildings* (1 Hz to 80 Hz).
2. Night period is defined as 10pm – 7am under BS 6472-1992.

Structural damage to buildings

There is currently no Australian Standard that provides guidance for assessing cosmetic building damage caused by vibration. The standards used to determine criteria for cosmetic damage include the British Standard BS7385-2:1993 *Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)* (refer to Table 10) and the *German Standard DIN 4150-3: 1999 Structural Vibration – Part 3: Effects of vibration on structures* (refer to Table 11). The more stringent criteria would be used for the Proposal.

Table 10 Cosmetic damage criteria - BS7385

Type of structure	Peak component particle velocity, mm/s ¹		
	4 to 15 Hz	15 to 40 Hz	40 Hz and above
Group 1 Reinforced or framed structures Industrial or heavy commercial buildings	50	50	50
Group 2 Un-reinforced or light framed structures Residential or light commercial buildings	15 to 20 ²	20 to 50	50

Notes:

1. Values referred to are at the base of the building, on the side of the building facing the source of vibration (where feasible).
2. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.

Table 11 Cosmetic damage criteria - DIN4150-3

Type of structure	Guideline values for velocity, (mm/s)		
	1 to 10 Hz	10 to 50 Hz	50 Hz to 100 Hz
Buildings used for commercial purposes, industrial buildings and buildings of similar design.	20	20 to 40	40 to 50
Dwellings and buildings of similar design and/or occupancy.	5	5 to 15	15 to 20
Structures that, because of their particularly sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (for example heritage listed buildings).	3	3 to 8	8 to 10

Heritage listed buildings may be more sensitive to structural vibration impacts than residential and commercial buildings and consequently a lower threshold vibration limit is adopted to ensure their protection.

The vibration criteria provided in Table 11 (from the *German Standard DIN 4150-3: 1999 Structural Vibration – Part 3: Effects of vibration on structures*) would be adopted for the management of vibration impacts on heritage structures.

Operational noise criteria

The *Industrial Noise Policy* provides guidance in relation to acceptable noise limits for industrial noise emissions, which includes, but is not limited to, noise emissions from mechanical plant.

The assessment procedure in the INP (EPA, 2000) has two components:

- controlling intrusive noise impacts in the short-term for residences
- maintaining noise level amenity for residences and other land uses.

The project specific noise levels established for the operation of the Proposal are summarised in Table 12 and are based on the lower of the intrusive and amenity criteria.

Table 12 Environmental noise emission criteria

Receiver	Period ¹	RBL (dBA)	Intrusive criteria (L _{eq,15min} dBA)	Existing ambient noise level (L _{eq,15min} dBA)	Amenity criteria ² (L _{eq,15min} dBA)	Project specific noise levels ³
R1-R7, R14 (BG2)	Day	46	51	60	52	51
	Evening	46	51	58	48	48
	Night	42	47	56	46	46
R8-R13 (BG1)	Day	41	46	55	58	46
	Evening	41	46	55	45	45
	Night	35	40	49	39	39
Commercial	When in use	-	-	-	-	65
Active recreation	When in use	-	-	-	-	55
School ⁴	Noisiest 1 hour period when in use	-	-	-	-	45
Place of worship ⁴	When in use	-	-	-	-	50

Note:

1. Daytime period refers to 7am to 6pm (or 8am to 6pm Sundays and public holidays)
Evening period refers to 6pm to 10pm
Night time refers to 10pm to 7am (or 10pm to 8am Sundays and public holidays).
2. Set at 10 dB less than the existing ambient noise level for the evening and night periods.
3. The project specific noise levels have been set as a L_{eq, 15min} in order to provide a conservative assessment. Where compliance is achieved over a 15-minute period, it is therefore implied that compliance will also occur over the day, evening or night period.
4. As per the INP, a +10 dB correction has been added to convert internal to external noise criteria.

6.3.2 Potential impacts

Construction noise

In order to assess the potential noise and vibration impacts from the proposed construction works, the construction phases described in Section 3.2 were further divided into 11 scenarios (Table 13) to provide a more accurate assessment.

Table 13 Construction assessment scenarios

Scenario	Description
1a – Site establishment and enabling works	<ul style="list-style-type: none"> establishment of site compound (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas etc.) establishment of temporary alternative pedestrian access, as required
1b – Site establishment and enabling works	<ul style="list-style-type: none"> removal of trees and vegetation
1c – Site establishment and enabling works	<ul style="list-style-type: none"> services relocation
2a – New lift and platform upgrade	<ul style="list-style-type: none"> demolition of existing structures as required
2b – New lift and platform upgrade	<ul style="list-style-type: none"> platform modifications including piling and foundations for the lift shaft
2c – New lift and platform upgrade	<ul style="list-style-type: none"> construction of lift shaft from the underpass to the platform level construction of columns, fencing and new canopy installation of lift installation of fixtures, lighting, signage and CCTV cameras for the station areas
2d – New lift and platform upgrade	<ul style="list-style-type: none"> platform resurfacing and regrading (if required)
3a – Station building works	<ul style="list-style-type: none"> reconfiguration of internal platform building to allow for a new communications/equipment room, staff facilities and new family accessible toilet
3b – Station building works	<ul style="list-style-type: none"> refresh of platform building including painting works
4 – Interchange works	<ul style="list-style-type: none"> modifications and making good the existing pedestrian underpass including resurfacing, lighting and painting creation of formal taxi waiting areas, kiss and ride, and accessible car parking spaces on Campbell Street and Woodburn Road
5 – Finalisation	<ul style="list-style-type: none"> installation of new sheltered bicycle racks on southern side of the station installation of wayfinding signage upgrade of electrical and power supply replanting/landscaping and fencing adjustments/bollards

Table 14 and Table 15 list the modelled construction noise levels for residential and non-residential receiver locations respectively based on the different construction scenarios in Table 13.

Table 14 Predicted construction noise levels during each scenario during standard hours—residential receivers

NML												
ID	Day	1a	1b	1c	2a ¹	2b ¹	2c ¹	2d ¹	3a	3b	4 ¹	5
R1	56	72	62	54	59 (70)²	61 (72)	60 (72)	63 (72)	60 (71)	54	57 (69)	58
R2	56	59	69	62	66 (77)	68 (78)	67 (78)	69 (78)	66 (77)	60	65 (77)	64
R3	56	57	71	64	70 (81)	71 (82)	70 (81)	73 (82)	69 (81)	64	66 (78)	68
R4	56	61	76	67	72 (83)	71 (82)	71 (82)	73 (82)	69 (81)	64	69 (81)	68
R5	56	49	55	46	55 (60)	56 (61)	55 (61)	58 (62)	54 (61)	50	47 (55)	52
R6	56	69	65	56	66 (74)	64 (73)	66 (74)	64 (73)	60 (72)	61	59 (70)	58
R7	56	59	59	51	59 (67)	57 (67)	58 (67)	58 (67)	54 (66)	53	54 (65)	52
R8	51	57	56	49	59 (67)	58 (68)	59 (68)	59 (68)	56 (67)	53	53 (63)	54
R9	51	60	59	52	64 (71)	61 (70)	62 (70)	61 (70)	58 (69)	56	57 (66)	56
R10	51	51	47	40	54 (60)	50 (60)	51 (60)	51 (60)	48 (59)	46	43 (53)	46
R11	51	49	48	44	50 (58)	54 (64)	53 (64)	56 (64)	52 (63)	46	50 (57)	50
R12	51	58	57	49	54 (65)	56 (66)	55 (66)	57 (66)	54 (65)	48	52 (64)	52
R13	51	50	44	40	42 (51)	47 (55)	47 (54)	45 (53)	42 (52)	34	46 (53)	41
R14	56	45	48	40	47 (52)	47 (53)	46 (53)	49 (53)	46 (52)	40	42 (49)	44

Notes:

1. The ICNG requires a +5 dB correction to be added to predicted noise levels to account for the annoying characteristics of the jackhammer, grinder or demolition saw used in this scenario.
2. Noise levels are presented without the use of jackhammers, with noise levels presented in brackets describe noise scenarios that include jackhammers.
3. Items in **BLACK** indicate predicted noise impact at this receiver during this work stage is above NML. Items in **RED** indicate a 'highly affected' residential receiver with a level of 75 dB(A) or greater.

Table 15 Predicted construction noise levels during each scenario – non-residential receivers

Land use		NML											
ID		Day	1a	1b	1c	2a ¹	2b ¹	2c ¹	2d ¹	3a ¹	3b	4 ¹	5
C1	Commercial/ Retail	70	58	81	74	77 (87)	80 (87)	80 (87)	77 (85)	75 (85)	66	80 (88)	74
C2	Commercial/ Retail	70	53	53	49	57 (63)	55 (65)	56 (65)	57 (66)	53 (65)	52	50 (63)	52
C3	Commercial/ Retail	70	63	61	55	66 (73)	69 (81)	68 (80)	72 (81)	68 (80)	62	58 (68)	67
C4	Commercial/ Retail	70	47	55	47	54 (64)	56 (67)	55 (66)	58 (67)	54 (66)	49	49 (61)	53
C5	Commercial/ Retail	70	49	53	46	52 (62)	55 (65)	54 (65)	57 (66)	53 (65)	47	49 (60)	51
C6	Commercial/ Retail	70	55	51	43	47 (57)	52 (62)	51 (62)	53 (62)	50 (61)	44	47 (56)	48
H1	Health Building, Consulting Room	55	58	71	65	68 (79)	71 (79)	70 (79)	71 (80)	67 (79)	61	69 (79)	66
H2	Health Building, Dental Clinic	55	58	80	72	75 (86)	78 (85)	78 (85)	75 (84)	73 (83)	65	77 (86)	72
H3	Health Building, Consulting Room	55	49	49	43	47 (57)	52 (62)	51 (62)	53 (62)	50 (61)	44	47 (56)	48
H4	Health Building, Consulting Room	55	55	51	47	50 (59)	56 (65)	55 (65)	57 (66)	53 (65)	47	53 (60)	52
H5	Health Building, Dental Clinic	55	42	45	37	44 (48)	46 (51)	45 (51)	48 (52)	44 (51)	39	40 (47)	42
A1	Active Recreation	65	37	42	36	42 (46)	46 (51)	45 (51)	48 (52)	44 (51)	38	42 (45)	42
A2	Active Recreation	65	34	38	34	43 (45)	42 (47)	42 (47)	44 (47)	40 (46)	35	38 (41)	38
A3	Active Recreation	65	40	46	38	44 (49)	45 (51)	45 (51)	48 (52)	44 (51)	40	38 (47)	42
A4	Active Recreation	65	37	43	35	43 (48)	43 (49)	43 (49)	46 (50)	42 (49)	38	35 (44)	40
W1	Place of Worship (Lingyen Mountain Temple Australia)	55	65	61	52	61 (69)	59 (68)	61 (69)	60 (68)	56 (67)	56	55 (67)	54

Land use		NML											
		Day	1a	1b	1c	2a ¹	2b ¹	2c ¹	2d ¹	3a ¹	3b	4 ¹	5
W2	Place of Worship (St James Anglican Church)	55	48	51	39	44 (54)	49 (60)	48 (60)	52 (61)	48 (60)	42	42 (52)	46
Y1	Child Care Centre	55	48	57	52	54 (64)	57 (67)	56 (67)	59 (68)	55 (67)	49	54 (66)	53
Y2	Child Care Centre	55	50	51	46	51 (60)	54 (65)	53 (65)	56 (65)	53 (64)	47	49 (59)	51
S1	School (Berala Public School)	55	39	37	33	40 (42)	40 (44)	39 (44)	40 (44)	37 (43)	32	37 (40)	35

Notes:

1. The ICNG requires a +5 dB correction to be added to predicted noise levels to account for the annoying characteristics of the jackhammer, grinder or demolition saw used in this scenario.
2. Noise levels are presented without the use of jackhammers, with noise levels presented in brackets describe noise scenarios that include jackhammers.
3. Items in **BOLD BLACK** indicate predicted noise impact at this receiver during this work stage is above NML.

The predicted noise levels indicate that exceedances of the noise management levels are expected at all the representative residential receivers during most construction activities. The nearest residential receivers located on Campbell Street, London Road and Woodburn Road are predicted to be most impacted.

Receivers along Elizabeth Street, Lidbury Street, Crawford Street, Berala Street, Burke Avenue and Hyde Park Road are generally predicted to experience lower noise levels and in some cases comply with the noise management levels due to the additional shielding provided by intervening buildings.

Noise levels are predicted to exceed the 'highly affected' noise management level at receivers represented by R2 to R4 (Campbell Street and Burke Avenue) during the use of jackhammers or demolition saws for activities associated with the installation of the new lift, platform upgrades and interchange modifications (construction scenarios 2a to 3a and 4).

The maximum exceedance of the noise management levels is predicted to occur at receiver R4 during the resurfacing of the platform (construction scenario 3a), where the noise management level is exceeded by 17dB, or 26dB if a jackhammer is used.

For non-residential receivers, exceedances of the noise management levels are predicted at C1, C3, H1, H2, H4, W1, Y1 and Y2. The maximum exceedance of the noise management levels is predicted at a commercial property (C1) situated about 20 metres south of the Proposal on Campbell Street.

During construction, it is unlikely that all machinery would be operational at the same time during the particular stage or activity (as assumed by the modelling). However, taking a worst-case scenario approach helps identify where noise impacts are likely to be a concern and assists in the formulation of mitigation measures.

The exceedances shown in Table 14 and Table 15 would be mitigated by implementing the standard noise mitigation measures provided by the *Construction Noise Strategy* (TfNSW, 2012c) where feasible and reasonable (refer to Section 6.3.3). The exceedances would be short-term and temporary, and limited to the duration of the construction period.

Out of hours works

Out of hours works would be required during possessions that typically extend 24-hours a day over a weekend. Approximately six possessions would occur during the construction period as described in Section 3.2.3.

Table 16 lists the modelled construction noise levels for the receiver locations based on construction activities that are likely to occur outside standard construction hours (refer to Section 3.2.3).

Table 16 Predicted construction noise levels – out of hours

ID		NML						
			1a	2a ¹	2b ¹	2c ¹	2d ¹	3b ¹
R1	Evening	51	72	59 (70) ²	61 (72)	60 (72)	63 (72)	54
	Night	47	- ⁴	59 (70)	61 (72)	60 (72)	63 (72)	54
R2	Evening	51	59	66 (77)	68 (78)	67 (78)	69 (78)	60
	Night	47	59	66 (77)	68 (78)	67 (78)	69 (78)	60
R3	Evening	51	57	70 (81)	71 (82)	70 (81)	73 (82)	64
	Night	47	57	70 (81)	71 (82)	70 (81)	73 (82)	64
R4	Evening	51	61	72 (83)	71 (82)	71 (82)	73 (82)	64
	Night	47	61	72 (83)	71 (82)	71 (82)	73 (82)	64
R5	Evening	51	49	55 (60)	56 (61)	55 (61)	58 (62)	50
	Night	47	49	55 (60)	56 (61)	55 (61)	58 (62)	50
R6	Evening	51	69	66 (74)	64 (73)	66 (74)	64 (73)	61
	Night	47	69	66 (74)	64 (73)	66 (74)	64 (73)	61
R7	Evening	51	59	59 (67)	57 (67)	58 (67)	58 (67)	53
	Night	47	59	59 (67)	57 (67)	58 (67)	58 (67)	53
R8	Evening	46	57	59 (67)	58 (68)	59 (68)	59 (68)	53
	Night	40	57	59 (67)	58 (68)	59 (68)	59 (68)	53
R9	Evening	46	60	64 (71)	61 (70)	62 (70)	61 (70)	56
	Night	40	60	64 (71)	61 (70)	62 (70)	61 (70)	56
R10	Evening	46	51	54 (60)	50 (60)	51 (60)	51 (60)	46
	Night	40	51	54 (60)	50 (60)	51 (60)	51 (60)	46
R11	Evening	46	49	50 (58)	54 (64)	53 (64)	56 (64)	46
	Night	40	49	50 (58)	54 (64)	53 (64)	56 (64)	46

ID	NML	NML						
		1a	2a ¹	2b ¹	2c ¹	2d ¹	3b ¹	
R12	Evening	46	58	54 (65)	56 (66)	55 (66)	57 (66)	48
	Night	40	58	54 (65)	56 (66)	55 (66)	57 (66)	48
R13	Evening	46	50	42 (51)	47 (55)	47 (54)	45 (53)	34
	Night	40	50	42 (51)	47 (55)	47 (54)	45 (53)	34
R14	Evening	51	48	47 (52)	47 (53)	46 (53)	49 (53)	40
	Night	47	48	47 (52)	47 (53)	46 (53)	49 (53)	40
C3	Evening/ Night	70	63	66 (73)	69 (81)	68 (80)	72 (81)	62
C4	Evening/ Night	70	47	54 (64)	56 (67)	55 (66)	58 (67)	49
W1	Evening/ Night	55	65	61 (69)	59 (68)	61 (69)	60 (68)	56
W2	Evening/ Night	55	48	44 (54)	49 (60)	48 (60)	52 (61)	42

Notes:

1. The ICNG requires a +5 dB correction to be added to predicted noise levels to account for the annoying characteristics of the jackhammer, grinder or demolition saw used in this scenario.
2. Noise levels are presented without the use of jackhammers, with noise levels presented in brackets describe noise scenarios that include jackhammers.
3. Items in **BOLD BLACK** indicate predicted noise impact at this receiver during this work stage is above NML. **BOLD RED** indicate a 'highly affected' residential receiver with level of 75 dB(A) or greater.
4. Activity unlikely to be undertaken during the night-time period.

The modelling has indicated that there would be exceedances of the out of hours noise management levels at all representative residential receivers. Residential receivers on Campbell Street are likely to be the worst affected during out of hours works.

Exceedances are also predicted at C3 and W1 (Lingyen Mountain Temple Australia), which have the potential to be in use during these periods.

Out of hours works would generally comprise a number of weekends or evening/night time periods over the construction period and are required for safety, constructability and traffic reasons. There is, however, potential for continuous out of hours works to be undertaken for a short period during the temporary station shutdown (if required). If extended out of hours works are required, additional mitigation measures such as respite periods would need to be applied.

Any out of hours works would be assessed in more detail following confirmation of the construction methodology by the Contractor and would be subject to further approval by TfNSW. This would include appropriate community notification and mitigation measures in accordance with TfNSW's *Construction Noise Strategy* (TfNSW, 2012c).

Sleep disturbance

Noise from intermittent peak noise events has the potential to cause sleep disturbance at the nearest residential receivers.

The predicted results indicate that sleep disturbance may be caused by activities in scenarios 2a to 3b (lift and platform works) and 4b (station building works). Sleep disturbance may occur at residential receivers represented by R1 to R4 (nearest receivers on Campbell Street and Burke Avenue), R6 to R9 (Campbell Street, Vivian Street and Woodburn Road) and R12 (Elizabeth Street).

The potential for sleep disturbance would be assessed in more detail following confirmation of the construction methodology by the Contractor and would be subject to additional mitigation measures in accordance with TfNSW's *Construction Noise Strategy* (TfNSW, 2012c).

Construction traffic

As noted in Section 3.2.6 the project would generally result in a small increase in vehicles compared with existing traffic levels on surrounding roads. Therefore, it is considered that the project would not result in any exceedance of the road traffic noise criteria.

Construction vibration

Construction scenarios that involve the use of jackhammers, wacker packers or bored piling rigs have the potential to create vibration which disturbs nearby sensitive receivers.

For jackhammers and bored piling rigs, an indicative safe working distance of two metres would minimise the risk of cosmetic damage for standard structures and disturbance to amenity.

For wacker packers, a safe working distance of 20 metres should satisfy both the human comfort and cosmetic building damage limits.

The Noise and Vibration Impact Assessment concluded that the separation distances from the nearest receivers to the operation of vibration intensive plant would be sufficient to mitigate potential building impacts including cosmetic damage and would not result in exceedances of human comfort criteria at nearby receivers (WSP | Parsons Brinckerhoff, 2016).

Berala Station is listed as a heritage item on the RailCorp section 170 Conservation and Heritage Register. In order to avoid structural impacts to heritage structures, the proposed works would be undertaken in accordance with the safe working distances outlined in Table 17.

Where work is required within the safe working distances of heritage structures, site-specific safe working distances would be established on-site prior to the vibration generating works commencing.

Vibration intensive work would not proceed within the safe working distances unless a permanent vibration monitoring system is installed approximately one metre from the building footprint, to warn operators in real time (e.g. flashing lights, SMS, or alarm system) when vibration levels are approaching the maximum vibration criteria. In addition, building surveys of sensitive structures within the heritage curtilage would be undertaken in order to assess potential for increased susceptibility to building damage from vibration.

Table 17 Recommended vibration levels and safe working distances for heritage items

Plant	Typical PPV (mm/s) ¹	Data source	Indicative safe working distance for heritage items ²
Jack hammer	0.5 at 10 m	<i>Environmental Noise Management Manual RMS 2001</i>	3 m
Bored piling rig	0.5 at 10 m	Calculated based on the CNS safe working distances for cosmetic damage	3 m
Wacker Packer	1 at 10 m	No data available, assumed to be similar to small roller	5 m

Notes

1. *Vibration levels are indicative only and may vary on site and are dependent on individual equipment, mode of operation and ground conditions.*
2. *Indicative distance required to meet the DIN 4150-3 mm/s heritage item limit.*

Operation

Operational activities at Berala Station are not proposed to significantly change and as a result the existing noise and vibration levels are unlikely to change.

Plant expected to be associated with the operation of the Proposal would include one lift, lighting and electrical equipment including security cameras. Mechanical plant required for the operation of the lift would be identified during detailed design and would be selected in order to achieve the acceptable noise levels identified in the *NSW Industrial Noise Policy* (EPA, 2000) and summarised in Table 12. New plant would be free from annoying sound characteristics such as tonality, low frequency, impulsive and intermittent noise.

There would be no vibration impacts associated with the operation of the Proposal.

6.3.3 Mitigation measures

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 *Construction Noise Strategy* (TfNSW, 2012c) and the Noise and Vibration Impact Assessment (WSP | Parsons Brinckerhoff, 2016).

The CNVMP would be the key management document that would prescribe specific mitigation measures to minimise construction noise and vibration. The measures would focus on contractor inductions, the efficient operation of plant and equipment, prescribing safe working distances for vibration intensive equipment and detailing procedures for noise and vibration monitoring, and obtaining TfNSW approval for out of hours works. The CVNP would also detail requirements for managing potential vibration impacts to heritage structures through monitoring and nominating safe working distances.

The CNVMP would also be supported by the Community Liaison Plan to be prepared for the Proposal, which would detail community notification requirements which can range from letter box drops, phone calls to offers of alternative accommodation depending on the level of impact.

Refer to Table 20 in Section 7.2 for a list of proposed mitigation measures.

6.4 Indigenous heritage

This section provides a summary of the Aboriginal Heritage Due Diligence Assessment prepared by Umwelt (2015) for the Proposal in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010).

The assessment included a desktop analysis including review of existing databases, past reports, historical maps and aerial imagery.

6.4.1 Existing environment

The study area forms part of a landscape that was used by the Wangal People for many thousands of years prior to European contact.

An extensive search of the Aboriginal Heritage Information System (AHIMS) database was undertaken by Umwelt on 1 October 2015 for a 500 metre radius from the proposal site.

The desktop search identified no previously registered AHIMS sites within 500 metres of the study area.

The Proposal is located within an area that has been heavily modified. The clear and observable disturbance to the area as a result of previous construction and use of the railway and station platform would have resulted in the removal of or significant disturbance to the natural soil profile.

The proposal site is located approximately 340 metres west of Haslams Creek; a tributary of the Parramatta River which is located approximately five kilometres to the north. No landscape features likely to indicate the presence of Aboriginal objects were identified in the study area. Therefore the proposal site has been assessed as having low Aboriginal archaeological potential (Umwelt, 2015). In accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010), no further Aboriginal heritage investigations are required.

6.4.2 Potential impacts

Construction

Construction of the Proposal would involve earthworks and other ground disturbance activities which have the potential to impact Indigenous sites, if present.

The due diligence assessment determined that there are no known Indigenous sites or areas where Indigenous objects are likely to occur. As such, there is a low risk/low likelihood that the Proposal would result in harm to Indigenous items.

Operation

The Proposal would not result in impacts to Indigenous heritage during operation.

6.4.3 Mitigation measures

If unforeseen Indigenous objects are uncovered during development, work would cease in the vicinity of the find and the TfNSW Project Manager and TfNSW Environment and Planning Manager are to be notified immediately to assist in co-ordinating next steps which are likely to involve consultation with an archaeologist, OEH and the Local Aboriginal Land Council/s. If human remains are found, work would cease, the site secured and the NSW Police and OEH notified.

Refer to Table 20 in Section 7.2 for a list of proposed mitigation measures.

6.5 Non-Indigenous heritage

This section provides an overview of potential impacts on non-Indigenous heritage. The assessment has included:

- a search of the following historic heritage registers on 12 January 2015:
 - National Heritage List
 - Commonwealth Heritage List
 - Register of the National Estate (non-statutory archive)
 - NSW State Heritage Register
 - Auburn LEP
- review of the heritage assessments prepared by Paul Davies Pty Ltd (Paul Davies Pty Ltd, 2015a and 2015b) as part of the concept design
- review of the archaeological desktop review undertaken by Umwelt (Umwelt, 2015) to assess the archaeological potential of the proposal site.

6.5.1 Existing environment

Database results

The desktop search identified no items listed on the Commonwealth, National or State Heritage Register within the study area or immediate surrounds. A number of locally listed heritage items were identified within proximity to the proposal site.

Berala Station, constructed in 1924, is listed on RailCorp's section 170 Heritage and Conservation Register and as an archaeological site on the Auburn LEP. The station is considered to be of local significance.

Heritage listed items within the vicinity of the proposal site are listed in Table 18 and shown in Figure 12.

Table 18 Heritage items/areas in the vicinity of the proposal site

Heritage item	Address	Heritage listing	Reference number	Approximate distance from the proposal site
Berala Railway Station Group	Woodburn Road	Railcorp's s170 Heritage and Conservation Register	4800211 (SHI)	Site is within the curtilage of the s170 listed item
Berala Railway Station - archaeological site	Campbell Street	Auburn LEP	A53	Site is within the curtilage of the site
Brush Box Street Trees	Lidbury Street	Auburn LEP	I24	300 metres west of the proposal site
Berala Public School	Cnr Clarke Street, Harrow Road and Auburn Road	Auburn LEP	I23	320 metres north-west of the Proposal



Figure 12 Heritage listed items within the vicinity of the proposal site

Historical background

Berala Station is situated on the Lidcombe to Regents Park line, originally a tramway service line for the second Potts Hill reservoir. The line was opened in 1912 and was transformed into a general freight and passenger line as residential development extended into the area. In the 1920s it was decided to extend the railway from Regents Park to Cabramatta to relieve the Main West and Main South lines.

Berala Station opened in 11 November 1912, when a single line with minimal earthworks was opened.

In 1924, the Lidcombe to Regents Park rail line was rebuilt with two tracks on an embankment and extended to join the southern line at Cabramatta. At Berala, this required a deviation of the line resulting in a new station being constructed approximately 30 metres south of the original line to replace the old station which was demolished.

Archaeological potential

The proposal site is located within the curtilage of the Berala Railway Station listed on the Auburn LEP 2010 as an archaeological site. The Auburn LEP categorises Berala Railway Station as being of local heritage. However, the section 170 listing for the Berala Railway Station Group states that, based on the surviving documentation and the evidence on site, it is unlikely there would be any potential archaeological remains at Berala Railway Station (OEH, 2009).

The original 1912 station and train line were demolished in 1924. The original 1912 Berala Station was located north of the current station in an area now disturbed by a shopping centre constructed in the 1960s and subsequently replaced in 2006 by the current shopping centre.

The proposal site has, therefore, been assessed as having low historical archaeological potential (Umwelt, 2015).

Berala Railway Station Group

Berala Station is listed on RailCorp's section 170 Heritage and Conservation Register as having local significance. The 1920s station building, ticket office and subway represent the significant reconstruction of the original Lidcombe-Regents Park line and its extension to Cabramatta, replacing the earlier Berala Station. The station building is an example of an extended rafter type of station building, of which there are relatively few on the metropolitan network. The station complex with its elevated platform, clearly visible platform building and street level subway is a recognisable feature in the area (OEH, 2009).

Station elements are described in more detail in the sections below with information sourced from the State heritage inventory listing.

Platform Building (1924)

The platform building is of weatherboard construction with a steep gable roof which incorporates awnings within its pitch. The roof has extended timber rafters that support the spread of the awnings. The roof is made of corrugated steel and has timber bargeboards and fascia. The building has a mix of timber windows. There are large double hung windows with double paned upper and lower sashes, some of which have painted upper sashes and lower sashes fitted with safety glass and some of which have been boarded up. There are smaller fixed glass windows and double hung windows which are fitted with wire enforced glass. The doors used in the building include steel grill gates and flat panelled doors with aluminium kick plates. The building has original weatherboard walls and most of its window and door openings are original although some windows have been partially boarded up and some doors have been replaced with steel grill gates.

The original building included a storage area, a waiting area and toilets. The existing configuration has remained the same. The toilets have been refitted with new bathroom fittings but it is possible that the cubicle partitions and doors are original. The toilets have recently installed plasterboard ceilings and ceramic tiled floors. The waiting room and store have original weatherboard ceilings and timber floorboards. Original cast iron ventilators have been retained in the store. An original internal window in the waiting room has been boarded up.

Ticket Office (c1930s)

The ticket office is located to the east of the main platform building. It is a narrow, single room, weatherboard structure that has been encased with painted, corrugated steel sheets. The north-eastern corner of the building has an aluminium framed glass enclosure. The roof of the ticket office is formed by the canopy over the platform. The structure has double hung timber windows with double paned upper and lower sashes fitted with safety grills, a flat panelled timber door and a new aluminium and glass ticket window.

The original weatherboard walls and ceilings have been painted and the floor is carpeted. The office has original cast iron ventilators. The room has a door that has been blocked up.

Platform (1924)

Platform 1 (Up) and Platform 2 (Down) have in-situ concrete faces and asphalt surfaces and together they form an island platform arrangement. The platforms are raised as compared to the surrounding area and road level.

Canopy (modern)

There is a modern canopy structure extending to the east of the platform building incorporating the roof of the ticket office and the stairs leading up to the platform from the subway.

Pedestrian Subway (1924)

The subway which runs under the elevated tracks and platform connects the station to Woodburn Road in the north and Campbell Street in the south. The subway has brick walls, a brick barrel vault and ceramic tiled stairs leading up to the platform.

Moveable Items

There is a safe in the ticket office.

Statement of significance

The statement of significance of the station is provided in Table 19.

Table 19 Berala Railway Station statement of significance (OEH, 2009)

SHR Criteria	Statement
Historical significance	Berala Railway Station is historically significant at a local level as the existing station with its 1920s station building, ticket office and subway represents the significant reconstruction of the original Lidcombe-Regents Park line and its extension to Cabramatta replacing the earlier Berala Station to the south.
Aesthetic significance	The station complex with its elevated platform, visible platform buildings and street level subway is a recognisable feature in the area. Berala Railway Station has local aesthetic significance as an example of a 1920s extended rafter railway station building with its steep gable roof and extended rafter awnings.

SHR Criteria	Statement
Social significance	The place has the potential to contribute to the local community's sense of place, and can provide a connection to the local community's past.
Rarity	The extended rafter platform building at Berala Railway Station is one of few buildings of this type in the Metropolitan network. Other examples are at Bullaburra, Cardiff, East Richmond and Hornsby.
Representativeness	The station building is representative of the style of railway station building which is characterised by extended rafters.
Integrity/Intactness	<p>Berala Railway Station has a moderate degree of integrity as the platform building is relatively intact. However the altered ticket office and the new canopy affect the integrity of the station.</p> <p>Platform Building</p> <p>The building is largely intact externally although its interiors have been modified. Some of the original elements retained include cubicle partitions and doors in the toilets, weatherboard ceilings and timber floorboards in the waiting room and store, and cast iron ventilators in the store.</p> <p>Ticket Office</p> <p>The ticket office has been considerably altered externally. However internally a number of original elements have been retained including weatherboard walls and ceilings and cast iron ventilators.</p> <p>Platforms</p> <p>Platforms 1 and 2 are original platforms.</p> <p>Canopies</p> <p>The canopies are new constructions.</p> <p>Pedestrian Subway</p> <p>The subway has been retained in its original configuration.</p>

Site observations

The following site observations were made by the heritage consultant in November 2015 (Paul Davies, 2015):

- The platform building remains roughly intact with external timber cladding, internal linings and most joinery. A number of changes have been made to the building including the installation of sheeting over the doors for security; addition of screens to windows; addition of steel grilles and metal linings to the waiting room that are not sympathetic to heritage values; toilets have been refitted; some windows are blocked; inappropriate external lighting has been installed; conduits and miscellaneous equipment have been added to the building; the roof has been reclad.
- The ticket office is highly modified externally and is considered to be of low heritage significance. The roof of the ticket office installed with the modern canopy has removed much of the context, visual and relational understanding of the building. The installation of the ticket vending machines and other structures adjacent to the building have further altered the station entry and role of the building. The interior linings of the building are considered to be of minor heritage significance, are not considered to be rare, do not demonstrate significant heritage values and are within a structure that is externally compromised in its form, use of materials and location. The building also serves no future use in

relation to the station operation and its location compromises safe and easy access to and from the stairs.

- The subway is of brick construction and is largely original with two arched openings and an arched roof form. The brick has been painted in a colour that is not sympathetic to heritage values.
- The stair form is original however the treads are not. There are four brick pillars at the top of the stairs that are not painted. The handrail at the top is original with mesh fitted for security. The stair outlet onto the platform is roofed by a modern platform canopy and an area on the platform close to the top of the stairs and adjacent to the ticket office is enclosed with glazing.

6.5.2 Potential impacts

Construction

Archaeological heritage

There is no known potential archaeological resource in the proposal site which is outside any known earlier development other than the establishment of the existing suburb and construction of the railway line and station.

The proposed works are located within the existing platform area and are unlikely to impact on any potential archaeological evidence of the original 1912 platform, which is recorded as being approximately 30 metres to the north of the current station platform. Despite the LEP archaeological heritage listing, the archaeological desktop assessment (Umwelt, 2015) concluded that there is a low risk of encountering archaeological items/deposits in the proposal site and that construction is unlikely to expose historical archaeological relics.

Berala Railway Station Group

The objectives of the Proposal are to improve accessibility and the amenity at Berala Station through a range of upgrade works; some of which have the potential to directly impact existing heritage elements of the station.

As described in Section 3.1, the Proposal would involve the removal of the existing extensively altered circa 1930s ticket office and the relocation of the public telephone and ticket vending machine located near the platform entry point from the stairwell. The ticket office is considered to be of low heritage significance due to its heavily altered condition including loss of its original roof and external cladding (Paul Davies, 2015).

The demolition of the ticket office is required to improve pedestrian circulation to the platform from the stairs. The removal of the ticket office would also improve visibility on the platform for customers and would provide more sheltered waiting areas on the station platform. The demolition of the building is considered to be justified as the building has been assessed as having low heritage significance and its removal would result in a number of improvements to customers. The removal of the ticket office would result in a very minimal impact on the overall heritage values of the station. Archival recording of the ticket office building would be undertaken prior to its demolition.

The proposed modifications to the platform building are described in Section 3.1.1. The impacts on the platform building would be largely contained to the interior of the building, but would involve painting the building exterior with finishes being sympathetic to existing heritage elements. The proposed internal refurbishment of the 1924 platform building would primarily involve modifications to the room layout, finishes and fit out to provide accessible customer (and staff) areas and facilities including:

- accessible toilets (family and staff toilets)

- refurbishment of existing customer toilet facilities
- segregation of former waiting room to a family accessible toilet and storage room
- refurbishment of the eastern most room to include an office and amenities for staff
- installation of required services.

The proposed refurbishment would reactivate the use of the building and ensure its ongoing maintenance.

The details regarding the internal modifications to the platform building (such as the extent of impact on the internal walls, final materials and finishes) would be subject to further consideration and heritage assessment during detailed design with the intent of minimising impacts to heritage fabric as far as practicable.

The Proposal would include the introduction of new elements into the visual environment including the lift and extended canopy which would be visible from the station platform and from adjacent receivers on Campbell Street. A visual impact assessment has been undertaken (refer to Section 6.2) and has concluded that the Proposal would result in a minor visual impact.

Other minor modifications to the platform include the relocation of ticket vending machines, seating, provision of tactile indicators along the platform edges etc. The proposed platform works would have a negligible heritage impact given the works do not involve major modifications.

Moveable heritage

Moveable items such as the safe in the ticket office and waiting benches in the platform building may be impacted by the Proposal. Further assessment of moveable heritage would be undertaken during detailed design and would consider the retention of moveable items in situ, and if not feasible then options to relocate, store or archive these items would be investigated.

Indirect impacts

Indirect impacts on heritage listed buildings and structures within the vicinity of construction works such as vibration impacts could occur during vibration intensive activities. Such impacts would be mitigated with the implementation of mitigation measures provided in Table 20, Section 7.2. Vibration impacts and safe working distances are discussed further in Section 6.3.

Overall, the Proposal is considered to result in a minor impact on the heritage significance of Berala Railway Station (Paul Davies, 2015). The implementation of design guidelines and mitigation measures described in Section 6.3.3 would help ensure that the heritage value of the station is maintained. In addition, a heritage architect would be engaged to assist in the development of the detailed design to minimise impacts on the heritage values of the station.

Operation

The operation of the Proposal does not present any risks to non-Indigenous heritage.

6.5.3 Mitigation measures

Detailed design

The detailed design and construction of the Proposal would be undertaken with consideration to the heritage values of the station.

In order to minimise impacts on the heritage fabric of the station, the following mitigation measures would be implemented during detail design:

- The Contractor would be required to engage a heritage architect and give due consideration to the design of the external elements such as the lift and extended canopy, along with the internal proposed alterations to the platform building.
- A heritage architect who is independent of the Contractor's personnel would be engaged by TfNSW to provide input to and ensure the design is sympathetic to the heritage values of the station. The independent heritage architect would also prepare a detailed heritage assessment for works that would affect the fabric of the existing station.
- Heritage recommendations provided by Paul Davies (2015) and Sydney Trains Heritage are to be considered during detailed design.
- The internal fit out of the platform building must retain or enhance existing features and original fabric of the building is to be retained where possible along with designing new elements in sympathetic colours, finishes and styles.
- The final design would need to be approved by TfNSW, in consultation with Sydney Trains. Sydney Trains would also be provided a copy of the relevant design and heritage documentation and notified of the construction commencement date so to allow for notification to the Heritage Division and update the section 170 heritage listing, if required.
- As Berala Station is also listed on the Auburn LEP as an archaeological site, Auburn City Council will be notified of the Proposal.
- A program of archival recording would be undertaken prior to the complete demolition of the ticket office, any demolition of existing walls associated with the platform building and prior to the relocation (if required) of moveable heritage items. This recording would include photographic records of the original context, layout, building materials and methods used during their construction. The recording would be undertaken in accordance with the guideline *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office, 1998).
- A register of moveable heritage objects within Berala Station would be prepared and further heritage assessment would be undertaken to consider the retention of moveable items (such as waiting room benches and the ticket office safe) in situ, and if not feasible then options to relocate, store or archive these items would be investigated. A copy of the record is to be provided to the Local History Collection at Auburn City Council Library and a copy is to be held by Transport for NSW.

Construction

Potential impacts to non-Indigenous heritage during construction would be managed through the implementation of the CEMP prepared by the Contractor that would map and protect nearby non-Indigenous heritage items and prescribe management measures to ensure these items are not affected.

If archaeological deposits are uncovered during development, work would cease in the vicinity of the find and the TfNSW Project Manager and TfNSW Environment and Planning Manager are to be notified immediately to assist in co-ordinating next steps which are likely to involve consultation with an archaeologist and OEH. Further archaeological work and/or consents would be obtained for archaeological deposits prior to works recommencing at the location, where required.

If excavations are required within the proposed compound locations, further archaeological assessment would be required to be undertaken.

Refer to Table 20 in Section 7.2 for a list of proposed mitigation measures.

6.6 Socio-economic impacts

6.6.1 Existing environment

Land use adjacent to Berala Station comprises commercial and residential uses. The area to the north of the station is characterised by commercial uses including the Berala town centre and medium to high density residential dwellings. The area to the south of the station includes a small commercial area to the immediate south of the station and medium to low density residential dwellings to the south-east and south-west of the station.

The Berala town centre with various small scale retail, business and community services is located to the north of the proposal site.

The closest residential properties are immediately adjacent to the proposal site on Campbell Street (within 20 metres).

Educational and religious facilities in the broader area include:

- St James Anglican Church which is situated approximately 170 metres north-west of the proposal site
- Berala Public School which is situated approximately 420 metres north-west of the proposal site
- Lingyen Mountain Temple Australia which is situated approximately 150 metres east of the proposal site.

A memorial garden and plaque is situated on the southern side of the station (west of the Campbell Street station entrance).

6.6.2 Potential impacts

Construction

The construction of the Proposal has the potential to temporarily impact customers, pedestrians, residents, motorists, businesses and other receivers as a result of:

- temporary loss of parking on nearby streets
- an increase in truck movements delivering site materials, plant and equipment
- construction noise, dust and visual impacts.

Access for emergency services would be maintained at all times and it is not anticipated that access to residential properties would be significantly affected during construction of the Proposal.

Impacts to the memorial and garden on the southern side of the station have been minimised as far as practicable. However, a number of the lilies planted around the existing memorial plaque may be impacted during the construction of the sheltered bike rack. Potential impacts to the garden would be subject to further consideration during detailed design in consultation with Sydney Trains and Council.

As discussed in Section 3.1, construction works may necessitate the temporary shutdown of Berala Station for a period of approximately four weeks. Replacement rail buses would provide regular services between Berala, Regents Park and Lidcombe during this period.

The potential temporary shutdown would result in a short-term inconvenience to customers at Berala Station. However, the shutdown, if required, would result in an overall reduction in the construction program (by approximately six months) which would minimise construction related impacts on the local community.

The details of the shutdown, if required, would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities and the local community.

Refer to sections 6.1, 6.2 and 6.3 for discussion on the potential traffic, access, visual and noise impacts arising from construction of the Proposal and the proposed management strategies.

Operation

Overall, the Proposal would provide positive socio-economic benefits to Berala and the Auburn City LGA, including:

- improved accessibility for customers at Berala Station providing an accessible route to station platforms through the provision of a lift
- improved customer amenity and facilities at the station including a family accessible toilet and wayfinding signage
- improved transport interchange facilities including new formalised kiss and ride areas and additional bicycle facilities on the southern side of the station
- potential increased use of public transport to and from Berala
- additional lighting and CCTV would provide positive CPTED outcomes for the area.

6.6.3 Mitigation measures

A number of environmental safeguards would be implemented to minimise potential impacts on the community with a particular focus on keeping the community informed and including the following:

- sustainability criteria for the Proposal would be established to encourage construction personnel to purchase goods and services locally helping to ensure the local community benefits from the construction of the Proposal
- a Community Liaison Plan (to be developed by the Contractor prior to construction) would identify all potential stakeholders and the best-practice methods for consultation with these groups during construction. The Plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where possible
- the community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan
- 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
- the details of the station shutdown, if required, would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities and the local community.

Refer to Table 20 in Section 7.2 for a list of mitigation measures.

6.7 Biodiversity

This section provides a summary of the Ecological Impact Assessment prepared by Jacobs (2016) which included a desktop assessment, literature review and site inspection of the study area.

6.7.1 Existing environment

Threatened species and communities

The results of the database searches identified the following threatened biota previously recorded or predicted to occur in the locality of the Proposal (up to five kilometre radius):

- 24 threatened flora species and two endangered plant populations listed under the TSC Act/EPBC Act
- 53 threatened fauna species and one endangered population listed under the TSC Act, FM Act and/or EPBC Act
- 37 migratory species listed under the EPBC Act.

No threatened flora, fauna or migratory species were identified during the survey. The study area does not contain any native remnant vegetation communities; threatened or endangered ecological communities. While fauna habitats are generally considered to be of poor quality, the desktop review identified that the Grey-headed Flying-fox (*Pteropus poliocephalus*) was considered to have a moderate likelihood to occur in the study area with the presence of suitable foraging habitat. Further assessment for this species has been considered in Section 6.7.2.

Flora

The study area is situated within a highly modified urban environment. Vegetation is dominated by landscape plantings and opportunistic vegetation that have established in the disturbed areas within and adjacent to the rail corridor. No native remnant vegetation communities are present in the study area or immediate surrounds. No threatened ecological communities occur within or immediately surrounding the study area. The locality has been historically and comprehensively cleared of native vegetation with the closest native vegetation community being located approximately 1.4 kilometres to the west along the Duck River.

The plantings are a mixture of species commonly planted as street trees and landscape plantings in the Sydney region including *Lophostemon confertus* (Brush Box), *Platanus X acerifolia* (London Plane Tree), *Fraxinus sp.* (Ash), *Jacaranda mimosifolia* (Jacaranda), *Cinnamomum camphora* (Camphor laurel), *Melaleuca styphelioides* (Prickly-leaved Tea Tree), and *Callistemon sp.* (Bottle Brush). Other trees including palms (likely to be *Archontophoenix alexandrae* (Alexandra palm), *Morus sp.* (Mulberry), *Caesalpinia sp.*, and a *Paulownia sp.* are also present.

The understorey vegetation is exotic with herbaceous and grass weeds growing amongst the ballast on the rail line, down the corridor slope and to the drainage channel adjacent to Campbell Street. The ground layer is dominated by *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Bidens pilosa* (Cobbler's Pegs), *Digitaria sp.* (Summer Grass), *Foeniculum vulgare* (Fennel), *Cyclosporum leptophyllum* (Slender Celery), *Cirsium vulgare* (Spear Thistle), *Hypochaeris radicata* (Cat's Ear) and *Conyza bonariensis* (Flea Bane).

Cestrum parqui (Green Cestrum), a regionally controlled noxious weed (Class 3) declared in the Auburn City LGA, was also identified in the rail corridor.

A total of 42 trees were recorded in the study area during the field survey. These trees range from very large mature *Cinnamomum camphora* (Camphor laurel) trees to smaller shrubs (i.e.

Callistemon) and trees re-sprouting from previous trimming works within the rail corridor (i.e. *Morus* sp.). The most significant trees were located in the north-east of the study area in a potential compound location (Compound 2). The *Lophostemon confertus* (Brush Box) trees in the south-west of the study area and the *Jacaranda mimosifolia* (Jacaranda) trees adjacent to the platform also contribute significantly to the streetscape and visual amenity of the area.

The location of each tree within the survey area is outlined in Figure 13.

An assessment of each tree including suggested Tree Protection Zones according to the *AS 4970-2009 for the Protection of Trees on Development Sites* is provided in Appendix C of the Ecological Impact Assessment (Jacobs, 2016).

Fauna habitat

Fauna habitat within the study area is generally of low quality and lacks important features such as hollow bearing trees, dense litter layer, and abundant woody debris. The vegetation in the study area does not provide any significant habitat for fauna but may provide limited foraging opportunities for urban adapted birds (such as the Australian Magpie and Magpie Lark). The *Lophostemon confertus* (Brush Box) trees and the palms may provide some limited foraging habitat for the threatened Grey-headed Flying-fox (*Pteropus poliocephalus*) but the contribution of these trees to the regional foraging resource would be very small.



Legend

- Study area
- Area of work
- Tree canopy

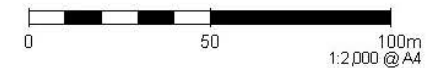


Figure 13 Location of trees within study area (Jacobs, 2016)

6.7.2 Potential impacts

Construction

Direct impacts

Direct biodiversity impacts of the Proposal are predicted to be minimal due to the disturbed nature of vegetation in the study area and the nature of the construction methods. Vegetation and habitat clearing would be minimal and no impacts to remnant native vegetation or high quality fauna habitat are predicted. Direct trauma to native fauna is expected to be minimal as no high quality habitats would be removed.

The final construction compound would be selected to minimise impacts to vegetation. Vegetation trimming may be required for the placement of equipment and/or the establishment of the temporary compound (refer to Figure 13).

If the proposed bicycle rack Option 1 on Campbell Street is selected, the removal of one *Paulownia sp.* (Paulownia tree) which has a DBH of 0.2 metres (refer to Figure 13, Tree 19) would be required. Lilies in this location that currently surround the existing memorial may also need to be removed and replaced with landscape plantings. Removal of this vegetation would not have any detrimental ecological impacts.

The extent of vegetation trimming and removal would be determined during detailed design and construction planning stages and would be minimised as far as practicable. Any trees that are found to require removal would be subject to further assessment, offsetting and approval from TfNSW.

Indirect impacts

Noise, dust, light and contaminant pollution during construction is predicted to be minimal. The mitigation measures outlined in Table 20 would ensure that these indirect impacts would be minimised.

Proliferation of weed species may occur as a result of the works. Without appropriate management strategies, construction activities have the potential to disperse weeds including species listed as noxious under the *Noxious Weeds Act 1993*. Construction activities also have the potential to import new weed species into the study area.

The most likely causes of weed dispersal and importation associated with the works include earthworks, movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. There is also the chance of the introduction and spread of *Phytophthora cinnamomi* (Root Rot) from machinery which could detrimentally affect the vegetation along the rail corridor. The mitigation measures outlined in Section 6.7.3 and Table 20 would ensure that weed and pathogen importation and spread is minimised.

Threatened species and communities

Assessments of significance were undertaken for the Grey-headed Flying-fox in accordance with section 5A of the EP&A Act (seven part test) and the significant impact criteria for EPBC Act matters of NES (DotE, 2013).

The assessments concluded that the Proposal is unlikely to result in a significant impact to the species. While minor vegetation removal would be required, the proposed works would not result in the removal of any high quality habitat or breeding habitat for the species. The Grey-headed Flying-fox would be able to persist in the study area after the works have been completed. The habitat would remain in a similar state after the proposed works have been completed.

Operation

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

6.7.3 Mitigation measures

Tree Protection Zones (TPZ) would be established prior to construction commencing as per the recommendations in the Ecological Impact Assessment (Jacobs, 2016) to protect trees to be retained during construction. An arborist would inspect trees at the completion of excavation works, and again at the completion of all works to ascertain the percentage loss of structural root zone of trees in close proximity to the works and advise on the health of tree and any remedial actions required.

TfNSW has prepared a *Vegetation Offset Guide* (TfNSW, 2013d) to provide a framework for a consistent approach to offset impacts to vegetation on applicable TfNSW projects and allows for appropriate offsets to be applied for one tree or a group of trees that do not form part of a vegetation community, regardless of whether they are native or not.

Any trees that are found to require removal during construction would be subject to further assessment, offsetting and approval from TfNSW.

The CEMP would be developed in accordance with the recommendations of the Ecological Impact Assessment (Jacobs, 2016) and would include a range of other weed control measures, tree protection, and erosion and sedimentation control measures.

Refer to Table 20 in Section 7.2 for a list of mitigation measures.

6.8 Contamination, landform, geology and soils

Geotechnical and contamination investigations were undertaken as part of the development of the concept design (Cardno, 2015c, 2015d and 2015e). The findings of these investigations are summarised in this section.

6.8.1 Existing environment

Geology and soils

Berala Station is situated on a high embankment with a difference of approximately 4.5 metres between street level (Campbell Street) and the platform level.

The *Sydney 1:100 000 Geological Series Map* (Herbert, 1983) indicates that the geology of the proposal site is comprised of shale, carbonaceous claystone, laminate, fine to medium-grained lithic sandstone, rare coal from the Wianamatta Group.

The geotechnical investigations indicated fill comprising asphalt or concrete underlain by gravelly sand was encountered at varying depths. Along the platform, directly above the underpass, fill was encountered to a depth of one metre. Naturally occurring soil and rock material encountered on site generally comprised of residual clayey sand/sandy clay, to varying depths between 0.80 metres and 4.80 metres overlying shale/siltstone rock. Rock encountered on site generally comprised of shale, with laminated Siltstone, at a depth of 5.60 metres and 8.36 metres respectively.

Acid sulphate soils

A review of the Australian Soil Resource Information System (ASRIS) National Acid Sulphate Soil database indicated that there is an extremely low potential for acid sulphate soils to occur within the study area.

Salinity

The Western Sydney Salinity Map (Department of Infrastructure, Planning and Natural Resources, 2002) indicates that there is a moderate salinity potential within the study area.

Contamination

A review of the NSW EPA's Contaminated Land Record and the PoEO public register identifies that the proposal site is not listed as a contaminated site, nor has the site been subject to regulation under the *Contaminated Land Management Act 1997*.

The preliminary contamination assessment did not identify any asbestos fibres (or asbestos containing materials) or exceedances for the commercial/industrial land-use in any of the samples analysed. The preliminary waste classification indicated that spoil would meet the requirements of general solid waste (Cardno, 2015c).

As the proposal site is located primarily within the rail corridor it may be subject to localised contamination as a result of the construction and operation of the rail line.

Asbestos and hazardous materials

No asbestos was detected during the soil contamination assessment undertaken by Cardno (2015e). However, asbestos containing materials and lead paint have been recorded within the station buildings including the ticket office.

6.8.2 Potential impacts

Construction

The Proposal would require excavation work for the installation for the foundations and footings for the lift shaft pit and canopy. Other trenching or excavation may be required for footpath and road works, relocation of services, drainage works and tree removal. There would also be earthworks required to adjust existing levels.

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 moderate due to the site terrain and proximity to the open stormwater channel. However, it is expected that erosion risks could be adequately managed through the implementation of standard measures as outlined in the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004).

Contamination

Excavation has the potential to expose contaminants, which if not appropriately managed, can present a health risk to construction workers and the community. Contaminants would 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.

The proposed demolition of the ticket office has the potential to disturb asbestos containing materials and other hazardous substances such as lead paint. Appropriate mitigation measures would be implemented to manage hazardous substances during the demolition of the ticket office (refer to Table 20). This would include the removal of all hazardous materials from the building by appropriately licensed asbestos/hazardous waste removalists and the provision of a clearance certificate (by an appropriately qualified hygienist) prior to the demolition of the building. The management of asbestos and hazardous waste is discussed further in Section 6.11.

Operation

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

6.8.3 Mitigation measures

As part of the CEMP, a site-specific Erosion and Sediment Controls Plan/s would be prepared and implemented in accordance with the 'Blue Book' - *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004). The Erosion and Sediment Control Plan would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.

An environmental risk assessment is to be undertaken prior to construction and must include a section on contamination as per the TfNSW Standard Requirements. Measures to mitigate potential impacts from any contaminated soil/materials during construction would be developed and implemented through an unexpected contamination finds procedure and Waste Management Plan as part of the CEMP. All waste would be managed in accordance with relevant legislation.

Refer to Table 20 in Section 7.2 for a list of mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The proposal site is located within the Haslams Creek catchment and is about 300 metres south-west of Haslams Creek which flows north-east and discharges into the Parramatta River. The station is elevated with a ground level pedestrian underpass which connects Campbell Street to Woodburn Road.

An open stormwater channel (owned by Sydney Water) runs parallel to the rail corridor on Campbell Street and within the proposal site.

The quality of surface water runoff in the vicinity of the proposal site would be impacted by the existing land uses, including the operation of local roads and the rail corridor.

Groundwater

A search of the Department of Primary Industries - Office of Water Groundwater Map identified no groundwater monitoring bores within 500 metres of the proposal site.

Groundwater was not encountered during the geotechnical investigation which included boreholes to a maximum depth of 8.35 metres (Cardno, 2015e). However, groundwater levels may change over time due to seasonal or other influences such as high rainfall events (Cardno, 2015e).

Flooding

The Haslams Creek system is comprised of a number of main tributaries. The Berala Station branch and railway culverts sub-branch are concrete channel tributaries of Haslams Creek and are located immediately south of the station within the railway corridor.

Based on flood extent mapping in the *Haslams Creek Floodplain Risk Management Study* (Bewshar Consulting, 2003), the area surrounding the station is affected by the 100 year average recurrence interval (ARI) and probable maximum flood (PMF) events. It should be noted that the Floodplain Risk Management Study indicates that due to the limitations of the survey information the flood extent lines are indicative only and the maps should not be relied upon as the sole basis for determining whether a particular location is susceptible to flooding.

The topography around the station drops north-east towards Haslams Creek. Based on the preliminary assessment, the site may be susceptible to flooding by overland runoff generated from the west of the station (Cardno, 2015a).

The ground levels at the Campbell Street station entrance are between 21.24 metres and 21.30 metres Australian Height Datum (AHD). The access path gently slopes down to a low point of 20.92 metres AHD below the station platform and gradually increases up to 21.5 metres AHD near the entrance to the shopping centre and to 22 metres AHD at Woodburn Road. Drainage pits and pipes are provided within the underpass.

The station platform is located above 25.0 metres AHD and would not be impacted by flooding. Access to the station from Campbell Street to the shopping centre entrance is located below the 5 year ARI water level of 21.5 metres AHD (Cardno, 2015a).

6.9.2 Potential impacts

Construction

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains and flow into nearby waterways.

Activities which would disturb soil during construction work have the potential to impact upon local water quality as a result of erosion and run off sedimentation.

Direct impacts to the open stormwater channel may occur for the construction of the bicycle rack and for the establishment of temporary access to Compound 2, if this location is selected. Appropriate controls would be detailed in the CEMP and established to ensure the waterway is adequately protected during construction activities.

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.

Operation

The Proposal is unlikely to impact upon the hydrology of the proposal site or the surrounding area. The detailed design would take stormwater management into consideration and while the new design does require some drainage modifications, such works would be designed and undertaken in accordance with the relevant standards and requirements.

Although the Proposal is unlikely to result in changes to drainage patterns, the underpass which provides access to the station from Campbell Street and Woodburn Avenue is located within an area susceptible to flooding in the 1 in 5 ARI and would be impacted by the 5 year ARI and larger events. The proposed infrastructure within the underpass including the new lift would be designed such that they are not impacted by, and are appropriately protected from flooding. This would include measures such as:

- the installation of a sensor system to detect water entering the lift shaft and prompt the lift to automatically return to the platform level
- the installation of a pump in the base of the lift pit to remove any water that enters the lift shaft.

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

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
- adequate measures are to be provided to reduce flood risks and appropriate measures are to be provided to ensure safe access is maintained
- flood mitigation measures and a maintenance strategy would be developed for the lift
- 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.

The potential impacts on the stormwater channel would be considered during detailed design and construction planning in consultation with Sydney Water. Appropriate mitigation measures would be established to ensure the structural integrity of the channel is not impacted.

As noted in Section 6.8.3, an Erosion and Sediment Control Plan would be prepared and implemented for the Proposal to manage risks to water quality. This would include specific controls to protect the open stormwater channel within the proposal site. Other mitigation measures that would be required for construction include regular vehicle and equipment maintenance along with spill kits and spill response procedures. Any dewatering would be undertaken in accordance with TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2015a).

Refer to Table 20 in Section 7.2 for a list of mitigation measures.

6.10 Air quality

6.10.1 Existing environment

Based on the existing land uses surrounding the proposal site, the existing air quality is considered to be characteristic of an urban environment. Sensitive receivers in the vicinity of the Proposal include staff and customers at Berala Station and residential and commercial properties around the station.

A search of the National Pollutant Inventory undertaken on 14 January 2016 for the 2013 to 2014 reporting period identified 36 air polluting substances from 10 sources in the Auburn LGA. The closest source was identified at 323 Chisholm Road, Auburn about 1.5 kilometres west of the proposal site.

Other contributors to air quality within the study area would include emissions from motor vehicles on the surrounding road network, and the diesel trains on the adjoining rail corridor.

6.10.2 Potential impacts

Construction

The main air quality impacts that have the potential to occur during construction would be temporary impacts associated with dust particles and emissions of carbon monoxide, sulphur dioxide, particulate matter (PM₁₀), nitrous oxides, volatile organic compounds, and polycyclic aromatic hydrocarbons associated with the combustion of diesel fuel and petrol from construction plant and equipment.

Anticipated sources of dust and dust-generating activities include:

- excavation for the foundations and footings of the lift shaft pits and canopy
- other trenching or excavation for road works, relocation of services, drainage works and tree removal
- demolition of the ticket office including potential for lead dust and asbestos dust
- stockpiling activities
- loading and transfer of material from trucks
- other general construction activities.

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 implementation of standard air quality management controls (listed in Table 20) would minimise the potential for air quality impacts.

Operation

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. Also, as the Proposal would increase access to public transport, the use of public transport would be anticipated to increase and subsequently aim to reduce the amount of private vehicle related emissions in the long-term.

6.10.3 Mitigation measures

Table 20 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/mud on vehicles. Such measures would be included in the CEMP to be prepared for the Proposal.

A Demolition Management Plan would also be prepared as part of the CEMP and would include mitigation measures to manage and monitor dust emissions (including lead and asbestos dust).

6.11 Waste

6.11.1 Construction waste

Construction of the Proposal would generate the following waste:

- surplus building materials
- asphalt and concrete
- earthworks spoil
- various building material wastes (including metals, timbers, plastics, concrete, carpeting etc.)
- demolition waste from the ticket office including asbestos and hazardous waste (such as lead painted timber) which may pose a health risk to construction crew if not managed appropriately
- general waste, including food and other wastes generated by construction workers.

6.11.2 Operational waste

The Proposal would not result in changes to operational waste.

6.11.3 Mitigation measures

Careful planning of construction activities would ensure that the volume of surplus materials is minimised.

A Demolition Management Plan would be prepared as part of the CEMP for the demolition of the ticket office. The plan would include procedures for the removal, handling, storage and disposal of hazardous materials and asbestos.

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. This is to include measures to manage asbestos and lead waste.

The application of the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) would also result in waste management targets to be developed for the Proposal and would include reuse and recycling.

The handling, storage, transport and disposal of all asbestos and hazardous waste (including lead waste) will be in accordance with the requirements of PoEO Act, WARR Act and relevant guidelines.

Refer to Table 20 in Section 7.2 for a list of mitigation measures.

6.12 Cumulative impacts

6.12.1 Existing or potential projects

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.

This section describes the cumulative impacts and benefits likely to arise from the combination of the construction and operation of the proposal with other projects being carried out in the area.

A search of the major projects register maintained by the Department of Planning and Infrastructure identified no major development proposals in the vicinity of the proposal site in the last five years.

A search of the Auburn City Council's Development Application Registers identified five residential developments (medium density) within one kilometre of the station. All of which are situated to the north of the station.

Other developments likely to occur within the locality would be small scale projects such as the construction of residential dwellings in adjacent residential areas.

The *Berala Village Draft Public Domain Plan*, developed by Auburn City Council in March 2015 presents potential future improvements to pedestrian comfort and safety with the addition of traffic calming, improved streetscapes and additional pedestrian infrastructure. The works include:

- raised pedestrian threshold and reduced crossing width across Burke Avenue, at Campbell Street
- widened footpaths, new tree plantings and seating area
- reduced road width for the existing raised pedestrian crossing on Campbell Street
- raised threshold at Crawford Street and Woodburn Street intersection
- four new bike racks on Woodburn Road.

Preliminary consultation with Council has indicated that works on Woodburn Road are likely to be completed by the end of 2016.

6.12.2 Potential impacts

Potential cumulative impacts may occur as a result of construction activities occurring simultaneously with the projects listed above. Potential impacts would include:

- increased traffic travelling through the study area and the surrounding road network and associated delays for road users
- construction noise and vibration
- reduced visual amenity.

Cumulative impacts would be minimised and managed through the application of environmental safeguards and management measures as summarised in Table 20.

Developments proposed within proximity to the proposal site would also increase construction vehicles on local roads and construction noise. The construction period for local developments is unknown.

6.12.3 Mitigation measures

Consultation with relevant stakeholders would be undertaken during construction planning, where required, to ensure that potential cumulative impacts are minimised. Any additional mitigation measures from consultation would be included in the construction TMP and CNVMP for the management of traffic and noise during construction.

During construction, the works would be co-ordinated with any other construction activities in the area as required. Consultation and liaison would occur with Auburn City Council, Sydney Trains, and any other developers identified to minimise cumulative construction impacts such as traffic and noise as far as practicable.

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.

Refer to Table 20 in Section 7.2 for a list of mitigation measures.

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 footprinting 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 20.

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 Berala. 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 local area.

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.

As discussed in Section 6.9, the proposal site is located on flood prone land. 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. Such changes in weather in the region are unlikely to impact on the operation of the Proposal (for more information on flooding refer to Section 6.9).

Climate change could lead to an increase in the frequency and severity of bushfires. No bushfire maps were available for the area at the time of this assessment; however, the Proposal would be designed with appropriate fire protection measures.

Climate change impacts would be considered during detailed design and a detailed hydrological assessment would be undertaken to ensure that the proposed infrastructure would not be impacted by flooding.

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) and the TfNSW *Environmental Management System (EMS)*. These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.1.4 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 increasing 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 include at a minimum the following management plans:

- Construction Traffic Management Plan
- Construction Noise and Vibration Management Plan
- Erosion and Sediment Control Plan
- Demolition Management Plan
- Waste Management Plan (including Asbestos and Hazardous Waste Management procedures).

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 any conditions of approval.

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 20. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 20 Proposed mitigation measures

No.	Mitigation measure
General	
1.	A Construction Environmental Management Plan (CEMP) would be prepared by the 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 Contractor prior to the commencement of construction and documented as part of the CEMP.

No.	Mitigation measure
3.	An Environmental Controls Map (ECM) would be developed by the Contractor in accordance with TfNSW's <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.
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.

Traffic and site access

8. 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:
- procedures for preparing and implementing Traffic Control Plans particularly for detours and traffic control to manage temporary road disruptions on Campbell Street and Woodburn Road
 - 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
 - maximising safety and accessibility for pedestrians and cyclists
 - ensuring adequate sight lines to allow for safe entry and exit from the site
 - ensuring access to railway stations, businesses, entertainment premises and residential properties is maintained (unless affected property owners have been consulted and appropriate alternative arrangements made)
 - managing impacts and changes to on and off street parking and requirements for any temporary replacement provision
 - parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
 - details of routes to be used by heavy construction-related vehicles, access to site compound(s) locations and loading zones to minimise impacts on sensitive land uses and businesses
 - 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
 - measures to manage traffic flows around the area affected by the Proposal including:
 - the scheduling of works/deliveries to avoid peak times and limiting works in road carriageways as much as practicable
 - regulatory and direction signposting as required, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP.
- 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.

No.	Mitigation measure
9.	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.
10.	Road Occupancy Licences for temporary road closures would be obtained, where required.
11.	The details of the temporary station shutdown, if undertaken would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities and the local community.
12.	If the station shutdown is undertaken, a shuttle bus management plan would be prepared as part of the TMP and endorsed by TfNSW. The plan would include details of replacement rail buses between Berala, Regents Park and Lidcombe stations.
Urban design, landscape and visual amenity	
13.	<p>The detailed design of the Proposal would be undertaken with reference to the following recommendations:</p> <ul style="list-style-type: none"> • review of materials and colour finishes for selected components • refinement in the design of the lift structure to minimise the bulk and height of the structure • refinement to the design of the extended platform canopy and drainage to minimise visual impact • consideration of the location of the public telephone and ticket vending machine to minimise clutter on the platform • tree planting would be considered to compensate for any proposed tree removal.
14.	<p>An Urban Design and Landscaping Plan (UDLP) would be prepared by the Contractor and submitted to TfNSW for approval, prior to finalisation of the detailed design. The UDLP, at a minimum, would address the following:</p> <ul style="list-style-type: none"> • the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns • materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences • location and design (where relevant) of pedestrian and bicycle pathways, street furniture including taxi facilities, bicycle storage, telephones and lighting equipment • landscape treatments and street tree planting to integrate with surrounding streetscape • total water management principles to be integrated into the design where considered appropriate • design measures included to meet the <i>NSW Sustainable Design Guidelines - Version 3.0</i>.
15.	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> .
16.	The detailed design of the Proposal would comply with the Crime Prevention Through Environmental Design principles where practicable.
17.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
18.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.

No.	Mitigation measure
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19.	During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.
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20.	Light spill from the rail corridor into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
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Noise and vibration

21.	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 (WSP Parsons Brinckerhoff, 2016). The CNVMP would identify sensitive receivers and noise and vibration criteria to adhere to and take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
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22.	<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">• 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• avoiding any unnecessary noise when carrying out manual operations and when operating plant• ensuring spoil is placed and not dropped into awaiting trucks• avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable• switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded• avoiding deliveries at night/evenings wherever practicable• no idling of delivery trucks• keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site• 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.
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No.	Mitigation measure
23.	<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"> • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction works at any one time • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc • 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 • use of quieter and less vibration emitting construction methods where feasible and reasonable.
24.	<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 Contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.</p>
25.	<p>If extended out of hours works are required during the potential station shutdown, the works would be subject to further assessment, mitigation and additional approval from TfNSW. The community would be notified prior to these works commencing.</p>
26.	<p>Where the $L_{Aeq(15\text{minute})}$ 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 TfNSW's <i>Construction Noise Strategy</i> (TfNSW, 2012c). This would include restricting the hours that very noisy activities can occur.</p>
27.	<p>Affected pre-schools, schools, universities and other identified sensitive receivers would be consulted in relation to noise mitigation measures to identify any noise sensitive periods, e.g. exam periods. As much as reasonably possible noise intensive construction works in the vicinity of affected educational buildings are to be minimised.</p>
28.	<p>Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.</p>
29.	<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"> • for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 <i>Structural Vibration in Buildings: Effects on Structures</i> and British Standard BS7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i> • 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 BS7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>.

No.	Mitigation measure
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30.	Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for heritage structures within the station and, all buildings/structures/roads with a plan distance of 20 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).
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31.	<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 (WSP Parsons Brinckerhoff, 2016). For vibration intensive activities proposed to occur within the safe working distances, management methods to mitigate vibration should include, but not be limited, to the following:</p> <ul style="list-style-type: none">• Attended vibration measurements are to be undertaken when work commences (or a vibration intensive activity commences), to determine site specific safe working distances.• Vibration intensive work would not proceed within the safe working distances unless a permanent vibration monitoring system is installed approximately one metre from the building footprint, to warn operators in real time (e.g. flashing lights, SMS, or audible alarm system) when vibration levels are approaching the maximum vibration criteria.• The use of less vibration intensive methods of construction or equipment would be considered where possible to reduce the potential for cosmetic damage. All equipment should be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts.
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Indigenous heritage

32.	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.
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33.	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 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

34.	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.
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35.	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 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.
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No.	Mitigation measure
36.	Heritage listed items within the vicinity of the Proposal and proposed mitigation measures to protect the items during construction are to be identified on the ECM and CEMP.
37.	As Berala Station is listed as a heritage item on Railcorp's s170 Heritage and Conservation Register and as an archaeological site on the Auburn LEP, Sydney Trains Heritage and Auburn City Council would be notified of the proposed works.
38.	If excavation works are required within the proposed construction compound locations, further archaeological assessment would be required to be undertaken and appropriate heritage approvals obtained (if required) prior to the works commencing.
39.	<p>In order to minimise impacts on the heritage fabric of the station, the following mitigation measures would be implemented during detail design:</p> <ul style="list-style-type: none"> • The Contractor would be required to engage a heritage architect and give due consideration to the design of the external elements such as the lift and extended canopy, along with the internal proposed alterations to the platform building. • A heritage architect who is independent of the Contractor's personnel would be engaged by TfNSW to provide input to and ensure the design is sympathetic to the heritage values of the station. The independent heritage architect would also prepare a detailed heritage assessment for works that would affect the fabric of the existing station. • Heritage recommendations provided by Paul Davies (2015) and Sydney Trains Heritage are to be considered during detailed design. • The internal fit out of the platform building must retain or enhance existing features and the original fabric of the building is to be retained where possible along with designing new elements in sympathetic colours, finishes and styles. • The final design would need to be approved by TfNSW, in consultation with Sydney Trains Heritage. Sydney Trains would also be provided a copy of the detailed design and heritage documentation and notified of the construction commencement date so to allow for notification to the Heritage Division of demolition works and update the section 170 heritage listing, if required. • A program of archival recording would be undertaken prior to the complete demolition of the ticket office, any demolition of existing walls associated with the platform building and prior to the relocation (if required) of moveable heritage items. This recording would include photographic records of the original context, layout, building materials and methods used during their construction. The recording would be undertaken in accordance with the guideline <i>How to Prepare Archival Records of Heritage Items</i> (NSW Heritage Office, 1998). • A register of moveable heritage objects within Berala Station would be prepared and further heritage assessment would be undertaken to consider the retention of moveable items (such as waiting room benches and the ticket office safe) in situ, and if not feasible then options to relocate, store or archive these items would be investigated. A copy of the record is to be provided to the Local History Collection at Auburn City Council Library and Sydney Trains Heritage.
Socio-economic	
40.	Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
41.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.

No.	Mitigation measure
42.	A Community Liaison Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
43.	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.
44.	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.
45.	The details of the shutdown, if required, would be subject to further consideration during detailed design and construction planning in consultation with the relevant authorities and the local community.
46.	The sheltered bike rack on the southern side of the station is to be located to avoid impacts to the memorial garden and plaque as far as practicable.
47.	Appropriate controls would be implemented to ensure the memorial and surrounding gardens are protected during construction activities.
48.	Potential impacts to the memorial garden would be subject to further consideration during detailed design in consultation with Sydney Trains and Auburn City Council.
Biodiversity	
49.	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).
50.	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.
51.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal.
52.	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.
53.	In the event of any tree becoming damaged during construction, the 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.
54.	Any trees that are found to require removal during construction would be subject to further assessment, offsetting and approval from TfNSW.
55.	For new landscaping works, mulching and watering would be undertaken until plants are established.

No.	Mitigation measure
56.	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>Noxious Weeds Act 1993</i> .
57.	<i>Cestrum parqui</i> , a Class 3 regionally controlled noxious weed, has been identified within the study area and must be treated to prevent dispersal in accordance with the requirements of the <i>Noxious Weeds Act 1993</i> .
58.	The relocation of the planted lilies on the Campbell Street station entrance would be considered during detailed design.
59.	Defined access tracks and entry/exit points are to be used for all vehicle movements.
60.	Offsets and/or landscaping would be undertaken in accordance with TfNSW's <i>Vegetation Offset Guide</i> (TfNSW, 2013d) and in consultation with Auburn City Council for both native and exotic trees removed as part of the Proposal.
Soils and water	
61.	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.
62.	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.
63.	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.
64.	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).
65.	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.
66.	In the event of a pollution incident, works would cease in the immediate vicinity and the 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.
67.	The existing drainage systems would remain operational throughout the construction phase unless a prior approval has been obtained from the relevant authority.

No.	Mitigation measure
68.	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).
69.	Emergency response measures during construction would include procedures to follow in a flood event
70.	The potential impacts on the open stormwater channel would be considered during detailed design in consultation with Sydney Water and appropriate measures would be implemented to ensure the waterway is protected during construction.
71.	<p>The following flood mitigation measures are to be considered during detailed design:</p> <ul style="list-style-type: none"> • further hydrological assessment would be undertaken to ensure that the Proposal would not be impacted by flooding • adequate measures are to be provided to reduce flood risks and appropriate measures are to be provided to ensure safe access to the station is maintained • flood mitigation measures and a maintenance strategy would be developed for the lift • 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.
Air quality	
72.	Air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's <i>Air Quality Management Guideline</i> (TfNSW, 2015h).
73.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
74.	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.
75.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
76.	<p>To minimise the generation of dust from construction activities, the following measures would be implemented:</p> <ul style="list-style-type: none"> • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • 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 • prevent mud and dirt being tracked onto sealed road surfaces.

No.	Mitigation measure
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Waste and contamination	
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| 77. | <p>A Waste Management Plan would be prepared as part of the CEMP to address waste management and would at a minimum:</p> <ul style="list-style-type: none">• 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. |
| 78. | <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> |
| 79. | <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> |
| 80. | <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> |
| 81. | <p>Any concrete washout would be established and maintained in accordance with TfNSW's <i>Concrete Washout Guideline – draft</i> (TfNSW, 2015i) with details included in the CEMP and location marked on the ECM.</p> |
| 82. | <p>A Demolition Management Plan would be prepared as part of the CEMP for the demolition of the ticket office. The plan would include procedures for the removal, handling, storage, and disposal of hazardous materials. The plan would also include measures for the management and monitoring of dust.</p> |
| 83. | <p>All asbestos must be handled and removed by an appropriately qualified asbestos removalist and disposed of at an EPA licensed facility capable of receiving asbestos.</p> |
| 84. | <p>The removal, handling and disposal of any asbestos waste would be undertaken by an appropriately licensed contractor, and in accordance with:</p> <ul style="list-style-type: none">• <i>Code of Practice for the Safe Removal of Asbestos 2005</i>• <i>Code of Practice for the Management and Control of Asbestos in Workplaces 2005</i>. |
| 85. | <p>All hazardous waste (including lead waste) material handling, storage, transport and disposal will be in accordance with the requirements of PoEO Act, WARR Act and relevant guidelines including the <i>Australian Standard 4361.1 Guide to lead paint management Part 1: Industrial applications</i>.</p> |
| 86. | <p>Prior to works commencing, lead paint flakes found around the work area are to be collected and stored as per hazardous waste controls.</p> |

Climate change and sustainability	
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| 87. | <p>Detailed design of the Proposal would be undertaken in accordance with the <i>NSW Sustainable Design Guidelines – Version 3.0</i> (TfNSW, 2013a) with a view to obtaining a Silver rating or better.</p> |
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No.	Mitigation measure
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| 88. | <p>The detailed design process would undertake the following:</p> <ul style="list-style-type: none">• an AS 14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's <i>Greenhouse Gas Inventory Guide for Construction Projects</i> (TfNSW, 2013e). The carbon footprint would be used to inform decision making in design and construction.• a climate change impact assessment with reference to the <i>Climate Change Impacts and Risk Management: A Guide for Business and Government</i> (Department of the Environment and Heritage, 2006) and the <i>ISCA Guidelines for Climate Change Adaptation</i> (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. |
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Cumulative impacts

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| 89. | <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> |
| 90. | <p>Consultation with relevant stakeholders would be undertaken during construction planning, where required, to ensure that potential cumulative impacts are minimised. Any additional mitigation measures from consultation would be included in the construction TMP and CNVMP for the management of traffic and noise during construction.</p> |
| 91. | <p>During construction, the works would be co-ordinated with any other construction activities in the area as required. Consultation and liaison would occur with Auburn City Council, Sydney Trains, and any other developers identified to minimise cumulative construction impacts such as traffic and noise as far as practicable.</p> |

8 Conclusion

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:

- improved accessibility for customers at Berala Station providing an accessible route to the station platforms through the provision of a lift
- improved customer amenity and facilities at the station including a family accessible toilet, extended canopy coverage and wayfinding signage
- improved transport interchange facilities including formalised kiss and ride areas, provision of accessible parking, upgraded bus facilities and sheltered bicycle facilities on the southern side of the station
- potential increased use of public transport to and from Berala.

The likely key impacts of the Proposal are as follows:

- temporary changes to vehicle and pedestrian movements to and around the station during construction
- temporary noise and vibration impacts during construction
- impacts to heritage listed platform buildings
- introduction of new elements such as the new lift and extended canopy into the visual environment.

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 3.1.4 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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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
<p>Any impact on a World Heritage property? There are no World Heritage properties in the vicinity of the Proposal.</p>	Nil
<p>Any impact on a National Heritage place? There are no National Heritage places in the vicinity of the Proposal.</p>	Nil
<p>Any impact on a wetland of international importance? There are no wetlands of international importance within 10 kilometres of the Proposal.</p>	Nil
<p>Any impact on a listed threatened species or communities? It is unlikely that the development of the Proposal would significantly affect any listed species or communities.</p>	Nil
<p>Any impacts on listed migratory species? It is unlikely that the development of the Proposal would significantly affect any listed migratory species.</p>	Nil
<p>Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.</p>	Nil
<p>Any impact on a Commonwealth marine area? There are no Commonwealth marine areas in the vicinity of the Proposal.</p>	Nil
<p>Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Proposal is for a transport facility and is not related to coal seam gas or mining.</p>	Nil
<p>Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal would not be undertaken on or near any Commonwealth land.</p>	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>(a) Any environmental impact on a community?</p> <p>There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. The potential temporary station shutdown would result in an inconvenience to commuters. Mitigation measures outlined in Table 20 would be implemented to manage and minimise adverse impacts.</p>	Minor
<p>(b) Any transformation of a locality?</p> <p>The Proposal would include the introduction of new visible elements in the landscape (including the construction of a new lift, extended canopy coverage and the installation of a new sheltered bicycle rack). The appearance of the new elements would be consistent with the existing station elements and are considered to be common features in urban areas.</p> <p>The extent of vegetation trimming and removal would be determined during detailed design and construction planning stages and would be minimised as far as practicable. Any trees that are found to require removal would be subject to further assessment, offsetting and approval from TfNSW. (refer to Section 6.7 for more detail).</p> <p>The Proposal would have a positive contribution to the locality by creating accessible entrances to the station and station platforms.</p>	Minor
<p>(c) Any environmental impact on the ecosystem of the locality?</p> <p>The Proposal may require minor vegetation removal. The extent of vegetation trimming and removal would be determined during detailed design and construction planning stages and would be minimised as far as practicable. Any trees that are found to require removal would be subject to further assessment, offsetting and approval from TfNSW.</p>	Nil
<p>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>There would be some temporary impacts during construction particularly in relation to noise, traffic and access and visual amenity.</p> <p>Minor vegetation removal may be required. Any trees that are found to require removal would be subject to further assessment, offsetting and approval from TfNSW.</p>	Minor

Factor	Impacts
<p>(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?</p> <p>The Proposal would have a positive contribution to the locality by creating equitable access to the station platforms from the underpass level.</p> <p>The station is listed on RailCorp's section 170 Heritage and Conservation Register. The Proposal would result in some minor impacts to some parts of the station that are heritage listed. Impacts to minimise heritage would be minimised through the implementation of the mitigation measures provided in this REF.</p> <p>A desktop archaeological assessment has been undertaken which determined that there is a low risk of encountering archaeological items/deposits and that the Proposal is unlikely to expose historical archaeological relics.</p>	Minor
<p>(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>The Proposal is unlikely to have any impact on the habitat of protected fauna.</p>	Nil
<p>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The Proposal is unlikely to have any impact on endangering any species of animal, plant or other form of life, whether living on land, in water or in the air.</p>	Nil
<p>(h) Any long-term effects on the environment?</p> <p>The Proposal is unlikely to have any long-term effects on the environment.</p>	Nil
<p>(i) Any degradation of the quality of the environment?</p> <p>The Proposal is unlikely to have any degradation on the quality of the environment.</p>	Nil
<p>(j) Any risk to the safety of the environment?</p> <p>The Proposal is unlikely to cause any pollution or safety risks to 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>	Minor
<p>(k) Any reduction in the range of beneficial uses of the environment?</p> <p>The Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.</p>	Nil
<p>(l) Any pollution of the environment?</p> <p>The Proposal is unlikely to cause any pollution or to the environment provided the recommended mitigation measures are implemented.</p>	Minor

Factor	Impacts
<p>(m) Any environmental problems associated with the disposal of waste?</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.</p> <p>All waste would be managed and disposed of 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>(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p> <p>The Proposal is unlikely increase demands on resources that are or are likely to become in short supply.</p>	Nil
<p>(o) Any cumulative environmental effect with other existing or likely future activities?</p> <p>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>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</p> <p>The Proposal would not affect or be affected by any coastal processes or hazards.</p>	Nil

Appendix C Sustainable Design Guidelines checklist

Compulsory initiatives

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
C.3 Five star appliances	Energy and greenhouse	Purchase plug-in equipment with at least five star Minimum Energy Performance Standards (MEPS) rating (fridges, air conditioners, etc) or an Energy Star accreditation (IT equipment).	DC	Yes
C.11 Reduce cement	Materials and waste	Reduce the absolute quantity of Portland cement by at least 30 per cent, as an average across all concrete mixes, by substituting it with supplementary cementitious materials (such as a fly ash, ground granulated blast furnace slag or alkali activated cements) subject to meeting strength and durability requirements.	DC	Yes
C.12 Biodiversity offsetting	Biodiversity and heritage	For non-significant impacts (inside or outside the rail corridor) offsetting is to be in accordance with the TPD Vegetation Offset Guide as applicable.	DC	Yes
C.13 Heritage conservation and enhancement	Biodiversity and heritage	100 per cent of significant heritage items are identified during project development and design and are protected or beneficially reused where practical. This will require consultation with all relevant Indigenous Heritage groups (where applicable).	DC	Yes
C.14 Heritage interpretation	Biodiversity and heritage	Achieve interpretation of all applicable heritage or historic items through development and implementation of a heritage interpretation strategy (e.g. incorporate interpretive signage at the station, which provides information on the heritage of the area).	DC	Yes
C.16 Water efficient fittings	Water	Ensure onsite amenities using potable water comply with the following criteria: Toilets to be WELS (max 4.5/3 L/min) dual flush toilets; Urinals to be waterless; All taps to be WELS (max 7.5 L/min); (see Green Star Office v3). Any other water fixtures should achieve at least a 5 Star WELS rating.	DC	Yes
C.17 Water efficient controls	Water	Specify sensors, timers or spring loaded devices for taps where possible to reduce water loss from taps that are left running.	D	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
C.20 Noise management	Pollution control	Project to comply with Transport Projects Construction Noise Strategy and related conditions of approval.	DC	Yes
C.21 Community involvement in planning	Community benefit	Actively engage with stakeholders including the community during planning.	D	Yes
C.22 Planning framework		Plan and design projects to take into considerations existing planning strategies in consultation with relevant authorities.	D	Yes
C.23 Crime Prevention Through Environmental Design (CPTED)	Community benefit	Incorporate CPTED principles during design. This may include natural observation and use of CCTV. Natural observation is achieved through fence, landscape, streetscape and open space design in public or staff supervised areas. This is achieved by minimising narrow corridors, hidden corners and through the use of lighting.	D	Yes

Discretionary initiatives

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
1.20 LED lights	Energy and greenhouse	Incorporate energy efficient LED lighting.	D	Yes
1.22 Lighting scheme	Energy and greenhouse	Prepare a lighting scheme by a suitably qualified lighting designer. Pay attention to zoning between lighting demands of different areas and strategic placement of lighting fixtures to maximise ground coverage.	D	Yes
1.26 Demand operated ventilation	Energy and greenhouse	HVAC system utilises Carbon Dioxide (CO ₂) sensors in occupied enclosed spaces (e.g. office spaces). This will allow system to adjust outside air ventilation rates to increase or decrease fresh air flow depending on occupancy rates at a given time.	D	Yes
1.28 Mixed mode ventilation	Energy and greenhouse	Incorporate mixed mode ventilation. This involves using natural ventilation when ambient conditions are suitable. Air conditioning only operating at peak temperature periods. Interlock A/C with windows so both cannot be used simultaneously.	D	Yes
1.40 Energy efficient HVAC	Energy and greenhouse	Select and design HVAC system with prioritisation of energy efficiency. See section 4.3.1.3 of the ASA Station Design Standard Requirements for further information on air conditioning and ventilation requirements at stations. Also refer to AS1668.2 -2002.	D	Yes
1.44 Vertical transport	Energy and greenhouse	Install energy efficient vertical transport systems (e.g. ramps; variable speed drive escalators that enable a slow-mode, so that they oscillate at lower speeds when not in use and increase in speed when users step into the foot panel at the entry to the escalator. Install and variable voltage variable frequency (VVVF) control gear for lifts.	D	Yes
2.8 Protection from extreme weather (sun, rain, wind)	Climate resilience	Consider design measures for protecting customers and electrical equipment from wind and rain during storm events.	D	Yes
2.9 Protect sensitive assets	Climate resilience	Protect sensitive assets (e.g. lifts, escalators) from the effects of extreme climate and weather.	D	Yes
3.6 Re-use of structures	Materials and waste	Retain or refurbish existing structures where possible.	DC	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
3.17 Low VOC paints and finishes	Materials and waste	Specify low volatile organic compound (VOC) paints and finishes. Refer to Green Star – Office Interiors v1.1 available online.	DC	Yes
3.18 Low VOC adhesives and sealants	Materials and waste	Specify all adhesives and sealants as low VOC. Refer to Green Star – Office Interiors v1.1 available online.	DC	Yes
3.29 Segregation of waste	Materials and waste	Enable waste segregation in the design process by including space for the collection and segregation of waste with appropriate marking (e.g. signage) and controls (e.g. lockable lids), located away from sensitive receptors (e.g. water courses). During construction, use facilities and procedures that maximise on-site separation of waste to maximise reuse/recycling.	DC	Yes
3.30 Reuse construction waste	Materials and waste	Maximise reuse of concrete, bricks, earthworks and other structural waste materials.	DC	Yes
3.34 Prevent electrolysis	Materials and waste	Prevent or minimise the effects of stray current electrolysis from electrified railway that increase the rate of corrosion such as selecting suitable building materials, avoiding using metal finishes in the vicinity of high voltage electricity, using masking agents or coatings to prevent exposure of metals, and preventing direct contact between metallic parts.	D	Yes
4.2 Ecological value opportunities	Biodiversity and heritage	Maximise ecological values through landscape species choice, and planting density and configuration. Make sure that appropriate weed management strategies are undertaken to avoid migration or contamination on and offsite.	DC	Yes
5.10 Planting	Water	Select plant species that require minimal or no irrigation after establishment.	DC	Yes
6.4 Avoid dangerous goods and hazardous materials	Pollution control	Use Safety Data Sheets (SDS) to avoid the use of dangerous goods and hazardous materials. See the materials section in Appendix B for details.	DC	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
6.17 Avoid glare and light pollution	Pollution control	Minimise ambient light levels and glare towards neighbouring properties (e.g. avoid or obstruct up lighting). Refer to ASA standard 3.11.3.3 for guidance and make sure that design complies with <i>AS4282 Control of the Obtrusive Effects of Outdoor Lighting</i> . Do not exceed minimum requirements of AS1158 for illuminance levels for 95 per cent of outdoor spaces.	D	Yes
7.28 Bicycle lockers and/or racks	Community benefit	Provide sheltered bicycle lock ups and/or lockers in or near entrance to the station. Allow for at least five per cent of staff use at maintenance facilities. See Section 3.9.3.1 of the ASA Station Design Standard Requirements for further information on bicycle parking requirements at stations.	D	Yes
7.29 Bicycle storage security	Community benefit	Locate bicycle storage area in an area with a high level of passive surveillance and/or prominent CCTV.	D	Yes
7.33 Safe pedestrian movement	Community benefit	Make sure that safe movement is promoted for pedestrians and cyclists by minimising vehicle crossings of paths, providing clear signage, and providing freedom from obstacles such as poles, trees etc.	D	Yes
7.39 Reduce graffiti	Community benefit	Minimise graffiti risks such as through treatment of fencing and other surfaces with anti-graffiti paint or coatings, vegetation cover to deter graffiti or providing designated walls for graffiti.	D	Yes