NSW GOVERNMENT | Transport for NSW

Homebush Station Upgrade

Review of Environmental Factors

Photomontage of Homebush Station, subject to detailed design

October 2016

Homebush Station Upgrade Review of Environmental Factors

Transport Access Program
Ref–5,423,045

Contents

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Abbreviations

Term	Meaning
AEP	Annual Exceedance Probability
AHIMS	Aboriginal Heritage Information Management System
ASA	Asset Standards Authority (refer to Definitions)
ASS	Acid Sulfate Soils
AVTG	*Assessing Vibration: A Technical Guideline*
BCA	Building Code of Australia
CBD	Central Business District
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CMP	Conservation Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
DBH	Diameter Breast Height
DDA	*Disability Discrimination Act 1992* (Cwlth)
DSAPT	*Disability Standards for Accessible Public Transport (2002)*
ECM	Environmental Controls Map
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	*Fisheries Management Act 1994* (NSW)
Heritage Act	*Heritage Act 1977* (NSW)

Term	Meaning
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2000).
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007* (NSW)
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
MCA	Multi-Criteria Analysis
NCA	Noise Catchment Area
NES	National Environmental Significance
NML	Noise Management Level
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	NSW Office of the Environment and Heritage
PDP	Public Domain Plan
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RailCorp	(former) Rail Corporation of NSW
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	*Roads Act 1993* (NSW)
Roads and Maritime	NSW Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SoHI	Statement of Heritage Impact
TCP	Traffic Control Plan
TfNSW	Transport for NSW
TGSI	Tactile Ground Surface Indicators (“tactiles”)
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
TSC Act	*Threatened Species Conservation Act 1995* (NSW)

Term	Meaning
UDP	Urban Design Plan
VDV	Vibration Dose Values
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)

Definitions

Term	Meaning
Annual Exceedance Probability	The percentage probability that an event of a certain size or larger will occur in any one year. For example, floods with a one percent Annual Exceedance Probability event have a one percent chance of being equalled or exceeded in one year.
Asset Standards Authority	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. Design Authority functions formerly performed by RailCorp are now exercised by ASA.
Blue Book	Landcom, 2004, *Managing Urban Stormwater: Soils and Construction, Volume - 4th Edition*
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
Design and Construct Contract	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 and completing the detailed design so that it is suitable for construction (subject to TfNSW acceptance). The Contractor is therefore responsible for all work on the project, both design and construction.
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).
Disability Standards for Accessible Public Transport	The Commonwealth *Disability Standards for Accessible Public Transport 2002* ("Transport Standards") (as amended) are a set of legally enforceable standards, authorised under the Commonwealth *Disability Discrimination Act 1992* (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.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. 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.
Feasible	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.
Interchange	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.

Term	Meaning
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches).
NSW Trains	From 1 July 2013, NSW Trains became the new rail provider of services for regional rail customers.
Opal card	The integrated ticketing smartcard being introduced by TfNSW.
Out of hours works	Defined as works *outside* standard construction hours (i.e. outside of 7 am to 6 pm Monday to Friday, 8 am to 1 pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Part 5 of the EP&A Act - in this instance, TfNSW.
Rail shutdown	Shutdown 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.
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 Homebush Station Upgrade.
Vegetation Offset Guide	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. The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.

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 Homebush 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.

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

Description of the Proposal

The Proposal would provide safe and equitable access to Homebush Station and the surrounding pedestrian network and would improve customer facilities and amenity. The improvements would in turn assist in supporting growth in public transport use and would provide an improved customer experience for existing and future users of the station.

The key features of the Proposal are summarised as follows:

- installation of four new lifts and upgrades to existing station access stairs to provide access to the existing footbridge
- installation of new canopies along the existing footbridge and lift landings for weather protection
- upgrades to the northern and southern station entrances
- refurbishment of the Amenities Building with a new family accessible toilet and new station office at footbridge level
- refurbishment of the Booking Office with a new lift lobby and new communications room at platform level
- new undercover bicycle rack on the northern side of the station
- provision of two new accessible parking spaces, a new taxi rank with provision for one space and a new kiss and ride space on the southern side of the station
- provision of a new kiss and ride space, a new bus bay and relocation of the existing bus shelter on the northern side of the station
- installation of a new pedestrian crossing on Loftus Crescent on the northern side of the station
- new kerb ramps to provide an accessible path of travel to new and existing interchange facilities
- ancillary works including services diversion and/or relocation, station power supply upgrade, platform regrading, minor drainage works, adjustments to lighting, upgrades to fencing and landscaping, new ticketing facilities including additional Opal card readers, improvements to station communication systems (including CCTV cameras and hearing loops) and wayfinding signage.

Subject to approval, construction is expected to commence in early 2017 and take around 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 and as such would support growth in commercial and residential development.

The Proposal fulfils the Transport Access Program objectives by proposing to provide:

- a station that is accessible to all, including those with a disability, the ageing, parents/carers with prams and customers with luggage
- improved customer experience (weather protection, better interchange facilities and visual appearance)
- minimised pedestrian conflict and crowding points
- improved integration with the surrounding precinct
- improved customer safety
- improved wayfinding in and around the station
- minimised impacts to heritage features of the station and the addition of heritage interpretation
- improved customer amenity
- improved cross corridor access and pedestrian links from The Crescent to Loftus Crescent by providing an accessible path of travel

The Proposal is also consistent with NSW planning strategies, including *NSW: Making it Happen* (NSW Government, 2015) and the *NSW Long Term Transport Master Plan* (TfNSW, 2012a).

The Proposal would also ensure that Homebush Station would meet legislative requirements under the *Disability Standards for Accessible Public Transport 2002* (DSAPT).

Design options considered

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

Three concept design options were originally developed to address accessibility, customer experience needs and other design principles, while a fourth option was developed at a later stage in consideration of heritage and visual impacts.

Improvements common to all options included the installation of new lifts at both station entrances and to the island platforms, new accessible parking and kiss and ride spaces, additional bicycle parking facilities, platform regrading and ancillary facilities such as power supply upgrades, CCTV adjustments and improvements to wayfinding signage.

The key differences focused on alternative station entrances and lift, footbridge and platform access arrangements and are summarised as follows:

- Option 1 proposed retaining the existing footbridge and providing new lifts for access to the existing footbridge at the station entrances and to the island platforms. The existing station stairs would be retained maintaining the existing access points to the station and island platforms
- Option 1b was later developed as a derivative of Option 1. Generally, the key design features of Option 1 were retained, however Option 1b proposed locating the new lifts to Platform 3/4 inside the existing Booking Office to reduce the visual impact of the new lift infrastructure. This design was informed by specialist heritage assessment and advice
- Option 2 proposed retaining the existing footbridge and the existing station entry locations. The existing stairs to the island platforms would be demolished and a new integrated footbridge structure would be provided, to the east of the existing footbridge, with new lifts and stairs to each of the island platforms
- Option 3 proposed the construction of a new separate pedestrian bridge and concourse with new lifts, stairs and new station facilities to the east of the existing footbridge. The existing footbridge would be retained. The station entry locations would be changed to align with the new footbridge.

Initial assessment of Options 1, 2, and 3 concluded that Option 1 was the preferred option as it would provide the best outcomes in terms of customer experience, accessibility and operational maintenance, followed by Option 2 and then Option 3. Following the initial Multi-Criteria Analysis (MCA) assessment, Option 1b was developed as a derivative of Option 1 as it would provide the benefits of Option 1 but with less impact to the heritage features of the station. As such, Option 1b was selected as the preferred option to progress to the next phase of design and planning.

Further information on these options and analysis is provided in Chapter 2.

Statutory considerations

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

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

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

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

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

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

As Homebush Station is listed on the State Heritage Register (SHR), an approval under Section 60 of the *Heritage Act 1977* (Heritage Act) would be required prior to the determination of this REF.

Chapter 6 of this REF presents the environmental impact assessment for the Homebush 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. Consultation was undertaken with Strathfield Municipal Council during the development of design options and the preferred option. Consultation with Council and other 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 three weeks. Further information about these specific activities is included in Section 5.4 of this REF.

During this period, the REF would also be available for viewing at the following locations:

- Strathfield Municipal Council office, 65 Homebush Road, Strathfield
- Strathfield Main Library, 65-67 Rochester St, Homebush
- Transport for NSW Office, Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood.

The REF would also be available to download from the TfNSW website[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-tap

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, from and around the station during construction
- temporary noise and vibration impacts during construction
- removal of trees and vegetation and subsequent application of planting offsets
- potential impacts to station heritage fabric from the refurbishment of the Booking Office and Amenities Building
- permanent changes to parking arrangements around the station including removal of approximately five on-street parking spaces
- net loss of one non-accessible toilet as a result of the provision of a family accessible toilet
- introduction of new elements into the visual environment including four new lifts and new canopies along the existing footbridge and lift landings.

The 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) with regard to 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 integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Homebush 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 use of public transport, such as trains, by upgrading stations to make them more accessible, and improving interchanges around stations with other modes of transport such as bicycles, buses and cars.

Homebush Station and interchange areas do not currently meet key requirements of the *Disability Standards for Accessible Public Transport 2002* (DSAPT) or the *Commonwealth Disability Discrimination Act 1992* (DDA).

Stairs currently provide the only means of access to the station platforms from the existing footbridge and do not provide an accessible path of travel for the elderly, people with reduced mobility, parents/carers with prams or customers with luggage. In addition, the existing footbridge width and surrounding interchange facilities are not DDA compliant and there is limited weather protection over the existing footbridge and stairs.

The Proposal would provide safe and equitable access to the station platforms and the surrounding pedestrian network and would improve customer facilities and amenity. 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 patronage has been taken into consideration during the design development. The Bureau of Travel Statistics 2014 station barrier counts indicated a daily patronage of 4,240 trips, which is expected to increase to 7,345 by 2036. The Proposal has been designed to cater for a daily patronage of 8,447 (which is the 2036 daily patronage plus an increase of 15 per cent).

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- installation of four new lifts and upgrades to existing station access stairs to provide access to the existing footbridge
- installation of new canopies along the existing footbridge and lift landings for weather protection
- upgrades to the northern and southern station entrances
- refurbishment of the Amenities Building with a new family accessible toilet and new station office at footbridge level
- refurbishment of the Booking Office with a new lift lobby and new communications room at platform level
- new undercover bicycle rack on the northern side of the station
- provision of two new accessible parking spaces, a new taxi rank with provision for one space and a new kiss and ride space on the southern side of the station

- provision of a new kiss and ride space, a new bus bay and relocation of the existing bus shelter on the northern side of the station
- installation of a new pedestrian crossing on Loftus Crescent on the northern side of the station
- new kerb ramps to provide an accessible path of travel to new and existing interchange facilities
- ancillary works including services diversion and/or relocation, station power supply upgrade, platform regrading, minor drainage works, adjustments to lighting, upgrades to fencing and landscaping, new ticketing facilities including additional Opal card readers, improvements to station communication systems (including CCTV cameras and hearing loops) and wayfinding signage.

Subject to planning approval, construction is expected to commence in early 2017 and take around 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 would involve upgrade works to Homebush Station, the surrounding streets and footpaths. The station is located around 12 kilometres west of the Sydney Central Business District (CBD) in the suburb of Homebush.

The suburb of Homebush is located in the Strathfield Municipal Local Government Area (LGA). It is a mostly residential suburb with some industrial and commercial land use and is bisected by the railway line. Homebush has experienced significant housing growth in recent years. Under the *Strathfield Local Environmental Plan* (Strathfield LEP) *2012*, the area to the south of the station is zoned as 'mixed use' and consists of local businesses, shops and Homebush Public School. The area to the north of the station is zoned as 'high density residential' and contains a mix of residential development including free standing single storey dwelling houses and larger scale multi storey residential flat buildings. The location of the Proposal in the regional context is shown in Figure 2.

Homebush Station is serviced by the T2 Airport, Inner West and South Line and is the 118th busiest station on the Sydney Trains network, with around 4,240 trips on an average weekday in 2014 (Bureau of Travel Statistics barrier counts, 2014).

The Proposal would involve works to Homebush Station which is located on land owned by RailCorp and operated and maintained by Sydney Trains. Works would also be undertaken on the surrounding road/footpath network within areas which are the responsibility of Strathfield Municipal Council. Refer to Figure 10 for a map of the proposed work areas.

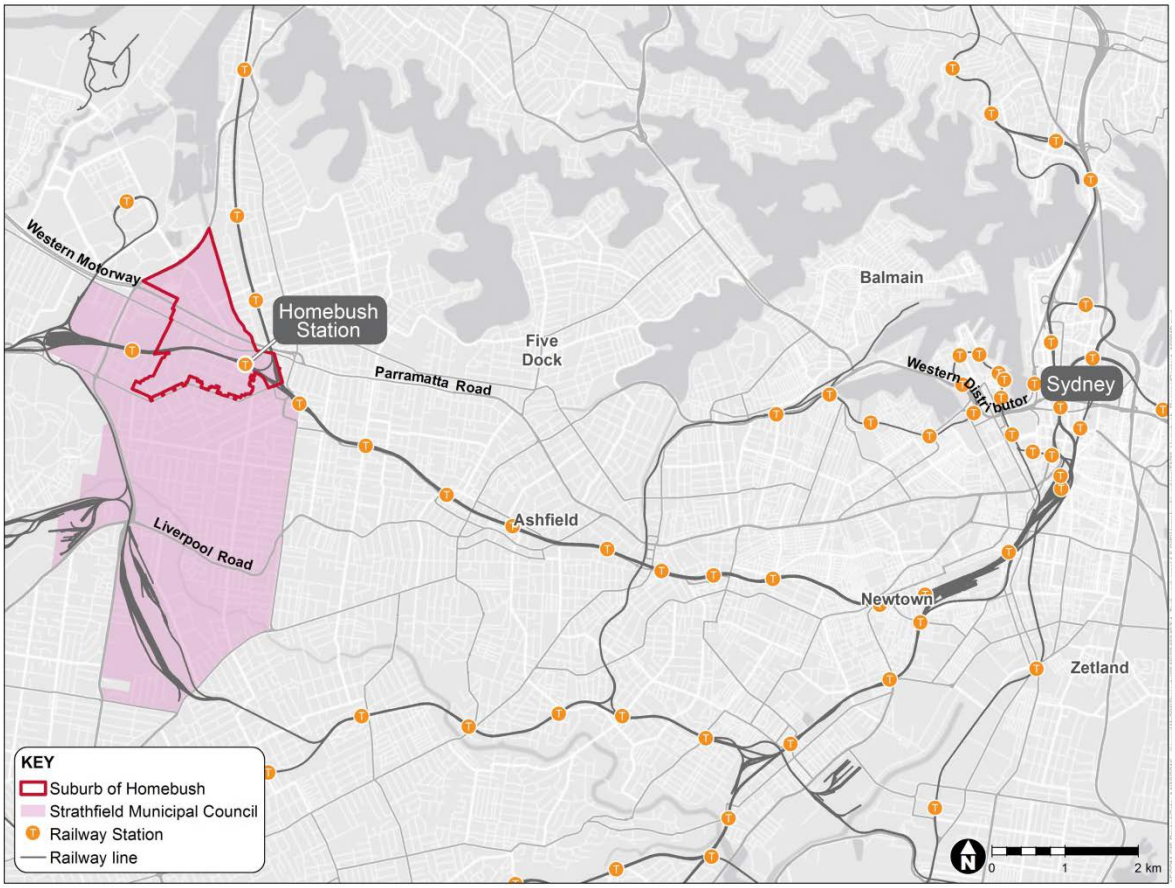

Figure 2 Regional context

1.3 Existing infrastructure and land uses

Homebush Station is a suburban customer station, with a catchment consisting of a mix of high, medium and low density residential housing and a small local centre to the south of the railway corridor which serves the local community. The local centre comprises a convenience store, foot outlets, a hairdressing store and vet. Homebush Station has three island platforms each with two platforms on either side and one side platform. While there are seven platforms at the station, only six are in use (Platform 1 is currently not used). Figure 3 shows the key features in the area surrounding the station.

A small commercial shopping strip is located along Rochester Street to the south of the station. A few small businesses are located immediately south of the station along The Crescent. Homebush Public School is located directly south of the station on the corner of Rochester Street and The Crescent. To the north of the station, the land use is a mix of residential development including free standing single storey dwelling houses and larger scale multi storey residential flat buildings.

The main station entrances are from The Crescent to the south and Loftus Crescent to the north. At the southern entrances, customers can access Platform 7 via a ramp from The Crescent, or the footbridge via stairs from The Crescent. At the northern entrance to the station, access is via stairs from Loftus Crescent to the existing footbridge. There are no canopies for weather protection above the existing footbridge and stairs except for a small covered section in the vicinity of the Booking Office.

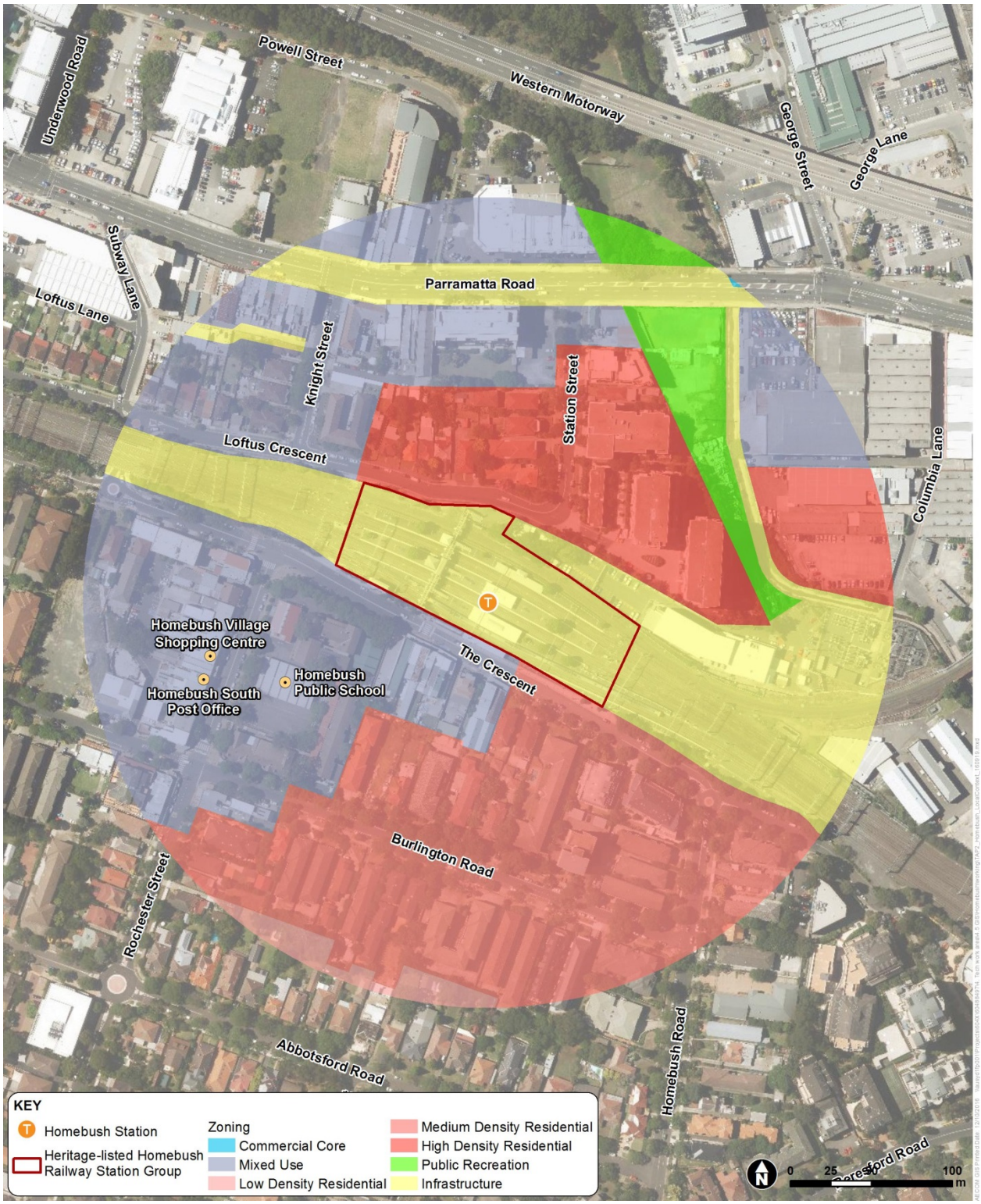

Figure 3 Site locality map

The station consists of three island platforms each with two platforms and a side platform as follows:

- Platform 1 is located on the northern side of the northern island platform and is not listed on the station's numbering system. The platform is not currently in use and is fenced off from the adjacent North Strathfield Junction goods line
- Platform 2 is located on the southern side of the northern island platform and currently has no scheduled services

- Platforms 3 and 4 are located on the middle island platform. Platform 3 currently has no scheduled services and Platform 4 is serviced by the T2 Line providing limited afternoon services to Central and the City Circle
- Platforms 5 and 6 are located on the southern island platform. Platform 5 currently has no scheduled services and Platform 6 is serviced by terminating services to and from Central and the City Circle
- Platform 7 is a side platform located on the southern side of the station and is serviced by the T2 Line, providing limited morning peak services to Campbelltown via Granville.

Figure 4 shows the existing layout of Homebush Station including platform numbers.

An Amenities Building, constructed in 1891, is located on the northern island platform (Platform 1/2). The Amenities Building is a two storey building which contains a store room at platform level and public amenities at footbridge level.

A Booking Office, constructed in 1891, is located on the middle island platform (Platform 3/4). The Booking Office is a two storey brick building which contains a store room at platform level and a booking office at footbridge level, which is accessed via the existing footbridge.

There are two platform buildings located at the station (one on Platform 1/2 and one on Platform 5/4). The platform building on Platform 1/2 was originally a general waiting room which is no longer in use and there is an awning and seating for customers. The platform building on Platform 5/6 is a former general waiting room and office, and is currently disused. Shelter and seating is provided for customers around the building perimeter. Neither platform buildings are accessible to the public.

There is a weather protection shelter on Platform 7 providing customers with shelter and seating.

Figure 4 Existing layout of Homebush Station

Existing transport interchange facilities available at Homebush Station include:

- bicycle parking with capacity for six bicycles located around 50 metres east of the southern station entrance on The Crescent. There are currently no bicycle storage facilities present on the northern side of the station
- bus stops located near the southern station entrance – route 408 (Rookwood to Burwood) operates eastbound and westbound services from The Crescent, and routes N60 and N61 (NightRide services) also operate from The Crescent
- a local school bus service located on Loftus Crescent on the northern side of the station
- there are no formal kiss and ride areas on either side of the station, however, timed car parking spaces on the southern side of the station along The Crescent, west of Rochester Street, have been allocated as a pick up and drop off area in peak times (from 8.30am to 10am and 2.30pm to 7.30pm).

There are no taxi ranks or commuter or public car parks located near the northern or southern station entrances.

Educational and religious facilities in the vicinity of the Proposal include:

- Homebush Public School around 20 metres south of the station
- Pre-Uni New College High School around 100 metres south west of the station
- Pre-Uni New College around 200 metres south east of the station
- Homebush Uniting Church around 250 metres south west of the station
- Homebush Jehovah's Witness Church around 300 metres south east of the station
- Russian Seventh Day Adventist Church around 320 metres south east of the station.

Parramatta Road is the nearest arterial road and is located around 100 metres north of the station. It provides a connection to the M4 Western Motorway to the north of the station.

Photographs of the existing station and surrounds are provided in Figure 5, Figure 6, Figure 7 and Figure 8.

Figure 5 View towards the northern Homebush Station entrance from Loftus Crescent

Figure 6 View towards the southern Homebush Station entrance from The Crescent

Figure 7 View towards the existing footbridge and platform access stairs from Loftus Crescent

Figure 8 View towards the Amenities Building (foreground) and Booking Office (background) from Loftus Crescent

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the Homebush Station Upgrade. 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 and Energy for 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 chosen.

2.1 Strategic justification

2.1.1 Overview

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

The Homebush 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.

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

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

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

The NSW Government has developed a *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 2006 up to 2036 in the area within the station catchment. The Proposal accommodates the forecasted Sydney Trains patronage growth (an increase of 15 per cent to 2036) and changing travel patterns.

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

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

2.1.2 Objectives of the Transport Access Program

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

- stations that are accessible to those with disabilities, the ageing and parents/carers with prams and customers with luggage
- 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 alarm, fences and security measures for car parks and interchanges, including stations, bus stops and wharves
- signage improvements so customers can more easily use public transport and transfer between modes at interchanges
- other improvements and maintenance such as painting, new fencing and roof replacements.

2.1.3 Objectives of the Proposal

The specific objectives of the Homebush Station Upgrade are to:

- provide a station that is accessible to all, including those with a disability, the ageing and parents/carers with prams and customers with luggage
- improve customer experience and convenience (weather protection, better interchange facilities and visual appearance)
- minimise pedestrian conflict and crowding points
- improve integration with the surrounding precinct
- improve customer safety
- improve wayfinding in and around the station
- minimise impacts to heritage features of the station and the addition of heritage interpretation
- improve customer amenity
- improve cross corridor access and pedestrian links from The Crescent to Loftus Crescent by providing an accessible path of travel.

2.2 Design development

TfNSW commissioned the development of a concept design for the Homebush Station Upgrade that would improve accessibility in and around the station and meet key architectural, engineering and urban design objectives (Parsons Brinckerhoff, 2015). The design development has accommodated the forecast Sydney Trains patronage growth (which is the estimated 2036 daily customer patronage plus an increase of 15 percent).

The development of the concept design involved several key tasks, including an assessment of existing interchange performance and identification of key deficiencies and opportunities for improving accessibility and customer experience. The assessment identified the following deficiencies with the existing station and surrounding interchange:

- lack of an accessible path of travel to the station and the island platforms

- limited weather protection along the existing footbridge and stairs
- lack of tactile ground surface indicators on the existing stairs
- non-DDA compliant platform levels and cross falls
- no DDA compliant accessible car parking facilities accessible to the station
- no taxi or kiss and ride facilities at the station
- lack of kiss and ride areas on the northern and southern side of the station resulting in illegal drop-offs in this area which impede road traffic movements
- lack of accessible facilities at the station – including an accessible Customer Information Window and family accessible toilet
- insufficient bicycle storage facilities with no bicycle storage to the north of the station
- no formal pedestrian crossing on Loftus Crescent on the northern side of the station.

The needs and opportunities at Homebush Station were then considered in the development of options for the concept design, with the preferred option to be further refined during detailed design.

2.3 Alternative options considered

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

Three concept design options were initially developed to address accessibility, customer experience needs and other design principles.

Improvements common to all options included the installation of new lifts at both station entrances and to the island platforms, new accessible parking and kiss and ride spaces, additional bicycle parking facilities, platform regrading and ancillary facilities such as power supply upgrades, CCTV adjustments and improvements to wayfinding signage. All options included the retention of the existing footbridge and station access stairs in order to minimise impacts to the heritage significance of the station.

The key differences between options focused on alternate station entrances and lift, footbridge and platform access arrangements. These differences are summarised as follows:

- Option 1 proposed retaining the existing footbridge and providing new lifts for access to the existing footbridge at the station entrances and to the island platforms. The existing station access stairs would be retained maintaining the existing access points. The new lifts to the platforms would located adjacent to the west of (and outside) the existing footbridge, Amenities Building and Booking Office. Canopies for weather protection would be provided along the existing footbridge. The Amenities Building and Booking office would be refurbished, including to provide accessible facilities (including a family accessible toilet)
- Option 1b was later developed as a derivative of Option 1. Generally, the key design features of Option 1 were retained, however Option 1b proposed locating the new lifts to Platform 3/4 inside the existing Booking Office to reduce the visual impact of the new lift infrastructure. Weather protection canopies were proposed along the extent of the existing footbridge, however canopies did not extend over the station stairs to ensure impacts to the heritage setting of the station were minimised. This design was informed by specialist heritage advice and assessment
- Option 2 proposed retaining the existing footbridge and the existing station entry locations. The existing stairs to the island platforms would be demolished and a new integrated footbridge structure would be provided, to the east of the existing

footbridge, with new lifts and stairs to each of the island platforms. Canopies for weather protection would be provided along the new and existing footbridges. The Amenities Building would be refurbished to provide accessible facilities (including a family accessible toilet)

- Option 3 proposed the construction of a new separate pedestrian bridge and concourse with new lifts, stairs and new station facilities to the east of the existing footbridge. The existing footbridge would be retained. The station entry locations would be changed to align with the new footbridge with significant upgrades to the station entry precincts proposed, particularly on the northern side. The new pedestrian bridge would require demolition of the existing Sydney Trains railway operations facility which provides demountable buildings and parking for Sydney Trains staff, located on the corner of Loftus Crescent and Station Street (east of the northern station entrance), to allow the construction of the new northern station entrance. New amenities (including a family accessible toilet) would be provided as part of the new pedestrian bridge.

2.3.1 The 'do-nothing' option

Under a 'do-nothing' option, existing access to Homebush Station would remain the same and there would be no changes to the way the station currently operates.

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

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

2.3.2 Assessment of identified options

The design options were assessed in a Multi-Criteria Analysis (MCA) that included consideration of factors such as customer experience, accessibility, engineering constraints, environmental and heritage constraints, modal integration and cost. The weighting of factors and the selection of a preferred option were determined during a MCA workshop with TfNSW, relevant stakeholders (including Sydney Trains) and the project design team. Following the identification of the initial three options, a further option was developed in consultation with heritage specialists to minimise impacts to the heritage aspects of the station.

2.4 Justification for the preferred option

The initial MCA for Options 1, 2, and 3 concluded that the precinct and interchange features of Options 1 and 2 should be adopted and that a preliminary Statement of Heritage Impact should be prepared to ensure impacts to the heritage value of the station were minimised. Following this preliminary assessment, and in consultation with heritage specialists, Option 1b was derived which provided the required access and interchange upgrades while minimising heritage impacts.

Option 1 provided an accessible link from the station entrances to the station platforms and weather protection at both station entrances. This option minimised impacts to the existing form of the station integrating the new lifts with the existing footbridge and buildings. Disadvantages include the potential requirement for temporary stairs at the southern station entrance during construction to maintain station access, limited weather protection, the requirement for a temporary station office during construction and greater temporary impacts on station access during construction in comparison with Option 3.

Option 2 provided an accessible link from the station entrances to the station platforms with increased comfort and weather protection for customers and would have no physical or direct impact on the heritage significance of the Booking Office. This option would require the provision of a new footbridge and concourse to the east of the existing footbridge which would be a new modern addition to the existing heritage aspects of the station. The structure would be large and would dominate views of the station from the east, having a greater visual impact than Option 1. This option also had substantial cost implications in comparison to Option 1. Other disadvantages include having greater temporary impacts on station access during construction in comparison with Option 3.

Option 3 provided improved access to and from the station with the provision of a new pedestrian bridge. This separate structure would have no direct impact to the heritage significance of the existing footbridge, Booking Office and Amenities Building and would have limited impacts to station access during construction in comparison to Options 1 and 2. Option 3 also had substantial cost implications and would require the use of the existing Sydney Trains railway operations facility which provides demountable buildings and parking for Sydney Trains staff, located on the corner of Loftus Crescent and Station Street (east of the northern station entrance), to allow the provision of the new station entrance to the north of the station. The new pedestrian bridge would be a modern addition to the existing heritage aspects of the station. The structure would be large and would dominate views of the station from the east, thereby having a greater visual impact than Option 1 and 2.

Following the initial MCA assessment, Option 1b was developed as a derivative of Option 1 as it would provide the benefits of Option 1 but with less impact to the heritage features of the station. Incorporating the lift to Platform 3/4 inside the Booking Office was considered to have a more positive heritage impact than placing it on the outside of the Booking Office as this would minimise the visual impact of the new lift structure. As such, Option 1b was selected as the preferred option to progress to the next phase of design and planning.

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 easy access upgrade of Homebush Station as part of the Transport Access Program to improve accessibility and amenity 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 four new lifts and upgrades to existing station access stairs to provide access to the existing footbridge
- installation of new canopies along the existing footbridge and lift landings for weather protection
- upgrades to the northern and southern station entrances
- refurbishment of the Amenities Building with a new family accessible toilet and new station office at footbridge level
- refurbishment of the Booking Office with a new lift lobby and new communications room at platform level
- new undercover bicycle rack on the northern side of the station
- provision of two new accessible parking spaces, a new taxi rank with provision for one space and a new kiss and ride space on the southern side of the station
- provision of a new kiss and ride space, a new bus bay and relocation of the existing bus shelter on the northern side of the station
- installation of a new pedestrian crossing on Loftus Crescent on the northern side of the station
- new kerb ramps to provide an accessible path of travel to new and existing interchange facilities
- ancillary works including services diversion and/or relocation, station power supply upgrade, platform regrading, minor drainage works, adjustments to lighting, upgrades to fencing and landscaping, new ticketing facilities including additional Opal card readers, improvements to station communication systems (including CCTV cameras and hearing loops) and wayfinding signage.

Figure 9 shows the general layout of key elements for the Proposal.

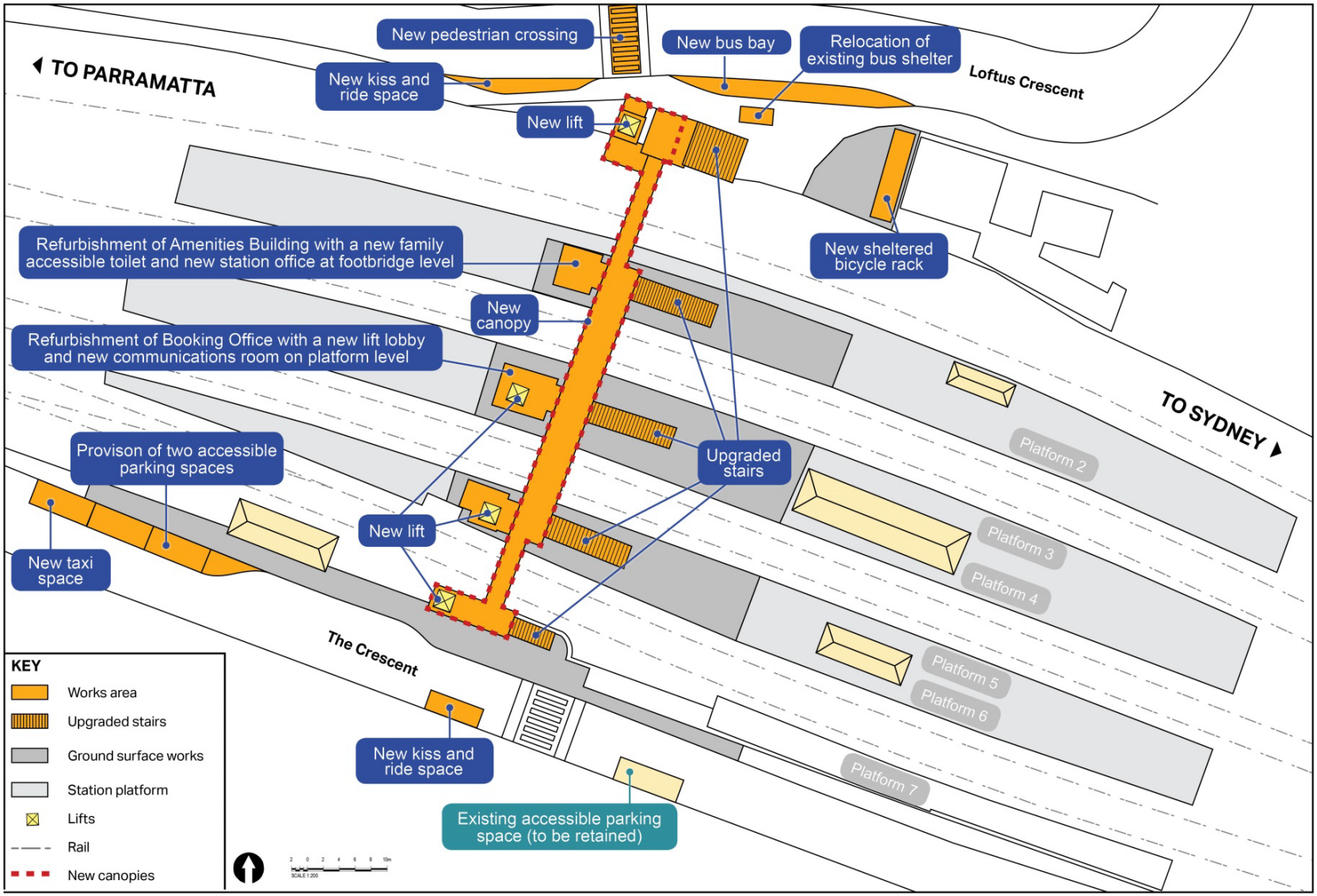

Figure 9 Key elements of the Proposal

(indicative only, subject to detailed design)

3.1.1 Scope of works

Details of the proposed works for station and interchange facilities to take place in and around the station to improve accessibility and customer experience are outlined below.

Station upgrade

The following would be undertaken for the station upgrade:

- installation of four new lifts and associated landings and support structures to provide access to the existing footbridge and station platforms
- upgrades to the existing northern and southern station access stairs including new concreting and safety features such as handrails and tactiles
- new canopies for weather protection installed over both station entrances, the existing footbridge and new lift landings
- refurbishment of the heritage Amenities Building to provide a new family accessible toilet and new station office at footbridge level
- refurbishment of the heritage Booking Office to provide a new lift lobby at footbridge level and a new communications room at platform level
- other platform modifications including new tactiles and regrading (where required) to ensure accessible paths of travel
- additional CCTV coverage, hearing loops and help points on the station platforms
- adjustment to station ticketing facilities (including Opal card readers and top up machines) and passenger information display screens
- services relocation including electrical, communications, signalling cables and overhead wiring (see Section 3.2.8 for further details)
- station power supply upgrade works, which may include an upgrade to the existing transformer (specific power requirements to be confirmed during detailed design)
- new/upgraded wayfinding signage and provision of statutory/regulatory signage
- upgrades to fencing and landscaping for areas affected by the works
- upgrades to existing lighting and installation of new lighting
- temporary works (where required) during construction in order to maintain existing pedestrian 'level of service' including the provision of temporary toilets and ticketing facilities
- temporary site compounds for storage of materials and equipment.

Interchange facilities

The following works would be undertaken for the upgrade of interchange facilities:

- realignment of The Crescent kerbing to provide two new accessible parking spaces, a new taxi rank with provision for one space and a new kiss and ride space on the southern side of the station
- realignment of the Loftus Crescent kerbing to provide a new kiss and ride space, a new bus bay and relocation of the existing bus shelter on the northern side of the station
- installation of a new pedestrian crossing on Loftus Crescent on the northern side of the station

- new kerb ramps to provide an accessible path of travel to new and existing interchange facilities
- resurfacing a section of the footpath along The Crescent on the southern side of the station
- provision of a new undercover bicycle rack on the northern side of the station with capacity for a minimum of 14 bicycles
- upgrades to existing lighting and installation of new lighting
- new wayfinding signage and provision of other signage, including statutory/regulatory signage.

Materials and finishes

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

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

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

- roof, canopies, gutters and downpipes - galvanised steel with Colorbond roof sheeting
- wet areas (family accessible toilet) - gyprock ceiling with low sheen finish
- lifts and associated shafts - concrete base with galvanised steel columns/frame, face brick to match existing brick, weatherboard cladding and glazing
- footpaths - brushed concrete
- rail corridor fencing - palisade and maxiguard with Colorbond paint
- stairs - concrete and steel frame with galvanized steel hand rails.

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

3.1.2 Engineering constraints

There are a number of constraints which have influenced the design development of the Proposal.

Existing structures: the placement and integrity of existing structures was considered during the development of the design – these structures included the existing footbridge, platforms, stairs, Amenities Building and Booking Office.

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: A Dial Before You Dig search has identified a number of utilities in the vicinity of the proposed works including:

- underground telecommunications cabling along Loftus Crescent and The Crescent

- electrical cabling along Loftus Crescent and The Crescent
- water reticulation and associated infrastructure (such as maintenance holes) along Loftus Crescent and The Crescent
- gas mains along Loftus Crescent and The Crescent
- overhead wiring on both sides of the station.

Other considerations: A number of other constraints have also been considered, including:

- heritage – Homebush Station is listed on the State Heritage Register (SHR), the RailCorp Section 170 Heritage and Conservation Register and the Strathfield LEP 2012. The overall form, scale and architectural character of the station has exceptional significance. Individual items of exceptional significance include the brick wall along the southern side of the station, the Booking Office and Amenities Building (refer to Section 6.5 for details of the heritage significance assessment)
- spatial constraint – there is limited area available for construction compounds and use of a large crane would be required to lift construction materials and equipment to the station. Prior to construction, the Contractor would obtain any licences / approvals required for operating a crane within private airspace where required. Proposed works within private airspace would be undertaken in accordance with the requirements of any relevant licences / approvals and in consultation with affected properties
- topography – the natural ground level at Homebush Station grades gently from north and east to south and west of the station
- rail infrastructure – overhead wiring spans the rail corridor at Homebush Station at three locations. Generally, this infrastructure requires a clearance of three metres
- urban design – a number of urban design features have been considered including retaining the existing garden setting and street trees along Loftus Crescent to the north of the station
- access - it is desirable to maintain pedestrian access to the station and across the railway during construction.

3.1.3 Design standards

The Proposal would be designed having regard to the following:

- *Disability Standards for Accessible Public Transport 2002* (issued under the *Commonwealth Disability Discrimination Act 1992*)
- Building Code of Australia (BCA)
- relevant Australian Standards
- Asset Standards 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
- other TfNSW policies and guidelines
- 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 it refers to a corporate target, or is 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 Homebush Station Upgrade. These compulsory initiatives have been reviewed and incorporated into the design (unless otherwise justified) and documented in a Sustainable Design Guidelines checklist that was approved by TfNSW (a summary of the key initiatives is provided in Appendix C). This checklist would be further developed during detailed design.

3.2 Construction activities

3.2.1 Work methodology

Subject to approval, construction is expected to commence in early 2017 and take around 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 identified in Table 1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

Table 1 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling works	• establishment of site compound (i.e. erect fencing, tree protection zones, amenities and plant/material storage areas) • establishment of temporary facilities as required (e.g. temporary ticketing office, temporary toilets etc) • removal of identified vegetation along The Crescent and Loftus Crescent • survey investigations • relocation of services
New lifts and platform upgrades	• partial demolition of existing structures (e.g. footbridge canopy, Amenities Building and Booking Office and stairs) • platform modifications, including piling and foundations for lift shafts • construction of lift shafts, upgrades to stairs, fencing and new canopies over the existing footbridge and lifts • installation of lifts • installation of fixtures, lighting, signage and additional CCTV cameras • platform resurfacing and installation of hearing protection loops
Station building reconfiguration works	• refurbishment of the heritage Booking Office to allow for the new lift, lift lobby, switch room and communications room • refurbishment of the heritage Amenities Building to allow for a new station office, family accessible toilet and staff facilities
Interchange works	• installation of pedestrian crossing and associated kerb ramps at Loftus Crescent • kerb realignment along The Crescent to accommodate a new taxi rank and kiss and ride facilities and accessible car spaces • kerb realignment along Loftus Crescent to accommodate a new kiss and ride area and bus stop bay • installation of a new sheltered bicycle rack at the northern station entrance • installation of wayfinding signage and other statutory/regulatory signage • electrical and power supply upgrade works • landscaping and fencing adjustments
Testing and commissioning	• activities to test and commission power supply, lifts, lighting, new/modifications to station services, ticketing systems, communication and security systems

3.2.2 Plant and equipment

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

- trucks (semi-trailer and tipper)
- generator
- bobcat
- hand tools
- mulcher
- concrete pump
- piling rig
- roller
- concrete truck
- hydreama/hirail (type of truck)
- wacker packer (compacter)
- nail gun
- impact drill
- chainsaw
- excavator (with auger)
- circular saw
- line marking truck
- coring machine
- demolition saw
- jack hammer
- grinder
- manitou (forklift)
- scissor lift
- franna crane
- lighting tower
- mobile crane
- bobcat
- slasher
- plate compactor
- vacuum truck
- cold milling machine

3.2.3 Working hours

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

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm 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 rail shutdowns, which are scheduled closures that would occur for track maintenance activities, 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, motorists and nearby sensitive receivers; and to ensure the safety of railway workers and operational assets. It is estimated that around 13 rail shutdowns would be required to facilitate the following:

- establishment of temporary facilities (e.g. temporary toilets and construction hoardings)
- services investigation and relocation
- demolition of the existing pavement at the station entrances, ramp and stairs
- excavation for the lift shafts and installation of lifts
- installation of piles for the lifts and canopies
- craning in the new lifts and canopies
- erecting the new canopies
- platform re-grading
- upgrades to station stairs.

Out of hours works may also be scheduled outside rail shutdowns (such as for working within the road to minimise traffic impacts).

Approval from TfNSW would be required for any out of hours work and the affected community would be notified in advance as outlined in TfNSW's *Construction Noise Strategy* (TfNSW, 2012c) (refer to Section 6.3 for further details).

3.2.4 Earthworks

The Proposal would require a small amount of earthworks. Excavations and earthworks would generally be required for the following:

- the foundations and pits for the new lift shafts and lifts which would require excavation at each proposed lift location. This would require excavation into soils/fill and shale rock up to a depth of around three metres
- trenching excavation for services within the rail corridor to a minimum depth of one metre on rail property or two metres if crossing beneath the railway
- the construction of upgraded footpaths (e.g. pavement resurfacing), station entrances and kerb ramp installation/realignment works
- other minor civil works including ground levelling from demolition activities and platform regrading, footings and foundations and drainage/stormwater works.

Excavated material would be reused onsite where possible or disposed of in accordance with relevant legislative requirements.

3.2.5 Source and quantity of materials

The source and quantity of materials required 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:

- temporary impacts to pedestrians and rail customers through changes in station access during construction
- potentially higher level of platform congestion arising from restricted access to certain areas of the island platforms (due to construction works or storage/lay down areas)
- higher road safety risk levels associated with construction vehicle-pedestrian interactions
- temporary closure of The Crescent and Loftus Crescent (during rail shutdowns to allow a crane to be used to install the southern lift). Any licences / approvals required for operating a crane within private airspace would be sought and the works would be undertaken in accordance with these approvals in consultation with affected properties, as outlined in Section 3.1.2
- temporary loss in parking availability along surrounding roads including The Crescent and Loftus Crescent due to the delivery of construction material and equipment, use of a crane to install the lifts and upgrades to interchange facilities interruptions to traffic flow on The Crescent and Loftus Crescent, particularly during road works

- minor disruptions to pedestrian/cyclist movements around the station
- a minor increase in traffic on the local road network.

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

3.2.7 Ancillary facilities

A temporary construction compound is required to accommodate a laydown and storage area for materials. The temporary construction compound would likely be located within the paved area at the Loftus Crescent station entrance and the immediately adjacent grassed area to the east of the paved area adjacent to the northern station entrance. Temporary storage/laydown areas may also be required on the island platforms.

A site office will also be required for the Proposal and would likely be located within a rented office space along The Crescent. Locations for the site office would be investigated and determined during detailed design.

The areas nominated for the temporary construction compound and laydown areas are located on land owned by RailCorp (managed by Sydney Trains). Impacts associated with utilising this area have been considered in Chapter 6 including requirements for rehabilitation.

Figure 10 shows the proposed works areas and the construction compound location.

3.2.8 Public utility adjustments

An upgraded electrical supply is required to accommodate the new infrastructure (e.g. new lifts) and would also supply power to the existing station lighting, communication rack equipment, general lighting, ticketing equipment, security and other general power requirements at the station. This would require a new padmount transformer to replace the existing polemount supply as well as other amendments.

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 (such as overhead wiring), however such relocation is unlikely to occur outside of the footprint of the works assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

There are post office boxes on the northern and southern sides of the station on Loftus Crescent and The Crescent. The box on the northern side of the station would be relocated in consultation with Australia Post. The new location would be determined during detailed design.

The box on the southern side of the station would be temporarily relocated during construction in consultation with Australia Post. Final post office box locations would be determined during detailed design in consultation with Australia Post to manage potential access and parking impacts.

Figure 10 Proposed works area

3.3 Property acquisition

The Proposal may require property acquisition to accommodate the new lift at the southern station entrance where there may be a minor encroachment on the footpath of The Crescent. Detailed consultation has been undertaken with Strathfield Municipal Council regarding this issue and would continue during detailed design, where the requirement for property acquisition would be confirmed.

3.4 Operation management and maintenance

The future operation and maintenance of Homebush Station is subject to further discussions with Sydney Trains, TfNSW and Strathfield Municipal Council. Structures constructed under this Proposal on RailCorp land would be maintained by Sydney Trains. However it is expected that adjacent landscaped areas and facilities on Loftus Crescent and The Crescent would continue to be maintained by Strathfield Municipal Council.

4 Statutory considerations

Chapter 4 provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government polices/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 EP&A Act.

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

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

4.2.2 Other NSW legislation and regulations

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

Table 2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
Contaminated Land Management Act 1997 (CLM Act) (NSW)	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 EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated (refer Section 6.8).
Crown Lands Act 1987 (NSW)	The Proposal does not involve works on Crown land.
Disability Discrimination Act 1992 (DDA) (Cwlth)	The Proposal would be designed having regard to the requirements of the DDA.
Heritage Act 1977 (Heritage Act) (NSW)	Relevant sections of the Heritage Act include: • Sections 57 and 60 (approval) where items listed on the SHR 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. Homebush Station is listed on the SHR, the RailCorp Section 170 Heritage and Conservation Register and the Strathfield LEP 2012. The Proposal aims to ensure equitable access outcomes are achieved at Homebush Station in a way that conserves important heritage values and minimises impacts on heritage significance. An approval under Section 60 of the Heritage Act would be required prior to any works proceeding. A heritage assessment and archaeological review has been undertaken for the Proposal and is summarised in Section 6.5. The heritage assessment has indicated 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. However, if unexpected archaeological items are discovered during the construction of the Proposal, all works would cease and appropriate advice sought, as per TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a).
National Parks and Wildlife Act 1974 (NPW Act) (NSW)	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). 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.
Noxious Weeds Act 1993 (NSW)	One noxious weed was identified in the Proposal area (broad-leaved privet). Appropriate management methods would be implemented during construction (refer Section 6.7).
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. In accordance with Part 5.7 of the PoEO Act, TfNSW would notify the EPA of any pollution incidents that occur onsite. The process would be outlined in the CEMP to be prepared and implemented by the Contractor.

Applicable legislation	Considerations
Roads Act 1993 (Roads Act) (NSW)	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 Loftus Crescent and The Crescent which are local roads under the control of Strathfield Municipal Council. Consent under the Roads Act is not required; however Road Occupancy Licence/s would be obtained from Strathfield Municipal Council for road works and any temporary road closures. Refer to Section 6.1 for more information.
Sydney Water Act 1994 (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
Threatened Species Conservation Act 1995 (TSC Act) (NSW)	The site does not contain suitable habitat for listed threatened species or communities and is unlikely to have a significant impact on threatened species or communities (refer Section 6.7).
Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)	TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.
Water Management Act 2000 (NSW)	The Proposal would not involve water use (from a natural source e.g. aquifer, river – only from the network), water management works, drainage or flood works, controlled activities or aquifer interference.

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 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. While consent for the Proposal is not required, the provisions of SEPP 55 have still been considered in the preparation of this REF.

Section 6.8 of this REF contains an assessment of the potential contamination impacts of the Proposal. It is unlikely that any large-scale remediation (Category 1) work would be required as part of the Proposal. However, given the historical use of the station as a rail corridor, there is potential for contaminants to be present within the soils underlying the station. Consideration of potential contamination impacts is provided in Section 6.8.

4.4 Local environmental planning instrument and development controls

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

4.4.1 Strathfield Local Environmental Plan 2012

The Strathfield LEP is the governing plan for the Strathfield Municipal LGA, including Homebush. Figure 11 shows the relevant section of the zoning map from the Strathfield LEP, with the indicative location of the Proposal. Table 3 summarises the relevant aspects of the Strathfield LEP applicable to the Proposal.

Table 3 Relevant provisions of the Strathfield LEP

Provision description	Relevance to the Proposal
Clause 2.3 - Zone objectives and Land Use Table	Under the Strathfield LEP: • the rail corridor is zoned as SP2 Infrastructure – Railway • local businesses, shops and Homebush Public School to the south of the station are zoned B4 – Mixed Use • single and multiple storey residential dwellings to the north of the station are zoned R4 – High Density Residential • there is a small area to the north-east of the station zoned RE1 – Public Recreation including the riparian zone of Powells Creek. The Proposal is consistent with the objectives of the SP2 Infrastructure, B4 Mixed Use, R4 High Density Residential and RE1 Public Recreation zoning.
Clause 5.9 - Preservation of trees or vegetation	Clause 5.9 of the Strathfield LEP is concerned with 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. A discussion of potential impacts to vegetation is discussed in Section 6.7.

Provision description	Relevance to the Proposal
Clause 5.10 - Heritage conservation	Clause 5.10 of the Strathfield LEP aims to conserve the heritage significance of heritage items within the LGA. Homebush Station is listed under Schedule 5 – Environmental Heritage of the Strathfield LEP (and also on the SHR and the RailCorp Section 170 Heritage and Conservation Register). Other heritage items and conservation areas in the immediate vicinity of the Proposal include: • Station Master's House (I39) • Homebush shops (I42) • Former Homebush Post Office (I41) • Homebush Public School (I43) • Village of Homebush Retail Conservation Area (C5). A discussion of potential impacts on heritage is presented in Section 6.5.
Clause 6.2 - Earthworks	Clause 6.2 of the Strathfield LEP aims to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. By virtue of clause 5(3) and 79 of the Infrastructure SEPP, the Proposal is permissible without development consent. Consideration of the potential impacts and mitigation measures for earthworks for the Proposal is outlined in Section 6.8.

Figure 11 Strathfield LEP zoning map

4.5 NSW Government policies and strategies

Table 4 provides an overview of other NSW Government policies and strategies relevant to the Proposal.

Table 4 NSW Government policies and strategies relevant to the Proposal

Policy/Strategy	Commitment	Comment
NSW Long Term Transport Master Plan (TfNSW, 2012a)	The *NSW Long Term Transport Master Plan* 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. The Master Plan would meet a number of challenges to building an integrated transport system for Sydney and NSW, including: • customer-focused integrated transport planning • integrated modes to meet customer needs • getting Sydney Moving Again • sustaining Growth in Greater Sydney. The Master Plan links to NSW 2021, the Metropolitan Strategy for Sydney, the State Infrastructure Strategy, regional and sub-regional strategies, and national plans.	The Proposal implements the following key themes in the Master Plan: • improving customers' journey experience • making better use of existing assets • providing accessible transport to help address social exclusion.
Disability Action Plan 2012-2017 (TfNSW, 2012b)	The *Disability Action Plan 2012-2017* 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. 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.	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.
Sydney's Walking Future - Connecting people and places (TfNSW, 2013b)	*Sydney's Walking Future* outlines the NSW government's efforts to: • 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 and by providing accessible cross-corridor access, hence contributing a relative reduction in local trips via private cars.

Policy/Strategy	Commitment	Comment
Sydney's Cycling Future - Cycling for everyday transport (TfNSW, 2013c)	*Sydney's Cycling Future* outlines the NSW government's commitment to a safe and connected network of bicycle paths as an important part of Sydney's integrated transport system. The government wants to make bike riding a convenient and enjoyable option by improving access to towns and centres, and investing in bicycle facilities at transport hubs.	The Proposal supports the government's Bike and Ride initiative that better integrates bicycle riding with other modes of transport, making it convenient to ride to transport hubs, park bicycles securely and transfer to public transport as part of longer transport journeys. The Proposal includes provision of a new undercover bicycle rack on the northern side of the station with capacity for a minimum of 14 bicycles, in addition to the existing southern bicycle rack which has capacity for six bicycles. In total there would be capacity for at least 20 bicycles around the station once the Proposal is operational.
Rebuilding NSW – State Infrastructure Strategy 2014 (NSW Government, 2014)	*Rebuilding NSW* is a plan to deliver $20 billion in new productive infrastructure to sustain productivity growth in our major centres and regional communities. Rebuilding NSW 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.	The Proposal supports investment in rail infrastructure, and aligns with the reservation of $8.9 billion for urban public transport to support Sydney's population, that is expected to reach almost six million by 2031.
A Plan for Growing Sydney (Department of Planning and Environment, 2014)	*A Plan For Growing Sydney* superseded the draft *Metropolitan Strategy for Sydney 2036*. 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. The Proposal is located in the Central subregion and the priorities relevant for the Strathfield area include: • a competitive economy • accelerated housing supply, choice and affordability and build great places to live • protection of the natural environment and promotion of its sustainability and resilience.	The Proposal is consistent with the objectives of this Plan and would deliver improved travel to and between modes, encourage greater public transport use and better integrate interchanges with the role and function of town centres. The Proposal would also assist in responding to forecasted growth in the region and as such would support growth in residential development and the local economy.

Policy/Strategy	Commitment	Comment
NSW: Making It Happen (NSW Government, 2015)	In September 2015, the NSW Government announced a series of State Priorities as part of *NSW: Making It Happen* (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. *NSW: Making it Happen* focuses on 12 key 'priorities' to achieve the NSW Government's commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services. One of the 12 priorities identified as part of *NSW: Making It Happen* relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.	The Proposal assists in meeting the priority by improving accessibility to public transport and encouraging greater use of public transport.
Community Strategic Plan 'Strathfield 2025' (Strathfield Municipal Council, 2012)	This Plan represents the community's long term vision for Strathfield's future to achieve wellbeing and prosperity for all who live, work, study or visit Strathfield. The Plan is focussed on five key themes including: • Strathfield connections • community wellbeing • promoting a prosperous LGA • balancing sustainable development with enhancement of the natural environment • improving infrastructure and Council services.	The Proposal is consistent with the objectives of this Plan and would 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 improve existing station and surrounding interchange infrastructure and would be designed in accordance with the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) with regard to the principles of ESD.
Community Access Plan 2015 - 2019 (Strathfield Municipal Council, 2015)	This Plan provides a range of actions that Council is committed to undertake to benefit sections of the Strathfield community and increase and address the needs of people with a disability. The Plan ensures that future development within the LGA is compliant with the DDA.	The Proposal would provide an accessible path of travel to the station platforms and improve the associated interchange facilities to provide greater inter-modal connectivity and equitable access for all. The Proposal would also ensure that Homebush Station would meet legislative requirements under the DDA and DSAPT.

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 Homebush Station Upgrade. Section 3.1.4 summarises how ESD has been 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. It presents 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 design development for the Proposal, TfNSW held a number of workshops to develop and discuss concept design options and identify a preferred option with various internal TfNSW stakeholders. Sydney Trains was also consulted.

Two meetings were held with Strathfield Municipal Council in November 2014 and October 2015. The following key issues were raised for consideration during the development of the preferred option:

- consideration of proposed residential development on the northern and southern side of the station and how this would likely increase station patronage
- the role of the existing footbridge at Homebush Station as a connection between each side of the railway line in addition to station access
- consideration of the Community Access Plan prepared by Strathfield Municipal Council in 2015
- existing traffic congestion and unsocial behaviour at the nearby Subway Lane
- ongoing consultation with Homebush Public School during the development of the design of the Proposal.

The preferred option incorporates many of these considerations including access improvements to and within the station and would improve the amenity of the local area.

A further meeting was held with Strathfield Municipal Council in October 2016 to discuss the preferred option. Council reiterated the above key issues as well as the following additional items:

- existing traffic congestion along The Crescent, particularly during school terms
- opportunities for public art to be incorporated at the station
- impacts of construction vehicles on parking availability within the surrounding area
- preference for the pedestrian crossing on Loftus Crescent to be raised
- improvements to landscaping along the boundaries of the rail corridor
- potential cumulative noise and traffic impacts from the construction of future high rise residential development on the northern side of Loftus Crescent.

These issues would be considered during detailed design and construction planning for the Proposal.

5.2 Consultation requirements under the Infrastructure SEPP

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

Table 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
Clause 13 | Consultation with Councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: • 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.	The Proposal includes works that would: • require connections to 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. Consultation with Strathfield Municipal Council has been undertaken in accordance with clause 13 of the Infrastructure SEPP and would continue throughout the detailed design and construction phase.
Clause 14 | Consultation with Councils – development with impacts on local heritage	Where railway station works: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area.	Homebush Station is listed under Schedule 5 – Environmental Heritage of the Strathfield LEP and would be affected by the Proposal. Other heritage items and conservation areas in the immediate vicinity of the Proposal include: • Station Master's House (I39) • Homebush shops (I42) • Former Homebush Post Office (I41) • Homebush Public School (I43) • Village of Homebush Retail Conservation Area (C5). No impact is proposed on these other heritage items. Consultation with Strathfield Municipal Council has been undertaken in accordance with clause 14 of the Infrastructure SEPP and would continue throughout the detailed design and construction phase.
Clause 15 | Consultation with Councils – development with impacts on flood liable land	Where railway station works: • impact on land that is susceptible to flooding – reference would be made to the *Floodplain Development Manual: the management of flood liable land.*	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Council is not required under Clause 15 of the Infrastructure SEPP. Refer to Section 6.9.

Clause	Clause particulars	Relevance to the Proposal
Clause 16 | Consultation with public authorities other than Councils	For *specified development* which includes consultation with the OEH for development that is undertaken adjacent to land reserved under the NPW Act, and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult with could include: • Roads and Maritime Services (Roads and Maritime) • Sydney Trains • OEH.	The Proposal is not located adjacent to land reserved under the NPW Act. Accordingly, consultation with the OEH on this matter is not required. The roads surrounding the Proposal are managed by Strathfield Municipal Council. Accordingly, consultation with Roads and Maritime has not been undertaken. Relevant permits and/or approvals would be obtained from the relevant roads authority prior to / during construction as required.

5.3 Consultation strategy

The consultation strategy for the Proposal was developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and the project team. The consultation strategy 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 is aware of the REF and consulted where appropriate
- provide opportunities for stakeholders and the community to express their views 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 at the station, and to the local community and rail customers, outlining the Proposal and inviting feedback on the REF
- advertisement of the 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

- direct contact with key stakeholders e.g. Homebush Public School, to inform them of the REF display
- consultation with Strathfield Municipal 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 three weeks.

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

1. Strathfield Municipal Council office, 65 Homebush Road, Strathfield
2. Strathfield Main Library, 65-67 Rochester St, Homebush
3. Transport for NSW Office, Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood.

The REF would also be available on the TfNSW website[2]. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email[3]. During this time feedback is invited from the public and stakeholders. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around Homebush Station) plus a 50 metre radius, on 10 August 2016. No Aboriginal heritage items were identified in the search results.

The extensive landscape modification that has occurred across the Proposal area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the Proposal area. Similarly, the high level of disturbance would suggest that the archaeological potential of the area is low. Therefore it was not considered necessary to undertake specific Aboriginal consultation.

5.6 Ongoing consultation

At the conclusion of the public display period for this REF, TfNSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered and responded to by TfNSW before determining whether to proceed with the Proposal (refer 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, Strathfield Municipal 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 to be developed prior to the commencement of construction by the Contractor.

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[2] http://www.transport.nsw.gov.au/projects-tap
[3] projects@transport.nsw.gov.au

6 Environmental impact assessment

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

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

6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment was prepared for the Proposal (AECOM, 2016a). The assessment included a desktop analysis and site inspection on 12 August 2016 of the existing traffic, transport and pedestrian access environment surrounding Homebush Station. Detailed traffic counts and modelling were not considered necessary as the Proposal is focused on the station area and is unlikely to have a major impact on the surrounding road network. The findings of the assessment are summarised in this section.

6.1.1 Existing environment

Homebush Station access

Homebush Station is served by the T2 Inner West and South Line providing connections to the suburban train network. Homebush Station is the 118th busiest station on the Sydney Trains network with approximately 4,240 trips per average weekday recorded in 2014 (Bureau of Travel Statistics barrier counts, 2014). The stations adjacent to Homebush are Flemington (to the west) and Strathfield (to the east).

The station consists of three island platforms each with two platforms and a side platform as described in Section 1.3. Both directions have between four to five services per hour during peak periods.

The main station entrances are from Loftus Crescent to the north and The Crescent to the south. The station is currently accessible by non-BCA compliant stairs on either side of a footbridge which crosses the railway. Stairs provide the only means of access from the footbridge to the island platforms. A ramp is provided to access Platform 7 from The Crescent. The footbridge and stairs also provide an access point for pedestrian and cyclists to cross the railway. There is limited weather protection along the footbridge and stairs, with only a small section of canopy over the footbridge near the Booking Office.

Within the station area there are a number of existing facilities for customers including ticket machines, Opal card readers, female and male toilets (non-accessible) and canopies for weather protection over waiting areas at Platforms 5, 6 and 7.

Road network and traffic

The local road network surrounding Homebush Station is shown in Figure 3 and includes Loftus Crescent, Station Street and The Crescent. These roads are managed by Strathfield Municipal Council.

Loftus Crescent is a local collector road with an east-west alignment (north of the station), connecting to Smallwood Avenue to the west and turning into Station Street to the east. Loftus Crescent is a two lane, two-way street with on-street parking on both sides. Close to the station, parking is only provided on the northern side of the road. The sign-posted speed limit is 50 kilometres per hour.

Station Street is a local street with a north-south alignment (north of the station) which links to Parramatta Road to the north and turns into Loftus Crescent to the south. Station Street is a two lane, two-way street with on-street parking provided on both sides. The sign-posted speed limit is 50 kilometres per hour.

The Crescent is a local collector road with an east-west alignment (south of the station) which provides a connection to Eastbourne Road to the west and Beresford Road to the east. The Crescent is a two lane, two-way street with on-street parking on both sides. Close to the station, parking is only provided on the southern side of the road. The sign-posted speed limit is 50 kilometres per hour with the exception of a school zone (40 kilometres per hour during school zone hours) near Homebush Public School.

Parramatta Road is the nearest major arterial road, is managed by Roads and Maritime and links the Sydney CBD and Parramatta. It has an east-west alignment and is located approximately 100 metres north of the station. It has a six-lane, two-way configuration with a sign-posted speed limit of 60 kilometres per hour.

Parking

There are currently no commuter parking facilities available around Homebush Station. On-street restricted parking is provided on the surrounding local road network including Loftus Crescent, Station Street, The Crescent and Rochester Street. These spaces are located within the local centre, have time restrictions and not available exclusively to rail customers.

An off-street Council car park with timing restrictions is provided off Burlington Road (west of Rochester Street) and motorcycle parking is provided on The Crescent (northern side) on the eastern side of the station.

Three accessible parking spaces are provided in close proximity to the station including:

- the southern side of The Crescent near the station entrance
- the eastern side of Station Street
- within the off-street Council car park around 150 metres south west of the station.

Taxi and kiss and ride facilities

There are currently no taxi or formal kiss and ride facilities provided at Homebush Station.

Three timed parking spaces along the southern side of The Crescent (west of Rochester Street), have been allocated as a pick up and drop off zone during peak hours. This zone is operational from 8:30am to 10am and 2:30pm to 7:30pm from Monday to Saturday.

Short-term parking and no parking / stopping zones on The Crescent and Loftus Crescent within close proximity to the station entrances may be used as informal kiss and ride areas.

Bus services

One bus route currently serves Homebush Station and operates on the southern side of the station along The Crescent. The 408 is operated by Sydney Buses and runs between Burwood to Rookwood via Flemington. Bus services are provided around every hour between 9:40 am to 3:40 pm from Monday to Friday.

NightRide services (late night buses) also stop at Homebush Station. The N60 operates between Town Hall and Fairfield via Homebush and the N61 operates between Town Hall and Carlingford via Homebush.

School buses also use the existing bus stop on The Crescent to pick up and drop off students of Homebush Public School.

The existing bus stop in front of Homebush Public School on the southern side of The Crescent is sheltered, and provides an accessible wheelchair space. The NightRide bus stop

on The Crescent is also sheltered. The bus stop on the northern side of The Crescent (route 408) currently provides seating, but no shelter facility.

School buses also service the existing bus stop on Loftus Crescent on the northern side of the station and this stop is sheltered.

Bicycle network and facilities

Cycle connectivity to Homebush Station is currently limited with no formal cycle routes in the vicinity of the station.

There is an existing bicycle rack with capacity for six bicycles located to the south of the station around 50 metres east of the station entrance on The Crescent. The bicycle rack is not sheltered. There are no formal bicycle racks provided north of the station.

Pedestrian facilities

Pedestrian access to Homebush Station is provided from Loftus Crescent and The Crescent via non-BCA compliant stairs and footbridge. Stairs currently provide the only means of access from the existing footbridge to the island platforms.

Footpaths are present along both sides of Loftus Crescent and The Crescent. There is also a pedestrian path on Rochester Road (connecting to The Crescent) and Knight Street (connecting to Loftus Crescent). The existing footbridge and stairs are unpaid (accessible to the public without a ticket) and provide an access point for pedestrians to cross the railway to/from Loftus Crescent to The Crescent. The existing form of access is currently inaccessible for mobility impaired persons due to the lack of accessible facilities.

To allow safe crossings of roads, a raised pedestrian crossing is available on the southern side of the station on The Crescent which provides direct access to the stairs at the southern station entrance and the ramp providing access to Platform 7.

Two pedestrian crossings are provided at the intersection of The Crescent and Rochester Street, located around 120 metres south west of the station, on the western and southern approach. In addition, pedestrian refuge islands are provided on all approaches to the roundabout on the northern side of the station at Loftus Crescent and Knight Street, around 110 metres north west of the station.

The pedestrian crossings on The Crescent have Tactile Ground Surface Indicators (TGSIs) installed to assist with providing an accessible path of travel.

There are no formal pedestrian crossings or traffic safety measures currently installed on Loftus Crescent.

A pedestrian count undertaken by Parsons Brinkerhoff during the AM peak period in May 2015 to better understand pedestrian movements around the station indicated the following pedestrian patterns:

- a relatively even split between the number of pedestrians entering the station from the northern and southern side
- the majority of pedestrians exit the southern side of the station on The Crescent (around 81 per cent)
- around 22 per cent of pedestrian movements were cross corridor movements.

Figure 12 presents the results of the pedestrian analysis, indicating the directional splits for pedestrians accessing and exiting the station.

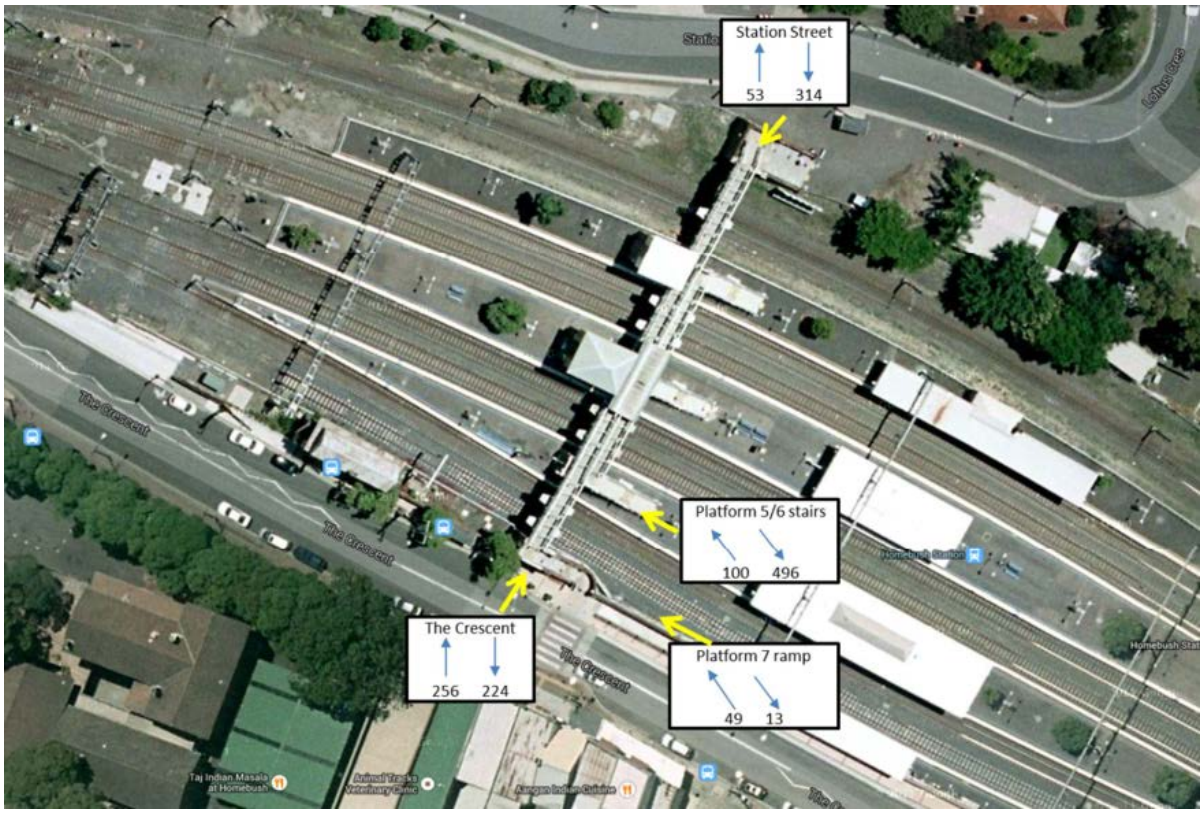

Figure 12 Pedestrian access and exit analysis

(Parsons Brinkerhoff, 2015)

6.1.2 Potential impacts

Construction phase

Customer and public access

Construction work is expected to impact pedestrians and customers given the restricted area in which construction works are to be carried out. There may also be changes to how customers access the island platforms, interchange facilities and adjacent footpaths which could result in longer walking distances and/or higher levels of congestion during peak periods. Construction works would be undertaken in a manner that enables public access routes to the station to be maintained. During reconfiguration of the Booking Office, a temporary ticket office would be installed as close as possible to the existing ticket office.

The station stairs would be partially closed to facilitate upgrades, which include the installation of safety features such as stair nosing, tactiles and handrails. Existing station access via the stairs (to both the island platforms and across the railway line) would be maintained during construction. As access to Platform 7 via The Crescent ramp would not be impacted during construction, impacts are expected to be minimal.

Pedestrian movements on the platforms would be temporarily impacted due to the reduced amount of space from storage/laydown areas required on the station platforms. The reduced space on the platform may increase pedestrian congestion and reduce the amount of standing area for customers. However, the majority of proposed works on the platforms, particularly for the new lifts, would be restricted to the western end of the platform away from the existing platform buildings, canopies and seating where customers are likely to wait for trains. Appropriate directional signage would be provided to minimise any potential impacts to pedestrian movement on the platform.

Platform regrading works would also temporarily impact pedestrian access to, from and around the platform. During re-grading, temporary surfacing would be provided to eliminate trip

hazards for customers using the platforms. Re-grading and re-surfacing works would also be scheduled to be completed during low pedestrian flows (such as night time periods or during rail shutdowns).

During construction and installation of the lift at the southern station entrance, construction hoarding would be required, which would likely extend to the edge of The Crescent road surface. This would temporarily disrupt pedestrian access movements at this location and a temporary walkway would be installed to divert pedestrian flow and maintain access. Access to the station would be maintained during construction and any works to be undertaken in close proximity to existing footpaths would be managed and controlled at all times to ensure that there is no impact to public safety.

Road network and traffic

Traffic generated by construction vehicles, including staff vehicles, is likely to be minimal given the nature of the works proposed and would fluctuate depending on the construction stage. Vehicle types are expected to generally consist of light vehicles from construction workers and heavy vehicle trips for delivery and removal of materials, plant and equipment.

Heavy vehicles would generate around one to 10 movements per day from Monday to Friday, and up to around 20 movements during weekend rail shutdowns. It is expected that this would result in a minimal impact on existing traffic conditions. Minor temporary increases in traffic could be due to:

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

Some works, such as the proposed upgrades to the interchange facilities may require temporary or partial lane closures and/or traffic diversions which may require a Road Occupancy Licence for temporary road closure. Road works would be undertaken progressively and in the minimum area and timeframe required to undertake the activity. Signage would be displayed around work areas to inform the public of any changes.

A section of The Crescent may require temporary closure to allow the use of a crane for the installation of the lifts. This would result in the temporary loss of access along The Crescent in the vicinity of the works during these periods and would be undertaken during low pedestrian and vehicle flows (i.e. weekend rail shutdowns). Partial closure of Loftus Crescent may also be required for the purpose of lift installation and the new pedestrian crossing. Temporary diversions would be determined during detailed design and would be managed with appropriate signage and traffic control, to direct vehicles along the diversions.

It may also be necessary to undertake other construction activities, such as concrete pours and delivery of oversized materials, outside standard construction hours to minimise traffic disruption.

Access for emergency vehicles would be maintained in accordance with emergency vehicle requirements. Emergency services would be advised of all planned changes to traffic arrangements prior to applying the changes.

Overall, provided the proposed traffic management measures are implemented, the likely impact to traffic during construction is expected to be manageable and would not have a major impact on the level of service of the surrounding road network.

Construction vehicle routes

The potential heavy vehicle access routes to Homebush Station likely to be utilised during construction are shown in Figure 13. The station is located near the M4 Western Motorway (east-west), Parramatta Road (east-west) and Centenary Drive (north-south), which are Roads

and Maritime approved B-double routes and provide high clearances and sufficient road widths to accommodate larger vehicles, making them suitable for heavy vehicle routes.

For the Proposal, it is anticipated that the M4 Western Motorway would serve construction vehicles travelling to Homebush Station from the west, Parramatta Road would serve vehicles from the east and west and Centenary Drive would serve vehicles from the north and south.

Heavy vehicle movements required as part of construction for the Proposal near to the Homebush Local Centre and schools, including Homebush Public School, would be restricted during peak traffic periods and school zone hours.

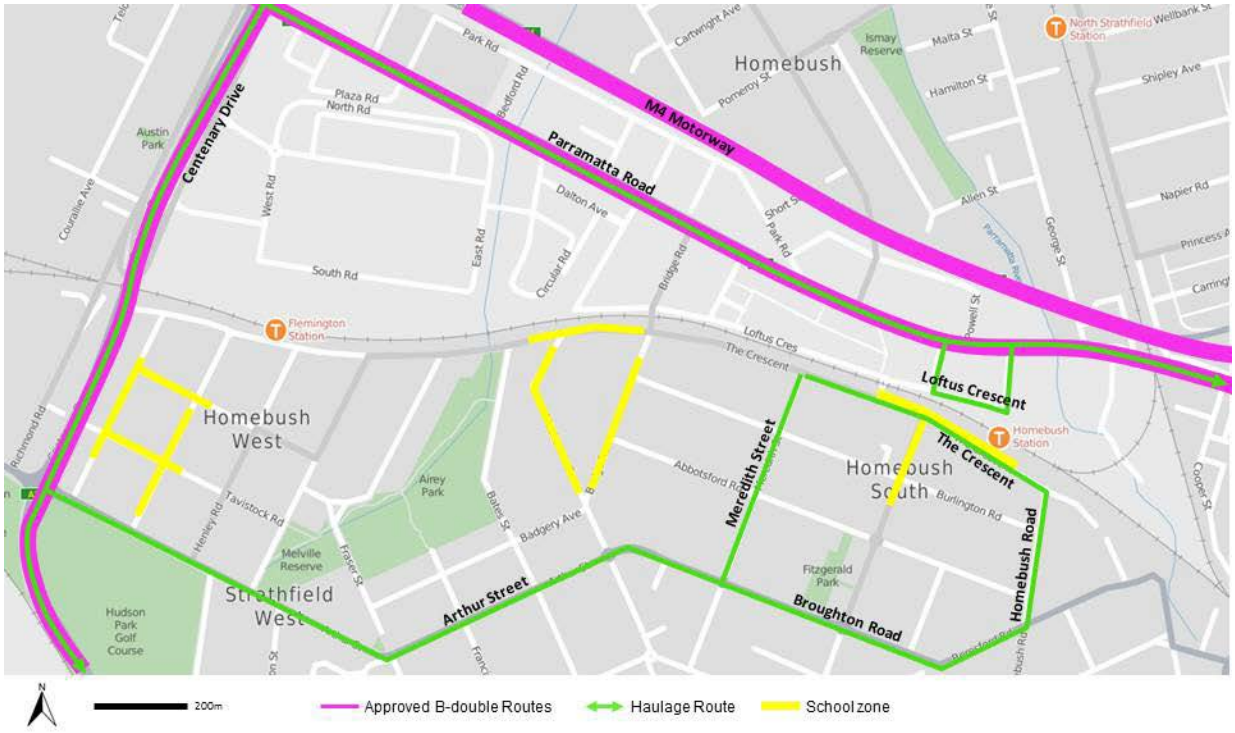

Figure 13 Proposed construction vehicle routes

(indicative only, subject to detailed design)

Parking

During construction, a section of The Crescent may be temporarily closed for access during the use of a crane required for construction activities (e.g. installation of the southern lift and platform lifts). In this location, street parking is not available on the northern side of The Crescent as the area is a dedicated bus and mail zone. These works would likely be undertaken outside of peak periods during a weekend rail shutdown, which would minimise impacts to the community. Loftus Crescent may also be temporarily impacted by the presence of construction machinery, however no impacts to parking are anticipated as parking is not currently available on the southern side of Loftus Crescent.

Both post office boxes would be temporarily relocated during construction to ensure associated mail zones can be access by Australian Post. Temporary and/or permanent relocations of post office boxes would be confirmed in consultation with Australia Post to manage potential impacts.

There may also be a temporary loss of parking during the proposed upgrades to the interchange facilities as work zones are set up around these areas and construction materials and equipment delivered. This would increase the demand for on-street parking within the local network in the short term.

Parking provisions would not be made for staff vehicles within or adjacent to the construction site; instead construction workers would be encouraged to car-pool or utilise adjacent public

transport services. However it is expected a portion of workers would travel via private vehicles which may also marginally increase the demand for on-street parking within the surrounding local streets.

Given the current availability of on-street parking surrounding Homebush Station, the impact to on-street parking demand in the short term would be minor. A construction Traffic Management Plan (TMP) would be prepared and would outline safeguards to be implemented to minimise potential parking impacts during construction.

Taxi and kiss and ride facilities

There are currently no formal kiss and ride zones or taxi spaces provided near Homebush Station. Temporary changes to the pick up and drop off zone are considered unlikely, however would be determined during detailed design and would be managed with appropriate signage and community notification and documented in the TMP.

Bus facilities

Generally, bus services in the vicinity of the Proposal would be minimally affected by construction activities. Minor impacts may occur during off peak times due to road works and temporary road closures (e.g. use of a crane). Existing bus stops would also be unavailable during kerb realignments to The Crescent and Loftus Crescent to relocate the bus stop. Access to the existing (or alternative) bus stop would be maintained throughout construction and any changes would be communicated to the public via signage or appropriate methods.

This would result in reduced speeds and potential diversions, however it is anticipated that buses would continue to service the bus stops on The Crescent and Loftus Crescent for the majority of the construction period. Any diversions or changes to bus services, or temporary relocation of bus stops, would be minimised where possible and adequately sign-posted. Any changes would be undertaken in consultation with bus service operators with notification provided to the community.

Bicycle network and facilities

There would be no impacts to existing bicycle facilities provided at Homebush Station as the existing bike racks on the southern side of the station would not be impacted during the construction phase.

Pedestrian facilities

During construction, there is the potential for temporary disruptions to the existing pedestrian facilities on local roads surrounding the station (including The Crescent and Loftus Street), particularly during the installation of the upgraded interchange facilities. This has the potential for increased safety risks for pedestrians due to possible interactions with construction plant and vehicles.

Potential impacts to pedestrians during construction would be managed through the development of a construction TMP detailing appropriate mitigation measures to minimise potential impacts. The details of these measures would be subject to further consideration during construction planning in consultation with the relevant authorities.

Appropriate signs and/or traffic controllers would be positioned to notify pedestrians of temporary arrangements and assist them in making safe pedestrian movements. Interactions between heavy vehicle movements and pedestrians would be managed by traffic controllers.

Property access

During construction, there is potential for temporary disruptions to private property access for residents and businesses along The Crescent, Loftus Street and Station Street. Property access would be maintained, where possible, to minimise the impact to local residents and businesses. However, during activities such as use of a crane and/or unloading of oversized

materials, short term impacts to property access may be necessary. In such situations, affected occupants would be informed in advance of the scheduled works.

Prior to construction, the Contractor would obtain any licences / approvals required for operating a crane within private airspace where required. Proposed works within private airspace would be undertaken in accordance with the requirement of any relevant licences / approvals and in consultation with affected properties and the Contactor would adhere to all relevant requirements to ensure the safe operation of the crane.

Operational phase

Customer and public access

The Proposal would provide equitable access to Homebush Station for customers with reduced mobility and parents/carers with prams. The Proposal would offer significant benefits to pedestrians including the installation of four new lifts to provide an accessible path of travel to the island platforms, upgraded stairs, new canopies along the existing footbridge and new lift landings. The Proposal would result in positive impacts in terms of contributing towards making railway transport more accessible to the community, would improve customer experience in the vicinity of the station and has the potential to encourage more customers to walk or cycle to the station.

The Proposal has been designed to cater for a daily patronage of 8,447 (which is the projected 2036 daily patronage plus an increase of 15 per cent). During the development of the concept design, a pedestrian assessment was undertaken to confirm that the Proposal would adequately cater for the projected increase in customers in terms of pedestrian flows.

To assess the pedestrian level of service (LoS), Fruin's Pedestrian Flow Rate criteria was adopted, which is the number of pedestrians that pass a point during a specific period of time for a given LoS. This is a qualitative measure of pedestrian comfort and crowding tolerance level. There are six levels of crowding for queuing areas, walkways and stairways, which are expressed in terms of LoS which range from 'A' (best level) to 'F' (worst level).

In the existing conditions and with the Proposal, the existing footbridge and station stairs achieve a LoS 'C' or better during the weekday AM peak with very little congestion expected and no queues forming on any set of stairs. This LoS is considered acceptable under the National Construction Code as determined by the Building Code of Australia.

However, during the weekday PM peak, the existing footbridge would continue to operate at a LoS 'E' and the stairs would operate at a LoS 'C' or worse. This is due to services distributed over four trains during the weekday PM peak resulting in around 190 people alighting each train at Homebush Station. This LoS is considered acceptable as the Proposal would not worsen the existing LoS, but would continue to provide access via the existing footbridge with a width no less than the existing footbridge.

Road network and traffic

The Proposal would assist in making public transport infrastructure more accessible to rail customers and provide an easier transition between transport modes, which has the potential to increase patronage. It is anticipated that the potential additional rail customers would mainly access the station precinct via walking rather than by vehicles. However, the improved kiss and ride facilities would provide formal areas for customer drop-off reducing potential illegal drop-offs which may have impeded road traffic movements. It is anticipated that there may be a small increase in traffic movements resulting from the formalised kiss and ride facilities, however the impact to traffic movements would be minimal given the relatively small volume of traffic that these facilities would generate.

As no commuter parking is proposed, the Proposal would not generate additional traffic movements for people coming to the station by car (excluding kiss and ride).

Overall, the increase in future road traffic associated with increased rail patronage at Homebush Station is expected to be minimal and it is considered that the Proposal would have a negligible impact on traffic in the local road network during operation.

Parking

The Proposal addresses the current lack of accessible parking spaces surrounding Homebush Station by providing two additional accessible parking spaces (in addition to the existing accessible car space) on the southern side of the station on The Crescent. The two new accessible parking spaces are proposed to be located on the northern side of The Crescent, west of the pedestrian crossing. This would result in the loss of three short term (1P) on-street parking spaces.

The proposed kiss and ride area on the southern side of The Crescent would be located in an existing short term (1P) on-street parking space which would result in the loss of one short term (1P) on-street parking space.

The proposed taxi rank on the northern side of The Crescent would be located in an existing short term (1P) on-street parking space which would result in the loss of one short term (1P) on-street parking space.

The proposed kiss and ride area on the southern side of Loftus Crescent would not impact the availability of parking as this area is currently signed as ‘no parking’.

Overall, the Proposal would result in the loss of five timed on-street parking spaces. This loss would have a minor impact on the Homebush Local Centre given the availability of existing timed on-street parking spaces within the area. However it is considered that the positive impacts arising from improved accessibility and upgraded facilities at Homebush Station would outweigh the potential negative impacts associated with the loss of timed parking spaces in the precinct.

Taxi and kiss and ride facilities

The Proposal includes the provision of a taxi rank on the southern side of the station along The Crescent, around 50 metres west of the station.

The Proposal includes the provision of two new kiss and ride areas with kerb ramps installed to provide an accessible path of travel (where required). One kiss and ride area is proposed on the southern side of The Crescent, adjacent to the pedestrian crossing, and one kiss and ride area is proposed on the southern side of Loftus Crescent, adjacent to the northern station entrance.

In summary, the Proposal would address the informal kiss and ride activity currently observed on roads adjoining Homebush Station and would improve accessibility to these facilities (e.g. providing new kerb ramps).

Public transport

The Proposal does not include changes to existing bus services and would not impact on the operation of buses in the vicinity of Homebush Station. While the existing bus stop locations on the northern side of The Crescent and the southern side of Loftus Crescent would be slightly adjusted, this would have a negligible impact on bus customers. No changes to rail services are proposed as part of the Proposal and the operation (service operation or timetabling) of public transport in the vicinity of Homebush Station would not be impacted. The Proposal includes improved interchange facilities and improved pedestrian access to Homebush Station, which may increase rail patronage.

It is anticipated that the additional rail patronage would mainly generate walking trips. However, with improved accessibility to Homebush Station and interchange facilities (on The Crescent and Loftus Crescent), it is anticipated that the proposed formal kiss and ride facilities would be more utilised by the community in and around the precinct.

The existing bus stops on The Crescent and Loftus Crescent do not have TGSIs to indicate boarding points and the northern bus stop on The Crescent for regular bus services is not sheltered. These facilities are not proposed as part of the Proposal, but will be investigated as a potential additional improvement during detailed design.

Bicycle network and facilities

The Proposal would not have an adverse impact on the local bicycle network. The introduction of additional bicycle storage facilities on the northern side of the station is likely to encourage active transport as a mode of access to the station precinct.

The Proposal includes the provision for a new undercover bicycle rack (with a capacity for a minimum of 14 bicycles) near the northern entrance. In addition to the existing bicycle rack that has capacity for six bicycles near the southern station entrance, there would be capacity for at least 20 bicycles which would meet the storage requirements for the station. This is consistent with the objectives of the NSW Government's Bike and Ride initiative as identified in *Sydney's Cycling Future*, which encourages improved cycling facilities at transport interchanges and better integrating bicycle riding with other modes of transport.

Additionally, the increase in bicycle storage capacity is likely to minimise informal bicycle parking along fences and railings.

Property access

The Proposal is not expected to adversely impact on existing access to properties in the vicinity of the station. It is anticipated that the provision of formalised kiss and ride facilities would reduce the number of people currently using existing property access points along Loftus Crescent to set-down/pick-up.

6.1.3 Mitigation measures

A construction TMP would be prepared by the Contractor in consultation with TfNSW and provided to Strathfield Municipal Council. The construction TMP would be the primary tool to manage potential traffic and pedestrian impacts associated with construction. The construction TMP, at a minimum, would include:

- procedures for preparing and implementing Traffic Control Plans (TCPs) for any detours or traffic controls to manage temporary road disruptions
- final construction traffic access routes, site compound(s), contractor parking and loading zones
- access routes to and from the local road network
- scheduling of works/deliveries to avoid peak commuter and school times and limiting works in the road carriageway as much as practicable to limit parking losses and maintain customer access to the station
- measures to:
    - limit temporary parking losses
    - maintain customer access to and from the station
    - maintain private property access unless otherwise agreed
    - identify changed traffic/pedestrian conditions including details of construction signage including signposts and variable message signs, traffic controllers and other community notifications.

The following mitigation measures would also be implemented:

- potential improvements to bus stops on The Crescent and Loftus Crescent would be considered during detailed design. This would include as a minimum the potential

installation of Tactile Ground Surface Indicators (TGSIs) to indicate boarding points, the provision of wheel chair spaces and the provision of a cover for weather protection for the bus stop on The Crescent

- heavy vehicle movements in proximity to the Homebush Local Centre and schools, including Homebush Public School, would be restricted during peak times and school zone hours
- where possible, access to the Australia Post boxes on The Crescent and Loftus Crescent would be maintained and temporary post boxes provided where required to maintain postal services in these locations
- communication 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 construction works.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.2 Urban design, landscape and visual amenity

A Visual Impact Assessment was undertaken for the Proposal (AECOM 2016b). The assessment included desktop analysis, a site inspection on 26 August 2016 and creation of photomontages. The photomontages provide an indication of what the Proposal may look like from key viewpoints once complete, and demonstrate the likely bulk and scale of the Proposal elements. Materials and finishes are indicative and would be further investigated during detailed design.

The Visual Impact Assessment was prepared in accordance with the R*oads and Maritime Environmental Impact Assessment Practice Note – Guideline for Landscape Character and Visual Impact Assessment* (Roads and Maritime, 2013). In accordance with this guideline, an impact grading matrix was used to assess both landscape and visual impacts. The sensitivity and magnitude of the impact was determined to produce a combined impact rating of negligible, low, moderate and high (refer to Table 6). The findings of the assessment are summarised in this section.

Table 6 Landscape character and visual impact grading matrix

SENSITIVITY \ MAGNITUDE	HIGH CHANGE	MODERATE CHANGE	LOW CHANGE	NEGLIGIBLE CHANGE
HIGH	HIGH	HIGH - MODERATE	MODERATE	NEGLIGIBLE
MODERATE	HIGH - MODERATE	MODERATE	MODERATE - LOW	NEGLIGIBLE
LOW	MODERATE	MODERATE - LOW	LOW	NEGLIGIBLE
NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

6.2.1 Existing environment

Landscape character

The landscape character surrounding Homebush Station is typical of a suburban residential setting and a small local commercial centre. Residential areas to the south and north west of the station consist of low density housing generally comprising single and double storey dwellings. To the north east of the station, high density housing borders the railway corridor and the northern mixed use zone. The local centre to the south of the station contains Homebush Public School and several shops, cafes and small businesses.

Station Buildings at Homebush Station include:

- the Booking Office which is a two storey building on the middle island platform and houses the station services; ticketing, staff, CCTV rack and communications
- the Amenities Building, which is a two storey building on the northern island platform and contains a store room and public amenities.

These buildings collectively demonstrate a former era of travel, communication and trade.

They are prominent visual elements of Homebush Station along with the existing footbridge and canopy, platform buildings, stairs, steel gantries and associated overhead wires.

Mature trees are located along the station platforms and there are sparsely planted trees located along the northern fence line adjacent to Loftus Crescent, including a mixture of exotic and native species which provide some screening of the railway from residential areas to the north. There are also sparsely planted trees along the southern fence line adjacent to The Crescent. The rail corridor is primarily bare of vegetation with the exception of some minor weed cover.

Visual receivers

Visual receivers are individuals and/or groups of people whose views may be affected by the Proposal. These include users of residential dwellings, commercial properties and open space and generally comprise residents, rail customers, motorists and pedestrians. Figure 14 represents the area that is likely to be visually affected by the Proposal.

Ten visual receiver locations have been identified to represent key viewpoints to and from the Proposal. As part of the Visual Impact Assessment, an assessment was undertaken to understand the potential impacts on views as a result of the Proposal at these locations. These locations are described in Table 7 and shown in Figure 15.

Table 7 Impact assessment for visual receivers

No.	Visual receiver	Description
1	Corner of The Crescent and Homebush Road	To assess the impact of changes on residential neighbours
2	The Crescent	To assess the visual impact on residential neighbours
3	The Crescent	To assess the impact of the changes on pedestrians and users of the Homebush Medical Centre
4	The Crescent	To assess the visual impact on commercial neighbours and pedestrians on the southern side of The Crescent
5	The Crescent	To assess the impact of the changes on pedestrians adjoining Homebush Public School

No.	Visual receiver	Description
6	Corner of The Crescent and Rochester Street	To assess the visual impact on pedestrians and commercial neighbours at the corner of The Crescent and Rochester Street
7	Corner of Loftus Crescent and Knight Street	To assess the visual impact on residential neighbours at the corner of Loftus Crescent and Knight Street
8	Loftus Crescent	To assess the visual impact on residential neighbours on the northern side of Loftus Crescent
9	Loftus Crescent	To assess the visual impacts on residential neighbours and pedestrians, directly opposite the station entrance, on the northern side of Loftus Crescent
10	Station Street	To assess the visual impact on residential neighbours on the eastern side of Station Street

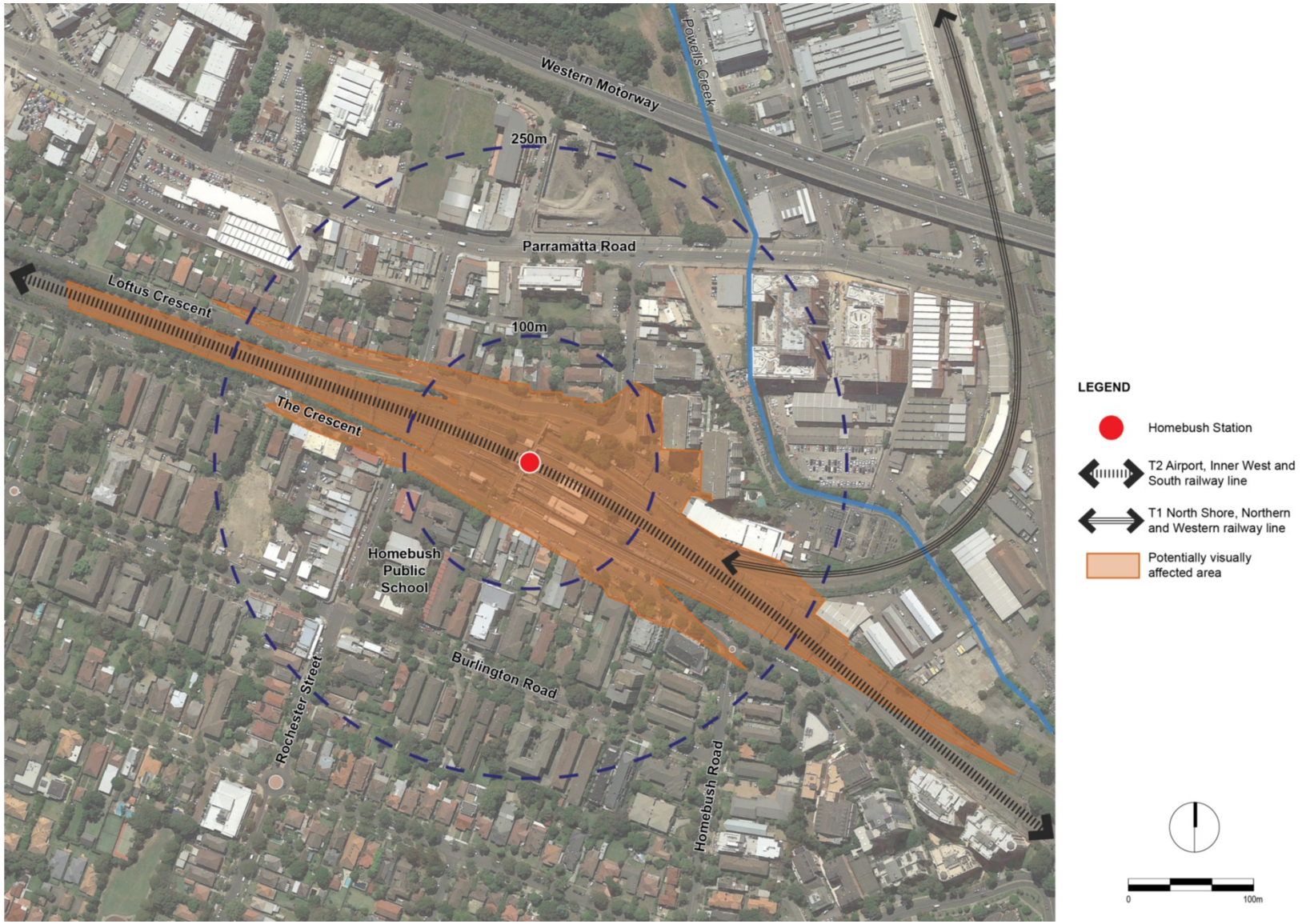

Figure 14 Visual envelope map showing potentially visually affected area

Figure 15 Visual impact assessment receiver locations

6.2.2 Potential impacts

Landscape character assessment

Five landscape character zones were determined as representative of the key land uses surrounding Homebush Station, including:

- residential
- high density residential
- infrastructure corridor
- local centre and heritage
- mixed use.

A landscape character assessment was undertaken as part of the Visual Impact Assessment (AECOM, 2016b) to determine the impacts of the Proposal during construction and operation to the five landscape character zones identified (refer to Figure 16).

Generally, visual impacts of the Proposal on the majority of the identified landscape character zones would be low. The Proposal would have a negligible impact on the mixed use zone to the north of the station along Parramatta Road, and the local centre and heritage zone to the south west of the station would experience a high impact as the Federation precinct to the south of the station is considered to have a high townscape character and quality which are potentially not well matched with the form, line, colour and materials of the proposed architectural elements.

The proposed works are relatively minor and would be most noticeable during construction. During operation, the Proposal would result in a minor change in landscape character. While new elements would be introduced to the environment as part of the Proposal, including the new lifts and canopies, these elements are considered to be consistent with railway station infrastructure and would be designed in accordance with the UDP to manage potential visual impacts.

A summary of potential impacts to landscape character zones, utilising the impact grading matrix previously discussed, is provided in Table 8.

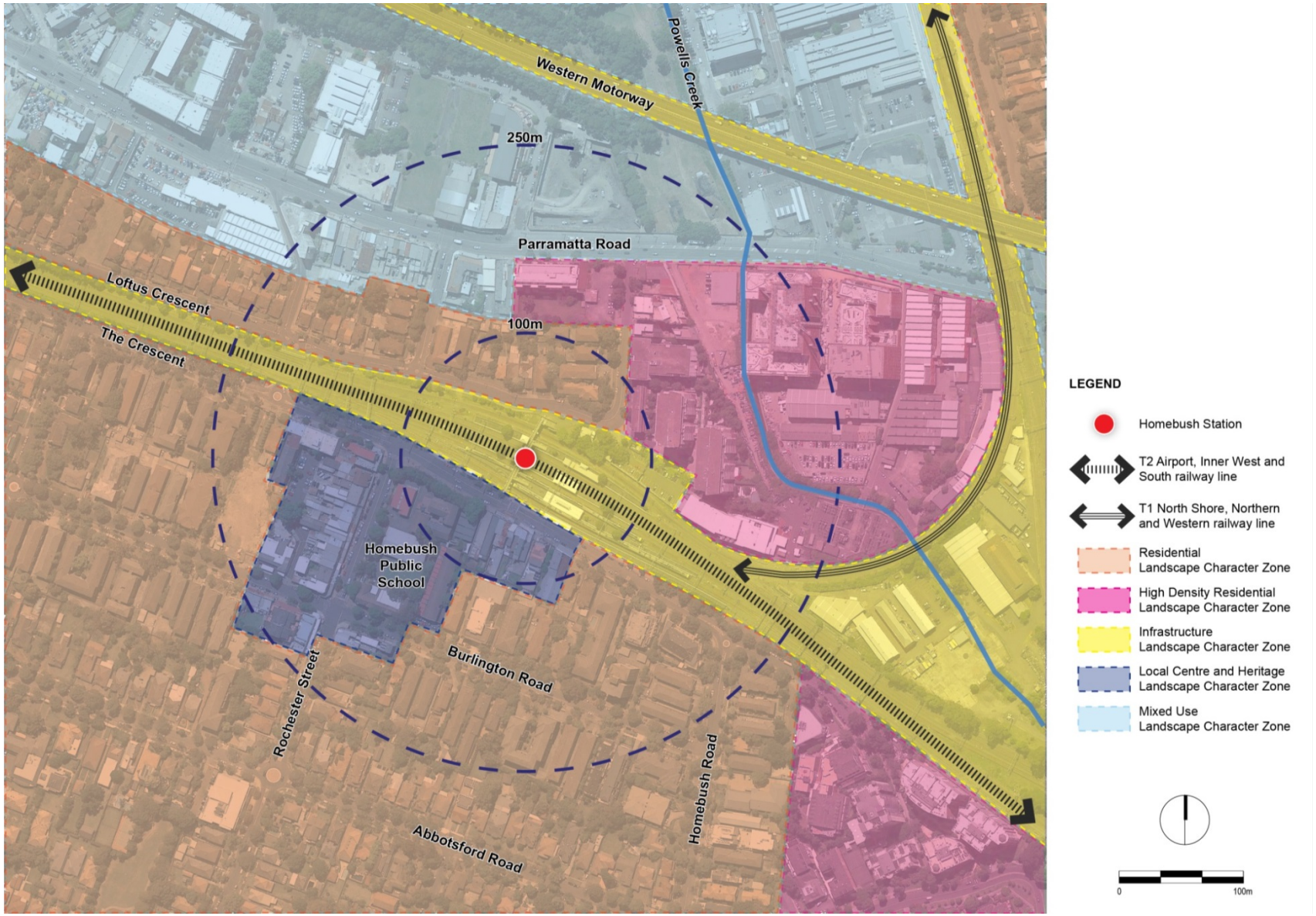

Figure 16 Landscape character zones

Table 8 Impacts to landscape character zones

Zone	Potential impacts	Impact assessment	Rating (refer to Table 6)
Residential landscape character zone	*Construction* • presence of temporary construction compound located to the north of the station on Loftus Crescent • temporary fencing and hoarding, road barriers, signage, scaffolding, temporary ticketing office, toilets and machinery (such as cranes) • road works for the installation of the new pedestrian crossing, kiss and ride bays, bus shelter and seats would be visible in the residential landscape character zone. *Operation* • visual impacts would be generally characterised by new lifts, canopies and upgraded station access stairs. To achieve clearances for safety and rail operational requirements, the top height of the new infrastructure would be approximately 9.5 metres above existing ground level which would be visible to residents along Loftus Crescent to the north of the station.	The upgrade work is relatively minor and would be most noticeable as a landscape character impact in the short term (i.e. during construction). During operation, the Proposal would represent a minor change to this landscape character zone given the distance to receivers, the small footprint of the lift shafts and that the proposed design and materials would maintain consistency with the existing station.	Low

Zone	Potential impacts	Impact assessment	Rating (refer to Table 6)
High density residential landscape character zone	*Construction* • presence of temporary construction compound located to the north-east of the station on Loftus Crescent • temporary fencing and hoarding, road barriers, signage, scaffolding, temporary ticketing office, toilets and machinery (such as cranes). *Operation* • the visual change would be limited to the upper levels of the high rise apartments located at the corner of Station Street (north-east of Homebush Station) which have direct views of the Proposal from their balconies and windows • the removal of seven small exotic trees within and directly north-east of the rail corridor would potentially open up views to the station, however this is localised to a very small area and the change in character would be likely to impact only a small number of residences in lower level apartments, and is not considered to be a significant impact on landscape character.	The upgrade work is relatively minor and would be most noticeable as a landscape character impact in the short term (i.e. during construction). During operation, the Proposal would represent a minor change to this landscape character zone given the distance to receivers, the small footprint of the lift shafts and presence of screening from existing trees and buildings. The removal of seven small exotic trees within and directly north-east of the rail corridor would have minimal impact as the Proposal would enhance the visual amenity of this landscape character zone.	Low

Zone	Potential impacts	Impact assessment	Rating (refer to Table 6)
Infrastructure corridor landscape character zone	*Construction* • temporary fencing and hoarding, road barriers, signage, scaffolding, temporary ticketing office, toilets and machinery (such as cranes). *Operation* • impacts would generally comprise relatively minor changes to a small section of a larger railway corridor • the upgrade includes new infrastructure elements including new lifts and canopies and upgrades to the existing station stairs. The new lifts at each station entrance and throughout the station would exhibit scale and bulk over the existing infrastructure. The new infrastructure would be a prominent architectural element of the character zone.	The upgrade works are relatively minor and would be noticeable as a landscape impact in the short term, creating a greater level of impact during construction due to the introduction of temporary fencing, hoarding, road barriers, signage, scaffolding, temporary toilets, and ticketing office. The change during operation would, in most cases, be only visible in the area immediately adjacent to the Proposal and the change is in keeping with the existing landscape character and use. The addition of relatively few contemporary architectural elements provides an unobtrusive link to the heritage features of the station.	Low

Zone	Potential impacts	Impact assessment	Rating (refer to Table 6)
Local centre and heritage landscape character zone	*Construction* • temporary changes during construction, e.g. temporary toilets, site compounds, temporary facilities, hoardings and crane/s. *Operation* • removal of 10 trees along The Crescent, Loftus Crescent and the station platform has the potential to open up views to the station • the upgrade includes new infrastructure elements including new lifts and canopies and upgrades to the existing station stairs. The new lifts at each of the station entrances and throughout the station would exhibit increased scale and bulk over the existing infrastructure. The new infrastructure would be a prominent architectural element of the character zone and designed to minimise bulk and scale.	This landscape character zone comprises a highly visited area and is activated by the nearby station, which puts emphasis on this area as a gateway to the surrounding residential areas and beyond. The Federation precinct to the south of the station is considered to have a high townscape character and quality which are potentially not well matched with the form, line, colour and materials of the architectural elements of the Proposal. Notwithstanding, the change would generally only be visible in the area immediately adjacent to the Proposal and the change is in keeping with the existing landscape character and use. The overall heritage impact of the Proposal has been assessed as neutral (Orwell & Peter Phillips, 2016). Although the new structures would change the appearance of the station and remove some significant fabric, they would facilitate its ongoing use for its original purpose and will maintain the consistency of design and materials that has characterised the station since its construction in 1892.	High
Mixed use landscape character zone	The mixed use landscape character zone is visually isolated from the changes due to the surrounding built form and existing vegetation.	Views from this landscape character zone would not be available to the Proposal and this zone is not located within or adjacent to the Proposal.	Negligible

Visual impact assessment

Construction phase

Temporary elements likely to be introduced into the visual environment during the construction period include:

- fencing and hoarding
- road barriers and signage
- temporary ticketing office and toilets

- crane and other construction equipment/plant
- site office and amenities.

Night works are also likely to be required for the Proposal which would involve temporary lighting to facilitate the works. Lighting installations would be placed to avoid light spill to adjoining road corridors and residential areas.

Construction activities would be temporary and transient in nature. To the south, views towards construction activities would be visible to the west of the existing footbridge, where the existing masonry walls of the station and stairs do not provide screening to this area. Views from the north would be partially blocked by the existing footbridge, however the temporary construction compound to the north of the station along Loftus Crescent would be visually prominent.

The overall visual impact of the construction of the Proposal is considered to be low, given that construction activities would be temporary and transient in nature.

Operational phase

An assessment of the visual sensitivity and magnitude of change at each visual receiver location (refer to Figure 15) was undertaken for the operational phase of the Proposal, and the results of this assessment are provided in Table 9. Figure 17 to Figure 22 provide photographs of existing views to Homebush Station from three locations along with an indicative photomontage of the Proposal as viewed from that location. The photomontages are conceptual, however they illustrate the likely visual changes and focus on viewing the Proposal in the wider setting in terms of bulk and scale, and at a pedestrian view-level, which is particularly relevant to visual impact assessment. The materials and finishes shown are indicative only and would be further investigated during detailed design.

Table 9 Operational visual impact assessment

No.	Visual receiver	Sensitivity	Magnitude	Rating (refer to Table 6)
1	Corner of The Crescent and Homebush Road	The sensitivity would be low within the context of a low number of residents who would have highly oblique views towards the Proposal.	The magnitude of change would be low. Views towards the Proposal would be substantially screened and filtered by existing street tree planting along The Crescent.	Low
2	The Crescent	The sensitivity to the Proposal is low as it is expected that a low number of residents would have direct views to the Proposal.	The magnitude of change would be low. Views toward Homebush Station are partially screened by existing street tree planting along The Crescent. The Proposal would generally be expected to have low levels of visibility from this location, with only the top of the new footbridge canopy and lifts visible.	Low

No.	Visual receiver	Sensitivity	Magnitude	Rating (refer to Table 6)
3	The Crescent (refer to Figure 17 and Figure 18)	The sensitivity would be moderate. Pedestrians and users of the Medical Centre would have direct and immediate views towards Homebush Station.	The magnitude of change would be moderate to high in the context of the heritage setting/place. The Proposal would form visually prominent elements along the northern side of The Crescent. The Proposal would introduce new architectural elements (i.e. new lifts and canopies and upgraded station access stairs) which complement the scale and form of the commercial buildings adjoining Homebush Station. New architectural elements would be well considered; respect heritage values and provide amenity benefit to the streetscape.	High to moderate
4	The Crescent	The sensitivity of the Proposal would be moderate. Commercial neighbours and pedestrian users would experience direct views in close proximity to the Proposal.	The magnitude of change would be high. Views from this location would be detailed and include key built elements including the new lifts and canopies. The visual prominence of the Proposal elements would be accentuated by being silhouetted against the sky. Receiver numbers would be high, however the sensitivity of these receivers to the Proposal is considered to be low because views would be transitory. The Proposal would introduce new architectural elements which complement the scale and form of the existing commercial and residential buildings adjoining the station.	High to moderate
5	The Crescent	The sensitivity would be moderate. Pedestrians and users of Homebush Public School would have direct and immediate views towards the Proposal.	The magnitude of change would be moderate. The Proposal would form visually prominent elements along the northern side of The Crescent. New architectural elements would be well considered, respect the heritage values and provide amenity benefit to the streetscape.	Moderate

No.	Visual receiver	Sensitivity	Magnitude	Rating (refer to Table 6)
6	Corner of The Crescent and Rochester Street	The sensitivity would be low, comprising pedestrians and commercial neighbour views.	The magnitude of change would be low. Visible portions of the Proposal would largely be restricted to the southern side of the station which would be partially screened by existing vegetation and other station infrastructure (including the Signal Box). Receiver numbers would be low and views would be transitory. The Proposal would introduce well considered architectural elements which would respect the heritage values of the station.	Low
7	Corner of Loftus Crescent and Knight Street	The sensitivity would be low. Residential receivers and pedestrian views would be indirect and seen from a distance.	The magnitude of change would be low. The Proposal would generally be expected to have low levels of visibility from this location, with only a small portion of the northern most lift and top of the footbridge canopy visible.	Low
8	Loftus Crescent (refer to Figure 19 and Figure 20)	The sensitivity would be moderate within the context of a low number of residents which would comprise highly oblique views towards the Proposal.	The magnitude of change would be moderate. Visible portions of the Proposal would largely be restricted to the northern end. The Proposal would introduce well considered architectural elements which are complementary to the scale and form of adjoining residential buildings.	Moderate
9	Loftus Crescent	The sensitivity of the residential receivers is high due to the close proximity to the Proposal. Views would be direct and from the primary place of residence, a view in which the receiver would have a proprietary interest.	The magnitude of change to the view seen from this receiver location is moderate. Views from this location would be detailed and include key built elements such as new canopies and lifts. However, the Proposal would introduce constructed elements which complement the scale and form of the existing infrastructure adjoining the station and would comprise well considered architectural elements.	High to moderate

No.	Visual receiver	Sensitivity	Magnitude	Rating (refer to Table 6)
10	Station Street (refer to Figure 21 and Figure 22)	The sensitivity of receivers would be high within the context of a relatively high number of residential receivers from this location. Upper level views toward Homebush Station would be expected from the high rise residential apartments along the eastern side of Station Street. However, the station would be likely to only comprise a small component of a much larger view from these elevated locations.	The magnitude of change to the view seen from this receiver location is moderate. Views from this location would be detailed and include key built elements such as new canopies and lifts.	High to moderate

Figure 17 Receiver Location 3 – existing view looking north west across The Crescent to Homebush Station

Figure 18 Receiver Location 3 – Photomontage 1 – proposed view looking north west across The Crescent to Homebush Station

Figure 19 Receiver Location 8 – existing view looking south-east along Loftus Crescent to Homebush Station

Figure 20 Receiver Location 8 – Photomontage 2 - proposed view looking south-east along Loftus Crescent to Homebush Station

Figure 21 Receiver Location 10 – existing view looking south-west from Station Street to Homebush Station

Figure 22 Receiver Location 10 – Photomontage 3 - proposed view looking south-west from Station Street to Homebush Station

Receiver locations 4, 9 and 10 are likely to experience a high to moderate visual impact. Overall, however, the Proposal is considered to have a moderate to low visual impact on the majority of people living, working in or travelling through the urban landscape surrounding Homebush Station during operation.

6.2.3 Mitigation measures

The overall visual impacts of the Proposal have been determined to range from low to high for the landscape character and surrounding visual receiver locations. Mitigation measures would be considered during design development and construction planning to minimise the level of visual impact of the construction and operation phases of the Proposal.

The detailed design of the Proposal is to be undertaken with reference to the recommendations included in the Visual Impact Assessment (AECOM, 2016b) which are included in the list of proposed mitigation measures in Section 7.2, and include:

- further design refinement of the new canopies, columns and fascia edge to minimise bulk and height and ensure the design is consistent with the heritage setting of the station
- consideration of a roofing type that is visually congruent with the period roofing (CEMP, 2005) for the lifts at the station entrances
- further consideration of the use of a more historically appropriate and relevant material for the lifts and canopy roofs
- selection of materials and colour finishes for new elements of the Proposal to minimise the bulk of structures
- design of new elements to achieve an architectural character that is complementary to existing elements rather than contrasting
- consideration of street tree plantings along the southern side of The Crescent (using period Brush Box) either to the whole street frontage or the commercial area to increase the amenity of this area
- selection and location of new tree plantings along Loftus Crescent that may provide partial screening or backdrop setting for constructed elements from surrounding receiver locations (such as receiver locations 4 and 9)
- design lighting to minimise upward spread of light near to and above the footbridge. Care should be taken when selecting luminaires to ensure that light spill and glare are kept to a minimum
- provision of an attractive public space that acknowledges the existing mixed use commercial development to the south of the station and creates attractive station entrances
- design of street furniture to consider Strathfield Municipal Council guidelines as relevant
- disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal to maintain screening of views.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.3 Noise and vibration

A Noise and Vibration Impact Assessment was undertaken for the Proposal (AECOM, 2016c). The assessment included establishing the existing background noise levels, construction noise management levels and vibration limits in the vicinity of Homebush Station. Surrounding

sensitive receivers that may be impacted by construction noise and vibration have been identified and mitigation measures have been recommended, where necessary, to reduce and manage noise and vibration impacts from the Proposal.

As operational noise levels are expected to remain largely unchanged, no quantitative modelling of operational noise impacts was undertaken. The findings of the assessment are summarised in this section.

6.3.1 Existing environment

Sensitive noise receivers

Twenty nine residential receivers and twenty two non-residential receivers were selected to represent the noise impacts within areas likely to have similar background noise levels as shown in Figure 23.

The closest residential receivers are located on Loftus Crescent (e.g. R1 and R2) and The Crescent (e.g. R3) between 20 and 50 metres from the Proposal. Other nearby residential receivers are located on Station Street, Knight Street, Burlington Street and Rochester Street.

The representative non-residential receivers included in the assessment included:

- Substation, Columbia Lane, Homebush (N1)
- Taj Indian Masala at Homebush, 25 The Crescent, Homebush (N2)
- Homebush Medical Centre, 17 The Crescent, Homebush (N3)
- Homebush Public School, Rochester Street, Homebush (N4)
- Strathfield Substation, 8 Parramatta Road, Homebush (N5)
- Punjab Halal Meats & Groceries, 1 Rochester Street, Homebush (N6)
- Homebush Medical Practice, 16 Rochester Street, Homebush (N7)
- Pre-Uni New College, 5 The Crescent, Strathfield (N8)
- Jehovah's Witness Kingdom Hall, 14-18 Homebush Road, Strathfield (N9)
- Strathfield Main Library, 65-67 Rochester Street, Homebush (N10)
- Uniting Church in Australia, 4 Meredith Street, Homebush (N11)
- Seminary of the Good Shepherd, 58 Abbotsford Road, Homebush (N12)
- St Anne's Anglican Church, 38 Homebush Road, Strathfield (N13)
- Hoosh Childcare, 25 Broughton Road, Strathfield (N14)
- Albert Road Medical Centre, 60 Albert Road, Strathfield (N15)
- Sister Disciples of the Divine Master, 55-57 Broughton Road, Strathfield (N16)
- Strathfield Girls High School, 3 Oxford Road, Strathfield (N17)
- Fraternity of the Holy Cross, 55 Homebush Road, Strathfield (N18)
- Latvian Lutheran Church, 30 Bridge Road, Homebush (N19)
- Saint Matha's School, 88 Churchill Avenue, Strathfield (N20)
- Homebush Boys High School, 29 Bridge Road, Homebush (N21)
- Saint Martha's Catholic Church, 66 Homebush Road, Strathfield (N22)

The closest non-residential receivers are located on The Crescent (N1 to N4). Homebush Public School is also located on the corner of The Crescent and Rochester Street around 30 metres from the Proposal.

To assist in determining noise criteria for the receivers surrounding the Proposal, two noise catchment areas (NCA) were identified. Both of the NCAs have a similar existing noise environment. The NCAs are shows in Figure 23.

Figure 23 Representative receiver locations and noise catchment areas (NCAs)

Background noise levels

Unattended and attended noise monitoring was undertaken in March 2016 at two representative receiver locations within each NCA (NCA 1 – 22 Loftus Crescent, and NCA 2 – 10 Melrose Street).

Monitoring determined that the existing noise environment within NCA 1 is dominated by traffic noise from the Western Motorway and Parramatta Road to the north, rail traffic to the south and noise generated by the use of the commercial properties.

The existing noise environment within NCA 2 is characterised by local road traffic noise. Traffic noise was typically louder in NCA 1 compared to NCA 2, likely due to the size of the roads and greater number of commercial properties (and associated vehicle movements).

These characteristics are typical of a suburban environment. For NCA 2, the evening and night time background levels were higher than the daytime background levels, likely due to a traffic peak in the evening as people travel home from work. A summary of the existing background noise during the day, evening and night for both NCAs is provided in Table 10.

Table 10 Existing background and ambient noise levels (dB(A))

NCA	Period[1]	Rating Background Level (RBL) (L_{90})[2]	Ambient noise levels (L_{Aeq})[3]
NCA 1	Day	42 dB(A)	61 dB(A)
	Evening	41 dB(A)	60 dB(A)
	Night	35 dB(A)	56 dB(A)
NCA 2	Day	40 dB(A)	55 dB(A)
	Evening	43 dB(A)	51 dB(A)
	Night	42 dB(A)	50 dB(A)

Notes:

1. *Day is defined as 7am to 6pm, Monday to Saturday and 8am to 6pm Sundays and public holidays.*
   Evening is defined as 6pm to 10pm, Monday to Sunday and public holidays.
   Night is defined as 10pm to 7am, Monday to Saturday and 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 EPA's *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change, 2009) is the principal guideline for the assessment and management of construction noise in NSW. The ICNG recommends standard hours of construction as:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sundays and public holidays: no works.

Noise management levels (NMLs) have been determined for receivers in accordance with the ICNG. The ICNG outlines NMLs for non-residential receivers such as commercial properties, schools and places of worship. NMLs for residential receivers are calculated based on the rating background level (RBL) + 10 dB(A) (for daytime periods) or the RBL + 5 dB(A) (for evening and night time periods). A 'highly noise affected' level of 75 dB(A) for residential receivers represents the point above which there may be strong community reaction to noise.

Where works exceed the NMLs, 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 NMLs developed for the Proposal for residential and non-residential sensitive receivers are listed in Table 11 and Table 12 respectively.

Table 11 Construction NMLs for residential receivers

NCA	Period	RBL (L_{A90})	Standard hours NMLs ($L_{Aeq,15min}$)	Out of hours NMLs ($L_{Aeq,15min}$)
NCA 1	Day	42 dB(A)	52 dB(A)	47 dB(A)
	Evening	41 dB(A)	N/A	46 dB(A) [1]
	Night	35 dB(A)	N/A	40 dB(A) [1]
NCA 2	Day	40 dB(A)	50 dB(A)	45 dB(A)
	Evening	43 dB(A)	N/A	45 dB(A) [1]
	Night	36 dB(A)	N/A	45 dB(A) [1]

Notes:

1. *Level adjusted to the daytime intrusive criterion based on community expectation of greater noise control during evening and night periods.*

Table 12 Construction noise management levels for non-residential receivers

Land use	NMLs, $L_{Aeq,15min}$ (applies when properties are in use)
Classrooms at schools and other educational institutions	55 dB(A) [1]
Places of worship	55 dB(A) [1]
Childcare centres	55 dB(A) [1]
Medical facilities	55 dB(A)
Library	55 dB(A) [1]
Industrial premises	75 dB(A)
Commercial premises	70 dB(A)

Notes:

1. *External NMLs are based upon a 45 dB(A) internal NML and a 10 dB reduction from outside to inside through an open window.*

Sleep disturbance noise goals have also been established for residential receivers which are based on the *NSW Road Noise Policy* (Department of Environment, Climate Change and Water, 2011). Based on the Policy, the sleep disturbance criteria for both NCA are a screening level of 45 dB(A) $L_{A1(1\ minute)}$ and an awakening reaction at 60-65 dB(A) $L_{A1(1\ minute)}$.

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 two dB(A).

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

The assessment of intermittent vibration outlined in the NSW EPA guideline *Assessing Vibration: A Technical Guideline* (AVTG) is based on Vibration Dose Values (VDVs). Maximum and preferred VDVs for intermittent vibration arising from construction activities are listed in Table 13. The VDV criteria are based on the likelihood that a person would be annoyed by the level of vibration over the entire assessment period.

Table 13 Preferred and maximum vibration dose values for intermittent vibration (m/s$^{1.75}$)

Location	Period	Preferred	Max
Critical areas[1]	Day or night time	0.1	0.2
Residences	Daytime[3]	0.2	0.4
	Night time[4]	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night time	0.4	0.8
Workshops[2]	Day or night time	0.8	1.6

Notes:

1. *Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. Places where sensitive equipment is stored or delicate tasks are undertaken require more stringent criteria than the residential criteria specified above.*
2. *Examples include automotive repair shops, manufacturing or recycling facilities. This includes places where manufacturing, recycling or repair activities are undertaken but do not require sensitive or delicate tasks.*
3. *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).*
4. *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. However, the German Standard (DIN 4150) provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration and are presented in Table 14. DIN 4150 states that buildings exposed to higher levels of vibration than recommended limits would not necessarily result in damage. The vibration criteria provided below in Table 14 would be adopted for the management of vibration impacts on structures, and include more conservative values for heritage structures.

Table 14 DIN 4150: Structural damage safe limits for building vibration velocity

Group	Type of Structure	At foundation – less than 10 Hz	At foundation – 10 Hz to 50 Hz	At foundation – 50 to 100 Hz	At the horizontal plane of the highest floor – all frequencies[1]
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20 mm/s	20 to 40 mm/s	40 to 50 mm/s	40 mm/s
2	Dwellings and buildings of similar design and/or use	5 mm/s	5 to 15 mm/s	15 to 20 mm/s	15 mm/s
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. heritage listed buildings)	3 mm/s	3 to 8 mm/s	8 to 10 mm/s	8 mm/s

Notes:

1. At frequencies above 100 Hz, the values given in this column may be used as minimum values.

Operational noise criteria

The *Industrial Noise Policy* (EPA, 2000) 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 *Industrial Noise Policy* has two components:

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

The specific noise levels established for the operation of the Proposal are summarised in Table 15 and are based on the lower of the intrusive and amenity criteria. The criteria apply to environmental noise emissions from plant and equipment installed as part of the Proposal.

Table 15 Operational noise emission criteria

Location	Period[1]	RBL dB(A)	Intrusive Criteria $L_{Aeq,\ 15\ min}$ dB(A)	Amenity Criteria $L_{Aeq,\ 15\ min}$ dB(A)	Project Specific Noise Level[2]
NCA 1	Day	42	47	55	47
	Evening	41	46	45	45
	Night	35	40	40	40
NCA 2	Day	40	45	55	45
	Evening	43	47	45	45

Location	Period[1]	RBL dB(A)	Intrusive Criteria $L_{Aeq, 15\ min}$ dB(A)	Amenity Criteria $L_{Aeq, 15\ min}$ dB(A)	Project Specific Noise Level[2]
	Night	36	47	40	40
School classroom[3]	Noisiest one hour period when in use	-	-	45[3]	45
Place of Worship[3]	When in use	-	-	50[3]	50
Commercial premises	When in use	-	-	65	65

Notes:

1. *Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays & Public Holidays. Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday & Public Holidays. Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays & Public Holidays.*
2. *The project specific noise levels have been set as an Leq, 15min in order to provide a conservative assessment. Where compliance is achieved over a 15-minute period, it is therefore implied that compliance would also occur over the day, evening or night period.*
3. *As per the INP, a +10 dB correction has been added to convert internal to external noise criteria.*

6.3.2 Potential impacts

Construction phase

To assess the potential noise impacts from the proposed construction works, the construction phases described in Chapter 3 were further divided into the following indicative scenarios to provide a more accurate assessment. Scenarios for each construction stage were modelled based on the likely construction equipment that would be used to understand the potential noise impact for each stage. Scenarios are outlined in Table 16.

A summary of the predicted construction noise levels for each scenario during standard working hours for residential receivers is shown in Table 17 and for non-residential receivers in Table 18.

Table 16 Construction assessment scenarios

Scenario	Activity	Stage	Timing
Site establishment and enabling works	Establishment of site compound (erect fencing, tree protection zones, amenities and plant/material storage areas), establish temporary facilities as required (e.g. ticketing office)	1A	Standard hours or daytime shutdown
	Removal of identified vegetation along The Crescent and Loftus Crescent.	1B	Standard hours
	Survey investigations and relocation of services	1C	Standard hours or 48 hr shutdown
New lifts and platform upgrade	Partial demolition of existing structures including the footbridge canopy, Amenities Building and Booking Office and stairs	2A	Standard hours or 48 hr shutdown
	Platform modifications including piling and foundations for lift shafts	2B	Standard hours or 48 hr shutdown
	Construction of lift shaft, upgrades to stairs, fencing and new canopies over the existing footbridge and lifts, installation of lifts, installation of fixtures, lighting, signage, additional CCTV cameras	2C	Standard hours or 48 hr shutdown
	Platform resurfacing and installation of hearing protection loop installation	2D	48 hr shutdown
Platform Building works	Refurbishment of the heritage Booking Office to allow for the new lift, lift lobby, switch room and communications room	3A	Standard hours
	Refurbishment of the heritage Amenities Building to allow for a new station office, family accessible toilet and staff facilities	3B	Standard hours or 48 hr shutdown
Interchange works	Installation of pedestrian crossing and associated kerb ramps at Loftus Crescent	4A	Standard hours
	Kerb realignment along The Crescent to accommodate a new taxi rank and kiss and ride facilities, kerb realignment along the Loftus Crescent to accommodate a new kiss and ride area and bus stop bay and installation of a new sheltered bicycle rack at northern station entrance	4B	Standard hours
	Installation of wayfinding signage and other statutory/regulatory signage, electrical and power supply upgrade works and landscaping and fencing adjustments	4C	Standard hours
Testing and commissioning	Activities to test and commission power supply, lifts, lighting, new/modifications to station services, ticketing systems, communication and security systems	-[1]	Standard hours

Notes:

– *Testing and commissioning has been omitted from the construction noise assessment given the noise generated from this activity would be negligible.*

Table 17 Predicted construction noise levels for each scenario during standard hours (dB(A)) for residential receivers

Receiver ID	NML	1A	1B	1C	2A	2B	2C	2D	3A	3B	4A	4B	4C
R1	52	**71**	**75**	**65**	**70**	**65**	**71**	**71**	**71**	**56**	**69**	**67**	**68**
R2	52	**69**	**75**	**66**	**71**	**71**	**72**	**75**	**72**	**62**	**75**	**75**	**75**
R3	52	**61**	**67**	**57**	**62**	**60**	**63**	**67**	**63**	**51**	**63**	**61**	**62**
R4	52	**60**	**65**	**55**	**60**	**61**	**61**	**66**	**61**	**52**	**65**	**63**	**64**
R5	52	46	51	44	49	50	50	**56**	50	41	52	50	51
R6	52	49	**61**	46	51	**53**	52	**58**	**52**	44	**59**	**57**	**58**
R7	52	55	**61**	51	**56**	**56**	**57**	**61**	57	47	**59**	**57**	**58**
R8	52	<40	40	<40	<40	<40	<40	<40	<40	<40	44	42	43
R9	50	41	47	<40	43	44	44	49	44	<40	47	45	46
R10	52	45	52	<40	44	44	45	49	45	<40	50	48	49
R11	52	<40	41	<40	<40	<40	<40	41	<40	<40	<40	<40	<40
R12	52	<40	44	<40	<40	40	40	45	40	<40	43	41	42
R13	52	50	**53**	44	49	49	50	**54**	50	40	**53**	51	**52**
R14	52	50	**56**	46	51	51	52	**57**	52	42	**54**	52	**53**
R15	52	<40	43	<40	<40	<40	<40	44	<40	<40	41	<40	40
R16	52	44	52	40	45	45	46	51	46	<40	48	46	47
R17	50	46	48	41	46	46	47	50	47	<40	49	47	48
R18	52	<40	43	<40	<40	<40	<40	45	<40	<40	<40	<40	<40
R19	52	45	50	42	47	47	48	**53**	48	<40	49	47	48
R20	50	<40	43	<40	<40	<40	40	43	40	<40	43	41	42
R21	52	44	50	40	45	46	46	52	46	<40	49	47	48
R22	52	<40	44	<40	<40	41	40	45	40	<40	44	42	43
R23	52	46	52	42	47	47	48	51	48	<40	49	47	48
R24	52	41	50	<40	43	43	44	48	44	<40	48	46	47
R25	50	<40	43	<40	<40	<40	<40	41	<40	<40	46	44	45
R26	50	<40	41	<40	<40	<40	<40	41	<40	<40	41	<40	40
R27	52	41	47	<40	42	41	43	46	43	<40	46	44	45
R28	52	45	50	41	46	48	47	**53**	47	<40	50	48	49
R29	50	<40	42	<40	<40	<40	<40	41	<40	<40	42	40	41

Notes:

- *Items in **BOLD BLACK** indicate a predicted noise impact above the NML.*
- *Items in **BOLD RED** indicate a 'highly affected' residential receiver with a noise level of 75 dB(A) or greater.*
- *Receiver locations are shown in Figure 23.*

Table 18 Predicted construction noise levels for each scenario (dB(A)) for non-residential receivers

Receiver ID	NML	1A	1B	1C	2A	2B	2C	2D	3A	3B	4A	4B	4C
N1	75	74	75	66	71	71	72	75	72	62	75	75	75
N2	70	66	**75**	67	**72**	**73**	**73**	**75**	**73**	64	**75**	**75**	**75**
N3	55	**62**	**69**	**60**	**65**	**66**	**66**	**72**	**66**	**57**	**71**	**69**	**70**
N4	55	**65**	**75**	**62**	**67**	**69**	**68**	**74**	**68**	**60**	**75**	**74**	**75**
N5	75	63	70	58	63	60	64	66	64	51	64	62	63
N6	70	60	68	55	60	61	61	66	61	52	67	65	66
N7	55	40	48	<40	44	45	45	51	45	<40	47	45	46
N8	55	52	**58**	48	53	52	54	**57**	54	43	55	53	54
N9	55	43	48	<40	43	43	44	48	44	<40	45	43	44
N10	55	<40	45	<40	40	40	41	46	41	<40	44	42	43
N11	55	45	52	41	46	46	47	52	47	<40	49	47	48
N12	55	45	47	<40	44	44	45	48	45	<40	51	49	50
N13	55	<40	43	<40	41	41	42	47	42	<40	46	44	45
N14	55	<40	43	<40	<40	<40	<40	43	<40	<40	42	40	41
N15	55	<40	<40	<40	<40	<40	<40	40	<40	<40	<40	<40	<40
N16	55	42	43	<40	42	42	43	46	43	<40	45	43	44
N17	55	<40	44	<40	40	42	41	45	41	<40	45	43	44
N18	55	<40	42	<40	<40	<40	<40	42	<40	<40	42	40	41
N19	55	41	43	<40	41	41	42	46	42	<40	44	42	43
N20	55	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40
N21	55	42	49	<40	43	44	44	49	44	<40	46	44	45
N22	55	<40	<40	<40	<40	<40	<40	41	<40	<40	40	<40	<40

Notes:

- *Items in **BOLD BLACK** indicate a predicted noise impact above the NML.*
- *Receiver locations are shown in Figure 23.*

Table 17 shows predicted noise impacts at selected representative residential receivers during standard hours. The modelling identified that there would likely be exceedances of the NMLs at most residential receivers, during standard hours for all assessed construction scenarios (i.e. all stages of Proposal construction works). The highest noise levels would likely occur during stages 1B (removal of vegetation), 2D (platform resurfacing) and 4A (interchange upgrades).

The largest number of 'highly affected' receivers would occur during Stage 1B (vegetation removal), due to the use of the mulcher which is characteristically the loudest construction plant item. The most affected residential receivers would be located along Station Street, to the north of the Proposal.

One residential receiver located on Station Street is predicted to be 'highly affected' (i.e. above 75 dB(A)) during Stages 1B, 2D, 4A, 4B and 4C. In addition R1 (on Station Street) may be 'highly affected' during stage 1B (removal of vegetation). These receivers are multi-storey residential apartment blocks.

Table 18 shows predicted noise impacts at representative non-residential receivers. Noise modelling predicts that there would likely be exceedances of the NMLs at four non-residential receivers, including: 25 The Crescent (commercial premise), Homebush Medical Centre (17 The Crescent), Homebush Public School (Rochester Street) and Pre-Uni New College (5 The Crescent). These exceedances occur at all the modelled scenarios.

Key noisy activities during daytime construction works include the use of chainsaws, demolition saws and excavators with hammers. However for each construction stage the duration of the works would be limited (e.g. removal of vegetation would likely only take around one to two days) and these stages would be spread over the 18 month construction period. This would provide respite periods (periods of time with no construction works occurring) in between stages of works.

The exceedances shown above in Table 17 and Table 18 would be mitigated by implementing standard noise mitigation measures provided in the *Construction Noise Strategy* (TfNSW, 2012c) where feasible and reasonable (refer to Section 6.3.3). The exceedances would be short-term and limited to the duration of the temporary construction period.

Out of hours works

Out of hours works would be required during rail shutdowns that would typically extend 24 hours a day over a weekend and are required for safety, constructability and traffic reasons. Around 13 weekend rail shutdowns would occur during the construction period as described in Section 3.2.3. Out of hours works may also be scheduled outside rail shutdown periods (e.g. such as for road works to minimise traffic impacts).

The predicted construction noise levels at residential receivers for each scenario (refer to Table 16 for scenarios) is shown in Table 19 for daytime out-of hours works (e.g. weekends) and Table 20 for evening and night time out-of-hours works.

The results of the modelling show exceedances of the out-of-hours NMLs (daytime, evening and night time) at residential receivers during all assessed stages of construction, with a similar numbers of exceedances during most construction stages. Similarly to standard construction hours, the largest numbers of exceedances occur during Stage 2D – platform resurfacing, with the same worst affected receivers located along Station Street, adjacent to the north of the work site. One multi-storey residential receiver located at 11 Station Street is predicted to be 'highly affected'.

The majority of residential receivers are predicted to exceed daytime NMLs during most of the out-of-hours construction stages, with a similar number of exceedances predicted during the evening period. A larger number of receivers are predicted to exceed night time NMLs.

It should be noted that the majority of out-of-hours works would occur during weekend rail shutdowns.

Since non-residential receivers' NMLs do not change according to the period of the day, one assessment for non-residential receiver operating hours is presented as shown in Table 18.

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).

Table 19 Predicted construction noise levels for each scenario during out of hours works (dB(A)) for residential receivers during daytime hours

Receiver ID	NML	1A	2A	2B	2C	2D	3B
R1	47	**71**	**70**	**65**	**71**	**71**	**56**
R2	47	**69**	**71**	**71**	**72**	**75**	**62**
R3	47	**61**	**62**	**60**	**63**	**67**	**51**
R4	47	**60**	**60**	**61**	**61**	**66**	**52**
R5	47	46	49	50	50	56	41
R6	47	**49**	**51**	**53**	**52**	**58**	44
R7	47	**55**	**56**	**56**	**57**	**61**	**47**
R8	47	<40	<40	<40	<40	<40	<40
R9	45	41	43	44	44	**49**	<40
R10	47	45	44	44	45	**49**	<40
R11	47	<40	<40	<40	<40	41	<40
R12	47	<40	<40	40	40	45	<40
R13	47	**50**	**49**	**49**	**50**	**54**	40
R14	47	**50**	**51**	**51**	**52**	**57**	42
R15	47	<40	<40	<40	<40	44	<40
R16	47	44	45	45	46	**51**	<40
R17	45	**46**	**46**	**46**	**47**	**50**	<40
R18	47	<40	<40	<40	<40	45	<40
R19	47	45	47	47	**48**	**53**	<40
R20	45	<40	<40	<40	40	43	<40
R21	47	44	45	46	46	**52**	<40
R22	47	<40	<40	41	40	45	<40
R23	47	46	47	47	**48**	**51**	<40
R24	47	41	43	43	44	**48**	<40
R25	45	<40	<40	<40	<40	41	<40
R26	45	<40	<40	<40	<40	41	<40
R27	47	41	42	41	43	46	<40
R28	47	45	46	**48**	47	**53**	<40
R29	45	<40	<40	<40	<40	41	<40

Notes:

- *Items in **BOLD BLACK** indicate a predicted noise impact above the NML.*
- *Items in **BOLD RED** indicate a 'highly affected' residential receiver with a noise level of 75 dB(A) or greater.*

Table 20 Predicted construction noise levels for each scenario during out of hours works (dB(A)) for residential receivers during evening and night time hours

Receiver ID	NML	2A	2B	2C	2D	3B
R1	46	**70**	**65**	**71**	**71**	**56**
R2	46	**71**	**71**	**72**	**75**	**62**
R3	46	**62**	**60**	**63**	**67**	**51**
R4	46	**60**	**61**	**61**	**66**	**52**
R5	46	**49**	**50**	**50**	**56**	41
R6	46	**51**	**53**	**52**	**58**	44
R7	46	**56**	**56**	**57**	**61**	**47**
R8	46	<40	<40	<40	<40	<40
R9	45	43	44	44	**49**	<40
R10	46	44	44	45	**49**	<40
R11	46	<40	<40	<40	41	<40
R12	46	<40	40	40	45	<40
R13	46	**49**	**49**	**50**	**54**	40
R14	46	**51**	**51**	**52**	**57**	42
R15	46	<40	<40	<40	44	<40
R16	46	45	45	46	**51**	<40
R17	45	**46**	**46**	**47**	**50**	<40
R18	46	<40	<40	<40	45	<40
R19	46	**47**	**47**	**48**	**53**	<40
R20	45	<40	<40	40	43	<40
R21	46	45	46	46	**52**	<40
R22	46	<40	41	40	45	<40
R23	46	**47**	**47**	**48**	**51**	<40
R24	46	43	43	44	**48**	<40
R25	45	<40	<40	<40	41	<40
R26	45	<40	<40	<40	41	<40
R27	46	42	41	43	46	<40
R28	46	46	**48**	**47**	**53**	<40
R29	45	<40	<40	<40	41	<40

Notes:

- *Items in **BOLD BLACK** indicate a predicted noise impact above the NML.*
- *Items in **BOLD RED** indicate a 'highly affected' residential receiver with a noise level of 75 dB(A) or greater.*

Sleep disturbance

Noise from loud construction activities has the potential to cause sleep disturbance at the nearest residential receivers.

The predicted results for the Proposal indicate that the sleep awakening reaction criterion of 60 to 65 dB(A) is predicted to be exceeded at some residences during Stages 2A, 2B, 2C, 2D and 3B. This includes in NCA 1 the residences facing the railway line along Loftus Crescent, Station Street and Knight Street, and some residences further north along Allen Street. In NCA 2, this includes residences facing the railway line along The Crescent, with some isolated residences located along Burlington Road, one street back from the railway, also predicted to have exceedances.

Construction activities (particularly those which have a high noise impact) would be undertaken during the daytime where feasible.

The predicted construction noise levels are typically the worst case noise levels, therefore the majority of actual noise levels are likely to be less than those predicted. 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, if required.

Construction traffic

No traffic counts have been conducted for the Proposal, however the number of proposed heavy vehicles have been estimated at around one to ten vehicles per day Monday to Friday. For weekend rail shutdowns works there would be around 20 heavy vehicles per day. This is a small increase in vehicles compared with existing traffic levels on surrounding roads. Therefore, it is considered that the Proposal would not result in an exceedance of the road traffic noise criteria.

Construction vibration

During construction, vibration generating machinery would be required including jackhammers, wacker packers and bored piling rigs. Construction activities that require the use of this machinery have the potential to create vibration which can disturb nearby sensitive receivers.

The Noise and Vibration Impact Assessment (AECOM, 2016c) concluded that the distances from the nearest receivers to the operation of vibration intensive machinery and/or 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.

Homebush Station is heritage listed on the SHR, the RailCorp Section 170 Heritage and Conservation Register and the Strathfield LEP 2012. In order to avoid structural impacts to heritage structures, the proposed works would need to be undertaken in accordance with the safe working distances outlined in Table 21. 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. 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.

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.

Table 21 Safe working distances of vibration intensive equipment (in metres)

Machinery/plant	Rating/ Description	Safe work distance: Cosmetic damage – residential/commercial	Safe work distance: Cosmetic damage - heritage
Jackhammer	Handheld	1 m	1 m
Wacker packer[1]	Handheld	5 m	5 m
Bored piling	≤ 800 mm	2 m	2 m

Notes:
1. There are no recommendations provided in the CNS for a wacker packer (assumed to be the same as a small roller)

Operational phase

Additional operational equipment at Homebush Station would include four new lifts which would not result in a significant increase in noise emissions. As such, the operational noise environment is expected to remain largely unchanged.

Standard noise controls such as appropriate selection of mechanical plant (including lifts) would reduce any impacts. If required, operational noise emissions shall be addressed during the detailed design phase in order to comply with the acceptable noise levels outlined in the *Industrial Noise Policy.*

No vibration impacts associated with the operation of the Proposal are anticipated.

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 (AECOM, 2016c).

The CNVMP would prescribe mitigation measures to minimise construction noise and vibration. The measures would focus on contractor inductions, selection and operation of plant and equipment, work scheduling (including respite periods), prescribing safe working distances for vibration intensive equipment, procedures for noise and vibration monitoring and obtaining approvals for out of standard hours works. The CNVMP would also detail requirements for managing potential vibration impacts to heritage structures through monitoring and safe working distances.

The CNVMP would be supported by the Community Liaison Plan to be prepared for the Proposal, which would detail community notification requirements including. During detailed design, further investigation would be undertaken to identify the noise and vibration impacts on the nearest sensitive receivers (including the nearby Medical Centre, Homebush Public School and 'highly affected' residential receivers). In accordance with TfNSW's *Construction Noise Strategy,* and in consultation with impacted receivers, feasible and reasonable mitigation measures would be implemented to minimise impacts during construction.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.4 Indigenous heritage

6.4.1 Existing environment

A due diligence assessment was undertaken for the Proposal in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010). An Aboriginal Heritage Information Management System (AHIMS) search

was undertaken for the area covered by the Proposal (the area around Homebush Station) with a 50 metre radial buffer on 10 August 2016. No AHIMS sites were identified in the search.

Certain landscape features, such as nearby waterways, sand dune systems, ridge tops, ridge lines, headlands, cliff faces and rock caves/shelters, can indicate the likely presence of Indigenous objects. Powells Creek is located around 200 metres east of Homebush Station. This section of the creek is within the upper catchment, has been extensively disturbed and is now drained through concrete lined channels. Therefore the potential for any remaining in-situ Aboriginal heritage items located along Powells Creek is considered to be low.

The extensive landscape modification and high level of disturbance that has occurred across the Proposal area suggests that the presence of culturally sensitive buried items is unlikely within the boundaries of the Proposal area.

6.4.2 Potential impacts

Construction phase

Construction of the Proposal would involve some minor excavation and other ground disturbing activities for the following activities:

- installation of foundations and footings for new lift shafts
- platform modifications and resurfacing
- kerb realignments of Loftus Crescent and The Crescent
- footpath pavement resurfacing and landscaping along The Crescent and Loftus Crescent
- relocation of services.

Ground disturbing activities have the potential to impact Indigenous sites, if present.

No known Indigenous heritage items are located in the vicinity of the Proposal area, and due to past disturbance the potential for unknown items to be present is considered to be low. Further, Powells Creek (a high risk landscape feature) has been previously extensively disturbed from general urban and residential development and the potential for any remaining in-situ Aboriginal heritage items located along the creek line is considered to be low. As such, the Proposal is unlikely to affect Indigenous heritage during construction.

Operational phase

There would be no risks to Indigenous heritage from the operation of the Proposal.

6.4.3 Mitigation measures

If previously unidentified Indigenous objects are uncovered during development, in accordance with TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a), work would cease in the vicinity of the find and the TfNSW Project Manager and TfNSW Environment and Planning Manager would 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 would be secured and the NSW Police and OEH would be notified.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.5 Non-Indigenous heritage

A Statement of Heritage Impact (SoHI) was prepared (Orwell & Peter Phillips, 2016) to assess potential heritage impacts associated with construction and operation of the Proposal and to

accompany an application for approval under Section 60 of the Heritage Act. A summary of the assessment in the SoHI is provided in this section.

6.5.1 Existing environment

A desktop search of historic registers including the World Heritage List, National Heritage List, Commonwealth Heritage List, the Register of the National Estate (non-statutory archive), NSW State Heritage Register (SHR), RailCorp's Section 170 Heritage and Conservation Register and the Strathfield LEP heritage schedule was undertaken for the area surrounding the Proposal.

Database results

The desktop search identified no items listed on the World, Commonwealth or National Heritage Lists within proximity of the Proposal. Heritage listed items within the vicinity of the Proposal are listed in Table 22.

Table 22 Heritage register search results

Heritage register	Item	Proximity to Proposal	Significance
State Heritage Register	Homebush Railway Station Group (#001170)	n/a	State
RailCorp Section 170 Heritage and Conservation Register	Homebush Railway Station Group (#4801087)	n/a	State
Strathfield LEP 2012	Homebush Railway Station (ID I40)	n/a	State
Strathfield LEP 2012	Station Master's House (ID I39)	15 metres north (11 Station Street, Homebush)	Local
Strathfield LEP 2012	Homebush shops (ID I42)	15 metres south (18-23 The Crescent, Homebush)	Local
Strathfield LEP 2012	Former Homebush Post Office (ID I41)	30 metres south (17 The Crescent, Homebush)	Local
Strathfield LEP 2012	Homebush Public School (ID I43)	20 metres south (26 The Crescent, Homebush)	Local

The curtilage of the State heritage listing for the Homebush Railway Station Group is shown in Figure 3 (refer page 20).

Historical background

Homebush Station was originally constructed in 1855 as part of the first railway line in NSW. The station was upgraded in 1891 which involved quadruplicating the track from Sydney to Homebush and the construction of two island platforms (currently Platforms 3/4 and 5/6), a side platform (currently Platform 2), a new footbridge and the Booking Office.

Homebush Station has undergone several developments since, including:

- addition of a new railway line, extension of the footbridge and conversion of the former side platform (currently Platform 1/2) to an island platform (1913)

- raising and concreting the footbridge and raising the stairs and Booking Office (1992)
- replacement of the platform building (that was destroyed in a fire in 1994) on Platform 3/4 with a waiting shelter
- construction of the Amenities Building (1996)
- addition of a new turnback railway line and platform (currently Platform 7), construction of a canopy on Platform 7 and conservation works on the platform building on Platform 5/6 (2008).

Homebush Railway Station Group

Homebush Railway Station Group comprises the following elements:

- seven platforms (on three island platforms and one side platform)
  - Platform 1 (1924)
  - Platform 2 (1891)
  - Platform 3/4 (1891)
  - Platform 5/6 (1891)
  - Platform 7 (2008)
- two platform buildings
  - one on Platform 1/2 (1891)
  - one on Platform 5/6 (1891)
- existing footbridge (1992)
- two canopies
  - one on Platform 3/4 (1994)
  - one on Platform 7 (2008)
- Signal Box (1892)
- Booking Office (1891)
- Amenities Building (1996).

A Conservation Management Plan (CMP) was prepared for the Homebush Station Railway Group in 2005 (Orwell & Peter Phillips, 2005). The CMP has been used to inform the SoHI and this environmental impact assessment. The individual elements are described in depth below, with descriptions sourced from the CMP and confirmed during analysis.

Platforms

All platforms have corbelled brick facing walls and are surfaced with asphalt, with the exception of Platform 1 which is faced with planks and has no applied surface. Overhead wiring support structures on the platforms are modern galvanised steel sections with older galvanised steel structures remaining beside them (some of which have been removed). There are trees along the three island platforms, in planter beds surrounded by brick or stone edging.

Platform building on Platform 1/2 (1891)

The platform building on Platform 1/2 has a single room for an office which is no longer in use. This room was originally a general waiting room. The building is clad in painted timber weatherboards with timber framed windows. It has a modern flush timber door and side panel within the original door opening. An air-conditioning unit and infill panel have also been installed. Modern galvanised steel grilles have been fixed over the door and windows and

there is a face brick chimney at the eastern end. The roof is hipped corrugated steel and an awning, attached to the platform building, is supported on cast-iron columns and brackets.

Internally, the room has a timber floor with carpet tiles. The walls are lined with veneered hardboard sheeting with vinyl jointing strips and the ceiling is lined with v-jointed softboard sheeting. The original chimneypiece has been removed and the chimney breast has been oversheeted with the walls. The original moulded timber cornice remains visible. The windows have a nine-pane top sash and single pane bottom sash, all reglazed with clear glass. The window opposite the door has a missing bottom sash.

Platform building on Platform 5/6 (1891)

The platform building on Platform 5/6 is of similar construction to that on Platform 1/2, however in more of its original condition. The building has two rooms; the western room is a store room (originally a general waiting room), and the eastern room is a former office (later an electrical room) and is now disused.

The western room has a timber floor with vinyl tiles. The walls and ceiling are lined with painted timber v-jointed boards with moulded timber battens and cornice. The brick chimneypiece has been rendered, the chimneypiece removed and fireplace bricked over. There are two sets of double six-panelled doors at the western end, with the upper four panes glazed. Similar to the platform building on Platform 1/2, there are two windows on each side with coloured glass in the nine-pane top sashes. A number of glass panes are cracked and several have been replaced with alternate materials. There are painted timber benches along the western wall and the two side walls.

The eastern room has a timber boarded floor, with a stone hearth in front of the chimneybreast. The fireplace has also been blocked up. There are two five-panelled doors opposite each other at the eastern end (the northern door has been fixed shut). There are electrical cabinets in the centre of the room and a cable tray extending towards the ceiling. The window in the eastern wall has an additional horizontal glazing bar in the bottom sash.

Existing footbridge (1992)

The original footbridge was constructed in 1892 to provide unrestricted pedestrian access between The Crescent and Loftus Crescent and to the station platforms. The original footbridge was extended in 1913 and then again in 1932. The existing footbridge is a recent prestressed concrete structure that comprises of a concrete deck resting on the original brick store rooms on the station platforms. It has concrete stairs with new lattice balustrades that match the balustrading of the original footbridge.

Signal Box (1892)

The former signal box is a three storey brick building with a timber gabled roof and weatherboard cladding. The main roof is corrugated galvanised iron. There is a single brick chimney located on the southern side of the building, and timber stairs providing access to the upper floors on the western side of the building. The northern side of the building has three recessed bays each containing two arched windows and the three lower windows are currently boarded. The internal walls are painted brick with timber partition walls and the floor is timber. There is no signalling equipment remaining in the building.

Booking Office (1891)

The Booking Office is located at footbridge level on top of a store room on Platform 3/4. It contains a covered waiting area with an adjoining store room and a ticket office with a kitchenette and lavatory. The structure overhangs the brick structure below on the north and south sides and is clad in weatherboard with a corrugated steel roof. A face brick chimney (without a stack) extends up the western side. The Booking Office has timber framed windows (original on the southern side and modern interpretations on the western side) and modern timber flush doors with applied moulding.

The internal walls are lined with v-jointed timber boards or flush-jointed plasterboard. The ceilings are also lined with v-jointed boards with a moulded timber cornice and battens. The floors are timber with carpet in the ticket office, vinyl in the kitchenette, tiles in the lavatory and bare boards elsewhere. The fire place has been blocked up and chimney removed. The original windows have multi-paned upper sashes with coloured glass (similar to those in the platform buildings) and single paned bottom sashes. Some panes have been replaced.

There is a former driver's rest room underneath the Booking Office. Opposite the Booking Office on the existing footbridge is a station indicator of traditional mechanical design (refer to Orwell & Peter Phillips, 2005).

The Booking Office is one of three such structures surviving from the late 19th century. Despite numerous alterations and additions, the Booking Office retains much of its original appearance and fabric and has remained in use for its original purpose.

Amenities Building (1996)

The Amenities Building is a modern structure located at footbridge level on top of a store room on Platform 1/2. Similar to the Booking Office, the building has an open lobby facing east, with a male and female toilet cubicle to the north and south respectively, on either side of a central store room. The floor is concrete with a broomed finish in the lobby and ceramic tiles in the lavatories.

External walls are clad in weatherboard with timber framed windows that have glazed louvres in the top half and fixed obscure glass below. The doors are flush timber with applied mouldings. Internal walls are lined in fibre cement with ceramic tiles to the height of the door. The roof extends over the existing footbridge to provide additional shelter.

Additional elements

Homebush Railway Station Group has a number of objects which may be valued as movable heritage, such as timber doors and windows, cast iron buckets, former station signs, a safe and other items salvaged from the demolition of former structures.

Statement of significance

The CMP identified Homebush Station as one of the most important surviving groups of buildings on the State railway system. It represents an almost intact station dating from the quadruplication of the main line in 1891, and the introduction at the same time of the first of the new standard buildings (those on Platforms 1/2 and 5/6), the Booking Office, the Signal Box, and the southern footbridge steps and boundary wall, which all survive largely unaltered. The later alterations and additions (including the extension of the footbridge in 1913, the more recently replaced footbridge deck and structure and the rebuilt platform waiting shelter) have been constructed in the same style as the original work, giving the station an evocative quality and consistency of architectural character that is rare within the NSW rail system. All of the other stations on the network that were constructed at the time have undergone considerably more alteration and only individual examples of the modified platform buildings survive. The consistency of design at Homebush Station extends to the character of the nearby buildings in The Crescent, most of which date from the late 19th or early 20th centuries, creating an important civic precinct.

Archaeology

Prior to the development of Homebush Station, the land surrounding Homebush was largely agricultural land with no reordered structures. The construction of the goods line (currently Platform 1) resulted in the demolition of the original station master's house, previously located to the north of the station. This would have likely disturbed any archaeological evidence relating to the history of the area. The later addition of the new turnback railway line and platform (currently Platform 7) in 2008 likely destroyed any archaeological evidence of the demolished 1890's carriage shed, locomotive depot and watering facilities and nursery

previously located along the southern side of the station. As such, Homebush Railway Station Group has been assessed as having low potential for significant archaeological remains.

6.5.2 Potential impacts

Construction

Homebush Railway Station Group

The objectives of the Proposal are to improve accessibility and the amenity at Homebush Station through a range of upgrade works. The following activities, described in Section 3, have the potential to directly impact existing heritage elements of the Homebush Railway Station Group:

- refurbishment of the Booking Office
- four new lifts; one at each end of the existing footbridge, one lift serving Platform 3/4, and one lift serving Platform 5/6
- the new canopy on the footbridge.

Other minor new elements are the new bicycle shelter on Loftus Crescent and the small cantilevered canopies to the lift entrances at street and platform level.

The proposed works are required to ensure that the facilities at the station comply with key requirements of the DSAPT and the DDA to ensure an accessible path of travel to and from the station.

The proposed alterations and conversion of use of the Booking Office would lead to a loss of cultural significance of this element of the station.

The new lifts at each end of the existing footbridge have been designed as attachments to the existing brick stair structures, reducing their visual impact. In keeping with the design of the current buildings on the existing footbridge, their external walls would be brick (with inset panels) at platform level and horizontal timber boarding at footbridge level. The lift shafts would have flat roofs so as not to compete for visual prominence with the pitched roofs of the existing structures at the station. The roofs would be set at the existing gutter level, with a similar projection and edge treatment, to have a positive design relationship with the other structures at the station. The lift landings at each end of the existing footbridge would have a balustrade that is partly brick (following the existing) and partly steel lattice as used elsewhere on the existing footbridge. The landing at the northern side of the station would be curved, echoing the curved brick wall of the original stairs at the southern end of the station.

The lift on Platform 5/6 has been constrained in its design and location by the space available at platform level. The upper section of the lift shaft is consistent with the design of the other structures on the existing footbridge, and adopts the precedent of the former extension to the Booking Office by extending the timber building well past the side of the brick structure beneath. This allows the timber structure to serve as the enclosure for the upper lift lobby, and also creates a symmetrical arrangement of similar buildings at footbridge level.

The installation of a new lift in the Booking Office on Platform 5/6 would remove some significant elements and would change the use of the existing rooms. However, this would have less of an impact to the heritage value of the Booking Office than if the lift structure were located externally to the Booking Office which would create an intrusive element and substantially diminish the overall character and significance of the station.

The existing partial canopy on the existing footbridge is unsympathetic to the overall heritage value of the station and is more reminiscent of the 1990s than the 1890s. The proposed canopies along the existing footbridge would provide a more appropriate design element than the existing canopy, however recommendations for further design refinement of these canopies have been outlined in Section 6.5.3, which if implemented would ensure the design of these elements is consistent with and contributes to the heritage setting of the station. The

station stairs would be without canopies (uncovered) to ensure impacts to the heritage setting of the station are minimised.

The Proposal would have a range of impacts on the heritage structures at Homebush Station. Elements that would be impacted as part of the Proposal are outlined in Table 23.

Table 23 Impact of the Proposal on individual heritage elements at Homebush Station

Element	Significance	Impact of Proposal
Overall form, scale and architectural character	Exceptional	Positive Overall form, scale and architectural character preserved in alterations and additions
Platform seats, lights and station signage	Little	Negligible
Loop top fencing around station	Little	Negligible
Brick wall along southern side of station	Exceptional	Minor adverse Part of the wall would be demolished for access to the new lift on the southern side of the station
Trees on platforms	Moderate	Moderate adverse One tree to be removed and two trees to be trimmed
Platform 1/2		
Platform 2 face	High	Negligible Platform resurfacing
Amenities Building		
Timber framing	Little	Negligible Interior refurbishment to provide office space
Wall, floor and ceiling finishes	Little	Negligible Interior refurbishment to provide a new office space and family accessible toilet
Platform 3/4		
Platform surface and edges	Moderate	Negligible Platform resurfacing
Former driver's rest room (underneath Booking Office)		Major adverse Internal refurbishment for the installation of a new lift and communications room
Original brick structure	Exceptional	Moderate adverse Large opening in the western wall for the installation of a new lift and partly rebuilt for lift entrance. New canopy over the new lift entrance

Element	Significance	Impact of Proposal
Concrete floor and tiled threshold	Little	Negligible Large opening made and pit dug for the installation of a new lift
Later window glass	Little/ Intrusive	Positive Intrusive panes replaced
Timber ceiling	Moderate	Moderate adverse Large opening made and trimmed for the installation of a new lift
Booking Office		Major adverse Internal refurbishment for the installation of a new lift
Original timber framing	Exceptional	Moderate adverse Ceiling framing trimmed around the new lift
Doors	Little	Negligible Internal doors removed
Later opening and internal walls	Moderate	Negligible Walls removed
Original timber flooring	High	Moderate adverse Large opening made and trimmed for the installation of a new lift
Floor coverings	Little	Negligible Coverings removed
Original boarded wall and ceiling linings	Exceptional	Moderate adverse Large opening made and trimmed for the installation of a new lift
Later wall and ceiling linings	Little	Negligible Linings removed
Platform 5/6		
Platform surface and edges	Moderate	Negligible Platform resurfacing
Platform building on Platform 5/6		Negligible New brick structure added nearby
Top courses of external brickwork	Moderate	Minor adverse Some brickwork removed for the new lift landing
Brick stairs to existing footbridge		
External form	Exceptional	Negligible

Element	Significance	Impact of Proposal
Original/early brick and stonework	High	Minor adverse Part of balustrade removed at footbridge level
Later brickwork and stonework	Moderate	Minor adverse Part of balustrade removed at footbridge level
Light fittings and handrails	Little	Negligible
Steel stairs to existing footbridge		
Precast concrete steps	Moderate	Negligible
Steel trestles	Moderate	Negligible Air conditioning equipment installed inside steel mesh cage
Existing footbridge deck and balustrades		
Concrete deck	Moderate	Negligible
Steel lattice balustrades and arches	Moderate	Negligible Small sections of lattice removed and others added, and new canopy and frame bolted on
Light fittings and handrails	Little	Negligible

Additional elements

Moveable items such as the timber doors and windows, cast iron buckets, former station signs and safe 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.

Platform trees were assessed in the CMP as having moderate significance and should be protected and conserved unless there are significant operational reasons for impacting them. The location of trees on the platforms is outlined in Figure 24. In particular tree 32 is proposed to be removed and trees 33 and 35 would be trimmed to ensure CCTV sight lines. As such, consideration of avoiding the need to remove or trim these trees would be investigated during detailed design.

Heritage significance

The overall heritage impact of the Proposal is assessed as neutral (Orwell & Peter Phillips, 2016). Although the new structures would change the appearance of the station and remove some significant fabric, they would facilitate its ongoing use for its original purpose and maintain the consistency of design and materials that has characterised the station since its construction in 1892. Given that the introduction of equitable access is essential to the continuing operation of Homebush Station, the Proposal would achieve this with the least adverse impact on heritage significance compared to alternative options considered.

Archaeology

There are no known areas of specific archaeological sensitivity that have been identified within the study area. The proposed works are located within and directly adjacent to the existing

station area and are unlikely to impact on any potential archaeological evidence of the historic land use or construction of the station. Therefore no archaeological permits are required at this stage.

There is potential for encountering general historic items during activities such as excavation within the rail corridor. In the event of uncovering any unknown heritage items TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) would be implemented. The Heritage Council must be notified of the discovery of a relic under Section 146 of the Heritage Act.

Conservation Management Plan (2005)

The CMP outlines policies to protect and conserve the integrity of the heritage value of the Homebush Railway Station Group. Table 24 provides a review of the Proposal against the relevant policies in the CMP.

Table 24 CMP policies relevant to the Proposal

Policy number	Provision	Proposal review
Policy 3.2	The place and its elements should continue to be used for railway purposes as part of an operational railway station.	The Proposal facilitates the continuing use of the station for railway purposes.
Policy 3.4	Uses with structural, spatial or building services requirements that would have a strong adverse effect on the character and significance of the place or its significant spaces and fabric are unacceptable.	The Proposal would have some adverse impacts on the significant spaces and fabric of the station, notably the Booking Office and the former train crew (driver's rest) room beneath. However, when assessed against alternatives for the necessary provision of access to the station platforms, the Proposal has the least adverse impact on the character and significance of the station as a whole. The Booking Office has been subject to previous alterations including an extension in the late 1920s and being raised when the existing footbridge was built in 1992. It was presumably around this time that the extension was removed and the present arrangement of internal walls was built.
Policy 4.1	Provision of equitable access to and from the station should be provided without undue adverse impact on the significance of the place and its elements.	The Proposal would provide equitable access to and from the station and station platforms. While some adverse impacts on certain elements are acknowledged (including the Amenities Building and Booking Office), these are necessary to reduce adverse impacts on the overall character and significance of the station.

Policy number	Provision	Proposal review
Policy 4.2	Stairs throughout the station should in general be preserved in their original configuration.	Some alterations to the stairs on the southern side of the station (The Crescent) are proposed, these would enable the stairs to reach the new lift landing at the existing footbridge level, eliminating the existing few steps beyond the present landing that leads directly to the existing footbridge. The existing arrangement of the stairs at the station were configured in 1992 and are an adaptation from the original arrangement in which there were steps incorporated into haunches at each end of the existing footbridge. Therefore the Proposal would result in only a relatively minor change in the configuration (the difference in slope between the brick balustrade and the handrail).
Policy 5.1	Unless otherwise stated in these policies, surviving original and early fabric and spaces should be retained intact and conserved.	The Proposal would impact the surviving original and early fabric of some brick walls at platform level and the timber floor and ceiling of the Booking Office. This impact is considered to be justifiable as this impact would better conserve the overall character of the station than the alternative options considered for the Proposal.
Policy 5.2	Rooms within the station buildings should generally remain unsubdivided.	The Proposal would result in the subdivision of the Booking Office. This impact is considered to be justifiable as this option would result in the least overall adverse impact on the station. The Booking Office has previously been subdivided unsympathetically.
Policy 5.4	Preservation and restoration are the preferred conservation processes to be used for fabric of exceptional and high significance.	Generally, fabric of exceptional and high significance will be preserved.
Policy 6.1	If changes to the significant building fabric are required, the approach should be one of minimal intervention (as much as necessary, as little as possible).	The Proposal represents the minimum extent of intervention considered necessary to provide equitable access to the station and to achieve the objectives of the Proposal (refer to Section 2.1.3). The preferred option has been refined from a series of options that had a considerably greater adverse impact on overall character and significance of the station (refer to Section 2.3), with only a little less adverse impact on significant fabric.
Policy 6.2	Intervention for purposes other than conservation of the fabric should occur in areas of lower rather than higher significance.	Interventions are proposed in localised areas of higher significance, resulting in less of an adverse heritage impact overall than more extensive interventions previously proposed in areas of lower significance.

Policy number	Provision	Proposal review
Policy 6.3	Removal of fabric of exceptional or high significance may be acceptable where that fabric has ceased to function and is actively contributing to deterioration in other significant fabric. Otherwise, such fabric should be removed only as a last resort after all other options have been considered. Where multiple elements are present, it may be acceptable to remove some of these elements provided that overall significance is not diminished.	The Proposal is the culmination of a design process examining numerous options, including the provision of a completely separate footbridge and lifts at the eastern end of the station. While these alternate options would affect little or no significant fabric, they would result in an overall adverse impact on the character and setting of the station, as well as rendering the existing footbridge obsolete. The provision of new lifts in structures separated from the Booking Office and Amenities Building whilst only having a small impact on significant fabric would have a more adverse impact on overall character and setting. The removal of some significant fabric is considered justifiable because of the reduction in adverse impacts overall.
Policy 7.1	Alterations and additions to original or early fabric of the buildings and other site elements should be confined to: • the removal of intrusive elements, and elements of little significance that interfere with interpretation, when they are no longer needed • the removal of elements of little or no significance that are contributing to the deterioration of original or early fabric • the reinstatement where appropriate of original or early fabric that has since been removed and for which good evidence exists • works to conserve the existing significant fabric • fully reversible works to adapt the place for changing uses as required.	The Proposal would facilitate the continuation of the existing use of the station, rather than to adapt the place for changing uses. Nevertheless, some aspects of the proposed works will be irreversible, in that they will remove significant fabric which will be capable in the future of reconstruction but not of restoration (in the limited Burra Charter sense). The likelihood of the Proposal being reversed is also minimal, as provision of equitable access will continue to be needed while the station remains operational.
Policy 7.2	Any alterations and additions to significant buildings and site elements should be confined to very minor works that are complementary and subservient to the original.	The impact of the Proposal on significant buildings and site elements cannot be considered ‘very minor’. However, they have been designed to be complementary and subservient to the original structures.

Policy number	Provision	Proposal review
Policy 7.3	Any new external elements should be designed and constructed in the same style, design detail and materials as the original elements, continuing a process that has been occurring at the station for nearly 100 years. The reuse of surplus original components in any new elements is encouraged.	All of the new external elements have been designed to emulate the original design style, materials and details of the original elements, although they will be readily recognisable as recent additions. There will be some reuse of original materials, such as bricks.

Other heritage items

Other local heritage items surrounding the Proposal include the following:

- Station Master's House located 15 metres north of the station
- Homebush shops located 15 metres south of the station
- Former Homebush Post Office located 30 metres south of the station
- Homebush Public School located 20 metres south of the station.

These items would all be visually impacted by the Proposal given their close proximity to the station. The Proposal would introduce new structures that would result in minor changes to the appearance of the station, however these new elements would be consistent with the existing rail infrastructure and not result in a substantial change in views.

Operational phase

The operation of the Proposal would not substantially impact non-Indigenous or archaeological heritage. While there would be minor permanent visual impacts on the heritage setting of the station, this would be offset by the long term benefits by improving accessibility at Homebush Station.

6.5.3 Mitigation measures

A number of mitigation measures would be implemented during detailed design and construction of the Proposal to avoid and/or minimise heritage impacts.

The detailed design and construction of the Proposal would be undertaken with consideration of the heritage values of the station. In order to minimise impacts to significant fabric and the heritage setting of the station, the following mitigation measures would be implemented:

- following detailed design, the Proposal would need to be approved by TfNSW, in consultation with Sydney Trains, and through the submission and approval of a Section 60 application by the Heritage Council in accordance with the provisions of the Heritage Act
- a suitably qualified heritage consultant would be engaged during detailed design to provide advice and input on the design, including but not limited to the following aspects:
    - further design refinement of the interior of the existing Booking Office (including the room beneath), new canopies over the lift entrances, the proposed canopy over the footbridge and proposed work to trees on platforms
    - selection of appropriate materials for the lift, lift shafts and canopies so as not to detract from the overall heritage setting of the station

    - minimising impacts to the Booking Office (both internal and external fabric)
    - establishing hold points in the construction program to allow time for inspection of the dismantled structures and salvaged elements, and for the making of informed decisions on how the works should proceed
    - opportunities for heritage improvements (e.g. paint removal)
- the heritage consultant would be required to prepare a detailed heritage assessment in accordance with OEH guidelines and in consultation with TfNSW and the Sydney Trains Heritage Team
- opportunities to avoid the need to remove or trim trees on the station platforms would be investigated during detailed design. No tree removal or trimming of trees on the station platforms is permitted without further justification (including feasibility of alternative options) being provided to, and accepted by, TfNSW in consultation with a qualified heritage consultant
- a movable heritage survey and assessment is to be prepared in accordance with NSW Heritage Division guidelines *Movable Heritage Principles* (NSW Heritage Office, 2000) and *Objects in Their Place* (NSW Heritage Office, 2004) prior to detailed design. The assessment is to provide a schedule of movable heritage objects and a detailed management strategy for their safeguarding during and after construction of the Proposal. This assessment should also provide guidance on potential areas of interpretation for certain objects
- an archival recording of the station as a whole is to be completed prior to and following construction, in accordance with NSW Heritage Division guidelines – *Photographic recording of heritage items using film or digital capture* (NSW Heritage Office, 2006) and *How to prepare archival records* (NSW Heritage Office, 1998). Copies should be provided to Sydney Trains for future reference. In particular, the archival recording should focus on the following elements:
    - the brick boundary walls in the vicinity of the new lifts
    - the Booking Office
    - the Amenities Building.

Potential impacts to non-Indigenous heritage during construction would be managed through the implementation of the CEMP. The CEMP would prescribe management measures to ensure impacts to the heritage fabric of the station are avoided or minimised and impacts to archaeological relics or deposits are avoided. The CEMP would include the following measures:

- preparation and implementation of a Heritage Management Plan that details the following as a minimum:
    - requirements for a heritage induction which is to be provided to onsite staff and contractors prior to construction, informing them of the location of known heritage items, constraints and guidelines to follow if unanticipated heritage items or deposits are located during construction
    - inclusion of a stop work procedure in accordance with TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) to manage activities in the unlikely event that archaeological relics or deposits are encountered.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.6 Socio-economic impacts

6.6.1 Existing environment

Land use on the southern side of Homebush Station generally comprises a mix of residential and commercial uses. There are several educational facilities, places of worship and a medical centre located south of the station. The area to the north of the station is characterised by low to high density residential dwellings, a light industrial area, local shops, car parking facilities and an electricity substation.

The closest residential properties are located around 20 metres north of the Proposal on Loftus Crescent and around 30 metres south of the Proposal on The Crescent. Educational and religious facilities in the vicinity of the Proposal include:

- Homebush Public School
- Pre-Uni New College High School
- Pre-Uni New College
- Homebush Uniting Church
- Homebush Jehovah's Witnesses Church
- Russian Seventh Day Adventist Church.

A review of the Australian Bureau of Statistics 2011 Census data was undertaken for Homebush. The suburb of Homebush has a population of 6,479 people with the largest age group being 25-29 year olds. The population density in Homebush is 30.44 persons per hectare. 53 per cent of the Homebush population are males. Australian citizens make up around 61 per cent of the suburb while 0.3 per cent of Homebush identify as Aboriginal and/or Torres Strait Islander. 92 per cent of the Homebush population is employed with 48 per cent of the suburb eligible to vote (citizens ages 18 and over). The senior population comprise around five per cent of the Homebush population (aged 70 and over).

In 2011, 39.8 per cent of employed people living in Homebush travelled to work on public transport (mostly by train) and 44.8 per cent by car (either as driver or as passenger).

6.6.2 Potential impacts

Construction phase

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

- temporary changes to vehicular and pedestrian access to, through and movements around the station
- temporary impacts to local traffic movements
- temporary loss of parking around the station on Loftus Crescent and The Crescent
- increased truck movements delivering materials and equipment and transporting waste
- construction noise, vibration, dust and visual impacts.

Access to the station via the existing station stairs would be maintained during construction. Access across the railway line would also be maintained via the existing footbridge during construction proving a safe and convenient location for the community to safely access the Homebush local centre from Loftus Crescent.

During construction, there is potential for temporary disruptions to private property access for residents and businesses along Loftus Crescent and The Crescent during activities such as

use of a crane, unloading of oversized materials and installation of the new pedestrian crossing on Loftus Crescent. In such situations, affected occupants would be notified in advance of the scheduled works. Property access would be maintained, where possible, to minimise the impact to local residents and businesses.

Station customers, local businesses and residents located on Loftus Crescent and The Crescent would be temporarily impacted during construction as a result of impacts to local traffic and parking, visual amenity, construction noise and vibration and air quality due to the proximity of the works (around 15 metres). Homebush Public School is also located around 30 metres from the southern side of the station. These impacts have been assessed in more detail in Section 6.1, Section 6.2, Section 6.3 and Section 6.10. Targeted consultation with these affected stakeholders, including Homebush Public School, would be undertaken prior to construction to determine appropriate measures to manage construction related impacts.

The Proposal may require property acquisition to accommodate the new lift at the southern station entrance where there may be a minor encroachment on the footpath of The Crescent. Consultation has been undertaken with Strathfield Municipal Council regarding this issue and would continue during detailed design, where the requirement for property acquisition would be confirmed.

Operational phase

Overall, the operation of the Proposal would provide positive socio-economic benefits to the Homebush community and the wider Strathfield LGA, including:

- improved accessibility for customers at Homebush Station, providing four new lifts and an accessible route to the station and island platforms
- improved connectivity within Homebush by providing an accessible location to cross the railway line
- 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, a taxi rank, provision of accessible parking, new sheltered bicycle facilities on the northern side of the station and provision of a new pedestrian crossing on Loftus Crescent enabling a safe road crossing to access the station
- additional CCTV, hearing loops and help points at the station, contributing to positive Crime Prevention Through Environmental Design (CPTED) outcomes for the station.

6.6.3 Mitigation measures

A number of safeguards would be implemented to minimise potential impacts on the community with a particular focus on keeping the community informed. These measures include:

- establishment of sustainability criteria for the Proposal to encourage construction personnel to purchase goods and services locally helping to ensure the local community benefits from the construction of the Proposal
- development of a Community Liaison Plan (to be developed by the Contractor prior to construction) to identify potential stakeholders (including Homebush Public School) 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 Proposal, where possible
- informing the community of construction progress, activities and impacts in accordance with the Community Liaison Plan

- providing contact details for a 24-hour construction response line, Project Infoline and email address for ongoing stakeholder contact throughout the construction phase.

Refer to Sections 6.1, 6.2, 6.3 for discussion on the potential traffic/access, visual and acoustic amenity impacts arising from the proposal and the proposed management strategies.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.7 Biodiversity

An Arboricultural Impact Assessment was undertaken for the Proposal (Birds Tree Consultancy, 2016).The assessment included a site inspection by a qualified arborist on 10 August 2016 which included a ground level inspection of trees within areas affected by the Proposal. As part of the Arboricultural Impact Assessment, a Visual Tree Assessment was undertaken in accordance with *Visual Tree Assessment Guidelines* (Mattheck and Breloer, 1994).

A site inspection was also undertaken by a qualified ecologist from AECOM on 7 October 2016.The findings of these assessments are summarised in this section. Weather during the visit was fine with clear skies and light wind. Temperature was approximately 25 degrees and there had been no rainfall in the previous 24 hours.

6.7.1 Existing environment

Landscape context

The Proposal is located within an urban area that has been extensively modified from its natural condition. This includes complete clearance of all remnant native vegetation throughout the area and replacement with native and exotic vegetation/trees for landscaping purposes.

There are a number of planted trees on the station platforms consisting of Brush Box (*Lophostemon confertus*) and Cypress (*Cupressus spp.*) species. The northern boundary of the station precinct is further landscaped with several native and exotic vegetation species which provide some screening of the railway for residential areas to the north. This includes a group of exotic trees within and around the existing railway operations facility, including four large Cocos Palms (*Syagrus romanzoffiana*), two White Cedar (*Melia azedarach*), a Chinese Elm (*Ulmus parvifolia*) and a fenced grassed area adjacent to the northern station entrance.

Along the southern boundary of the station precinct, adjacent to The Crescent, there are several street trees to the east and west of the station entrance. The area immediately opposite the mixed use commercial area is devoid of landscaping, presumably due to the narrowed footpath in this area. Three planted Brush Box (*Lophostemon confertus*) are located within the footpath adjacent to the southern station entrance.

The rail corridor is primarily void of vegetation with the exception of some minor weed cover.

Threatened species and communities

A search of the Atlas of NSW Wildlife (September 2016) identified records of five migratory species listed under the EPBC Act that have previously been recorded within a five kilometre radius of the Proposal area. The records were not located in the vicinity of the Proposal.

No threatened flora or fauna listed under the TSC Act or EPBC Act have been recorded within a five kilometre radius of the Proposal area.

An EPBC Act Protected Matters search identified the following endangered ecological communities as likely to occur within five kilometres of the Proposal area:

- Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- Shale Sandstone Transition Forest of the Sydney Basin Bioregion
- Subtropical and Temperate Coastal Saltmarsh
- Turpentine-Ironbark Forest in the Sydney Basin Bioregion.

None of these ecological communities, or any other threatened ecological communities listed under the TSC Act or EPBC Act were identified within the Proposal area during the ecologist's site inspection.

Flora

Fifty six individual trees were assessed as outlined in Figure 24 and described in detail in Appendix D. All trees within the Proposal area are species regularly used as landscaping plants.

Tree protection zones (TPZ) were defined for the trees within the Proposal area in accordance with *Australian Standard AS4970- 2009 Protection of Trees on Development Sites*. TPZs were calculated as a circular area with a radius 12 times the diameter at breast height of the tree in line with AS 4970-2009. Any encroachment over 10 per cent of the TPZ would require further ecological or arboricultural assessment to determine whether the tree is at risk from the proposed activity.

Fauna

Fauna observed on site was restricted to common native and exotic urban-adapted birds including the Australian Magpie (*Cracticus tibicen*) and Indian Myna (*Acridotheres tristis*). No other fauna was observed during the site visit, though it should be noted that specific fauna surveys were not conducted.

Existing vegetation within the Proposal area provides limited and generally low quality habitat for native fauna. No obvious cavities or hollows were observed within any of the trees within the Proposal area and there was no immediate evidence of fauna activity in or around trees. The large Cocos Palms on the northern side of the station (IDs12, 13, 14 and 15) may provide some foraging habitat for Grey-headed flying fox (*Pteropus poliocephalus*) and therefore could be potentially considered as an important resource in the context of the surrounding urban environment. Aside from this the habitat within the Proposal area lacks important habitat features such as hollow bearing trees, dense leaf or coarse woody debris.

Weeds

One noxious weed, Broad-leaved Privet (ID 19) and two individuals of an environmental pest Laurel (ID 28 and 29) were identified in the Proposal area inside the northern boundary fencing of the rail corridor. Additional species of noxious weeds may be present, particularly within the wider rail corridor.

Figure 24 Trees and tree protection zones

6.7.2 Potential impacts

Construction phase

Direct impacts

The Proposal would require removal of up to 10 planted exotic/native trees from the northern and southern side of the rail corridor and station platform. Trees requiring removal are identified in Table 25 and shown in Figure 24). These trees do not form part of a threatened ecological community (TEC) under either the TSC Act or EPBC Act and are generally considered to comprise marginal habitat, offering marginal foraging resources to common mobile fauna species. Despite this, assessments of significance for this species under both the EP&A Act and EPBC Act have been undertaken for the potential impact of the removal of the four Cocos Palms on the Grey-headed flying fox. These assessments are included in Appendix E. These assessments indicated that the removal of these palms would not result in a significant impact upon this species.

Several trees would also require trimming (including 33 and 35 located on the station platforms to ensure CCTV sight lines). Trees ID 33 and 35 have been assessed as having moderate heritage significance and should be protected and conserved unless there are significant operational reasons for impacting them (refer to Section 6.5). As such, consideration of avoiding the trimming of these two trees should be investigated during detailed design (such as locating CCTV cameras in an alternative location).

Any trimming required would be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2015a) and TfNSW's *Fauna Management Guideline* (TfNSW, 2015b).

Potential impacts upon other fauna species arising from the Proposal are considered to be minor and are likely to be limited to common and/or exotic urban-adapted species.

Other trees in the Proposal area would be retained where reasonable and feasible. During detailed design, the opportunity to retain trees ID 17 and 52 would be investigated as these currently provide screening to nearby receivers and contribute to the general streetscape. Opportunities to retain tree ID 32 on the station platform would also be investigated during detailed design to minimise heritage impacts. The implementation of the mitigation measures identified in Section 6.7.3 would minimise biodiversity impacts generally. On this basis, it is considered unlikely that the Proposal would result in significant adverse impacts to native vegetation.

Table 25 Trees proposed to be removed as part of the Proposal

ID	Species	Common name	DBH (centimetres)	Associated with local TEC?	Offsets required if removed[3]
11	*Ulmus parvifolia*	Chinese Elm	23	No	Four
12	*Syagrus romanzoffianum*	Cocos Palm	30	No	Two
13	*Syagrus romanzoffianum*	Cocos Palm	30	No	Four
14	*Syagrus romanzoffianum*	Cocos Palm	30	No	Two
15	*Syagrus romanzoffianum*	Cocos Palm	30	No	Two
16	*Melia azedarach*	White Cedar	32	No	Four

ID	Species	Common name	DBH (centimetres)	Associated with local TEC?	Offsets required if removed[3]
17	*Melia azedarach*	White Cedar	25	No	Four
32	*Cupressus spp*	Cypress	40	No	Four
49	*Lophostemon confertus*	Brush Box	29	No	Four
52	*Acacia binervia*	Coast Myall	40	No	Four

Notes:

1. *Diameter at Breast Height*
2. *Threatened Ecological Communities*
3. *TfNSW, 2013, Vegetation Offset Guide, Sydney (TfNSW 2013d)*

Indirect impacts

Without the implementation of appropriate mitigation measures, there is potential for the proliferation of weed species, including species listed as noxious under the *Noxious Weeds Act 1993*, as a result of construction activities. Construction activities also have the potential to import new weed species into the Proposal area.

During construction, noise, dust, light and contaminant pollution impacts upon biodiversity are predicted to be minimal, however there may be some indirect impacts to fauna species that may use the trees outside of the Proposal area as habitat. Mitigation measures outlined in Section 7.2 would be implemented to minimise direct and indirect impacts on biodiversity.

Operational phase

There would be no operational risks to biodiversity as a result of the Proposal.

6.7.3 Mitigation measures

TfNSW has prepared a *Vegetation Offset Guide* (TfNSW, 2013d) to provide a framework for a consistent approach to offsetting impacts to vegetation on applicable TfNSW projects. The guide also allows for appropriate offsets to be provided 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.

As 10 trees have been identified for removal, the Arboricultural Impact Assessment has recommended that a minimum of 34 trees be planted to meet TfNSW's offset ratios. Any additional trees that are found to require removal during construction would also need to be approved by TfNSW for removal and offsetting.

A number of additional environmental safeguards would be implemented to minimise potential impacts to biodiversity:

- opportunities to avoid the need to remove or trim trees on the station platforms would be investigated during detailed design. No tree removal or trimming of trees on the station platforms is permitted without further justification (including feasibility of alternative options) being provided to, and accepted by, TfNSW in consultation with a qualified heritage consultant. Any removal or trimming would only be undertaken if deemed necessary during detailed design and would be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2015a) and TfNSW's *Fauna Management Guideline* (TfNSW, 2015b)
- the Contractor would be required to investigate opportunities to retain trees ID 17 and 52 during the detailed design and construction of the Proposal and to avoid impacts to any trees/vegetation beyond which that which are assessed in this REF

- should the detailed design or onsite works determine the need to remove or trim any additional trees (i.e. in excess of the 10 assessed in this REF), the Contractor is to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval
- TPZs are to be identified and clearly demarcated for all trees within 10 metres of the proposed work that are to be retained, with all TPZs surveyed (refer to Figure 24) and included in the Environmental Controls Map (ECM). Tree protection is to be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include the provision of exclusion fencing around TPZs
- offsets and/or landscaping would be undertaken in accordance with TfNSW's *Vegetation Offset Guide* (TfNSW, 2013d) and in consultation with Strathfield Municipal Council, and/or the owner of the land upon which the vegetation is to be planted. Any additional clearing would also require assessment and tree offset planting
- weed control measures, consistent with TfNSW's *Weed Management and Disposal Guideline* (TfNSW, 2015f), are to be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during construction. This would include the management and disposal of weeds in accordance with the *Noxious Weeds Act 1993.*

Refer to Table 26 in Section 7.2 for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.8 Contamination, landform, geology and soils

A geotechnical desktop assessment was undertaken as part of the development of the concept design report (Parsons Brinkerhoff, 2015). The findings of this assessment are summarised in this section.

6.8.1 Existing environment

Landform, geology and soils

Homebush Station is situated at the top of a gentle rise surrounded by slightly undulating topography. The railway lines at Homebush Station are around 11 metres above sea level.

The *1:100,000 Geological Map of Sydney* indicates that the geology underlying the Proposal is Ashfield Shale of the Wianamatta Group, which typically comprises inter-bedded black to dark grey shales, laminite and fine to medium grained sandstones (Department of Minerals and Energy, 1991). These materials typically weather to form a residual profile of one to three metres of medium to high plasticity clays.

A review of existing borehole information was undertaken for boreholes surrounding Homebush Station, with all located around 200 to 400 metres north of the station. The geology encountered at these boreholes was consistent and is therefore likely to be present at Homebush Station. Residual soils are present up to a depth of five metres over weathered bedrock comprising siltstones and sandstones from Ashfield Shale. Existing fill of around one metre is also likely to be present.

Acid sulfate soils

A review of the Strathfield LEP Acid Sulfate Soils (ASS) Map identified Homebush Station and the surrounding area to be located within land classified as Class 5 ASS risk (very low risk).

Salinity

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

Contamination

The *AS 4482.1-2005 - Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds* lists the chemicals used by specific industries. The Standard lists the following chemicals that are commonly associated with railway yards and therefore may be present at Homebush Station:

- hydrocarbons
- arsenic
- phenolics
- heavy metals
- nitrates and ammonia.

Asbestos is another potential contaminant given its historical use as a component in train braking systems.

A review of the NSW EPA Contaminated Land Register did not identify any registered sites within the local vicinity of Homebush Station. However, given the historical use of the station as a rail corridor, there is potential for contaminants to be present within the soils underlying the station. Historic activities associated with rail corridors that have the potential to result in contamination include the introduction of fill materials including ash, fuel or oil spills and accidental leaks or spills from maintenance and operational activities.

6.8.2 Potential impacts

Construction phase

The Proposal would require excavation work for the installation of foundations and footings for new lift shafts and lifts, platform modifications and resurfacing. Other excavation may be required for footpath and road works along Loftus Crescent and The Crescent, relocation of services, drainage works, new lighting, sheltered bicycle racks and bus shelters.

Erosion and sedimentation

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
- increase in sediment loads entering the stormwater system and/or local runoff.

Such impacts can lead to an adverse environmental impact on biodiversity, for example through the introduction of sediment into waterways.

These impacts are considered to be minor due to the limited level of ground disturbance required for the Proposal and the relatively flat topography and stability of the site. Erosion risks can be adequately managed through the implementation of standard measures as outlined in *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004), (the Blue Book).

Contamination

Excavation also has the potential to expose contaminants, which if not appropriately managed, can present a health risk to construction workers and the community. The exposure of contaminants could also pose an environmental risk if they were to enter nearby waterways through the stormwater infrastructure.

There is also potential for construction activities to result in the contamination of soil through accidental fuel or chemical spills from construction plant and equipment.

The Proposal also has the potential to disturb asbestos containing material and other hazardous substances (such as lead paint) from the refurbishment of the Booking Office and/or Amenities Building. Appropriate mitigation measures would be implemented to manage hazardous substances during demolition works. This would include the removal of hazardous materials from the structure by appropriately licensed asbestos/hazardous waste removalists.

The risk of impacts from contamination (if any) on human health (public) and the receiving environments from the construction activities is considered to be low.

The management of asbestos and hazardous waste is discussed further in Section 6.11.1.

Operational phase

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

6.8.3 Mitigation measures

As part of the CEMP, a site-specific Erosion and Sediment Control Plan would be prepared and implemented in accordance with the Blue Book. The Erosion and Sediment Control Plan would be established prior to the commencement of construction and be updated and managed according to the activities occurring during construction.

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 contaminated soil/materials identified 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.

As there is potential for onsite contamination given historic activities associated with the railway land use, prior to construction commencing, a contamination investigation would be undertaken by a suitable qualified professional 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 waste disposal facility.

The Booking Office and Amenities Building would also be inspected to confirm the presence and/or location of any asbestos. The handling, storage, transport and disposal of all asbestos and hazardous waste (including lead waste) will be in accordance with the requirements of the PoEO Act, WARR Act and relevant guidelines. Impacts and mitigation measures for waste management are discussed in Section 6.11.1.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

Homebush Station is located in the Powells Creek catchment and around 200 metres west of Powells Creek. Powells Creek runs north for around three kilometres and drains into Homebush Bay. The upper part of the catchment is drained through concrete lined channels largely comprising residential development and some areas of light industrial and open space land uses. Downstream of Powells Creek is a natural creek channel surrounded by dense mangrove vegetation. The catchment is slightly sloped with the highest elevation south of the station at 55 metres above sea level.

Water quality within the catchment would be generally consistent with water quality in urban waterways, including the presence of heavy metals, nutrients and weeds.

Groundwater

The Department of Primary Industries (Water) (formerly NSW Office of Water) groundwater database holds records of licenced groundwater bores in NSW. A review of the database identified several groundwater monitoring bores within 500 metres of Homebush Station. The closest monitoring bore is located within the property of Suttons Holden Homebush caryard on the Great Western Highway (GW111481), around 300 metres north west of the station. Groundwater at this location is recorded at a depth of 2.7 metres below ground level.

Flooding

Overland flows within the Proposal area flow from local sub-catchments to the south of the station in a northerly direction towards Powells Creek. In the vicinity of Homebush Station, overland flows are intercepted and conveyed by the existing drainage network. The existing overland flow path does not cross the station. During large rainfall events, the drainage network can be restricted resulting in localised flooding. Generally, flooding events result in flood levels less than 0.01 metres for the one per cent Annual Exceedance Probability (AEP) event on the southern side of the station along The Crescent.

As existing overland flows do not cross the station, the Proposal is unlikely to impact existing drainage along The Crescent. Further, during flooding, minor flows that have the potential to be conveyed along the rail corridor would be intercepted by drainage structures in the rail corridor.

6.9.2 Potential impacts

Construction phase

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains and flow into waterways. Activities which would disturb soil during construction work also have the potential to impact on local water quality as a result of erosion and run off sedimentation.

Direct impacts to the underground stormwater network may occur from demolition and construction activities through damaged infrastructure and pollutants entering waterways. Appropriate controls would be detailed in the CEMP and established to ensure the drainage points are adequately protected during construction activities.

Moderate to heavy wet weather events may cause localised flooding which could increase the potential for soil erosion and sedimentation impacts on stormwater. Where required, dewatering activities would be undertaken in accordance with the Blue Book and managed in line with TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2015b). If required, dewatering volumes are unlikely to be significant (generally less than one megalitre), and the requirement for an aquifer interference licence would not be required.

Operational phase

The Proposal is unlikely to have a significant impact on the hydrology of the surrounding area. The Proposal would result in an overall increase in hardstand area, which would reduce the total pervious area of the station. This could potentially result in an increase in the volume and flow velocity of stormwater entering the network downstream of the station. Considering the Proposal would result in minimal changes to the ground surface and no changes to the extents of the island platforms, overall the Proposal would result in a negligible impact on overland flows.

New eaves and gutters would be installed for new canopies and roofs, which would be connected to the existing drainage network. New drainage outlets would be installed to connect to existing stormwater pits and form part of Strathfield Municipals Council's stormwater system. Runoff from the new taxi, kiss and ride and parking areas would continue

to drain to the existing street drainage system. It is likely that existing water and sewer connections would be utilised for the new amenity features at the station, including the family accessible toilet. All works would be designed and undertaken in accordance with the relevant standards and requirements.

Consultation has been undertaken with Strathfield Municipal Council regarding the additional volume of stormwater generated from the station entering Council's existing drainage system. Consultation would continue during detailed design and construction.

6.9.3 Mitigation measures

The following mitigation measures would be implemented:

- final drainage arrangements and flooding risks would be determined and confirmed during the detailed design phase
- consultation would be undertaken with Strathfield Municipal Council regarding additional discharge of stormwater from the station into Council's existing drainage system
- 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 underground stormwater network surrounding Homebush Station
- regular vehicle and equipment maintenance would be undertaken
- spill kits would be available on site and included on ECMs, and training in spill response procedures would form part of the site inductions provided for construction staff
- dewatering (if required) would be undertaken in accordance with *TfNSW's Water Discharge and Reuse Guideline* (TfNSW, 2015b)
- platform regrading works would be undertaken with consideration of drainage requirements (such as a new drainage pipe or grated drainage channel if required).

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.10 Air quality

6.10.1 Existing environment

Based on the land uses surrounding Homebush Station, the existing air quality is likely to be characteristic of an urban environment. A search of the National Pollutant Inventory undertaken on 19 September 2016 for the 2014-2015 reporting period identified four existing and registered sources of air pollution the Strathfield LGA. The source closest to the Proposal is an LPG gas facility located at East Road, Homebush West, around one kilometre north west of the station. Other contributors to air quality surrounding the Proposal include emissions from motor vehicles on the surrounding road network and diesel trains operating on the adjoining freight rail corridor.

Sensitive receivers in the vicinity of the Proposal include staff and customers of Homebush Station, Homebush Public School and residential and commercial properties around the station.

6.10.2 Potential impacts

Construction phase

Temporary air quality impacts that have the potential to occur during construction include minor increases in dust and emissions of carbon monoxide, sulphur dioxide, particulate matter, nitrous oxides, volatile organic compounds and other substances associated with the combustion of diesel fuel and petrol from construction plant and equipment.

Anticipated sources of dust and dust-generating activities include:

- partial demolition of existing infrastructure
- upgrade of surrounding interchange facilities
- trenching and excavation for footpath and road works, platform regrading, relocation of services, drainage works, new lighting, sheltered bicycle racks and bus shelters
- refurbishment of the Amenities Building and Booking Office
- 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 ground disturbance with the potential to generate significant quantities of dust and other emissions. 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.

Operational phase

Overall impacts on air quality during the operation of the Proposal would be negligible as the Proposal would not result in a change in land use. Also, as the Proposal would increase access to public transport, the use of public transport would be expected to increase and lead to a relative reduction in the amount of private vehicle related emissions in the long-term.

6.10.3 Mitigation measures

Section 7.2 provides a list of mitigation measures that are proposed to manage air quality during construction. They are aimed around maintaining and operating plant and equipment efficiently and implementing measures for dust suppression including watering, covering 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 be prepared as part of the CEMP and would include mitigation measures to manage and monitor dust emissions from the partial demolition of existing structures at the station (e.g. station entrances, stairs, Booking Office and Amenities Building).

6.11 Other impacts

6.11.1 Waste

During construction of the Proposal, the following waste materials would be generated:

- asphalt and concrete
- excavated spoil

- building material wastes (including metals, timbers, plastics, packaging, fencing etc.)
- electrical wiring and conduit waste (from electrical connections)
- hazardous chemical wastes
- green waste (including weeds)
- demolition waste from the existing pavement at the station entrances, ramp and part of the station entry stairs including potential asbestos and hazardous waste
- general waste, including food scraps generated by construction workers.

Careful planning of construction activities would ensure that the volume of surplus materials is minimised. Waste management would be undertaken in accordance with the WARR Act and a Waste Management Plan would be prepared that would identify potential waste streams associated with the works and outline methods of disposal, reuse and recycling as well as other onsite waste management practices.

A Demolition Management Plan would also be prepared for the partial demolition of the existing station entrances, stairs, Booking Office and Amenities Building. This plan would include procedures for the removal, handling, storage and disposal of hazardous materials and a protocol for asbestos management (if identified during construction). The handling, storage, transport and disposal of asbestos and hazardous waste (including lead waste) would be in accordance with the requirements of the PoEO Act, WARR Act and relevant guidelines.

Waste management targets in accordance with the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a) would be developed for the Proposal and would include reuse and recycling.

The Proposal would not result in changes to operational waste management arrangements.

Refer to Table 26 in Section 7.2 for a full list of proposed mitigation measures.

6.11.2 Utilities

There are numerous electrical, drainage, communication and signalling services throughout the station including on the island platforms, adjacent to the railway line and over the station. Services to be impacted by the Proposal would need to be either temporarily or permanently relocated to enable Homebush Station to remain operational during construction and operation of the Proposal.

A Dial Before You Dig enquiry was lodged to obtain information on existing services/utilities in and adjacent to the Homebush Station precinct as part of the concept design assessment (Parsons Brinkerhoff, 2015). Services identified include underground telecommunications, electrical, water/sewer, drainage and gas infrastructure along Loftus Crescent, The Crescent and within the station footprint. There are also above ground low and high voltage electrical cables, rail overhead wiring and signalling infrastructure which would constrain the station upgrade and may require temporary and/or permanent relocation during the works.

All services would be located prior to any detailed design development and mechanical excavation, through the use of service location (non-destructive digging) methods.

Refer to Table 26 in Section 7.2 for a full list of mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.12 Cumulative impacts

Cumulative impacts occur when two or more projects are carried out concurrently and in close proximity to one another. The impacts may be caused by both construction and operational activities and can result in a greater impact to the surrounding area than would be expected if each project was undertaken in isolation. Multiple projects undertaken at a similar time/similar

location may also lead to receivers experiencing construction fatigue, particularly around noise, traffic and air quality impacts, if not appropriately managed.

6.12.1 Existing or potential projects

A search of the Department of Planning and Environment's Major Projects Register, the Sydney East Joint Regional Planning Panel Development and Planning Register and the Strathfield Municipal Council Development Applications register on 22 September 2016 identified the following developments in proximity to the Proposal:

- upgrades to Flemington Station including new lifts and stairs, a new concourse overbridge and footbridge, new family accessible toilet, new kiss and ride area and new bicycle racks (around 1.5 kilometres west of Homebush Station)
- power supply upgrades at Strathfield Substation (around 200 metres east of Homebush Station)
- residential, commercial and retail development for a private property 'Columbia Precinct' located at 2-20 Parramatta Road (around 120 metres north of Homebush Station)
- demolition of existing structures and construction of an eight storey and five storey building. Located at 33-36 Loftus Crescent, Homebush (around 450 metres west of Homebush Station)
- amendments being sought to the Strathfield LEP 2012 regarding building height and floor space ratios. Located at 11-17 Columbia Lane, Homebush (around 200 metres east of Homebush Station)
- reconfiguration of the property basement, introduction of a waste collection area, internal unit reconfigurations, relocation of rooftop common space and building modifications. Located at 29-35 Burlington Road and 32 The Crescent, Homebush (around 250 metres south west of Homebush Station)
- demolition of existing structures and construction of a part nine-, part five- storey residential building. Located at 40-42 Loftus Crescent, Homebush (around 500 metres west of Homebush Station)
- reconfiguration of basement levels and construction of a fourth level of basement parking. Located at 17-35 Parramatta Road and 5 Powell Street, Homebush (around 230 metres north of Homebush Station)
- future high rise residential development on the northern side of Loftus Crescent as identified by Strathfield Municipal Council (immediately to the north of Homebush Station).

Potential cumulative impacts may occur as a result of construction activities occurring simultaneously with other construction works in the area. Potential impacts could include:

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

Given the distance and nature of nearby developments and projects, it is anticipated that the cumulative impacts would be negligible, provided that mitigation measures in Section 7.2 are implemented.

Traffic associated with the construction work for the Homebush Station Upgrade is not anticipated to have a major impact on the surrounding road network. Operational traffic and

transport impacts would have a minimal impact on the performance of the surrounding road network.

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

6.12.2 Mitigation measures

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.

Consultation with relevant stakeholders including Strathfield Municipal Council and RailCorp/Sydney Trains would also be undertaken during construction planning where required, to consider potential cumulative impacts and implement measures required to minimise these impacts. Additional mitigation measures identified through consultation would be included in the construction TMP and CNVMP (as part of the CEMP) for the management of traffic and noise during construction.

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 Gas - project level) compliant carbon footprinting exercise in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects* (TfNSW, 2013e) as the Proposal's capital investment value is greater than TfNSW's current threshold. The carbon footprint would be used to inform decision making in design and construction if the estimated greenhouse gas emissions are determined to be greater than the carbon dioxide equivalent value established by the National Greenhouse and Energy Reporting threshold.

Due to the small scale of the Proposal and the short term temporary nature of the 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 Section 7.2.

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 Homebush. 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.

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 Homebush region are unlikely to impact on the Proposal (for more information on flooding refer to Section 6.9).

Climate change could lead to an increase in frequency and severity in bushfires. The Proposal is not situated on land mapped as bush fire prone, but would be designed with appropriate fire protection measures. The suburb of Homebush and surrounding areas are highly urbanised with only very small pockets of remnant bushland and therefore unlikely to be of a bushfire risk.

6.13.3 Sustainability

The design of the Proposal has been developed based on the principles of sustainability, including consideration 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.

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

7 Environmental management

This chapter of the REF identifies how the environmental impacts of the Proposal would be managed through the implementation of environmental management plans and mitigation measures. Section 7.2 lists the proposed mitigation measures 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 potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

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

7.2 Mitigation measures

Mitigation measures for the Proposal are listed in Table 26. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 26 Proposed mitigation measures

No.	Mitigation measure
	General
1.	A Construction Environmental Management Plan (CEMP) is to be prepared by the Contractor in accordance with the relevant requirements of *Guideline for Preparation of Environmental Management Plans,* 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 is to be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An Environmental Controls Map (ECM) is to be developed by the Contractor in accordance with TfNSW's *Guide to Environmental Controls Map* (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 are to be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance are to be undertaken during construction at appropriate intervals.
6.	Any modifications to the Proposal, if approved, are to 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.

No.	Mitigation measure
7.	Service relocation is to be undertaken in consultation with the relevant authority. Contractors are to mark existing services on the ECM to avoid direct impacts during construction.
	Traffic and site access
8.	Relevant authorisation(s) from the appropriate road authority is to be obtained for the proposed operational changes to street parking and signage, and the pedestrian crossing on Loftus Crescent.
9.	Prior to the commencement of construction, a Traffic Management Plan (TMP) is to be prepared as part of the CEMP and would include at a minimum: • 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 Homebush Railway Station and surrounding businesses, entertainment premises and residential properties (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 • ensuring heavy vehicle movements in proximity to the Homebush Local Centre and schools, including Homebush Public School, are restricted during peak times and school zone hours • details for the locations of kiss and ride, taxi rank and replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions are to be considered for the accessibility impaired • consideration of the installation of Tactile Ground Service Indicators at the existing bus stops on The Crescent and Loftus Crescent to indicate boarding points • consideration of the provision of wheel chair spaces and a cover for weather protection for the bus stop (route 408) on The Crescent • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP. Consultation with the relevant roads authorities is to be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.
10.	Communication is to 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.
11.	Road Occupancy Licences for temporary road closures are to be obtained, where required.
12.	Construction works are to be scheduled to minimise temporary loss of interchange facilities and available parking, including during works on the new station entrances, kiss and ride areas and parking upgrades.
13.	Temporary and/or permanent relocations of box office boxes is to be confirmed during detailed design and in consultation with Australia Post to manage potential access impacts.

No.	Mitigation measure
14.	Access to private properties and businesses adjacent to the works is to be maintained during construction, unless otherwise agreed by relevant property owners.
15.	Should road closures be required, signage is to be erected to clearly delineate alternative access so that nearby businesses would operate as normal.
16.	Construction vehicle traffic movements are to be restricted to outside of peak road traffic periods and outside of school peak periods, where practicable.
17.	The performance of project traffic arrangements is to be monitored during construction.
18.	The queuing and idling of construction vehicles in residential streets is to be minimised through staging of deliveries where practicable.
19.	Pedestrian access to and from the station is to be maintained at all times during normal operational hours throughout the construction period unless bus replacement services are in operation.
20.	Emergency services are to be advised of planned changes to traffic arrangements associated with the proposal prior to applying the changes.
21.	Any licences/approvals required for operating a crane within private airspace are to be sought and the works undertaken in accordance with these approvals and in consultation with affected property owners.
22.	A Road Safety Audit shall be undertaken as part of detailed design process and on completion of construction. The Road Safety Audit is to be submitted to and accepted by TfNSW.
	Urban design, landscape and visual amenity
23.	During detailed design, further design refinement of the new canopies, columns and fascia edge is to be undertaken to minimise bulk and height and ensure the design is consistent with the heritage setting of the station. This is to be undertaken in accordance with the mitigation described in Section 6.5 and the Sydney Trains Canopies and Shelters Design Guide for Heritage Stations (July, 2016).
24.	During detailed design, further consideration of the use of a more historically appropriate and relevant material for the lifts and canopy rooves.
25.	The detailed design of the Proposal is to comply with Crime Prevention Through Environmental Design principles.

No.	Mitigation measure
26.	An Urban Design Plan (UDP) is to be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The UDP, at a minimum, would address the following: • the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns (including consideration of Crime Prevention Through Environmental Design principles). This is to include but not be limited to: o connectivity with surrounding local and regional movement networks including street networks, other transport modes and active transport networks. Existing and proposed paths of travel for pedestrians and bicycles should be shown o integration with surrounding local and regional open space and or landscape networks. Existing and proposed open space infrastructure/landscape elements should be shown o integration with surrounding streetscape including street wall height, active frontages, awnings, street trees, entries, vehicle cross overs etc o integration with surrounding built form (existing or desired future) including building height, scale, bulk, massing and land-use • design detail that is sensitive to the amenity and character of heritage items located within or adjacent to the Proposal area.

No.	Mitigation measure
27.	A Public Domain Plan (PDP) is to be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The PDP, at a minimum, would address the following: • materials, finishes, colour schemes to minimise the bulk of structures and maintenance procedures including graffiti control for new walls, barriers and fences • location and design of pedestrian and bicycle pathways, street furniture including relocated kiss and ride, bus and taxi facilities, bicycle storage (where relevant), telephones and lighting equipment • landscape treatments and street tree planting to integrate with surrounding streetscape including consideration to the selection and location of new tree plantings along Loftus Crescent that may provide partial screening of the station from surrounding receivers, and facilitate improved amenity, such as the landscape setting of the station • consideration of street tree plantings along the southern side of The Crescent (using period Brush Box) either to the whole street frontage or the commercial area to increase the amenity of this area • design of new elements to achieve an architectural character that is complementary to existing elements rather than contrasting • provision of an attractive public space that acknowledges the existing mixed use commercial development to the south of the station and creates attractive station entrances • vegetation disturbance is to be limited to the minimum amount necessary to maintain screening of views • design of street furniture to consider Strathfield Municipal Council guidelines as relevant • opportunities for public art created by local artists to be incorporated, where considered appropriate, into the Proposal • total water management principles to be integrated into the design where considered appropriate • design measures included to meet TfNSW's *NSW Sustainable Design Guidelines - Version 3.0* (TfNSW, 2013a) • identification of design and landscaping aspects that will be open for stakeholder input, as required • disturbance of vegetation is to be limited to the minimum amount necessary to construct the Proposal to maintain screening of views.
28.	All permanent lighting is to be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting.*
29.	Worksite compounds are to be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
30.	Temporary hoardings, barriers, traffic management and signage are to be removed when no longer required.
31.	During construction, graffiti is to be removed in accordance with TfNSW's standard requirements.
32.	Light spill from the rail corridor into adjacent visually sensitive properties is to be minimised by the use of cut-off lighting, 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, particularly during night works.

No.	Mitigation measure
	Noise and vibration
33.	During detailed design, further investigation is to be undertaken to identify the noise and vibration impacts on the nearest sensitive receivers (including the nearby Medical Centre, Homebush Public School and 'highly affected' residential receivers). In accordance with TfNSW's Construction Noise Strategy, and in consultation with impacted receivers, feasible and reasonable mitigation measures are to be implemented to minimise impacts during construction.
34.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) is to be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), *Construction Noise Strategy* (TfNSW, 2012c) and the Noise and Vibration Impact Assessment for the Proposal (AECOM, 2016c). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable. The CNVMP is to be submitted to TfNSW for endorsement prior to finalisation of the detailed design.
35.	The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which are to be considered, include: • 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 are to 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.
36.	The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which are to be considered, include: • 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.

No.	Mitigation measure
37.	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.
38.	Where works are proposed outside of standard construction hours, (7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays), the TfNSW Communications Manager is to be notified at least 10 days prior to works (independently to the Out of Hours Work application submitted to the TfNSW Environment and Planning Manager).
39.	Where construction noise levels are predicted to exceed the Rating Background Level at nearby affected sensitive receivers, respite periods are to be observed, where practicable, and in accordance with TfNSW's *Construction Noise Strategy* (TfNSW, 2012c). This would include restricting the hours that very noisy activities can occur.
40.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works are to be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (AECOM, 2016c) and attended vibration monitoring or vibration trials are to be undertaken where these distances are required to be challenged. If construction works are proposed within these distances, a permanent vibration monitoring system is to be installed approximately one metre from the building footprint to warn operators in real time when vibration levels are approaching the maximum vibration criteria. This may include the use of flashing lights, SMS, or an alarm system.
41.	Vibration resulting from construction and received at any structure outside of the project is to be managed in accordance with: • for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 *Structural Vibration in Buildings: Effects on Structures* and British Standard *BS 7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)* • for human exposure to vibration the acceptable vibration - values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) which includes British Standard BS *7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).*
42.	Property conditions surveys are to be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 20 metres from the works and all heritage listed buildings and other sensitive structures within 50 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).
43.	Affected pre-schools, schools, universities and other identified sensitive receivers are to 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.
	Indigenous heritage
44.	All construction staff are to 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.

No.	Mitigation measure
45.	If unforeseen Indigenous objects are uncovered during construction, the procedures contained in TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) are to be followed, and works within the vicinity of the find would cease immediately. The Contractor is to 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 is to cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit is to be obtained prior to works recommencing at the location.
	Non-Indigenous heritage
46.	A Section 60 approval under the *Heritage Act 1977* is to be obtained from the NSW Heritage Council prior to works commencing and the conditions of such must be implemented.
47.	A Heritage Management Plan (including detailed drawings, documentation and specifications) and Work Method Statement are to be prepared as part of the CEMP to address heritage impacts and required management procedures to minimise risks to heritage. The plan is to be prepared by the heritage architect and submitted to TfNSW.
48.	Prior to and following completion of works, TfNSW would notify Sydney Trains and provide copies of all relevant plans and drawings to allow for Sydney Trains to update the RailCorp Section 170 Heritage and Conservation Register listing description and historical context.
49.	Prior to and following completion of works, TfNSW would notify Strathfield Municipal Council given Homebush Station is listed on the Strathfield LEP.
50.	During detailed design, further design refinement of the cantilevered canopies at the lift entrances at platform level is to be undertaken. This should be undertaken by a suitably qualified heritage architect and provided to TfNSW for approval.

No.	Mitigation measure
51.	The recommendations from the Statement of Heritage Impact (Orwell & Peter Phillips, 2005) are to be considered during detailed design and implemented where feasible. This includes: • archival recording of the station, in particular the brick boundary walls in the vicinity of the new lifts, and the Booking Office, prior to the commencement of and following works • location of existing moveable heritage items within the station, preparation of a detailed inventory of these items, identification of additional items to be recovered as part of the proposed works, and arrangements for the protection and safe storage of all moveable items during the works, to be completed prior to the commencement of works • a requirement for an interpretation strategy to be completed before the works commence and be implemented within an appropriate time following completion of the works, where possible incorporating moveable items stored at the station • the appointment of a suitably qualified and experienced heritage consultant throughout the documentation and construction period, with authority to review and advise on documents and work in progress • the use of alternative solutions to satisfy the requirements of the National Construction Code, where deemed-to-satisfy solutions would result in avoidable adverse heritage impacts • submission of further details for the following items prior to construction: o the interior of the existing Booking Office (including the room beneath) showing original fabric to be removed and retained, and any works required arising from the proposed new use, such as fire safety upgrading o new canopies over the lift entrances, and the proposed canopy over the footbridge o proposed works to trees on platforms • the use of skilled and experienced heritage tradespeople for work on the project, instructed by an architect and engineer also having skills and experience in the conservation and repair of historic buildings • a requirement for the completed project to be signed off by the appointed heritage consultant as having been completed in accordance with good conservation practice • hold points in the construction program to allow time for inspection of the dismantled structures and salvaged elements, and for the making of informed decisions on how the works should proceed.
52.	The recommendations from consultation with Sydney Trains Heritage shall be considered during detailed design and implemented where feasible.
53.	Opportunities to avoid the need to remove or trim trees on the station platforms would be investigated during detailed design. No tree removal or trimming of trees on the station platforms is permitted without further justification (including feasibility of alternative options) being provided to, and accepted by, TfNSW in consultation with a qualified heritage consultant.
54.	A movable heritage survey and assessment is to be prepared in accordance with NSW Heritage Division guidelines *Movable Heritage Principles* (NSW Heritage Office, 2000) and *Objects in Their Place* (NSW Heritage Office, 2004) prior to the detailed design for the Platform Building. The assessment is to provide a schedule of movable heritage objects, and a detailed management strategy for their safeguarding during construction and operation of the Proposal. This assessment is to also provide guidance on potential areas of interpretation for certain objects (such as the timber bench, phone, etc.).

No.	Mitigation measure
55.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) are to 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 are to be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
56.	Prior to construction, an archival recording of the station as a whole is to be completed prior to construction in accordance with the NSW Heritage Division guidelines – *Photographic recording of heritage items using film or digital capture* (NSW Heritage Office, 2006) *and How to prepare archival records* (NSW Heritage Office, 1998). Copies should be provided to Sydney Trains Heritage Council for future reference. In particular the archiving would focus of the following elements: • the brick boundary walls in the vicinity of the new lifts • the Booking Office • the Amenities Building.
57.	A heritage induction is to be provided to onsite staff and contractors 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.
58.	To effectively mitigate potential impacts of vibration on the heritage structures activities that cause vibration are to be managed in accordance with German Standard DIN 4150 – Part 3 (DIN 1999) heritage specifications. Real time vibration monitoring is to be conducted at commencement of relevant works to confirm compliance with the German Standard DIN 4150. If vibration levels approach the determined trigger level, then the construction activity would cease and the heritage structure is to be assessed and alternative construction methodologies developed, where practicable, before construction recommences.
	Socio-economic
59.	A Community Liaison Plan is to be prepared prior to construction to identify 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.
60.	Feedback through the submissions process is to be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
61.	Targeted consultation is to be undertaken with the relevant authorities to determine appropriate measures to manage any potential impacts associated with access to major events at Sydney Olympic Park. This may include scheduling works outside of major event times.
62.	Contact details for a 24-hour construction response line, Project Infoline and email address are to be provided for ongoing stakeholder contact throughout the construction phase.
63.	The community is to be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.

No.	Mitigation measure
	Biodiversity
64.	Opportunities to avoid the need to remove or trim trees on the station platforms would be investigated during detailed design. No tree removal or trimming of trees on the station platforms is permitted without further justification (including feasibility of alternative options) being provided to, and accepted by, TfNSW in consultation with a qualified heritage consultant. Any removal or trimming would only be undertaken if deemed necessary during detailed design and would be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2015a) and TfNSW's *Fauna Management Guideline* (TfNSW, 2015b).
65.	The Contractor is to investigate opportunities to retain trees ID 17 and 52 during the detailed design and construction of the Proposal and to avoid impacts to any trees/vegetation beyond which that which is assessed in this REF and the supporting Arboricultural Impact Assessment (Birds Tree Consultancy, 2016).
66.	Construction of the Proposal must be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2015d) and TfNSW's *Fauna Management Guideline* (TfNSW, 2015e).
67.	All workers are to 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.
68.	Disturbance of vegetation is to be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Arboricultural Impact Assessment (Birds Tree Consultancy, 2016) are to be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained are to be protected through temporary protection measures discussed below.
69.	Tree Protection Zones (TPZs) are to be established around trees to be retained, as nominated in the Figure 24. TPZs are to be included in the Environmental Controls Map (ECM). Tree protection is to be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs.
70.	In the event of any tree to be retained 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.
71.	Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor is to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval.
72.	For new landscaping works, mulching and watering is to be undertaken until plants are established.
73.	Weed control measures, consistent with TfNSW's *Weed Management and Disposal Guideline* (TfNSW, 2015f), are to be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the *Noxious Weeds Act 1993.*
74.	Offsetting would be undertaken in accordance with TfNSW's *Vegetation Offset Guide* (TfNSW, 2013d) and in consultation with Strathfield Municipal Council, and/or the owner of the land upon which the vegetation is to be planted. Any additional clearing would also require assessment and tree offset planting

No.	Mitigation measure
	Soils and water
75.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan is to be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures are to be implemented prior to commencement of works and maintained throughout construction.
76.	Prior to construction, contamination investigations are to be undertaken to confirm the presence and/or location of contaminated material, particularly with respect to asbestos.
77.	Erosion and sediment control measures are to be established prior to any clearing, grubbing and site establishment activities and are to be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures are to be maintained and left in place until the works are complete and areas are stabilised.
78.	Vehicles and machinery are to be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment are also to be refuelled offsite, or in a designated refuelling area.
79.	All fuels, chemicals and hazardous liquids are to be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and TfNSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2015g).
80.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) are to be implemented in accordance with relevant EPA guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2015g) during the construction phase. All staff are to 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.
81.	In the event of a pollution incident, works are to cease in the immediate vicinity and the Contractor is to immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA are to be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.
82.	The existing drainage systems are to remain operational throughout the construction phase.
83.	Should groundwater be encountered during excavation works, groundwater is to be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2015b).
84.	Final drainage arrangements and flooding risks are to be determined and confirmed during the detailed design phase. Consultation is to be undertaken with Strathfield Municipal Council regarding the proposed additional discharge in stormwater from the station into Council's existing drainage system.
85.	Dewatering (if required) is to be undertaken in accordance with TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2015b).
86.	Platform regrading works is to be undertaken with consideration of drainage requirements (such as a new drainage pipe or grated drainage channel if required).

No.	Mitigation measure
	Air quality
87.	Air quality management and monitoring for the Proposal is to be undertaken in accordance with TfNSW's *Air Quality Management Guideline* (TfNSW, 2015h).
88.	Methods for management of emissions are to be incorporated into project inductions, training and pre-start/toolbox talks.
89.	Plant and machinery are to be regularly checked and maintained in a proper and efficient condition. Plant and machinery is to be switched off when not in use, and not left idling.
90.	Vehicle and machinery movements during construction are to be restricted to designated areas and sealed/compacted surfaces where practicable.
91.	To minimise the generation of dust from construction activites, the following measures are to be implemented: • 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.
	Waste and contamination
92.	The CEMP (or separate Waste Management Plan, if necessary) must address waste management and is to at a minimum: • identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data.
93.	An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, is to 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.
94.	A Demolition Management Plan is to be prepared and is to include mitigation measures to manage and monitor dust emissions (including potential lead and asbestos dust) from the Proposal, including the partial demolition of the station access stairs, Booking Office and Amenities Building.
95.	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (EPA, 2014) prior to disposal. This information must be provided to TfNSW by the Contractor as soon as the information becomes available. Confirmation of the disposal of spoil and waste at a suitably licensed facility must also be forwarded to TfNSW as soon as the information is made available.
96.	All spoil to be removed from site is to be tested to confirm the presence of any contamination. Any contaminated spoil is to be disposed of at an appropriately licensed facility. Records of all waste disposed for the Proposal are to be kept.

No.	Mitigation measure
97.	Any concrete washout is to be established and maintained in accordance with TfNSW's *Concrete Washout Guideline* – draft (TfNSW, 2015i) with details included in the CEMP and location marked on the ECM.
98.	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 in accordance with: • *Code of Practice for the Safe Removal of Asbestos 2005* • *Code of Practice for the Management and Control of Asbestos in Workplaces 2005.*
99.	Prior to works commencing, lead paint flakes found around the work area are to be collected and stored as per hazardous waste controls.
100.	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 *AS 4361.1 Guide to lead paint management Part 1: Industrial applications.*
	Cumulative impacts
101.	The potential cumulative impacts associated with the Proposal are to be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures are to be developed in the CEMP, and implemented as appropriate.
102.	Consultation with relevant stakeholders is to be undertaken during construction planning, where required, to ensure that potential cumulative impacts are minimised. Additional mitigation measures from consultation are to be included in the construction TMP and CNVMP for the management of traffic and noise during construction.
103.	During construction, the works are to be co-ordinated with other construction activities in the immediate vicinity as required. Consultation and liaison would occur with Strathfield Municipal Council, Sydney Trains and developers to minimise cumulative construction impacts such as traffic and noise as far as practicable.
	Climate change and sustainability
104.	Detailed design of the Proposal is to be undertaken in accordance with the *NSW Sustainable Design Guidelines – Version 3.0* (TfNSW, 2013a).
105.	The detailed design process is to include a Greenhouse Gas (project level) compliant carbon footprinting exercise in accordance with *AS 14064-2 and TfNSW's Greenhouse Gas Inventory Guide for Construction Projects* (TfNSW, 2013e). The carbon footprint would then be used to inform decision making in design and construction.
106.	The detailed design process is to undertake a climate change impact assessment with reference to the *Climate Change Impacts and Risk Management: A Guide for Business and Government* (Department of the Environment and Heritage, 2006) and *the ISCA Guidelines for Climate Change Adaptation* (AGIC, 2011) to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc. are to be considered in the design.

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, 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 Homebush Station, providing an accessible route to the station and island platforms through the provision of four new lifts
- improved connectivity within Homebush, providing an accessible location to cross the railway line
- 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, a taxi rank, provision of accessible parking, new sheltered bicycle facilities on the northern side of the station and provision of a new pedestrian crossing on Loftus Crescent enabling a safe road crossing to access the station.

The main impacts of the Proposal include:

- temporary changes to vehicle and pedestrian movements to, from and around the station during construction
- temporary noise and vibration impacts during construction
- removal of trees and vegetation and subsequent application of planning offsets
- potential impacts to station heritage fabric from the refurbishment of the Booking Office and Amenities Building
- permanent changes to parking arrangements around the station including removal of approximately five on-street parking spaces
- net loss of one non-accessible toilet as a result of the provision of a family accessible toilet
- introduction of new elements into the visual environment including four new lifts and new canopies along the existing footbridge and lift landings.

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 environmental impact statement 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 have been considered during the concept design of the Proposal and would be further considered during the 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 adverse impacts on the environment.

References

AECOM, 2016a, *Traffic, Transport and Access Impact Assessment – Homebush Station Upgrade,* Sydney

AECOM, 2016b, *Visual Impact Assessment – Homebush Station Upgrade,* Sydney

AECOM, 2016c, *Noise and Vibration Impact Assessment - Homebush Station Upgrade,* Sydney

AGIC, 2011, *Guidelines for Climate Change Adaptation,* Australian Green Infrastructure Council (now Infrastructure Sustainability Council of Australia), Sydney

Birds Tree Consultancy, 2016, *Arboricultural Impact Assessment – Homebush Station Upgrade*, Sydney

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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
Any impact on a World Heritage property? There are no World Heritage Properties in the vicinity of the Proposal.	Nil
Any impact on a National Heritage place? There are no National Heritage places in the vicinity of the Proposal.	Nil
Any impact on a wetland of international importance? There are no wetlands of international importance in the vicinity of the Proposal.	Nil
Any impact on a listed threatened species or communities? It is unlikely that the development of the Proposal would significantly affect any listed threatened species or communities.	Nil
Any impacts on listed migratory species? It is unlikely that the development of the Proposal would significantly affect any listed migratory species.	Nil
Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.	Nil
Any impact on a Commonwealth marine area? There are no Commonwealth marine areas in the vicinity of the Proposal.	Nil
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 does not relate to coal seam gas or mining.	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal would not be undertaken on or near any Commonwealth land.	Nil

Appendix B Consideration of clause 228

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

Factor	Impacts
(a) Any environmental impact on a community? There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. Mitigation measures outlined in Section 7.2 would be implemented to manage and minimise adverse impacts.	Minor
(b) Any transformation of a locality? The Proposal would include the introduction of new visible elements in the landscape (including the four new lifts and canopies and upgraded stairs). 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 extent of vegetation trimming and removal has been minimised as far as practicable. The Proposal would have a positive contribution to the locality by creating an accessible entrance and path of travel to and from the station in addition to an accessible connection across the railway line.	Minor
(c) Any environmental impact on the ecosystem of the locality? The Proposal would require the removal of 10 trees within the rail corridor, however this vegetation does not form part of any threatened ecological communities, or is likely to provide habitat for threatened species and so would have a negligible impact to the ecosystem. The extent of vegetation trimming and removal has been minimised as far as practicable. Any additional trees that are found to require removal, not assessed in this REF, would be subject to further assessment, offsetting and approval from TfNSW.	Nil
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? There would be some temporary impacts during construction particularly in relation to noise, traffic and access and visual amenity. The removal of vegetation would also result in a visual change however the number of trees to be removed has been minimised as far as possible and would be managed via offsetting. Tree plantings along The Crescent and Loftus Crescent that may provide partial screening of the station from surrounding receivers would be considered in the Public Domain Plan, to be prepared by the Contractor. Any additional trees that are found to require removal, not assessed in this REF, would be subject to further assessment, offsetting and approval from TfNSW.	Minor

Factor	Impacts
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The Proposal would have a positive contribution to the locality by creating equitable access to the station, the island platforms and across the railway corridor. The station is listed on the SHR, the RailCorp Section 170 Heritage and Conservation Register and the Strathfield LEP 2012. The Proposal would result in some minor impacts to some parts of the station that are heritage listed. Impacts to heritage would be minimised through the implementation of the mitigation measures provided in the REF. 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.	Minor
(f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)? The Proposal is unlikely to have any impact on the habitat of protected fauna.	Nil
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal is unlikely to have any impact on endangering any species of animal, plant or other form of like, whether living on land, in water or in the air.	Nil
(h) Any long-term effects on the environment? The Proposal is unlikely to have any long-term effects on the environment.	Nil
(i) Any degradation of the quality of the environment? The Proposal is unlikely to have any degradation of the quality of the environment.	Nil
(j) Any risk to the safety of the environment? Provided the recommended mitigation measures are implemented, the Proposal is unlikely to cause any pollution or safety risks to the environment. Specific management measures would be implemented to manage asbestos and other hazardous materials that may be encountered during construction or demolition works.	Minor
(k) Any reduction in the range of beneficial uses of the environment? The Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.	Nil
(l) Any pollution of the environment? The Proposal is unlikely to cause any pollution of the environment provided the recommended mitigation measures are implemented.	Minor

Factor	Impacts
(m) Any environmental problems associated with the disposal of waste? 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. Prior to construction, contamination investigations would be undertaken to confirm the presence of contaminated material, particularly asbestos. All waste would be managed and disposed of with a site-specific Waste Management Plan prepared as part of the Construction Environmental Management Plan. Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.	Minor
(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal is unlikely to increase demands on resources that are, or are likely to become, in short supply.	Nil
(o) Any cumulative environmental effect with other existing or likely future activities? Cumulative effects of the Proposal are described in Section 6.12. Where feasible, project activities and 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.	Nil
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? As the Proposal is not located within the vicinity of the coast, it would not impact on coastal processes and coastal hazards, including those under projected climate change conditions.	Nil

Appendix C Sustainable Design Guidelines checklist

Compulsory initiatives

Initiative	Theme	Description	Design (D) & Construction (C) Interface	Under Consideration
C.1 Carbon footprint	Energy and greenhouse	Undertake AS14064-2 (greenhouse gases – project level) compliant carbon footprinting exercise for all projects with a capital investment value over $10 million in accordance with Transport for NSW's Greenhouse Gas Inventory Guide for Construction Projects. The carbon footprint is to be used to inform decision-making in design and construction. Use standard carbon coefficient values for construction material and fuel usage. Monitor and report the carbon footprint every six months during construction.	DC	Yes
C.5 Renewable Energy	Energy and greenhouse	Purchase at least 25% of site-based electricity energy needs from Green Power or renewable sources during construction of the asset.	C	Yes
C.6 Climate change impact assessment	Climate resilience	Perform a climate change impact assessment for each project worth over $10M using current scientific predictions (i.e. Intergovernmental Panel on Climate Change (IPCC), Commonwealth Scientific and Industrial Research Organisation (CSIRO) etc) to determine the hazards/risks associated with future climatic conditions. Refer to 'Climate Change Impacts and Risk Management: A Guide for Business and Government' and the 'AGIC Guidelines for Climate Change Adaptation' for guidance.	D	Yes
C.7 Design for climate change	Climate resilience	All projects with a capital investment value over $10 million to design out extreme, high and medium risks as identified in the climate change impact assessment where practicable.	D	Yes
C.9 Reduce waste to landfill	Materials and waste	Ensure at least 95 per cent of construction and demolition waste (by weight) is diverted from landfill, and either recycled or reused, for all projects with a capital investment value over $10 million.	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

Initiative	Theme	Description	Design (D) & Construction (C) Interface	Under Consideration
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.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
C.18 Monitor and record construction water	Water	Projects that have capital value greater than $10 million are to monitor and record water consumption at the site office, all outlets available to the construction site and other water uses such as from non--potable sources.	C	Yes
C.20 Noise management	Pollution control	Project to comply with Transport Projects Construction Noise Strategy and related conditions of approval.	DC	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) & Construction (C) Interface	Under Consideration
1.3 Power factor correction	Energy and greenhouse	Install power factor correction (PFC) units to keep the power factor of the system as close to one as possible.	D	Yes
1.13 Green travel plans	Energy and greenhouse	Develop and implement green or sustainable travel plans during construction for employees to get to site offices and construction sites.	C	Yes

Initiative	Theme	Description	Design (D) & Construction (C) Interface	Under Consideration
1.15 Light coloured finishes	Energy and greenhouse	Use light coloured finishes on floors, walls and ceilings of offices, stations and platforms to help reflect ambient light. Within car parks, consider glare and safety issues that may arise.	D	Yes
1.20 LED lights	Energy and greenhouse	Incorporate energy efficient LED lighting.	D	Yes
1.23 CCTV lighting	Energy and greenhouse	Install low light CCTV monitoring equipment.	D	Yes
2.3 Passenger comfort	Climate resilience	Review levels of passenger comfort to take account of climate change (e.g. provision of additional shelter from winds and driving rain and increased shading from sun in locations where customers wait for transport).	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
3.4 Recycled / renewable materials	Materials and waste	Maximise the recycled content of construction materials, in particular those included in the Infrastructure Sustainability Council of Australia's IS Materials Calculator available from ISCA for free at www.isca.org.au.	DC	Yes
3.5 Optimise design	Materials and waste	Optimise design to minimise material consumption, mass/volume/space use and above ground land use.	D	Yes
3.6 Re-use of structures	Materials and waste	Retain or refurbish existing structures where possible.	DC	Yes
3.7 Recycled concrete	Materials and waste	Reuse concrete, bricks and other structural materials in construction on site where available and suitable.	DC	Yes
3.9 Recycled aggregate	Materials and waste	Use recycled aggregate in non-structural uses (e.g. building base course, sub-grade to any car parks and footpaths, backfilling to service trenches, kerb and gutter).	DC	Yes
3.14 Sustainable structural steel	Materials and waste	Source at least 60 per cent of structural steel (by weight) from a steel fabricator/contractor accredited by the Environmental Sustainability Charter of the Australian Steel Institute.	C	Yes
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

Initiative	Theme	Description	Design (D) & Construction (C) Interface	Under Consideration
3.20 Timber	Materials and waste	95% of all timber products (by cost) comprise re-used or post-consumer recycled timber, Forest Stewardship Council (FSC) or Australian Forest Scheme (AFS) certified timber, and/or timber from NSW sustainably managed forests.	DC	Yes
3.25 Cut-fill balance	Materials and waste	Balance site works to avoid excess or import of spoil.	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
3.36 Prefabrication	Materials and waste	Use prefabricated building and civil components (for bridges, walls (retaining, deflection, noise), culverts, platforms, level crossings and tunnel lining etc) to reduce construction waste material usage, pollution risks and travel.	DC	Yes
3.37 Low finish interiors	Materials and waste	Specify low-finish interiors (e.g. exposed brick/rock walls, unpainted galvanised steel, polished concrete walls and floors) to avoid the need for large quantities of paint and/or cement render. Consider graffiti removal in specifying surface textures.	D	Yes
3.40 Façade reuse	Materials and waste	Incorporate existing building facades in station upgrades.	D	Yes
3.41 Coordinate dimensions	Materials and waste	Design for standard material sizes and components to reduce waste and improve ease of assembly and disassembly.	D	Yes
3.43 Durable finishes	Materials and waste	Specify building materials and finishes to demonstrate high quality and durability.	D	Yes
3.47 Correct site layout	Materials and waste	Layout of construction sites (including plant and equipment) to be designed to reduce travel distances and double carrying.	C	Yes

Initiative	Theme	Description	Design (D) & Construction (C) Interface	Under Consideration
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
4.9 Heritage items in the vicinity	Biodiversity and heritage	Design for the interrelationship between new development/redevelopment and proximate buildings of heritage/cultural significance.	D	Yes
5.10 Planting	Water	Select plant species that require minimal or no irrigation after establishment.	DC	Yes
5.15 Permeable and porous surfaces	Water	Design for permeable and porous surfaces to allow for stormwater infiltration (preferably with other treatments such as vegetated swales).	D	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
6.5 Apply noise control hierarchy	Pollution control	Apply a hierarchy of control by addressing noise at source first (e.g. orient equipment away from residential receivers), then propagation path (e.g. a noise barrier) and finally at the receiver (e.g. double glazed windows) as a last option (see Rail Infrastructure Noise Guidelines for further information).	D	Yes
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 AS4282 Control of the Obtrusive Effects of Outdoor Lighting. Do not exceed minimum requirements of AS1158 for illuminance levels for 95 per cent of outdoor spaces.	D	Yes
7.13 Enhance visual interest of asset	Community benefit	Use lighting, landscaping and/or public art to direct visual interest towards the structure and enhance the visual amenity of the structure.	DC	Yes
7.19 Kiss and ride	Community benefit	Provide for kiss and ride at the station.	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 5% 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

Initiative	Theme	Description	Design (D) & Construction (C) Interface	Under Consideration
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
7.36 Safe hot water	Community benefit	Use safe hot water fittings (instead of mixing valves) to control water temperature at the tap and prevent scalding.	DC	Yes
7.38 Reduce vandalism	Community benefit	Minimise risks from vandalism during design, such as designing pedestrian bridges and walkways with a high degree of surveillance or railings, restrict window openings and limit to a maximum 80mm opening.	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
7.50 Shading	Community benefit	Provide shade through vegetation or structures over platform, concourse, car parks and pedestrian pathway areas and work/lunch areas.	D	Yes

Appendix D Detailed Tree List

The table below provides a list of all trees within the vicinity of the site, a description of each tree, the TPZ radius recommended and each tree's retention value. Refer to Figure 24 for location.

Tree No.	Scientific Name	Description	TPZ Radius (m)	Retention value
1	*Lophostemon confertus*	This mature tree is approximately 7m tall with a canopy spread of 8m. It has a single trunk with a diameter at breast height (DBH) of 400mm. This tree is in good health and condition with minimal deadwood and moderate epicormic growth.	4.8	High
2	*Melaleuca decora*	This mature tree is approximately 5m tall with a canopy spread of 3m. It has a single trunk with a DBH of 120mm. This tree is in fair health and condition with a thinning canopy, minimal deadwood and epicormics growth.	1.44	High
3	*Lophostemon confertus*	This mature tree is approximately 9m tall with a canopy spread of 12m. It has a single trunk with a DBH of 420mm. This tree is in good health and condition with minimal deadwood and moderate epicormic growth.	5.04	High
4	*Lophostemon confertus*	This mature tree is approximately 11m tall with a canopy spread of 5m. It has a single trunk with a DBH of 210mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.52	High
5	*Angophora costata*	This mature tree is approximately 14m tall with a canopy spread of 12m. It has a single trunk with a DBH of 320mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.84	High
6	*Corymbia maculata*	This mature tree is approximately 16m tall with a canopy spread of 8m. It has a single trunk with a DBH of 300mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.6	High
7	*Corymbia gummifera*	This mature tree is approximately 13m tall with a canopy spread of 9m. It has a single trunk with a DBH of 300mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.6	High
8	*Corymbia maculata*	This mature tree is approximately 20m tall with a canopy spread of 12m. It has a single trunk with a DBH of 400mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	4.8	High

Tree No.	Scientific Name	Description	TPZ Radius (m)	Retention value
9	*Melaleuca quinquenervia*	This mature tree is approximately 7m tall with a canopy spread of 4m. It has a single trunk with a DBH of 220mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.64	High
10	*Melaleuca quinquenervia*	This mature tree is approximately 9m tall with a canopy spread of 6m. It has a single trunk with a DBH of 250mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3	High
11	*Ulmus parvifolia*	This mature deciduous tree is approximately 6m tall with a canopy spread of 3m. It has twin co-dominant trunks from the base with an aggregate DBH of 230mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.76	High
12	*Syagrus romanzoffianum*	This mature tree is approximately 10m. It has a single trunk with a DBH of 4m. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.5	Low
13	*Syagrus romanzoffianum*	This mature tree is approximately 10m. It has a single trunk with a DBH of 4m. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.5	Low
14	*Syagrus romanzoffianum*	This mature tree is approximately 10m. It has a single trunk with a DBH of 4m. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.5	Low
15	*Syagrus romanzoffianum*	This mature tree is approximately 10m. It has a single trunk with a DBH of 4m. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.5	Low
16	*Melia azedarach*	This mature deciduous tree is approximately 11m tall with a canopy spread of 7m. It has a single trunk with a DBH of 320mm. This tree is in good health and condition with minimal deadwood and epicormics growth.	3.84	High
17	*Melia azedarach*	This mature deciduous tree is approximately 9m tall with a canopy spread of 6m. It has twin co-dominant trunks from the base with an aggregate DBH of 250mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3	High
18	*Ulmus parvifolia*	This mature tree is approximately 14m tall with a canopy spread of 12m. It has a single trunk with a DBH of 360mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	4.32	High

Tree No.	Scientific Name	Description	TPZ Radius (m)	Retention value
19	*Ligustrum lucidum*	This mature tree is approximately 10m. It has a single trunk with a DBH of 6mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3	None
20	*Ulmus parvifolia*	This mature tree is approximately 11m tall with a canopy spread of 8m. It has a single trunk with a DBH of 320mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.84	High
21	*Ulmus parvifolia*	This mature tree is approximately 12m tall with a canopy spread of 8m. It has a single trunk with a DBH of 320mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.84	High
22	*Pittosporum undulatum*	This mature tree is approximately 5.5m tall with a canopy spread of 4m. It has twin co-dominant trunks from the base with an aggregate DBH of 260mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.12	Low
23	*Pittosporum undulatum*	This mature tree is approximately 6.5m tall with a canopy spread of 5m. It has a single trunk with a DBH of 140mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	1.68	Low
24	*Pittosporum undulatum*	This mature tree is approximately 4.5m tall with a canopy spread of 3m. It has a single trunk with a DBH of 270mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.24	Low
25	*Casuarina spp*	This mature tree is approximately 9m tall with a canopy spread of 3m. It has a single trunk with a DBH of 250mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3	High
26	*Melaleuca armillaris*	This mature tree is approximately 6m tall with a canopy spread of 4m. It has multiple co-dominant trunks from the base with an aggregate DBH of 240mm. This tree is in poor health and condition with a sparse canopy, significant deadwood and minimal epicormic growth.	2.88	Low
27	*Acacia decurrens*	This mature tree is approximately 8.5m tall with a canopy spread of 4m. It has twin co-dominant trunks from the base with an aggregate DBH of 220mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.64	High

Tree No.	Scientific Name	Description	TPZ Radius (m)	Retention value
28	*Cinnamomum camphora*	This mature tree is approximately 5.5m tall with a canopy spread of 4m. It has multiple co-dominant trunks from the base with an aggregate DBH of 300mm. This tree is in poor health and declining condition with a sparse canopy, significant deadwood and minimal epicormic growth.	2.9	None
29	*Cinnamomum camphora*	This mature tree is approximately 6.5m tall with a canopy spread of 5m. It has multiple co-dominant trunks from the base with an aggregate DBH of 300mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.88	None
30	*Cupressus spp*	This mature tree is approximately 5.5m tall with a canopy spread of 3m. It has multiple co-dominant trunks from the base with an aggregate DBH of 350mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	4.2	Moderate
31	*Lophostemon confertus*	This mature tree is approximately 10.5m tall with a canopy spread of 6m. It has a single trunk with a DBH of 470mm. This tree is in good health and condition with minimal deadwood. The entire crown is elite epicormic growth as a result of topping or incorrect pruning. There is evidence of decay in basal wound.	5.64	Moderate
32	*Cupressus spp*	This mature tree is approximately 6m tall with a canopy spread of 4m. It has a single trunk with a DBH of 300mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.6	Moderate
33	*Lophostemon confertus*	This mature tree is approximately 11m tall with a canopy spread of 7m. It has a single trunk with a DBH of 510mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	6.12	High
34	*Lophostemon confertus*	This mature tree is approximately 13m tall with a canopy spread of 7m. It has a single trunk with a DBH of 420mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	5.04	High
35	*Lophostemon confertus*	This mature tree is approximately 12m tall with a canopy spread of 6m. It has twin co-dominant trunks from the base with an aggregate DBH of 580mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	6.96	High

Tree No.	Scientific Name	Description	TPZ Radius (m)	Retention value
36	*Cupressus spp*	This mature tree is approximately 7m tall with a canopy spread of 6m. It has a single trunk with a DBH of 300mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.6	Moderate
37	*Lophostemon confertus*	This mature tree is approximately 9m tall with a canopy spread of 5m. It has multiple (4) co-dominant trunks from 1m above the base with an aggregate DBH of 550mm. This tree is in good health and condition with minimal deadwood and epicormic growth. There is evidence of decay at the primary junction of two co dominant trunks in this high retention value tree. We recommend Resistograph testing to determine viability of retention.	6.6	High
38	*Lophostemon confertus*	This mature tree is approximately 8m tall with a canopy spread of 5m. It has a single trunk with a DBH of 390mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	4.68	High
39	*Cupressus spp*	This mature tree is approximately 5.5m tall with a canopy spread of 4m. It has multiple co-dominant trunks from the base with an aggregate DBH of 300mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.6	Moderate
40	*Lophostemon confertus*	This mature tree is approximately 11m tall with a canopy spread of 9m. It has a single trunk with a DBH of 850mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	10.2	High
41	*Lophostemon confertus*	This mature tree is approximately 12m tall with a canopy spread of 7m. It has a single trunk with a DBH of 570mm. This tree is in good health and condition with minimal deadwood and epicormic growth. There is unusual basal swelling which may be evidence of decay in the butt of this tree. We recommend Resistograph testing for decay.	6.84	High
42	*Eucalyptus scoparia*	This mature tree is approximately 8m tall with a canopy spread of 5m. It has a single trunk with a slight lean to the north and a DBH of 220mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.64	Moderate
43	*Casuarina spp*	This mature tree is approximately 7m tall with a canopy spread of 4m. It has a single trunk with a DBH of 120mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	1.44	Moderate

Tree No.	Scientific Name	Description	TPZ Radius (m)	Retention value
44	*Lophostemon confertus*	This mature tree is approximately 6m tall with a canopy spread of 3m. It has twin co-dominant trunks from the base with an aggregate DBH of 110mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	1.32	High
45	*Cinnamomum camphora*	This mature tree is approximately 11m tall with a canopy spread of 8m. It has a single trunk with a DBH of 810mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	9.72	High
46	*Lophostemon confertus*	This mature tree is approximately 10.5m tall with a canopy spread of 7m. It has a single trunk with a DBH of 900mm. This tree is in good health and condition with minimal deadwood and epicormic growth. There is unusual basal swelling which may be evidence of decay in the butt of this tree. Resistograph testing for decay recommended.	10.8	High
47	*Lophostemon confertus*	This mature tree is approximately 8m tall with a canopy spread of 5m. It has a single trunk with a DBH of 190mm. This tree is in good health and condition with minimal deadwood and epicormic growth. This tree is located within the footpath and is surrounded by a tight tree grate that will constrict the trunk in the short term.	2.28	High
48	*Lophostemon confertus*	This mature tree is approximately 6m tall with a canopy spread of 5m. It has a single trunk with a DBH of 210mm. This tree is in good health and condition with minimal deadwood and epicormic growth. This tree is located within the footpath and is surrounded by a tight tree grate that will constrict the trunk in the short term.	2.52	High
49	*Lophostemon confertus*	This mature tree is approximately 7m tall with a canopy spread of 6m. It has a single trunk with a DBH of 290mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.48	High
50	*Lophostemon confertus*	This mature tree is approximately 7m tall with a canopy spread of 6m. It has a single trunk with a DBH of 230mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.76	High
51	*Lophostemon confertus*	This mature tree is approximately 7m tall with a canopy spread of 6m. It has a single trunk with a DBH of 270mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.24	High

Tree No.	Scientific Name	Description	TPZ Radius (m)	Retention value
52	*Acacia binervia*	This mature tree is approximately 4m tall with a canopy spread of 4m. It has twin co-dominant trunks from the base with an aggregate DBH of 200mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	2.4	High
53	*Bauhinia spp*	This mature tree is approximately 7m tall with a canopy spread of 3m. It has multiple (3) co-dominant trunks from the base with an aggregate DBH of 300mm. This tree is in poor health and condition with a sparse canopy, moderate deadwood and epicormic growth.	3.6	Low
54	*Viburnum tinus*	This mature tree is approximately 5m tall with a canopy spread of 3m. It has multiple co-dominant trunks from the base with an aggregate DBH of 200mm. This tree is in fair health and condition with a thinning canopy, minimal deadwood, epicormic growth and some apical dieback.	2.4	Low
55	*Bauhinia spp*	This mature tree is approximately 7m tall with a canopy spread of 3m. It has multiple (3) co-dominant trunks from the base with an aggregate DBH of 400mm. This tree is in poor health and condition with a sparse canopy, moderate deadwood and epicormic growth.	4.8	Low
56	*Bauhinia spp*	This mature tree is planted in a narrow elevated bed adjacent retaining wall and it is approximately 7m tall with a canopy spread of 4m. It has twin co-dominant trunks from the base with an aggregate DBH of 280mm. This tree is in good health and condition with minimal deadwood and epicormic growth.	3.36	Moderate

Appendix E Assessments of Significance

EP&A Act: Grey-headed flying fox (*Pteropus poliocephalus*)

Criterion	
	(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
	The impact of the proposal in relation to Grey-headed flying fox is limited to the removal of four large Cocos palms (*Syagrus romanzoffianum*) to the north of the station. These trees are all mature and are producing fruit. Whilst these trees are very likely be utilised as a foraging resource for local populations of this species they are unlikely to be of critical importance in the context of significant alternative resources in the plethora of established residential gardens in the vicinity. On this basis it is not expected that the impacts arising from construction will result in an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.
	The action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.
	(b) in the case of an endangered population, whether the action proposed is likely **to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction**
	Not applicable.
	Not applicable.
	(c) in the case of an endangered ecological community or critically endangered **ecological community, whether the action proposed:**
	(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
	Not applicable.
	Not applicable.
	(ii) is likely to substantially and adversely modify the composition of the ecological **community such that its local occurrence is likely to be placed at risk of extinction.**
	Not applicable.
	Not applicable.
	(d) in relation to the habitat of a threatened species, population or ecological community:
	(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed
	The degree of habitat removal for the proposal is limited to the removal of the four subject Cocos palms. No additional indirect or off-site impacts are expected.

Conclusion	The proposed activity will not result in the modification or removal of a significant amount of foraging habitat for this species.
Criterion	**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action**
Response	The removal of the four subject Cocos palms is highly unlikely to result in a fragmentation of habitat for this species such that it would result in isolation or fragmentation of habitat for this highly mobile species.
Conclusion	Habitat for this species is not likely to become further fragmented or isolated from other areas of habitat as a result of the proposed action.
Criterion	**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.**
Response	The four Cocos palms would represent a tiny fraction of the overall foraging habitat for this species within the local area and region in general. Given the abundance of alternative foraging habitat, particularly within established residential gardens, the subject palms are not considered to be important to the long term survival of the species in the locality.
Conclusion	The habitat to be affected by this proposal is not likely to be critical to the long term survival of the species in the locality.
Criterion	**(e) whether the action proposed is likely to have an adverse effect on critical** habitat **(either directly or indirectly).**
Response	Not applicable.
Conclusion	Not applicable.
Criterion	**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.**
Response	No recovery plan or threat abatement plan has been gazetted for this species. However, the OEH species profile sets out several priority activities to assist in the conservation of this species: • protect roost sites, particularly avoid disturbance September through November • identify and protect key foraging areas • manage and enforce licensed shooting • investigate and promote alternative non-lethal crop protection mechanisms • identify powerline blackspots and implement measures to reduce deaths; implement measures to reduce deaths from entanglement in netting and on barbed-wire • increase public awareness/understanding about flying-foxes, and their involvement in flying-fox conservation • monitor the national population's status and distribution • improve knowledge on demographics and population structure to better understand ecological requirements of the species. The proposal will not affect the potential for the above actions to be implemented.
Conclusion	The proposed activity is not inconsistent with the actions recommended to assist this species.

Criterion	**(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**
Response	The proposal is not considered to be part of a key threatening process, nor would it be a contributory factor of any such processes.
Conclusion	The proposed action will not result in the operation of or increase in the impact of this key threatening process

Overall Conclusion

The proposal, removing four mature Cocos palms, is unlikely to result in an impact upon the foraging resources for Grey-headed flying fox such that any local populations would be lead to decline or become further threatened. Overall it is considered unlikely that the impact of the project on the species would affect its long-term survival in the locality.

The proposed activity is not likely to result in a significant impact to this species.

No further assessment is recommended for this species.

EPBC Act: Grey-headed flying fox (*Pteropus poliocephalus*)

Criterion	**(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** The impact of the proposal in relation to Grey-headed flying fox is limited to the removal of four large Cocos palms (*Syagrus romanzoffianum*) to the north of the station. These trees are all mature and are producing fruit. Whilst these trees are very likely be utilised as a foraging resource for local populations of this species they are unlikely to be of critical importance in the context of significant alternative resources in the plethora of established residential gardens in the vicinity. As such it is not expected that the removal of these trees would lead to a long term decrease in the size of an important population. The proposed action is not likely to have a significant impact on the species leading to a long-term decrease in the size of an important population.
	ii. reduce the area of occupancy of an important population The degree of impact upon potential foraging habitat for this species (four Cocos palms) is considered to be negligible in the context of significant alternative foraging resources in the nearby area in the form of residential gardens. As such the area of occupancy for this species would not be affected. The proposed action would not reduce the area of occupancy of an important population of this species.
	iii. fragment an existing important population into two or more populations The impacts associated with the proposal will be limited the removal of four non-native Cocos palms. It is considered unlikely that this would lead to any fragmentation of any local population, important or otherwise.

Conclusion	The proposed activity is unlikely to fragment an existing population into two or more populations.
Criterion	**iv. adversely affect habitat critical to the survival of a species**
Response	The four subject Cocos palms are unlikely to constitute habitat critical to the survival of this species based upon the abundance of similar or better quality habitat within the locality.
Conclusion	The proposed activity is unlikely to adversely affect habitat critical to the survival of the species.
Criterion	**v. disrupt the breeding cycle of an important population**
Response	The impacts associated with this proposal will be limited to the removal of four Cocos palms. This would not reduce the foraging habitat for this species to the point where its breeding cycle of any important populations in the area is likely to be placed at risk.
Conclusion	The proposal is unlikely to disrupt the breeding cycle of an important population of this species.
Criterion	**vi. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**
Response	The impacts upon habitat for this species will be limited the removal of four Cocos palms. This is highly unlikely affect habitat for this species such that it would be put at risk of decline.
Conclusion	The proposal is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Criterion	**vii. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat**
Response	The site already includes several urban weeds common to the Sydney Basin. Given the mitigation measures proposed the potential for further weeds to be introduced by the proposed is expected to be very limited. Despite this there remains a small potential for the proposal to aid the spread of weeds due to the movement and/or introduction of soil, vehicles and equipment. A Site Erosion and Sediment Control Plan or Soil Water Management Plan, in accordance with the Blue Book, is to be implemented for the proposal. Weed, stormwater and pest management activities would be implemented as part of the environmental management framework for the site.
Conclusion	It is unlikely that the proposed action will result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat.
Criterion	**viii. introduce disease that may cause the species to decline**

Response	The study area is potentially infected with *Phytophthora cinnamomi*. Habitat disturbance may aid the spread of *Phytophthora*. Controls on the movement of vehicles, and human traffic into native vegetation habitat will be implemented. Construction activities would follow protocol to prevent introduction or spread of *Phytophthora cinnamomi*, either Sydney Region Pest Management Strategy or Best Practice Guidelines for *Phytophthora cinnamomi* (DECC 2008). The proposed management controls for *Phytophthora* will reduce the risk of spread of this pathogen.
Conclusion	It is unlikely that the proposed action will introduce disease that may cause these species to decline.
Criterion	**ix. interfere with the recovery of the species**
Response	The impacts associated with the proposal are of a scale that are very unlikely to significantly affect any local populations of this species. It follows from this that these impacts are unlikely to interfere with the recovery of this species.
Conclusion	The proposed activity is unlikely to interfere with the recovery of this species.
Criterion	**An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:** **i. lead to a long-term decrease in the size of an important population**
Response	The proposal will not substantially affect foraging habitat for this species in the area due to its negligible resource in the context of surrounding urban gardens. As such it is not expected to lead to long term decrease in the size of an important population, providing all relevant mitigation measures are implemented.
Conclusion	The proposed action is not likely to have a significant impact on the species leading to a long-term decrease in the size of an important population.

Overall Conclusion

The proposal will have only a minor impact upon foraging habitat for this species. Mitigation and management measures have been proposed in order to reduce the potential for further impacts and as such it is considered unlikely that the impact of the project on the species would affect its long-term survival in the locality.

The proposed activity is not likely to result in a significant impact to this species.

No further assessment is recommended for this species.