NSW GOVERNMENT | Transport for NSW

Flemington Station Upgrade

Review of Environmental Factors

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Contents

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Figures

Tables

Abbreviations

AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
APS	Access to Premises (Disability Standards)
ARI	Average Recurrence Interval
ASA	Assets Standards Authority (refer to Definitions)
BCA	Building Code of Australia
CCTV	closed circuit television
CEMP	Construction Environmental Management Plan
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
D&C	Design & Construct
DDA	*Disability Discrimination Act 1992* (Commonwealth)
DSFAPT	Disability Standards for Accessible Public Transport 2002 (under the *Disability Discrimination Act 1992)* (Commonwealth)
DSI	Detailed Site Investigation (Phase II Contamination Investigation)
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
ESD	Ecologically Sustainable Development (refer to Definitions)
ETS	electronic ticketing system
FAT	family accessible toilet
FM Act	*Fisheries Management Act 1994*
Heritage Act	*Heritage Act 1977*
HV	high voltage
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
LV	low voltage
NCC	National Construction Code
NES	National Environmental Significance
Noxious Weeds Act	*Noxious Weeds Act 1993*
OHWS	Overhead Wiring Structure
NPW Act	*National Parks and Wildlife Act 1974*
PA system	public address system
PID	public information display

POEO Act	*Protection of the Environment Operations Act 1997*
OEH	Office of Environment and Heritage
RailCorp	Rail Corporation of NSW
RAP	Remediation Action Plan
RMS	Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
SPI	station passenger information
TPZ	tree protection zone
TfNSW	Transport for NSW
TCP	Traffic Control Plan
TGSI	Tactile Ground Surface Indicators ('tactiles')
TSC Act	*Threatened Species Conservation Act 1995*
TVM	ticket vending machine

Definitions

Average Recurrence Interval The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.

Assets 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.

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 *Disability Discrimination Act (Cth) 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.

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.

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).

Opal card The integrated ticketing smartcard being introduced by TfNSW.

Proponent A person or body proposing to carry out an activity under Part 5 of the EP&A Act – in this instance, TfNSW.

Rail Possession Possession is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.

Sensitive receivers Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.

Sydney Trains On 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 Flemington Station Upgrade works.

Executive summary

Transport for NSW (TfNSW) is the proponent for the Flemington Station Upgrade (the Proposal). TfNSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW.

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

The Proposal is designed to ensure that the railway station and interchange facilities meet the future growth and transport needs of the Strathfield Local Government Area (LGA) and the wider Sydney region.

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

TfNSW proposes to upgrade facilities at and around Flemington Station:

- A new covered concourse overbridge west of the existing location linking The Crescent and the two island platforms
- Three new lifts and three sets of stairs providing access from the footbridge to station platforms
- New uncovered footbridge to maintain pedestrian access to Sydney Markets
- A family accessible toilet on Platform 3/4
- New platform canopies for shelter and shade
- New kiss and ride area and bike racks
- Demolition of the existing concourse over-bridge, ticket office, toilets, and the dog-leg section of the footbridge.

Subject to approval, the works related to the Proposal are anticipated to commence in mid 2015. It is anticipated that the project will take up to 24 months to complete.

Need for the Proposal

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport interchanges, train stations and commuter car parks 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 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 program objectives by proposing to provide:

- Three new lifts to provide accessible access from street to platforms
- Relocated taxi and bus access
- New bus and taxi canopies
- New kiss and ride space
- Upgraded facilities for staff and customers including a family accessible toilet
- Upgraded lighting and CCTV
- Upgraded signage to the station and interchange
- Cross-corridor access to Sydney Markets and integration with the existing street pattern.

The Proposal would also ensure that Flemington Station would meet legislative requirements under the Disability Standards for Accessible Public Transport (DSFAPT).

Design options

In 2011, a Concept Design Study for the proposed Flemington Station Upgrade was undertaken by GHD. This study report identified issues which governed the assessment of the design options to be developed.

The design option presented in this REF:

- Provides a safer environment for passengers, as the new concourse is located close to the middle of the platform to more evenly distribute access to trains (more central loading). The design improves station functionality, by reducing congestion, improving access to ticketing and improving platform clearance rates.
- Requires only a small number of adjustments to platform structures
- Returns the heritage platform buildings to functional use
- Provides easier staging and safer working conditions during construction to maintain operation of the existing concourse, and access to Sydney Markets, during the construction phase
- Provides a wider footbridge to the Sydney Markets boundary, a better alignment with the concourse to better meet pedestrian requirements, and provides lifts with sufficient capacity to meet anticipated high usage by Markets patrons.

Statutory considerations

The EP&A Act is the key legislative instrument for the environmental impact assessment of development proposals in NSW. 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.

State Environmental Planning Policy (Infrastructure) 2007 (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development. 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: railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms, 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 development consent. Consequently the environmental impacts of the Proposal have been assessed by TfNSW under Part 5 of the EP&A Act.

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

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

A summary of the steps in the assessment process under the EP&A Act is provided in Figure 1: Planning approval process for the proposal.

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, or where local heritage items are affected. Although not mandated under Part 5 of the EP&A Act or the Infrastructure SEPP, TfNSW will be undertaking consultation with the surrounding community stakeholders, which will include:

- Direct notification to community stakeholders by way of newsletter and
- Public display of the REF.

Community consultation activities for the Proposal will be undertaken during public exhibition of this REF. The REF will be displayed for a period of two weeks (14 days).

During this period, the REF will be available for viewing at the Strathfield Municipal Council office and library, TfNSW's Community Information Centre in the Sydney CBD and via download from the TfNSW website at http://www.transport.nsw.gov.au/projects-tap. Furthermore, an information line (1800 684 490) would be available for the public to make enquires about the Proposal.

TfNSW will 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 will be kept informed throughout the duration of the construction period.

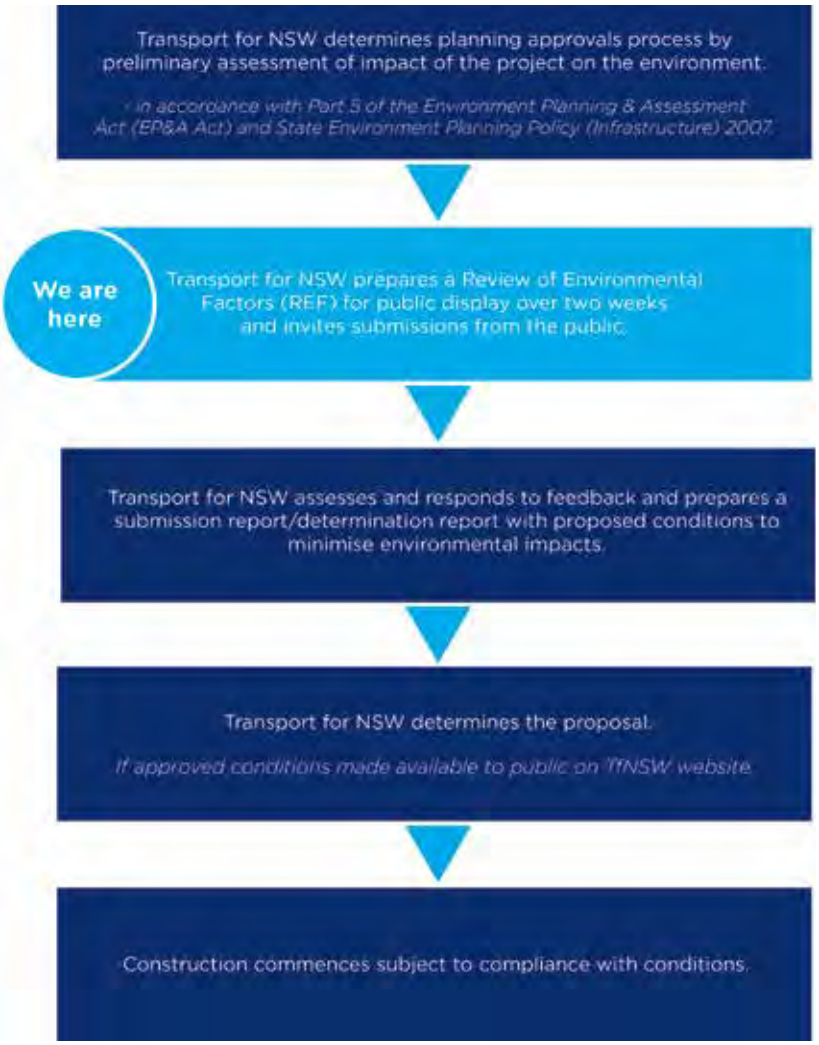


Figure 1: Planning approval process for the proposal

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.

During the construction period the following key impacts would be expected to occur if the Proposal were to proceed:

- Disruptions to vehicle and pedestrian movements
- Tree and vegetation removal
- Noise and vibration
- Visual impacts
- Visual and minor construction impacts to the heritage listed platform building
- Demolition of the existing concourse over-bridge, ticket office, toilets, and the dog-leg section of the footbridge.

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

Crime Prevention Through Environmental Design (CPTED) principles would be incorporated into the design in order to minimise risk to personal safety and asset security.

The long term operational impacts of the Proposal would be positive for Flemington Station commuters and the general community within the town centre. The upgrade would provide enhanced amenity for access to and throughout the station and to Sydney Markets, and would provide upgraded bus, kiss and ride, and bicycle parking facilities. Improved access would service a growing population in the Strathfield LGA and encourage public transport use to the metropolitan areas of Sydney.

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 Proposal has also been designed in accordance with the Transport for NSW's Sustainable Design Guidelines and has taken into account the principles of Ecologically Sustainable Development (ESD).

Key sustainability initiatives include the incorporation of energy efficient equipment and lighting. These initiatives would be considered further amongst others during the detailed design, construction and operational phases of the Proposal.

Potential adverse impacts associated with the Proposal would be appropriately managed in accordance with the mitigation measures outlined in this REF. 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

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 Flemington Station Upgrade (the Proposal), to be delivered by Transport Projects Division (TfNSW).

1.1 Overview of the Proposal

The Proposal comprises:

- A new covered concourse overbridge west of the existing location linking The Crescent and the two island platforms
- Three new lifts and three sets of stairs providing access from the footbridge to station platforms
- New uncovered footbridge to maintain pedestrian access to Sydney Markets
- A family accessible toilet on the main platform
- New platform canopies for shelter and shade
- New kiss and ride area and bike racks
- Demolition of the existing concourse over-bridge, ticket office, toilets, and the dog-leg section of the footbridge.

Artist's impressions of the Proposal are presented at Figure 7, Figure 8 and Figure 9.

The Proposal would facilitate extension of public transport use, particularly for the elderly, those with disabilities, or those with shopping, prams, luggage etc. This would support a reduction in cross-regional trips, reducing the relative dependency on private vehicles.

Subject to approval, the works related to the Proposal are anticipated to commence in mid 2015. It is anticipated that the project will take up to 24 months to complete.

1.2 Location of the Proposal

Flemington Station is located on the T2 Inner West & South Line, in the Strathfield Municipal Council local government area. See Figure 2: Regional context of Flemington Station and Figure 3: Local context of Flemington Station. The station is the 88th busiest station on the network with 24-hour barrier counts of 2,940 into the station (2012 figures). (Reference: http://visual.bts.nsw.gov.au/barrier/). The station generally serves the suburbs of Homebush West and Homebush, and is around 16 kilometres west of the Sydney Central Business District (CBD).

Existing infrastructure

The station comprises six tracks and four platforms (two island platforms) which are accessed by an elevated structural steel framed concourse with stair access to each platform. An elevated pedestrian walkway approximately 150m long links the existing Flemington Station concourse and Sydney Markets. The elevated walkway links residential and commercial developments south of the RailCorp property ownership boundary, with Sydney Markets and commercial and residential developments to the north.

Flemington Station provides public access between The Crescent retail precinct and Sydney Markets, causing the station to be highly used especially on the weekend when the Markets are open to the public.

The station catchment includes the suburb of Homebush West and the western half of the suburb of Homebush. Homebush West is a residential, industrial and commercial area, while Homebush is a predominantly residential area, with some industrial and commercial land use. Both Homebush West and Homebush have experienced significant housing growth in recent years.

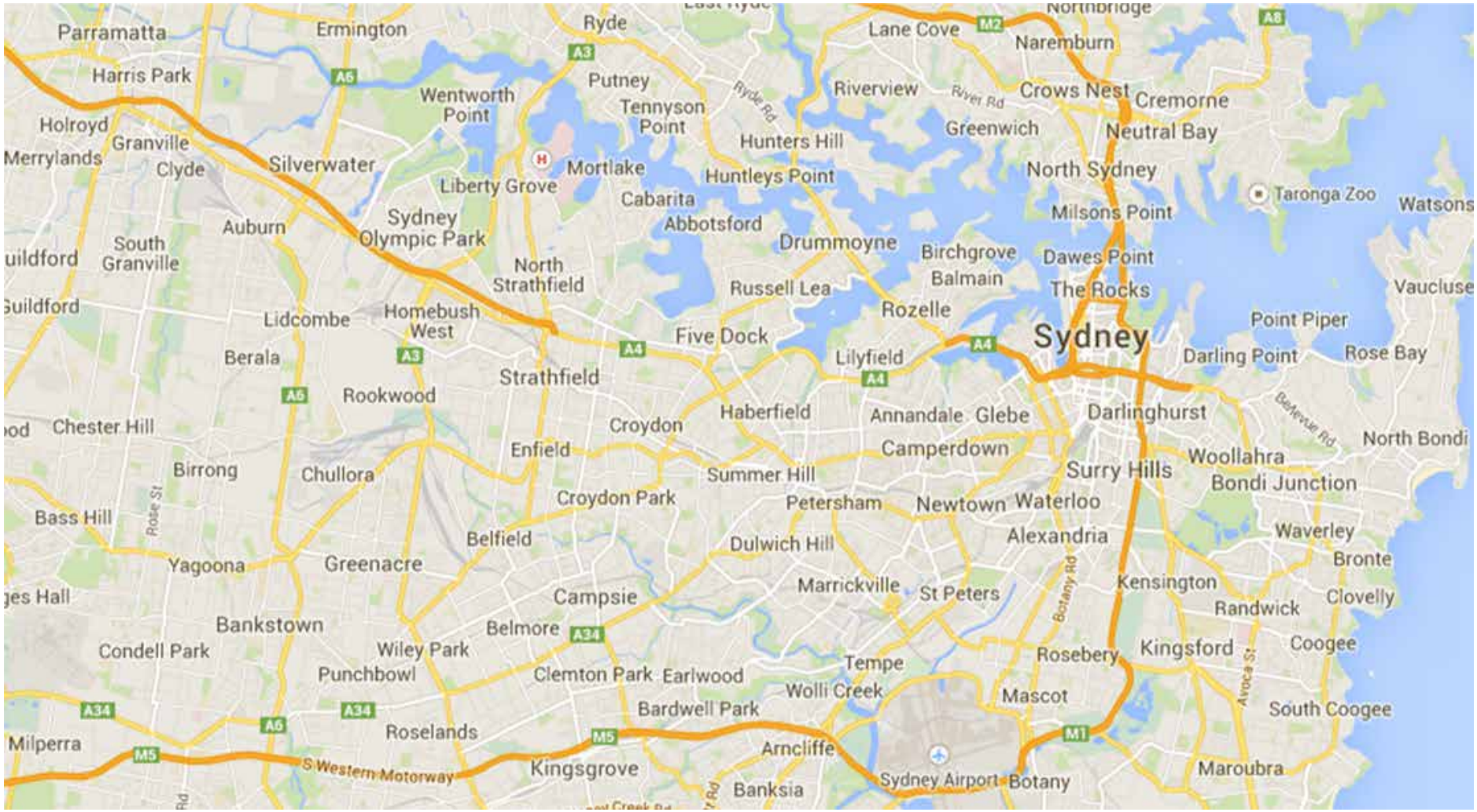


Figure 2: Regional context of Flemington Station

Base map source: Google maps

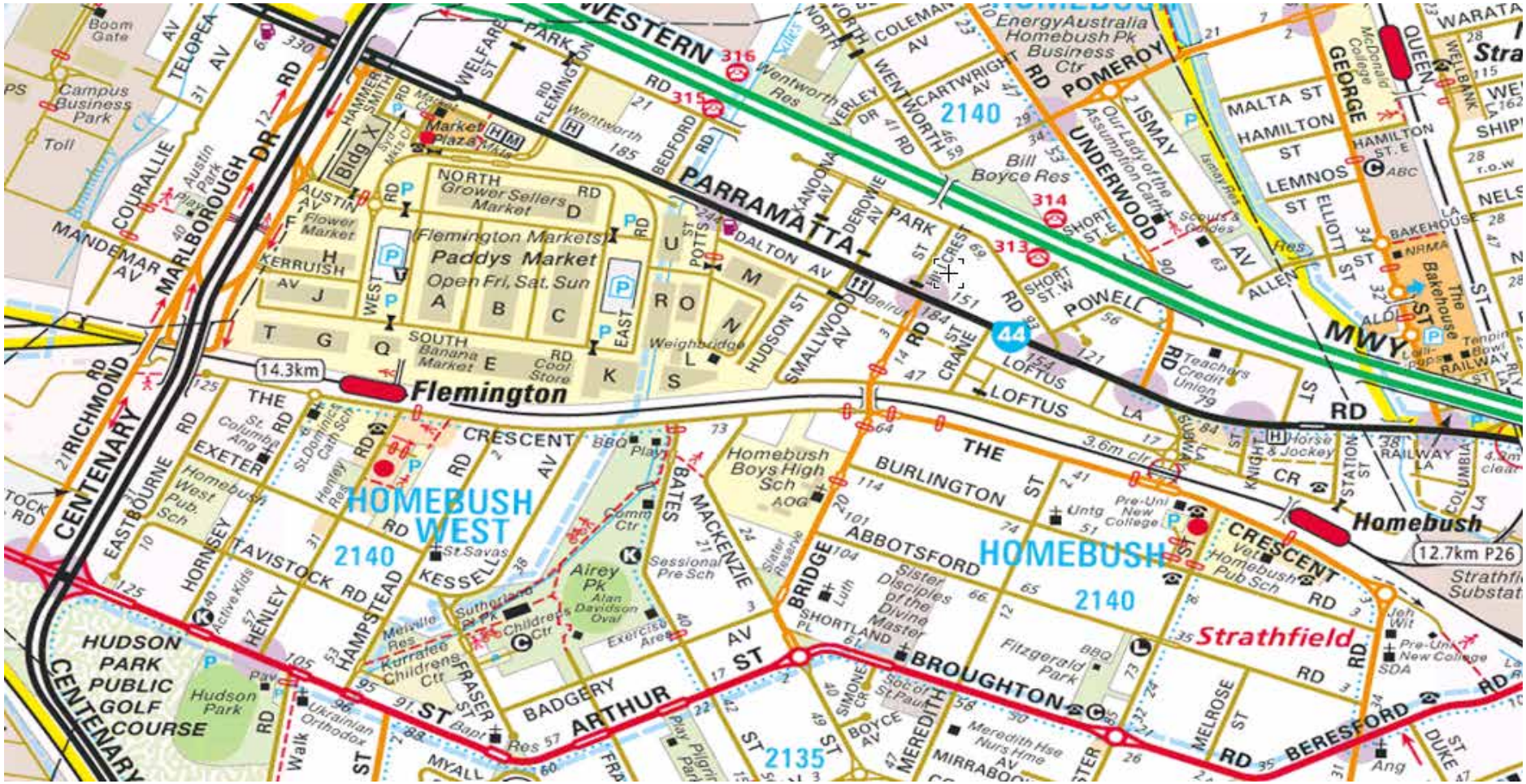


Figure 3: Local context of Flemington Station

Base map source: Sydway

Major features of the local area include Sydney Markets (or Paddy's Market), Direct Factory Outlets Homebush, Market Plaza, Homebush Village Shopping Centre, Airey Park, Hudson Park and Hudson Park Golf Course, Bressington Park, Melville Reserve, the Campus Business Park, five churches and four schools.

On the south side of the rail corridor in The Crescent and adjacent to the Proposal, there are a number of community facilities, including the Edmund Rice Centre, St Dominic's Catholic Church (cnr The Crescent and Hornsey Road), and the Sri Karphaga Vinayaker Temple. Homebush West Primary School is located in Exeter Road around 200 metres south of The Crescent, and Homebush Boys High School is located in Bridge Road around 600 metres to the east.

On the north side of the rail corridor, Loftus Crescent and Smallwood Avenue comprise single storey detached residences on one side of the roads, with the rail corridor and Sydney Markets on the opposite side of each road respectively.

Flemington Maintenance Centre is the largest Sydney Trains train depot, and is responsible for maintenance and stabling facilities. The depot is located about 800 metres to the west of the station.

Outside Flemington Station, land uses along The Crescent include retail and light commercial. The Homebush West town centre is characterised by a large number of Chinese and Vietnamese restaurants, butchers, green grocers and herbalists as well as traditional Asian medical outlets.

Time-restricted kerbside parking is provided along The Crescent between Hornsey Road and Hampstead Road. All three are local roads administered by Strathfield Municipal Council. All are posted with 50 km/hr speed limits. A school zone is also designated along Hornsey Road, 200 metres south of the project site, in relation to Homebush West Primary School.

On the south side of the existing station, commuters may change between bus, rail, taxi, private car and bicycle. However, there is currently no formalised kiss and ride zone. Sydney Markets occupies the northern side of the RailCorp property ownership boundary, and only pedestrian access to the station is possible.

The closest identified centres in the *Metropolitan Strategy for Sydney 2031* (NSW Government 2013) are Parramatta (Regional City) around 9 kilometres to the west and Burwood (Major Centre) around 4 kilometres to the east. Sydney Olympic Park (Specialised Centre) is 2.5 kilometres to the north.

The proposed works on the north side of Flemington Station are located on land owned by RailCorp, and on RailCorp land leased to Sydney Markets Limited. The proposed works to the south of the station are situated on a local public road (The Crescent) under the care and control of Strathfield Municipal Council.

Following are photos that indicate the current environment at Flemington Station.

The Flemington Station overhead booking office viewed from the overhead footbridge to Sydney Markets (looking south east).

The Flemington Station overhead booking office viewed from Platform 3. The proposed new structure would be located in front of the overhead stanchion in the mid-ground.

The trestle structure supporting the overhead booking office.

The overhead booking office, looking south to The Crescent.

Looking south west from Platform 4. The brick wall on the rail corridor boundary is on the edge of the heritage curtilage.

Looking south west from Platform 4. The vegetation in the rail corridor would need to be removed to allow for the new overhead concourse structure.

The existing canopies (not considered heritage items) would be removed, and new canopies would be provided.

Heritage building on Platforms 3/4, looking west. A new door opening would be provided in the eastern end wall to provide level access to a new staff office.

Heritage building on Platforms 3/4, looking east. The curtain wall around the old toilet facilities would be demolished and a new family accessible toilet would be provided.

Platforms 1/2 looking south west from the overhead footbridge. A new Communications Room would be provided in this building with minimal external impact.

Heritage platform buildings at Flemington Station viewed from The Crescent.

Flemington Station viewed from the overhead pedestrian footbridge to Sydney Markets (looking west).

Approximate location of the proposed new overhead concourse structure (from Platforms 3/4 looking south towards The Crescent).

Existing access to Flemington Station and Sydney Markets from The Crescent.

The existing marked threshold foot crossing across The Crescent outside Flemington Station. This crossing would be moved about 35m to the west

The existing stair access from Flemington Station to The Crescent.

Commercial precinct in The Crescent opposite Flemington Station.

View from the intersection of The Crescent/ Henley Road looking north west, with the Flemington Station platform buildings in the background.

View from the taxi shelter on the north side of The Crescent, looking across Henley Road.

Looking west from the pedestrian overbridge near The Crescent. The trees and shrubs to the left would be removed.

Detail of the heritage building on Platforms 1/2.

The Sydney Markets pedestrian footbridge looking east towards Flemington Station.

The pedestrian footbridge looking towards Sydney Markets.

Area within Sydney Markets used for storage that would be required for a temporary construction site. Note freight wagons in mid-ground.

Figure 4: Photos of the Flemington Station precinct

1.3 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW. For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 of the 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 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 significantly impact a matter of national environmental significance (NES) or Commonwealth land and the need to make a referral to the Commonwealth Department of Environment for any necessary approvals under the EPBC Act.

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 discussion of the options that have been considered during development of the Proposal and why the preferred option has been chosen.

2.1 Strategic justification

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

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

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

- Reduce travel times
- Minimise public transport waiting times for customers
- Improve co-ordination and integration between transport modes
- Grow patronage on public transport
- Improve public transport reliability
- Improve customer experience with transport services.

The NSW Government has developed a *Long Term Transport Master Plan* (December 2012). 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 forecast Sydney Trains patronage growth (+15% to 2036) and changing travel patterns.

Further details of the application of NSW Government policies and strategies are discussed in Section 4.2 of this REF.

2.1.1 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 where it is needed most. The program aims to provide:

- Stations that are accessible for those with a disability, for seniors and parents with prams
- Modern buildings and facilities for all modes that meet the needs of a growing population
- Modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- Safety improvements including extra lighting, help points, 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.

2.1.2 Objectives of the Proposal

The objectives of the Flemington Station Upgrade project are to:

- Improve commuter access to Flemington Station and interchange
- Improve customer experience (specifically weather protection, better interchange facilities and visual appearance)
- Minimise pedestrian conflict and crowding points
- Improve integration with surrounding precinct
- Improve customer safety
- Improve wayfinding in and around the station
- Respond to the heritage values of the site
- Improve customer amenity
- Maintain the pedestrian link to Sydney Markets.

2.1.3 Existing station access

Flemington Station currently comprises two island platforms, servicing four tracks. A further two tracks for freight trains are located on the northern side of the rail corridor, and are not serviced by a platform. Both island platforms are furnished with station infrastructure including canopies, seating, signage, and recently installed Opal card readers.

Platforms 1/2 are on the (Sydney Markets) northern side of the station and serve mainly as through platforms for Sydney and Parramatta interurban services. These platforms are used for local commuter services a number of times each year during track possessions (rail shutdowns) on the Inner West Line. Platforms 3/4 on The Crescent side of the station are the Up and Down tracks for the Inner West Line, and are the platforms used throughout the year for regular commuter services.

Both of the island platforms have platform buildings which are no longer used other than for storage, with the exception of some station equipment located in the eastern end of the Platform 3/4 building.

The station also includes an overhead booking office situated on an elevated structural steel-framed concourse, which provides access to the station platforms below. The concourse floor is supported partly on steel-framed structures and partly on heavy brick piers with an in-situ concrete deck to the concourse. The steel frame is fully exposed without fire protection and is non-compliant with existing fire standards. The steel structure does not comply with the vertical and horizontal clearances required from the track lines below, and train impact protection does not comply with applicable current standards.

Pedestrians are able to access the concourse from The Crescent to the south via a stairway, and also from Sydney Markets to the north via an approximately 150 metre-long elevated pedestrian steel footbridge, which terminates in stairs within Sydney Markets. This concourse and footbridge arrangement also provides a direct route for pedestrian patrons across the railway line from The Crescent to Sydney Markets.

As the only access to the station platforms is currently via stairways (both across the rail corridor and to/from the platforms), Flemington Station is not currently accessible to mobility-impaired persons.

There is no formal commuter car parking facility available in the interchange precinct. There is a bus stop in The Crescent (as well as a NightRide stop) and a two-car taxi rank close to the station entrance. Access is primarily dependent on foot traffic via local streets on the south side of the station. There is a marked pedestrian crossing in The Crescent directly at the station entrance.

Other access-related issues include the lack of DDA-compliant parking, and DDA-compliant staff facilities (office, staff uni-sex toilet) and public amenities that are not compliant with current policies, codes and standards. The concourse building was subject to complete internal refurbishment in the mid 1990s when these rooms were reconfigured.

Figure 5: Overhead view of Flemington Station

Source: Google maps

2.2 Options and design development

2.2.1 Options development

In 2011, GHD was engaged to undertake a Concept Design Study for the proposed Flemington Station Upgrade. The concept study canvassed three options for consideration:

Option 1: Upgrade the existing footbridge and concourse structure and include new lifts.

Replace existing concourse to match existing layout with upgraded public and staff toilets including a family accessible toilet. The layout does not include an enlarged paid and unpaid circulation areas, communications room, air conditioning plant room, larger staff area and ticket barriers included in the other options.

Option 2: New concourse and upgrade existing footbridge located at the Sydney (east) end.

This option includes a new concourse which would be located west of the existing and closer to the central part of the platform. The new concourse would include stair and lift access in The Crescent, to the Markets and to each platform. It would also provide a larger station management area, along with larger public toilets, and a family accessible toilet. It would comply with Disability Discrimination Act (DDA) requirements and (the former) RailCorp engineering standards. The existing concourse would be demolished.

Option 3: New concourse and footbridge located on the alignment of the footbridge into Sydney Markets linking the corner of The Crescent and Henley Road.

Design and construct a new concourse and footbridge with better alignment and closer to the central part of the platforms. The new concourse incorporates stairs and lifts as for option 2, a larger station management area, public toilets including a family accessible toilet, disabled toilet and associated support areas like communications room, air conditioning plant room and cleaner's room. This option would achieve compliance with DDA requirements and comply with (the former) RailCorp engineering standards. The existing concourse would be demolished.

The 2011 Concept Design Study report found that the preferred option was for the development of Option 3. This option was viewed as the most suitable for the following reasons:

- Better alignment with the Sydney Markets footbridge
- Small number of adjustments to platform structures
- Location close to the middle of the platform will comply with Platform Design Standards to provide a safer environment for passengers
- Removal of dog-leg section of footbridge
- Retention of heritage platform buildings
- Meets the condition for a clear span of Platform 1/2 thus ensuring that the design does not preclude the possibility of future revised track layout to improve access to Flemington Maintenance Centre.

Advantages and disadvantages of the options as per the Concept Design Study are discussed in Table 1: Options development below.

Table 1: Options development

Advantages	Disadvantages
Option 1: Upgrade the existing footbridge and concourse structure and include new lifts.	
• Makes use of the existing access arrangement in the Crescent with minimum disruption to the footpath. • Stairs remain on RailCorp property. • Least disruption to existing rail infrastructure. • The new concourse areas can be located at the same level as the paid and unpaid areas to achieve full access. • Represents the most cost effective solution to maintain access to Sydney Markets. • The least expensive of the 3 options.	• Retains access at the end of the platform. • Inadequate platform loading space for co-location of lift and stairs. • Existing concourse level does not comply with the required 5.9m clearance from the platform level. • The existing dog-leg of the footbridge to Sydney Markets is retained but is only 2m wide unless the entire deck is replaced which would require strengthening the steel support structure. • Requires the existing 33kV power line to be relocated to new aerials or underground. • Extensive disruption to the public during construction with extended staging required. • Would require reconstruction of the existing building due to the deck replacement, which negates any retained value in the existing building. • Difficulty in providing effective impact protection.

Advantages	Disadvantages
Option 2: New concourse and upgrade existing footbridge located at the Sydney (east) end	
• The concourse would be located at a wider more central section of the platform and provide better platform access. • This option provides modern facilities for the public and station staff in accordance with (the former) RailCorp standards. • Manageable disruption to use of the existing concourse and its continued operation during construction stage. • Better management of paid and unpaid areas • Minimum alteration to The Crescent access arrangement. • Minimum change to the footbridge over Sydney Markets apart from possible lifting and upgrading to match the new concourse level. • Larger retail, public and staff amenity areas would be accommodated in the new concourse. • Shorter dog leg of the footbridge to Sydney Markets. • Siting of the new concourse is confined to the eastern half of the platforms to minimise any impact on existing heritage platform buildings.	• The platform stair is located towards the narrow end of the platform, providing only minimal circulation clearance space for commuters. • Relocation of existing platform shelters is required. • The lift and stair in The Crescent would be located on the Council footpath. • Requires utility adjustments. • Retains the existing footbridge to the Markets which limits the width to 2m unless replacement of the deck and strengthening is undertaken as for Option 1.

Advantages	Disadvantages
Option 3: New concourse and footbridge located on the alignment of the footbridge into Sydney Markets linking the corner of The Crescent and Henley Road	
• New 3m wide footbridge to the Markets to align with the concourse. • Better supervision and management of paid and unpaid areas on the concourse level. • New modern facility to ASA standards with improved public and staff amenities including full access throughout. • Location closer to the widest part of the platforms enables compliance with clearances for circulation around lift and stairs. • Larger retail, public and staff amenities would be accommodated in the new concourse. • Access in the crescent relatively close to the existing pedestrian crossing, taxi rank and bus stop. • Easier staging and safer working conditions during construction to maintain operation of the existing concourse during the construction phase. • Siting of the new concourse is confined to the eastern half of the platforms to minimise any impact on existing heritage platform buildings.	• The lift and stair in The Crescent would be located on the Council footpath. • Requires utility adjustments. • The concourse location at the widest part of the platforms results in a longer span structure to clear Platforms 1/2. In contrast, Option 2 updated to match the Option 3 layout would be able to achieve a slightly shorter clear span over Platforms 1/2. • The new stairs on Platforms 1/2 may impact on heritage curtilage of the existing brick platform buildings. • Reuse of the heritage platform buildings would need to address the structural condition of the buildings.

2.2.2 The 'do-nothing' option

All existing access to the platform and footbridge remains the same. There are no changes to the way the interchange currently operates.

The NSW Government has identified the need to deliver modern and accessible transport infrastructure where it is needed most. The 'do nothing' option was not considered a feasible alternative as it would not meet legislative requirements, NSW Government objectives and would not assist in encouraging the use of public transport.

2.2.3 Development of preferred design

Since the 2011 Concept Design Report, changes in operational and functional requirements and staffing structures have resulted in a reduced need for a large concourse area.

In 2014, TfNSW engaged Kellogg Brown & Root Pty Ltd to develop the indicative layout diagram for the station. This layout provided the suggested position of the new concourse and highlighted a number of project constraints, including requirements for:

- Any new structure to be clear of existing OHW structures and existing OHW structures not to be fitted to the underside of the structure

- The new concourse structure to be positioned between the existing OHW structures
- The footbridge to tie into the existing Sydney Markets footbridge at the land boundary between RailCorp and Sydney Markets
- The pedestrian footbridge access to Sydney Markets to be open to the public at all times
- The section of the Sydney Markets footbridge owned by Sydney Markets Limited to be retained at its existing height.

2.2.4 Design options

The existing station layout currently provides access from The Crescent to Sydney Markets by way of a steel elevated footbridge.

The existing pedestrian footbridge north of the RailCorp land ownership boundary is owned by Sydney Markets Limited. The height of this footbridge is RL 20.525 at this location and TfNSW is advised that Sydney Markets have no plans to modify the footbridge height/replace the footbridge at this time. The level of the proposed concourse therefore needs to be designed to cater for the height difference (i.e. to fall from RL22.4 to 20.525) while still providing DDA/BCA compliant access. The proposed new section of the pedestrian footbridge also needs to be located clear of the existing overhead wire (OHW), and remain open at all times.

2.2.5 Applicable Access Codes and Standards

Design development is required to meet applicable access codes and standards. Transport agencies are responsible for providing equitable access for their respective infrastructure under the *Disability Discrimination Act 1992* (DDA).

The following accessibility standards and legislation apply to railway stations, associated infrastructure and services in NSW:

- *Disability Discrimination Act 1992* (DDA)
- *Disability Standards for Accessible Public Transport 2002* (DSFAPT)
- Disability (Access to Premises - Buildings) Standards 2010 Part H2 (APS)
- National Construction Code 2012 Part H2 (NCC)
- Australian Standards (as referenced in DSFAPT, APS and the NCC)
- ASA Engineering Standard – Stations and Buildings – Station Design Standard Requirement ESB003

Any elements of the existing concept design that are not designed to the current codes and standards must be re-designed to meet those codes and standards at the detailed design stage.

2.3 Justification for the preferred option

The preferred option in the 2014 Concept Design Study - Option 2:

- Increases accessibility for commuters with mobility impairment, those with shopping/luggage and parents with prams
- Contributes towards customer amenity by providing lifts and DDA-compliant access on the pedestrian footbridge to Sydney Markets (up to the RailCorp property ownership boundary). This would also assist in customers carrying bulky or heavy packages relating to purchases at Sydney Markets

- Provides improved accessible customer facilities including a family accessible toilet
- Accommodates patronage growth to 2036 (+15%) and changing travel patterns
- Provides for a more direct pedestrian route between the interchange and the platforms by re-orienting the platform stairs, thus minimising change in travel directions that characterises the current arrangement
- Provides a safer environment for passengers, as the new concourse is located close to the middle of the platform to more evenly distribute access to trains (central loading)
- Returns the heritage platform buildings to functional use
- Provides better supervision and management of paid and unpaid areas on the concourse level
- Provides improved bus, taxi and bicycle facilities
- Provides safety improvements including extra lighting and security measures, and a safer traffic/pedestrian arrangement including accessible parking spaces and a kiss and ride zone
- Addresses the need for passive surveillance, and maximises the perception of security and safety
- Provides a wider footbridge to the Sydney Markets boundary, a better alignment with the concourse to better meet pedestrian requirements, and provides lifts with sufficient capacity to meet anticipated high usage by Markets patrons.

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 report.

3.1 The Proposal

As described in Section of this REF, the Proposal involves the Flemington Station Upgrade as part of the Transport Access Program.

The design of the proposed works is described in more detail below.

3.1.1 Design Features

The key features of the Proposal are outlined below.

Stage 1

- New station entry point
- Three new lifts and three sets of stairs to provide accessibility to the platforms from The Crescent
- A new covered concourse overbridge linking The Crescent and the two island platforms
- An uncovered pedestrian footbridge to join the new covered concourse overbridge linking to the existing Sydney Markets footbridge at the RailCorp property ownership boundary
- Platform resurfacing/re-levelling, and ground surface tactile indicators
- New platform canopies to link the new covered concourse to the existing platform buildings, and demolition of the existing canopies
- Refurbishment of the existing building on Platform 3/4 to house new station facilities including:
  - a family accessible toilet
  - staff amenities
  - station office facilities.
- Installing a new communication equipment room in the existing building on Platform 1/2
- Upgraded lighting and CCTV
- Upgraded signage
- New digital station public address system
- Anti-throw screens
- Provision of /adjustments to rail systems and utilities
- Provision of passenger information and ticketing equipment.

Interchange works

Modifications in The Crescent to accommodate the new lift and stair entry include:

- Relocation of the existing pedestrian crossing and bus stop to be closer to the new station entry
- Relocated bus and taxi zones
- New bus and taxi canopies
- New kiss and ride zone
- New bike racks
- An accessible footpath between the various interchange modes
- Upgraded signage.

Stage 2

Following completion of Stage 1:

- The existing concourse overbridge, overhead booking (ticket) office and toilets would be demolished.

A diagram of the Proposal is at Figure 6: Design features of the Proposal (subject to detailed design). Artist's impressions of the Proposal are provided in Figure 7: Artist impression of the proposed station upgrade from The Crescent (looking west) (subject to detailed design), Figure 8: Artist impression of the proposed station upgrade from The Crescent (looking east) (subject to detailed design) and Figure 9: Artist impression of the proposed station upgrade (looking south - from Sydney Markets) (subject to detailed design) below.

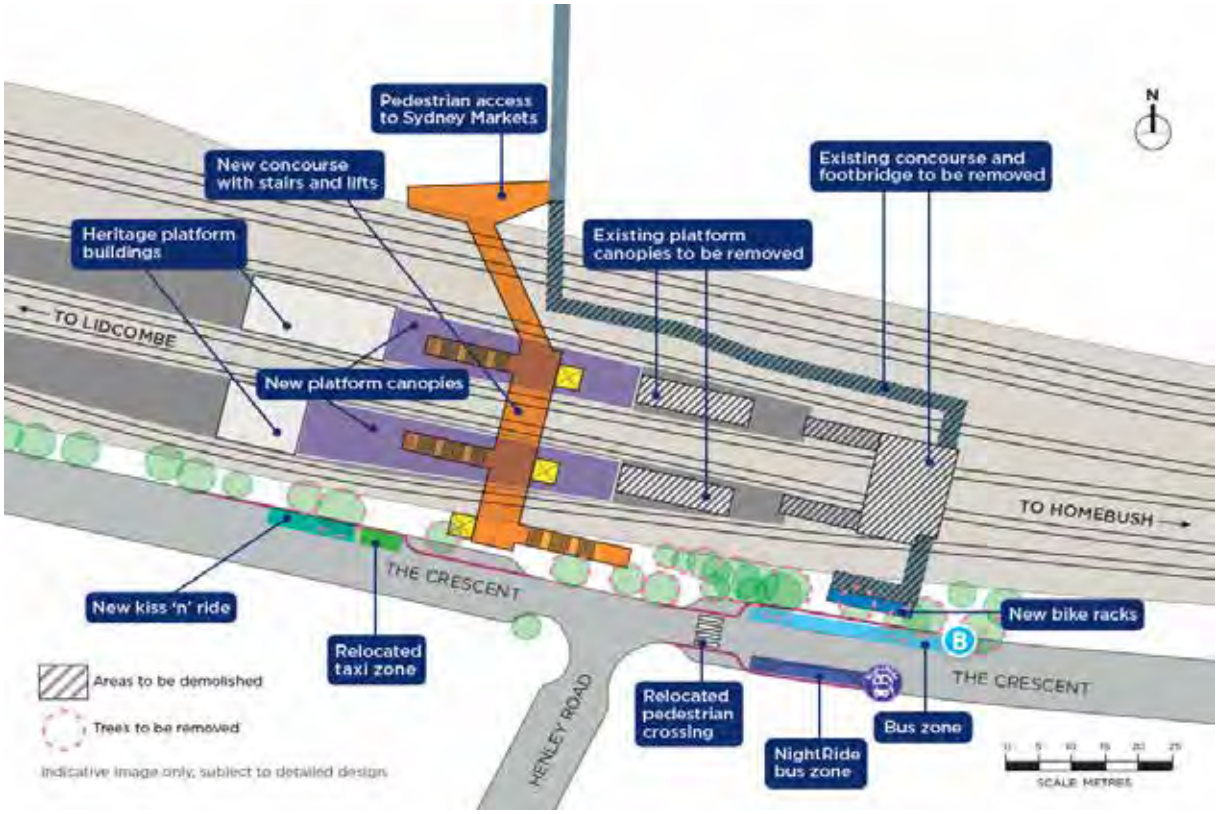


Figure 6: Design features of the Proposal (subject to detailed design)

Figure 7: Artist impression of the proposed station upgrade from The Crescent (looking west) (subject to detailed design)

Figure 8: Artist impression of the proposed station upgrade from The Crescent (looking east) (subject to detailed design)

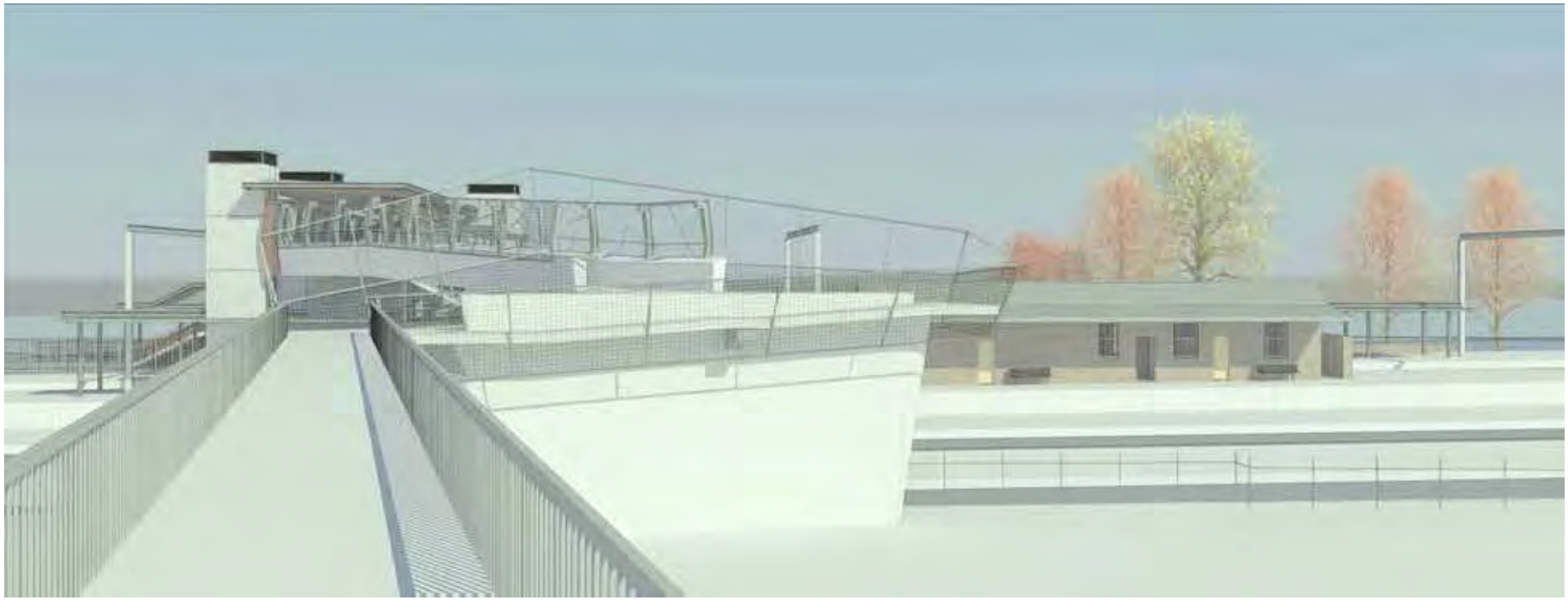


Figure 9: Artist impression of the proposed station upgrade (looking south - from Sydney Markets) (subject to detailed design)

Note the trapezoidal switchback structure designed to cater to the differing heights of the footbridges.

Finishes and materials

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

The general design life of the overhead bridges would be 100 years with various parts having various design life periods. The station buildings would be constructed of a range of different materials, with a different palette for each architectural element. Subject to detailed design, these would include:

- Lift shafts – precast concrete and glass
- Concourse and overbridge – concrete base with mesh throw screens, decorative panels and roof
- Platform stairs – concrete with mesh throw screens and canopy
- Stairs to The Crescent – concrete with porcelain tiled panels and canopy
- Platform canopies – steel frame and glass
- Sydney Markets footbridge – concrete structure with steel mesh and framed throw screens.

The final design would be submitted to TfNSW's Design and Sustainability Review Panel for comment, and that the Urban Design and Landscape Plan (UDLP) would need to be accepted by TfNSW.

3.1.2 Sustainability in design

TfNSW is committed to delivering projects in a manner that balances economic, environmental and social issues to ensure a sustainable transport system for NSW. TfNSW has environmental and sustainability targets, that apply to the delivery and operation of transport projects. TfNSW has developed the Sustainable Design Guidelines which are to be complied with on our projects.

By applying these targets and guidelines, TfNSW covers the following sustainability themes:

- energy management
- pollution control
- climate change resilience
- resource management
- biodiversity
- heritage
- liveable communities
- corporate sustainability.

3.2 Construction activities

3.2.1 Engineering constraints

The Concept Design has attempted to incorporate construction techniques to maximise construction during standard working hours. However, due to rail safety requirements, some works will need to be undertaken during rail possessions, which generally occur during weekends and night time periods.

3.2.2 Work methodology

The key construction elements to be undertaken as part of the Proposal are detailed below in Table 2: Scope of works (subject to detailed design).

Table 2: Scope of works (subject to detailed design)

General	Civil & building	Enabling Works
• Site mobilisation • Erect signage, fencing and hoardings • Modifications to access from the Sydney Markets • Paving works at the Sydney Markets • Demolition of existing footbridge and concourse	• Construction of new footbridge with lifts • Improved bus interchange and taxi stop on The Crescent • Building refurbishment and fit out on platforms • Improved wayfinding and lighting • Platform drainage	• Diversion of existing HV on goods lines and suburbans • Utility diversions • Fit out of new Communications Room on Platform 1/2 • New OHW structure and re-profiling OHW • Divert and protect platform services during the works • Provision of new fire water supply and booster station • Upgraded power supply

Possession strategy

Rail track possessions would be required during the construction of the Flemington Station Upgrade. The number and duration of these proposed possessions has been minimised where possible at the concept design stage.

Based on the concept developed to date, it is estimated that approximately 13 possessions would be required to facilitate construction of the Proposal.

The Proposal would need to be constructed within railway operating constraints and the rail possession schedule. Some works would be required during weekend track possessions and during night periods to minimise impacts to commuters and local traffic. The existing concourse and Platform 3/4 would remain accessible by commuters at all times during normal train operations, and either closed or controlled during the relevant possession works (usually weekends).

The work methodology would be developed further, in consultation with the construction contractor and TfNSW.

3.2.3 Plant and equipment

Indicative construction activities and equipment are shown in the following table:

Table 3: Construction scenarios and indicative plant and equipment

Activities	Construction periods	Equipment
Relocation of services and preparation of structure	Daytime only	Excavator
		Truck
		Vibrating plate compactor
		Hand tools
Relocation of services and preparation of structure – Piling works	Daytime – weekend possessions	Piling rig
		Generator
		Truck
		Concrete pump
		Franna cranes
	Evening and night time – weekend possessions	Piling rig
		Lighting generator
		Generator
		Truck
		Franna cranes
Relocation of services and preparation of structure – Preparation of Structure works	Daytime – weekend possessions	Mobile crane
		Generator
		Hand tools
		Concrete trucks
		Concrete pump
		Franna cranes
		Trucks
	Evening and night time – weekend possessions	Mobile crane
		Generator
		Lighting generator
		Hand tools
		Franna cranes
		Trucks

Activities	Construction periods	Equipment
Construction of access bridge, deck support system, lift shafts and stairs	Daytime – weekend possessions	Jackhammer
		Generator
		Piling rig
		Truck
		Concrete trucks
		Concrete pump
		Concrete truck
		Mobile crane
		Hand tools
		Jackhammer
		Franna cranes
		Elevated Working Platforms - EWPs
	Evening and night time – weekend possessions	Generator
		Piling rig
		Truck
		Concrete truck
		Mobile crane
		Hand tools
		Jackhammer
		Franna cranes
		Lighting generators
		EWPs
Construction of external cladding	Daytime only	Hand tools
		EWPs

Activities	Construction periods	Equipment
Demolition of existing structure and site clearing (Existing footbridge and concourse)	Daytime – weekend possessions	Bobcat
		Jackhammer
		Excavator with hammer
		Trucks
		Concrete saw
		Excavator
		Crane
		Oxygen and acetylene cutting equipment
		Grinders
		EWPs
		Generators
	Evening and night time – weekend possessions	Trucks
		Excavators
		Crane
		Oxygen and acetylene cutting equipment
		Grinders
		Lighting generators
		EWPs
		Generators

(Source: AECOM, *Noise and Vibration Impact Assessment*, 2014)

3.2.4 Working hours

Construction works would take up to 24 months, from mid 2015. The standard construction hours would be as follows:

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

Much of the work is able to be undertaken in non-possession times using appropriate means of safe working to protect the live network.

However, some works outside of standard hours would be required during evening, night periods and weekends during track possessions, and for key activities (including possible short-term closures of The Crescent).

Where out of hours works are required, approval from TfNSW would be required and the affected community would be advised as outlined in the TfNSW's *Construction Noise Strategy* (TfNSW, 2012), and as per the Flemington Station *Environmental Noise and Vibration Impact Assessment* (AECOM November 2014).

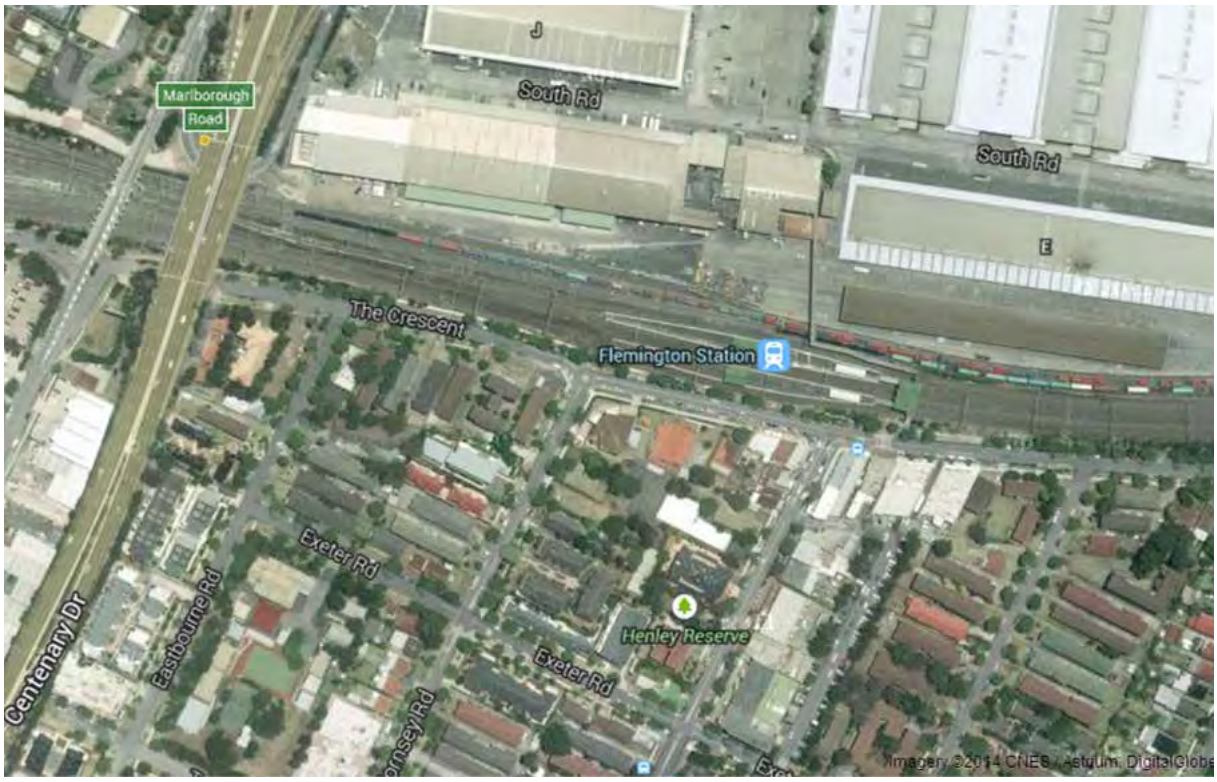


Figure 10: Construction site footprint

Base map source: Google maps

3.2.5 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal, and would be in accordance with the TfNSW Sustainable Design Guidelines. Materials would be sourced, where practicable, from local suppliers.

3.2.6 Construction Traffic Access

Heavy vehicle access to the site would be from Arthur Street (to the south of the precinct), which links the wider regional network. The intersection of Arthur Street and Henley road is signalised, and allows right turn movements from westbound Arthur Street into Henley road. From the west, access to the site could be made via Hornsey road. However, there are school zones on Hornsey Road. Refer to Figure 11: Potential construction vehicle access routes below.

Figure 11: Potential construction vehicle access routes

Base map source: Google maps

3.2.7 Ancillary facilities

Site compounds would be required during construction. The final location of any storage/stockpile site would be confirmed during development of the detailed construction methodology. The compound location would be subject to consultation with the landowner (Sydney Markets Limited/RailCorp/Council). Indicative site compound facilities are shown in Figure 12.

Indicative ancillary facilities include the following locations:

- Approximately 700 m^2 of RailCorp land currently leased by Sydney Markets on the northern side of the corridor/western side of the overhead pedestrian footbridge and used as a storage area for pallets. This would be required for the duration of construction. This area would be secured with perimeter fencing with shade cloth or equivalent. This construction zone area has been assessed and approved under the Flemington Station Upgrade Electrical Enabling Works, as having negligible impacts.
- A proposed construction zone access path for small vehicles within Sydney Markets – access from Centenary Drive on the northern side of the RailCorp property ownership boundary.
- A laydown zone of around 240m^2 is proposed along a section of around 50m of the footpath area of The Crescent, near the station access gates, about 60m east of the current station entrance and opposite 89 The Crescent. Tree clearing is required in this area.

Figure 12: Indicative construction and laydown areas

(Base map source: Google maps. Indicative only, not to scale)

3.2.8 Public utility adjustments

A utility investigation, including 'Dial Before You Dig' enquiries and non-destructive excavation work, has been undertaken during preliminary design stages.

The following utilities occur within the Proposal area:

- Ausgrid /Energy Australia– electrical
- Telstra and Optus – telecommunications/NBN
- Sydney Water Corporation (SWC) - water and sewerage
- Jemena - gas
- Strathfield Municipal Council - stormwater
- RailCorp/Sydney Trains – CCTV, signalling and electrical.

The appropriate utility providers would be consulted during the detailed design phase.

It is possible some additional services may require relocation. Such relocation is unlikely to occur outside of the work footprint assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken.

3.3 Property impacts

While the majority of the proposed works are within the RailCorp land ownership boundary, road and footpath works are on land under the care and control of Strathfield Municipal Council. Notably, this includes proposed road works associated with the location of the new station entry, including the reconfigured bus zone, and accessible parking.

A small area of property acquisition for the Proposal has been identified where the station stairs and lift impact on The Crescent road reserve. TfNSW would negotiate this acquisition with Strathfield Municipal Council/RMS.

Sydney Markets leases a strip of land on the northern edge of the working railway corridor from RailCorp. The lease is currently held over and is under negotiation for an extension. It is proposed that the lease area will be amended to provide for the relocation of the relevant High Voltage wiring, fencing and structural elements of the proposed Flemington Station Upgrade Project.

3.4 Operation and maintenance

The future operation and maintenance of the new station interchange arrangement is subject to further discussions with Sydney Trains, TfNSW and Strathfield Municipal Council. Structures constructed under this Proposal would be maintained by Sydney Trains. It is expected that adjacent garden/landscape areas would continue to be maintained by Strathfield Municipal Council.

4 Statutory considerations

Chapter provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government polices/strategies, NSW legislation, environmental planning instruments, and Commonwealth legislation.

4.1 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, and
- **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 Flemington Station Upgrade. Section 6.12.3 summarises how ESD has been incorporated in the design development of the proposal. Section 6.12 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 and operation of the proposal.

4.2 NSW Government policies and strategies

In addition to statutory requirements, several NSW Government policies and strategies are relevant to the Proposal. Table 4: Relevant NSW Government policies/strategies summarises the NSW Government policies and strategies applicable to the Proposal.

Table 4: Relevant NSW Government policies/strategies

Policy/Strategy	Commitment	Comment
NSW 2021	NSW's *2021 State Plan* is a ten year plan developed in 2012 by the current State government. It outlines high level strategic priorities and associated goals for government and its respective agencies. A key aspect in the transport strategy includes the: • Return of quality transport and community services • Building infrastructure that improves' people's lives and • Strengthening our local environments. NSW 2021 includes the following goals, targets and priority actions relevant to the Proposal: • reduce travel times • minimise public transport waiting times for customers • improve co-ordination and integration between transport modes • grow patronage on public transport • improve public transport reliability • improve customer experience with transport services.	The proposal is consistent with the NSW Government's commitment to: • grow patronage on public transport, and • improve customer experience with transport services. and in particular with NSW 2021 Goal 7 – Reduce travel times, and Goal 20 – build liveable centres. The Proposal contributes to Goal 14 – Increase opportunities for people with a disability, by improving transport access. The Proposal also supports active transport by contributing to the development of cycle facilities as part of an integrated local network.
Rebuilding NSW State Infrastructure Strategy 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 massive 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 6 billion by 2031.

Policy/Strategy	Commitment	Comment
NSW Transport Master Plan	The *NSW Long Term Transport Master Plan* (December 2012) identifies a planned and coordinated set of actions to address transport challenges. It would guide the NSW Government's transport funding priorities over the next 20 years. The Long Term Master Plan would meet a number of challenges to building an integrated transport system for Sydney and NSW, including: • Customer-focussed 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 key themes in the Master Plan: • Improving customers' journey experience • Making better use of existing assets • Providing accessible transport to help address social exclusion.

Policy/Strategy	Commitment	Comment
Metropolitan Strategy for Sydney 2031	The draft *Metropolitan Strategy for Sydney* sets out a new plan for the city's future over the next two decades. By 2031, Sydney will have around 1.3 million additional people. For Sydney to sustain its global status it must remain a genuinely liveable city with good transport infrastructure and high levels of accessibility and cross regional connectivity. A key policy is: • Sydney's growth will be supported by current and future investment in transport, particularly public transport • Demand for car travel will be managed to reduce congestion and infrastructure costs, consistent with the Long Term Transport Master Plan • Greater use of public transport, walking and cycling will be encouraged.	*The Proposal supports Objective 24:* *Plan and deliver transport and land use that are integrated and promote sustainable transport choices.*

Policy/Strategy	Commitment	Comment
Central Subregion	The Central Subregion covers the council areas of Ashfield, Botany Bay, Burwood, Canada Bay, Hunters Hill, Lane Cove, Leichhardt, Marrickville, Mosman, North Sydney, Randwick, Ryde, Strathfield, Sydney (City Of), Waverley, Willoughby and Woollahra. The strategy provides for an increase in population of 242,000 people by 2031 (from 1,144,000 to 1,385,000 people); an increase in housing of 138,000 dwelling units and an increase in employment of 230,000 jobs. Specific regional priorities include: • Enhance the role of the subregion as Sydney's global economic driver, including strengthening connections within the Global Sydney and Global Economic Corridor city shapers • Enable housing intensification throughout the sub-region, particularly around established and new centres, key corridors and along the Inner West Line The transport system supports the economic growth of every subregion in Sydney by getting people to jobs and services and other daily activities in a fast, safe and reliable way. Most travel is undertaken within the subregion where people live.	The Proposal is consistent with the priorities for the Central Subregion. The Proposal would facilitate extension of transport networks to connect Flemington with job opportunities at Burwood, Parramatta, and the CBD, and other employment and entertainment opportunities in the Sydney metropolitan area. This would support a reduction in cross-regional trips, resulting in less need to use private cars.
Sydney's Walking Future	*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.

4.3 NSW legislation and regulations

4.3.1 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.

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal. Having regard to these provisions, TfNSW has determined that no significant environmental impact is likely and that therefore an environmental impact statement is not required.

Clause 228 of the EP&A Regulation defines the factors which must be considered when assessing an activity under Part 5 of the EP&A Act is likely to have a significant impact on the environment.

Chapter 6 of this REF provides an environmental impact assessment of the Proposal in accordance with clause 228. Appendix 1 specifically responds to the factors for consideration under clause 228.

4.3.2 Other NSW legislation and regulations

The table below provides a list of other relevant legislation applicable to the proposal.

Table 5: Other relevant legislation applicable to the Proposal

Legislation	Requirements for the Proposal
Heritage Act 1977 (NSW)	Flemington Station Group is listed on the RailCorp Section 170 Register. Formal notification needs to be provided to Sydney Trains as the Proposal has the potential to impact on heritage items listed on the s170 register. Transport agencies are responsible for conserving heritage places under their stewardship, as well as provide equitable access under the *Disability Discrimination Act 1992* and relevant transport standards. The Proposal aims to ensure equitable access outcomes are achieved in a way that conserves important heritage values and minimises impacts on heritage significance.
National Parks and Wildlife Act 1974 (NSW)	Sections 86, 87 and 90 require consent from the Office of Environment and Heritage (OEH) for the destruction or damage of Aboriginal objects. The Proposal is unlikely to disturb any Aboriginal objects.
Threatened Species Conservation Act 1995 (NSW)	The site does not contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer to Section 6.7).
Fisheries Management Act 1994 (NSW)	Adequate stormwater quality measures would prevent any adverse impacts on any natural watercourse. The Proposal would not affect any listed threatened species, marine vegetation or involve dredging or dam works.

Legislation	Requirements for the Proposal
Contaminated Land Management Act 1997 (NSW)	The site has not been declared under the CLM Act as being significantly contaminated.
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The proposed works are not included as a scheduled activity under the PoEO Act. Therefore an Environment Protection Licence under this Act is not required. Part 5.7 provides a Duty to notify the EPA in the event of a pollution incident occurring.
Water Management Act 2000 (NSW)	The Proposal would not involve any marked increase in water consumption, water management works, drainage or flood mitigation works, controlled activities or aquifer interference.
Waste Avoidance and Resource Recovery Act 2001 (NSW)	TfNSW would carry out the construction of the Proposal in accordance with the objects of this Act. A Waste Management Plan would be prepared and implemented during construction.
Native Title Act 1993 (Commonwealth)	The proposed site is unlikely to be affected by any native title holders or claim.
Disability Discrimination Act 1992 (DDA) (Commonwealth); *Disability Services Act 1993 (NSW);* *Disability Standards for Accessible Public Transport 2002 (DSFAPT) (Commonwealth)*	The objects of the DDA are to eliminate, as far as possible, discrimination against persons on the grounds of disability, including in the provision of services. The proposal would promote the objectives of TfNSW's Disability Action Plan 2012-2017 which aims to eliminate, as far as practicable, direct and indirect discrimination in the provision of transport services to NSW residents and visitors. The Plan requires all new and refurbished transport infrastructure to meet customer focussed design standards and comply with DDA requirements.

4.4 State Environmental Planning Policies

4.4.1 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of the Proposal.

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: railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms, and associated public transport facilities for railway stations.

Consequently, development consent is not required, 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 prior to the commencement of certain types of development. Section 5.5 of this REF discusses the consultation undertaken with Council during the development of the Proposal.

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.

4.5 Local environmental planning instruments and development controls

The Flemington Station Upgrade falls within the Strathfield LGA and is covered by the *Strathfield Local Environmental Plan 2012* (SLEP). The SLEP 2012 provides the statutory framework for all planning within the area and also contains provisions to conserve local heritage and protect sensitive land.

Refer to Figure 13 below for the zoning of Flemington Station precinct under the SLEP 2012.

4.5.1 Strathfield Local Environmental Plan 2012

Table 6: Relevant provisions of the Strathfield Local Environmental Plan 2012

Description	Comment
Zone	The Proposal is zoned as Zone SP 1 (Special Activities), SP2 (Infrastructure), and B4 (Mixed Use, located on land in Homebush West Town Centre) (refer to Figure 13).
Zone Objectives and Development Control	SP 1 – Special Activities The objectives of Zone SP1 (which covers Sydney Markets) are: – *To provide for special land uses that are not provided for in other zones.* – *To provide for sites with special natural characteristics that are not provided for in other zones.* – *To facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land.* Development is permitted with consent is for: *"The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose."* No works or uses are permissible without development consent. The works to be undertaken as part of the Proposal within the SP1 zone are compatible with its existing and intended use and would therefore be permissible with consent. SP2 (Infrastructure) The objectives of Zone SP2 (which includes the station and rail corridor) are: – *To provide for infrastructure and related uses.* – *To prevent development that is not compatible with or that may detract from the provision of infrastructure.* – *To ensure that development does not have an adverse affect on adjoining land.* Development permitted with consent includes *"Roads; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose"* No works or uses are permissible without development consent The works to be undertaken as part of the proposal within the SP2 zone are therefore permissible with consent. – *sport patronage and encourage walking and cycling.* – *To facilitate mixed use urban growth around railway stations and transport nodes and corridors, commercial centres and open space.* Development permitted with consent includes: *Passenger transport facilities.* The works to be undertaken as part of the proposal within the B4 zone are therefore permissible with consent.

Description	Comment
Zone Objectives and Development Control (continued)	<u>B4 (Mixed Use)</u> The objectives of Zone B4 (which includes The Crescent road reserve) includes: – *To provide a mixture of compatible land uses* – *To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.* – *To facilitate mixed use urban growth around railway stations and transport nodes and corridors, commercial centres and open space.* Development permitted with consent includes: *Passenger transport facilities*. The works to be undertaken as part of the proposal within the B4 zone are therefore permissible with consent. However, clause 5.12 of the LEP identifies that: *"This Plan does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out with or without development consent, or that is exempt development, under State Environmental Planning Policy (Infrastructure) 2007." [and]* *"This Plan does not restrict or prohibit, or enable the restriction or prohibition of, the use of existing buildings of the Crown by the Crown."* Accordingly, consistent with the above and by virtue of clause 79 of the ISEPP provisions, the proposed works are permissible without development consent in the SP1 (Special Activities), SP2 (Infrastructure) and B4 (Mixed Use) zones.
Relationship to the Proposal	The Proposal is consistent with the objectives of SP1 (Special Activities), SP2 (Infrastructure) and B4 (Mixed Use) zones in that it provides for passenger transport infrastructure and related or ancillary uses (access to Sydney Markets/traffic management facilities relating to access). The works are also consistent as they would encourage a high quality standard of development which is aesthetically pleasing and functional.

Description	Comment
Preservation of trees or vegetation	Clause 5.9(3) of the LEP identifies that: *"A person must not ringbark, cut down, top, lop, remove, injure or wilfully destroy any tree or other vegetation to which any such development control plan applies without the authority conferred by:* *(a) development consent, or* *(b) a permit granted by the Council."* The Proposal requires the removal of trees that are not prescribed under Clause 5.9, discussed above and would therefore require development consent. However by virtue of clauses 5(3) & 79 of the ISEPP, the clearing of vegetation for the Proposal is permissible without development consent and would be approved under Part 5 of the EP&A Act.
Heritage conservation	Clause 5.10 of the LEP provides for conservation of the environmental heritage of Strathfield, and the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views; and for the conservation of archaeological sites, and Aboriginal objects and Aboriginal places of heritage significance. See Section 6.5 for further details regarding heritage considerations.

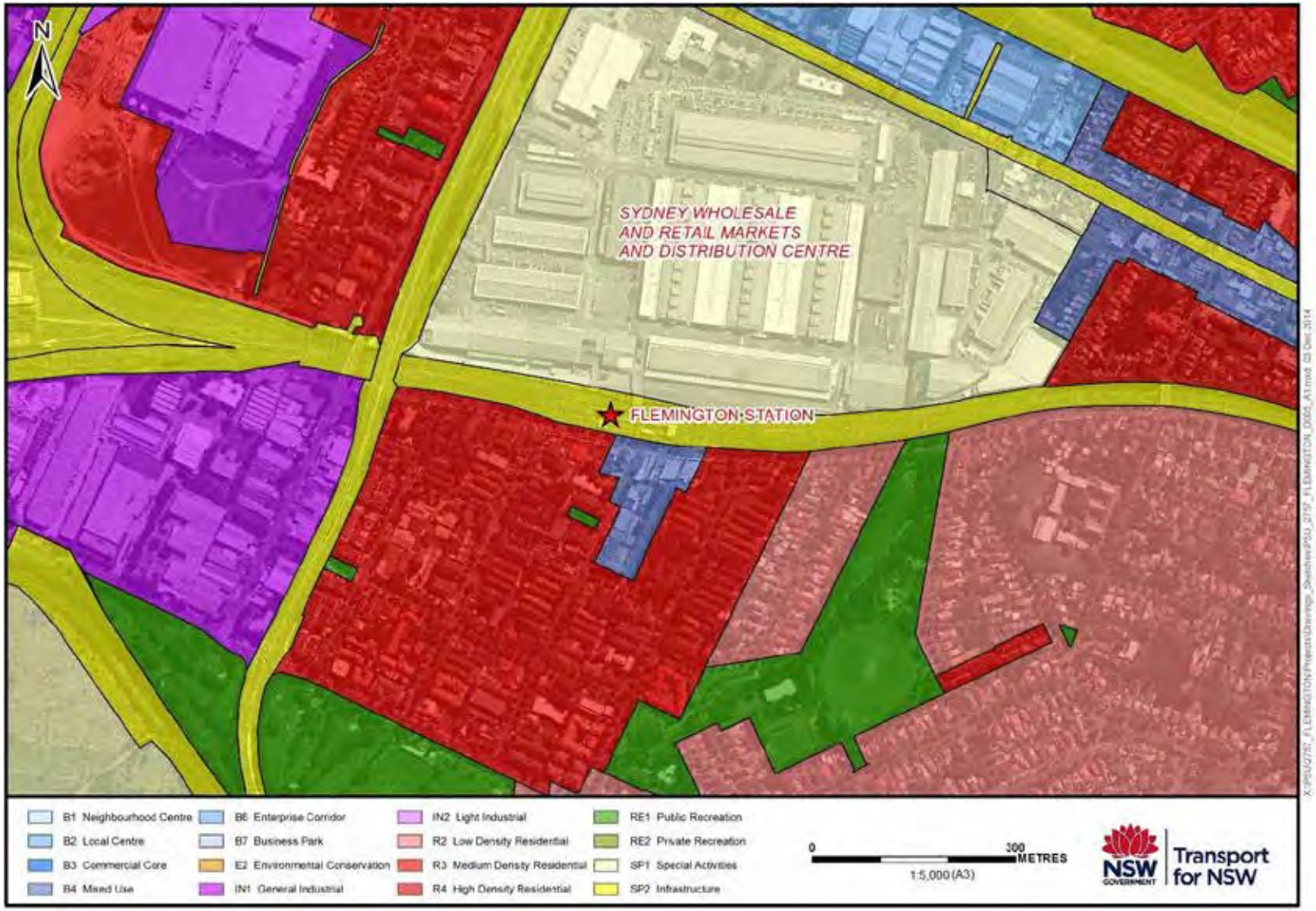


Figure 13: Strathfield LEP 2012 zoning map

4.5.2 Other planning guidance

Other planning guidance includes:

- Draft *Strathfield Comprehensive Local Environment Plan*, *Parramatta Road Corridor Urban Design* study
- Draft *Parramatta Road Transport and Mobility Study*

This study addresses access and transport issues in the Parramatta Road corridor area and supports planned increases in housing density in the Strathfield LEP 2012.

Key strategies to address prevailing issues include:

  - Marlborough Road pedestrian safety solution
  - Lift access, bicycle parking and additional signage at stations
  - Courallie Precinct to Flemington Station lighting upgrade.
- *Development Control Plan No 20* (DCP20), Parramatta Road Corridor Area 2005
- Sydney Markets Master Plan 2006.

The Master Plan identifies a proposed future connection between Flemington Station and Parramatta Road, connecting through the centre of the Markets site.

Existing/future development

There are currently several major residential/commercial developments planned for a total of around seven hectares (in the vicinity of the Campus Business Park site) to the north west of the station, adjacent to Marlborough Road and Courallie Avenue (e.g. Centenary Park, 78 Marlborough Road with 1500 dwellings). These developments are around 700 metres from Flemington Station.

UrbanGrowth NSW has drawn up a plan for more than 50,000 new apartments to be built along Parramatta Road in connection with the proposed WestConnex Motorway. Some of these new residents could access Flemington Station, particularly if Sydney Markets extends its footbridge from the station precinct and adds a lift/s.

4.6 Commonwealth legislation

4.6.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of National Environmental Significance (NES) or matters relating to Commonwealth land.

These matters are considered in full in Appendix 2.

The proposal would not impact on any matters of NES or on Commonwealth land. Therefore a referral to the Commonwealth Department of the Environment is not required.

5 Community and stakeholder consultation

The consultation strategy for the Proposal was developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and TfNSW. The consultation strategy ensures that relevant stakeholders, customers and the community are informed of the Proposal and have the opportunity to provide input.

The objectives of the consultation strategy are to:

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

5.1 Consultation tools and activities

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

- Public display of the REF
- Distribution of project updates by letterbox drop up to a radius of approximately 500 metres to the station to local community and rail commuters, where appropriate, outlining the Proposal and inviting feedback on the REF
- Advertisement of REF public display in local newspapers with details of the TfNSW website that includes a summary of the Proposal and information on how to provide feedback
- Consultation with Council, Sydney Markets, RMS, Sydney Trains and other non-community stakeholders
- Advertisement of the REF public display on posters installed at Flemington Station.

5.2 Public display of the REF

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 placed on public display for a period of two weeks at the following locations:

Transport for NSW
Community Information Centre
388 George Street
Sydney, NSW
Monday to Friday 9.00 am to 5.00 pm

Strathfield Municipal Council
Customer Service Centre
65 Homebush Road
Strathfield, NSW
Monday to Friday 8.30 am to 4.30 pm

Strathfield Library
65-67 Rochester Street
Homebush, NSW
Monday to Thursday 9.30 am to 8.00 pm
Friday 9.30 am to 6.00 pm
Saturday 9.00 am to 4.00 pm
Sunday 1.00 pm to 5.00 pm

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

Feedback on the REF is invited during the public display period. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal.

5.3 Consultation requirements under SEPP (Infrastructure) 2007

In accordance with Part 2 Division 1 of the Infrastructure SEPP, TfNSW is required to undertake consultation with relevant Council and/or other public authorities where works are likely to affect council infrastructure/services, and other relevant areas as detailed below in Table 7: Infrastructure SEPP consultation requirements.

Where consultation is required, TfNSW will notify the relevant Council and authorities in accordance with the ISEPP requirements, and take into consideration any response to the notice that is received from the council/public authority within 21 days after the notice is given.

Table 7: Infrastructure SEPP consultation requirements

Consultation with Councils – development with impacts on council related infrastructure and services	Relevance to the Proposal
Where proposed works: • substantially impact on storm water management services • 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.	ISEPP triggers the following requirements: *Clause 13: - consultation with councils (development with impacts on council-related infrastructure or services).* The Proposal would include works that would: • disrupt pedestrian and vehicle movements • impact on road pavements under Council care and control and • impact on Council operated footpaths. Consultation with Strathfield Council has been undertaken and would continue throughout the detailed design and construction phases.
Consultation with Councils – development with impacts on local heritage	**Relevance to the Proposal**
Where proposed works: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area	ISEPP triggers the following requirements: *Clause 14: consultation with Councils (development with impacts on local heritage).* There is no proposed impact on Council's local heritage. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Non-indigenous Heritage in section 6.5
Consultation with Councils – development with impacts on flood liable land	**Relevance to the Proposal**
Where proposed works: • impact on land that is susceptible to flooding – reference would be made to *Floodplain Development Manual: the management of flood liable land'*.	The proposed site is not susceptible to flooding. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Hydrology assessment in section 6.9
Consultation with public authorities other than Councils	**Relevance to the Proposal**
Where development is undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974*, OEH and other agencies specified by the Infrastructure SEPP where relevant.	The Proposal is not adjacent to land reserved under the *National Parks and Wildlife Act 1974*. Consultation with relevant public authorities, would be undertaken as a matter of course.

Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult would include:

- Roads and Maritime Services (RMS)
- RailCorp
- Sydney Trains
- Sydney Markets Limited.

Sydney Markets Limited has been kept informed about the development of the Proposal. There are potential impacts to Sydney Markets from the requirement for a construction zone for the duration of works in an area currently used for pallet storage (and within RailCorp land ownership). A similar sealed area would be provided nearby. Vehicular access to the construction zone is also required.

There is also the potential for pedestrian access to the Markets from The Crescent via the overhead footbridge to be disrupted for short periods during construction.

5.4 Aboriginal community involvement

An Aboriginal Heritage Inventory Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around Flemington Railway Station) with a 200 metre radius, on 2 July 2014. The closest Aboriginal site was over two kilometres away and would not be impacted by the Proposal.

The extensive landscape modification that has occurred across the study area suggests that intact evidence of Aboriginal land use is unlikely to occur within the study area boundaries. 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.

5.5 Local Government consultation

TfNSW provided Strathfield Municipal Council with a briefing on the Proposal on 10 April 2014. The key issues addressed were the proposed changes to The Crescent layout, the location of the pedestrian crossing, and loss of parking in the area. The comments and outcomes from the workshop were recorded. A further briefing to Strathfield Municipal Council was conducted on 6 November 2014. Issues raised are detailed in Table 8: Potential issues raised by Strathfield Municipal Council during consultation below.

Table 8: Potential issues raised by Strathfield Municipal Council during consultation

Item	Issue	TfNSW response
Relocation of the pedestrian crossing	Council proposed that the new crossing be located west of the Henley Road intersection	TfNSW has advised that the disadvantages of this location include: • There is minimal pedestrian desire along this line • This option does not address the requirements of pedestrians heading to/ from the east • This would potentially increase the risk of pedestrians crossing The Crescent outside the marked crossing and thus reduces safety. • The majority of the customers would likely use the lifts compared to the stairs. TfNSW's preferred solution is for the crossing to be moved so it remains on the east of the Henley Road intersection.
Communications	Council advised that there was a large number of people speaking a language other than English, most notably Chinese and Tamil. Signage would need to be erected outside the station well in advance.	TfNSW committed to liaise closely with Council on communications issues.

Additional meetings and workshops would be held with key stakeholders during the detailed design process. These would include but not be limited to:

- Strathfield Municipal Council
- Sydney Buses, Star City, Sydney Markets
- Taxi Council
- Heritage Division of the Office of Environment & Heritage
- RailCorp/Sydney Trains.

5.6 Ongoing consultation

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

Should TfNSW determine to proceed with the Proposal, a Determination Report will be prepared. The Determination Report will be made available on the TfNSW website and will summarise the key impacts identified in this REF, response to submissions, and include Conditions of Approval for the Proposal.

Should TfNSW determine to proceed with the Proposal, interaction with the community will continue throughout the construction phase would be undertaken in accordance with a Community Liaison Plan (CLP) to be developed by the Contractor prior to the commencement of construction.

6 Environmental impact assessment

This environmental impact assessment has been undertaken in accordance with Part 5 of the EP&A Act and 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 1.

6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment (TT&AIA) of the Proposal was carried out by GTA Consultants (NSW) Pty Ltd in July 2014.

The purpose of the TT&AIA is to determine the potential traffic and transport impacts that the proposed commuter car park and interchange upgrade would have on the adjoining road network. In that regard, the intent of this assessment is to:

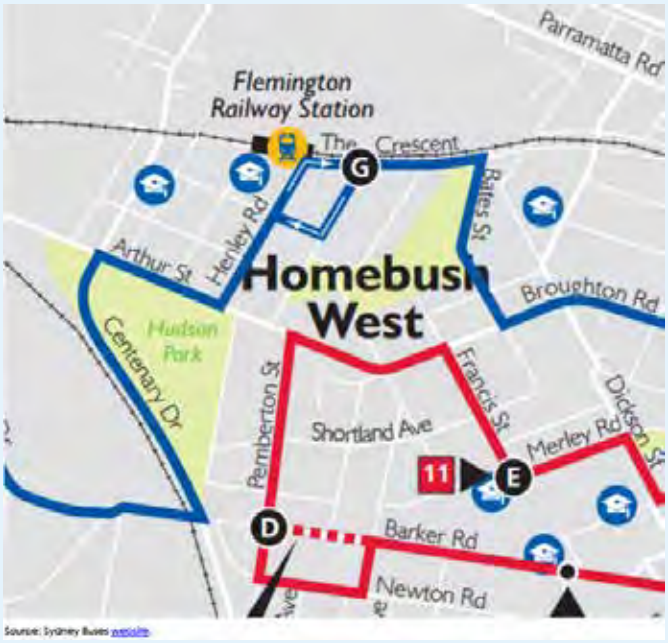
- Broadly assess existing traffic conditions and surrounding road network in terms of traffic volumes and road capacity
- Review the traffic generation potential of the project and its impacts on the surrounding road network
- Review of the geometry and layout of the preliminary concept design for the proposed car park and interchange arrangements
- Broadly assess the likely traffic implications during construction.

6.1.1 Existing environment

Flemington Railway Station is located in the suburb of Homebush West (the previous name of which was Flemington). It is in the Strathfield Local Government Area (LGA), approximately 16 kilometres west of the Sydney Central Business District. Existing traffic, transport and access are at Table 9: Existing traffic, transport and access, and existing facilities are at

Table 9: Existing traffic, transport and access

Transport	Details
Train	Flemington Station, on the T2 Inner West and South Line, generally provides City-bound services twice an hour between 4:30am and 7am, four times an hour between 7am and 9pm, and twice an hour from 9pm to midnight. There are also additional services in the afternoon period from 3pm to 5pm. Campbelltown-bound train services are generally provided twice an hour between 4am and 5am, three times an hour between 5am and 8am, four times an hour between 8am and midday (with an additional service from 8am to 9am), then twice an hour until 3pm, four services an hour between 3pm and 10pm, and two services an hour between 10pm and 1am. Services to other major destinations that are not on the T2 line would require transfers at key rail interchanges such as Strathfield, Lidcombe or Granville.

Transport	Details
Bus	Bus services are provided at a bus zone with capacity for two buses and located adjacent to the existing station entrance on the north side of The Crescent, to the east of the intersection with Henley Road. Service routes include Route 408 (Sydney Buses, Burwood – Rookwood). Bus Route 408 turns south instead on Hampstead Road from The Crescent, then west on Exeter Road then onto southbound Henley Road. The return journey does not pass directly outside The Crescent, due to the tight left-turn bus manoeuvre required at the Henley Road/The Crescent intersection. A bus shelter with seating is provided at this location. However, the location and design presents potential security issues, as it provides limited passive surveillance opportunity - the shelter's walls limit views to/from the surrounding area.  Source: Sydney Buses website NightRide buses also serve Flemington Station Precinct. Routes N60 (Fairfield – Town Hall) and N61 (Carlingford – Town Hall) provide night time services on Fridays, Saturdays and public holidays. These use a designated bus stop on the south side of The Crescent, east of Henley Road intersection. This bus zone is also used by Star City shuttle buses and shuttle buses operated by Sydney Markets.
Parking for those with a disability	There is currently no DDA compliant accessible parking provided at Flemington Station.
Kiss and ride	No formal kiss and ride facilities are provided near the station. However, car drivers have been observed to use the taxi rank as an informal drop-off zone for their passengers, noting that the taxi rank is often unoccupied during weekdays.

Transport	Details
Taxi	A taxi rank with capacity for two taxis is located adjacent to the station entrance on the north side of The Crescent. The taxi rank is provided with the regulatory "Taxi Zone" signage, as well as a shelter and seating. The shelter does not allow adequate space to accommodate people with a disability and there are no kerb ramps.
Bicycle Facilities	There are no formal bicycle parking facilities available in the immediate vicinity of the station. Observations indicate that customers use the existing fencing outside the station to secure bikes. Up to 12 bicycles were observed to be informally parked at the station precinct on a weekday.
Commuter Car Parking	There are no formal commuter car parking facilities available in the interchange precinct.
Parking	Time-restricted street parking is available on The Crescent and on Henley Road. The restrictions are generally either 30-minutes or 1-hour time limits, with limited spaces on The Crescent for 15-minute parking. Unrestricted parking is available on the streets surrounding the shopping precinct. Further parking is available at the Homebush West Shopping Precinct car park with a 2-hour time limit. Access to the shopping precinct car park is on Henley Road and Exeter Road. Time restricted on-street parking is available on the Crescent and on Henley road. The restrictions are generally either 30 minute or 1 hour time limits, with limited spaces on the crescent for 15 minute parking. Unrestricted parking is available on the streets surrounding the shopping precinct. Further parking is available in the shopping centre car park with a 2 hour time limit. Access this car park in from Henley Road and Exeter Road. Pedestrians have been observed to frequently pass through this car park as a short cut to the station.
Pedestrian Access and Movements	Existing access to the station is achieved via two locations: • stairway from The Crescent near the bus zone and pedestrian crossing • footbridge linking the station concourse with Sydney Markets. The key pedestrian desire lines accessing Flemington Station and Precinct (see Figure 14) include: • To/from residential and commercial developments in the Centenary Drive area, via The Crescent (north side), • To/from Henley Road and retail area, accessed via the pedestrian crossing on the east side of the intersection of Henley Road and The Crescent, • To/from Homebush Boys High School further to the east on The Crescent, via the pedestrian crossing and the footpath on The Crescent (east), and • To/from Sydney Markets via the station concourse and footbridge (particularly during weekends). The Flemington Station concourse sample surveys indicate pedestrian volumes of over 1,000 pedestrians an hour (both directions) during busy weekends. Counts from surveys in June 2014 indicate that: • up to 475 pedestrians use the crossing on The Crescent during the peak weekday hour (7:45-8:45am) • more than 550 pedestrians use the same crossing during the peak weekend hour (12:15-1:15pm).

Transport	Details
Traffic Access and Movements	The road network surrounding Flemington Station and precinct is focused on the south side of the railway line. To the north of the railway line and the station lies Sydney Markets, which is linked to Flemington Station by a pedestrian footbridge. The key roads surrounding the station include The Crescent, Henley Road, Hornsey Road and Hampstead Road. The Crescent is a local road aligned in an east-west orientation parallel to and running adjacent to the railway line. It is zoned with 50 km/hr speed limits, and links the suburb of Homebush West with Homebush. Outside Flemington Station, land uses along The Crescent include retail and light commercial. Time-restricted kerbside parking is provided along The Crescent between Hornsey Road and Hampstead Road. Hornsey Road, Henley Road and Hampstead Road are all oriented in a general north-south direction, each running parallel to the others. They link The Crescent with Arthur Street, which provides access to the wider subregion, linking with Centenary Drive (Route A3) and Strathfield. All three are local roads administered by Strathfield Municipal Council. All are posted with 50 km/hr speed limits. A school zone is also designated along Hornsey Road. The intersection of Henley Road and Arthur Street is signalised, while the intersections of Hornsey Road and Hampstead Road with Arthur Street are priority-controlled. As such, Henley Road functions as the key traffic access route to Flemington Station from Arthur Street. The intersection of Henley Road and Hampstead Road with The Crescent are priority controlled, while the intersection of Hornsey Road and The Crescent is roundabout-controlled.

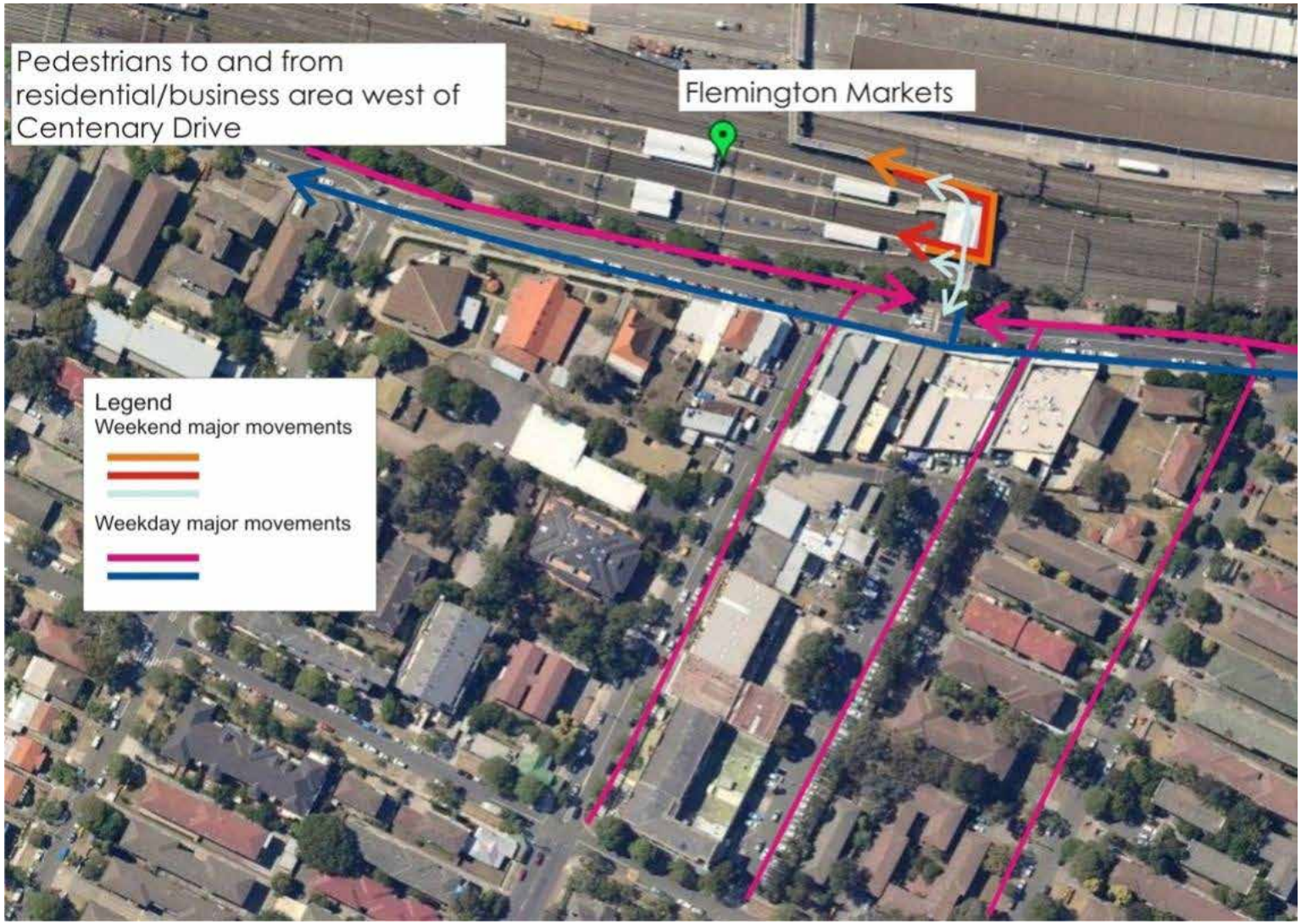


Figure 14: Key pedestrian desire lines in and around Flemington Station

Basemap source: Google maps

Table 10: Existing facilities at Flemington Station

Getting around the station		Accessibility	
Stairs	✓	Hearing loop	✓
Escalator	✗	Platform tactile tiles	✗
Lift	✗	Portable boarding ramp	✓
Ramp	✗	Wheelchair accessible toilet	✗
Level crossing	✗	Wheelchair accessible payphone	✗
		Wheelchair accessible carspace/s	✗

General facilities		Transport interchanges	
Ticket vending machine	✓	Bus stop close by	✓
Eftpos	✓	Ferry wharf close by	✗
Toilet	✓	Taxi rank close by	✓
Payphone	✓	Bike racks or bike lockers	✗
Passenger display screens	✗	Kiss and ride	✗
Help point	✓	Car park close by	✗

Source: www.sydneytrains.info

6.1.2 Potential impacts

The assessment of the traffic, transport and access impacts associated with the proposed upgrade works at Flemington Station and the surrounding public transport interchange and precinct identifies opportunities for a more efficient transport interchange to meet customer requirements.

(a) Construction phase

The key impacts for the construction phase have been identified and are discussed below:

Pedestrian access to Flemington Station: Construction activities relating to the platform/ platform buildings may require localised temporary closure of pedestrian access to parts of the station during construction. These could include sections such as the north side footpath on The Crescent (west of the intersection with Henley Road), the existing pedestrian crossing on The Crescent, and areas on the station platforms.

Bus: The following impacts on public transport access and operations could be expected during construction of the project:

- Potential bus rerouting (temporary) during demolition of the existing pedestrian crossing and the construction of the new pedestrian crossing on The Crescent.

- Potential bus customer access restrictions during demolition of the existing stairs on The Crescent.
- Temporary relocation of the NightRide bus stop.
- Rail track possessions (where rail services cease to operate).

Adequate information and signage would need to be provided to customers prior to any significant changes to existing operations.

Details of any changes to bus operation would not be known until the detailed design stage. This would be managed through the development of a CTMP provided by the Contractor.

Taxi: The construction arrangements would result in an impact to taxis. Alternative arrangements would be made with taxi operators and these would be managed through the development of the CTMP.

Kiss and ride: There is currently no formal kiss and ride zone at the station, although there is informal use of taxi and bus zones. Alternative temporary arrangements would need to be made and these would be managed through the development of the CTMP.

Cyclists: Construction of the Proposal may require short-term temporary closure of roads on both sides of the station, potentially impacting on cyclists.

Traffic impacts: The potential impacts of construction activities and construction traffic with regard to transport and parking include:

- Additional heavy vehicle flows and new construction vehicle access arrangements
- Potential minor impacts to commuters, Sydney Trains staff and Markets patrons, although works would be staged to minimise impacts. Impacts can include traffic diversions and temporary access restrictions near the interchange.
- Impact on surrounding land uses (including temporary pedestrian diversions, the temporary removal of existing parking spaces, and changes to bus and taxi zones)
- Degradation of amenity via construction traffic noise, and
- Visual impacts related to the above.

Construction activities on The Crescent would be likely to require temporary closure of portions of The Crescent. Detailed construction staging information and the consequent traffic rerouting plans are not yet available.

Any proposed traffic rerouting would need to be communicated to the community in advance of the proposed works.

Heavy vehicles: During construction, heavy vehicles would be required to bring building material, precast sections, and large plant and equipment to the site and remove any waste. The number of heavy vehicles would be kept to a minimum, and where practical, they would operate outside the peak hours.

Heavy vehicle access to the site would likely be from Arthur Street (to the south of the precinct), which links with the wider regional road network. The intersection of Arthur Street and Henley Road is signalised, and allows right turn movements from westbound Arthur Street into Henley Road. From the west, access to the site could be made via Hornsey Road. However, there are school zones on Hornsey Road, with schools located nearby.

Indicative construction traffic routes and volumes are shown in Figure 11: Potential construction vehicle access routes. The CTMP
would include:

- Timing of proposed works
- Hours of construction activities
- Number of construction vehicles to be used
- Designation of construction routes
- Mitigation and management measures including use of traffic control signals, construction vehicle access and traffic circulation arrangements
- Designation of temporary parking during construction works (for both the community and project personnel), and
- Contact details for key onsite construction personnel.

The turning movements / swept paths of access intersections to the station site would likely limit heavy vehicle usage to 12.5 metre rigid trucks. It is likely that 19 metre heavy vehicles (e.g. truck-and-dog trailer) or longer would have difficulty accessing the station site from the south. Alternatively, delivery of larger construction components by accessing the site from the Sydney Markets site, or rail would be considered.

Site-specific traffic management issues would be addressed through the implementation of appropriate Traffic Control Plans (TCPs) developed in consultation with the relevant Roads Authority. The TCPs would outline key details such as advanced warning signage, traffic flow management and pedestrian management measures.

Construction worker parking and traffic: The volumes of light construction vehicles are not known at this stage. However, it is unlikely that there will be parking available for construction staff adjacent to the site, either off-street or on-street.

To mitigate congestion due to on-street parking of construction works, project personnel would be required to park away from the station and Town Centre where possible. Alternatives include encouraging use of public transport, and considering discussions with Sydney Markets Limited to enable construction staff vehicles to be parked within the Sydney Markets site, with access to the construction site via the existing or the new footbridge. It is noted that there would be limited construction activities during weekends, while traffic movements on the Sydney Markets site are limited during weekdays (compared with weekends).

Parking impacts: During construction there would be a decrease in available parking spaces around the existing and proposed new station entry, mainly on the section of The Crescent (north side) west of the Henley Road intersection. This would also impact on the taxi zone, as noted above.

Construction zones: It is proposed that several areas would be temporarily fenced off to provide for storage/laydown areas (see Figure 12).

(b) Operational phase

The Proposal includes amendments to existing traffic infrastructure, particularly relocation of the station entry, and the corresponding relocation of the marked pedestrian foot crossing and bus and taxi zones.

Several options were considered for the location for the pedestrian crossing, and the preferred location is on the east side of the Henley Road/The Crescent intersection closer to the proposed new stairway entrance to the station. This option provides the highest benefits for customers in the station precinct while meeting warrants for the installation of marked pedestrian crossings.

The impacts of the relocation of the pedestrian crossing were assessed using traffic modelling software (SIDRA), using assumed growth factors for traffic and pedestrian flows. (Refer to the *Traffic Transport & Access Impact Assessment*, GTA, August 2014)

The report finds that it is expected that traffic queues would form when pedestrians are using the crossing and traffic is required to give way. However, the intersection degree of saturation indicates that there is still spare capacity for the intersection to operate at acceptable levels.

Aspects of the design that would influence operation of Flemington Station would be those that result from:

- A relocated and improved entry in The Crescent, with additional weather protection to improve amenity and access to the station
- Improved access for those with a disability resulting from the addition of three passenger lifts, and widened footpaths
- The relocation of the pedestrian crossing on The Crescent closer to the Henley Road intersection that would result in shorter walking distances for more than 1,000 pedestrians during a typical weekday, and more than 750 pedestrians during a typical 3-hour weekend peak, without significantly impacting on intersection operation
- Relocation of the bus zone in The Crescent close to the new entry, with a new improved bus shelter, to provide a higher level of security for bus customers
- The relocated pedestrian crossing and bus zone which offers the opportunity to create kerbside parking spaces on the north side of The Crescent, east of the bus zone
- The provision of a designated kiss-and-ride space with a kerb ramp to assist those with a disability contributes towards more equitable access to the railway station and precinct. Access to the new kiss and ride space would need to be from Hornsey Road.
- Access to the relocated taxi zone further to the west in The Crescent that would need to be from Hornsey Road. It is also proposed to provide a kerb ramp at this location to assist access for those with a disability. Egress could be achieved directly via Henley Road.
- The provision of formal bicycle parking facilities that would provide cyclist-customers with more secure facilities to leave their bicycles at the station precinct
- A net loss of approximately eight short-term kerbside parking spaces due to the rearrangement of facilities on The Crescent
- Unrestricted parking is available on the streets surrounding the shopping precinct. Further parking is available at the Homebush West Shopping Precinct car park which has a 2-hour limit. Access to this parking is via Henley and Exeter Roads.

The relocation of the existing pedestrian crossing on The Crescent would provide a more direct route for customers accessing the station, particularly those to/from the direction of Henley Road. The relocated crossing also allows for a more compact transport interchange without significantly impacting on traffic operations.

There may be the potential for a new accessible drop-off in The Crescent as a result of these works, and this would be determined at detailed design.

Relocation/ reallocation of parking in the immediate vicinity of the interchange would lead to a loss of eight 1P (one hour) kerbside parking spaces on the section of The Crescent (north side) west of the Henley Road intersection, due to the new taxi rank and the kiss-and-ride space, and the potential provision of an accessible drop-off space. However, this decrease would be offset by a potential increase of approximately two kerbside parking spaces on the north side of The Crescent east of the proposed bus zone.

The report concludes that the operation stage impacts of the project include:

- Improved pedestrian access to, from and within the station and interchange precinct, facilitated by the provision of new passenger lifts, interchange facilities, wider pedestrian circulation area on the concourse, and more direct access to Sydney Markets.
- Potential increased vehicle manoeuvres to access interchange facilities, in particular the (proposed) accessible drop-off/pick-up space and the kiss and ride space. However this is offset by a more direct egress route from the station precinct.

6.1.3 Mitigation measures

- Prior to the commencement of construction, a CTMP would be prepared as part of the CEMP which addresses, as a minimum, the following:
  - Traffic management, including adequate signage to inform motorists and pedestrians of the work site
  - Proposed road closures and associated traffic controls/mitigation to be implemented
  - impacts and changes to parking including proposed parking for construction workers:
    - The impacts of construction traffic and on deliveries on the local road network and the impacts on intersection operation would be minimised by undertaking construction vehicle traffic movements outside of AM and PM peak road traffic periods and outside of school peak periods where feasible
    - Signs would be provided at each access point to assist in deliveries to each work site
    - Construction vehicle parking would be limited to designated areas. Areas of temporary on-street parking during peak construction events would be identified in the CTMP to minimise the impact on surrounding properties and businesses. Opportunities for using an area within Sydney Markets for construction staff parking would also be considered in discussion with Sydney Markets Limited.
    - Where possible, alternative means of transport to and from the site for construction workers would be promoted e.g. encourage the use of public transport, car share or use of a shuttle bus service especially for construction staff not carrying heavy tools or equipment.
  - location of construction compounds
  - routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
  - details for the relocation of the bus stops and taxi rank, including appropriate signage to direct patrons.

Consultation with the relevant Roads Authority would be undertaken during preparation of the CTMP, where required. The performance of all project traffic arrangements would be monitored during construction.

- A Road Safety Audit would be undertaken during detailed design and design amendments made as required
- Heavy vehicles would be restricted to specified routes, with the aim of minimising impacts on local roads, high pedestrian areas and school zones. Where feasible, route markers would be installed for the guidance of heavy vehicles along designated routes
- The impacts of construction traffic and on deliveries on the local road network and the impacts on intersection operation would be minimised by undertaking construction vehicle traffic movements outside of AM and PM peak road traffic periods and outside of school peak periods where feasible
- Investigation would be undertaken into the potential for shuttling equipment and spoil on engineering trains
- Pedestrian access to the station platforms would be maintained at all times trains are operational. Pedestrian paths that would be required to be closed off should be properly hoarded and provided with safe and convenient alternative crossing points.
- Pedestrian access across the rail corridor would be maintained at all times (other than for possible very minor interruptions)
- Temporary traffic management to be implemented at The Crescent/Hornsey Road, The Crescent/Henley Road, and the Centenary Drive access point for critical activities. Traffic control staff would limit access to priority vehicles during critical activities if required.
- The queuing and idling of construction vehicles in residential streets would be minimised.
- Road occupancy licences for temporary closure of roads would be obtained where required.
- A pre and post construction assessment of road pavement assets would be conducted in areas likely to be used by heavy construction vehicles.
- Access to all private properties/businesses adjacent to the works would be maintained during construction, unless otherwise agreed by consultation with specific relevant property owners.
- In order to manage risks of pedestrians crossing The Crescent away from the marked crossing, a pedestrian barrier on the north side of The Crescent would be installed.
- In order to address potential pedestrian safety issues in the precinct, it is recommended that consideration be given to designating the section of The Crescent between Hornsey Road and Hampstead Road, and the section of Henley Road from Exeter Street to the station precinct as a 40 km/hr High Pedestrian Activity Area (HPAA). This recommendation would need to be discussed with Strathfield Municipal Council's Local Traffic Committee.
- Once the new interchange is operational, consideration would be given to traffic movement priority to Henley Road traffic. The degree of saturation of the Henley Road/The Crescent intersection may be lower under this operational scenario.

6.2 Urban design, landscape and visual amenity

A *Visual Impact Assessment, Flemington Station Upgrade* was carried out by IRIS Visual Planning + Design in September 2014.

6.2.1 Existing environment

The Proposal site is located within Homebush West Town Centre, within an urban context. Homebush West is primarily a suburban village, servicing the needs of the local community and surrounding district in terms of business and educational facilities and services. The built form of the area has a mix of modern and historic buildings with more dense, multi-storey commercial development focused around Henley Road. Refer to Figure 15 for the local landscape character plan.

The railway line and Flemington Station creates a boundary between two distinctly different landscape character areas. To the north, the Sydney Markets are characterised by large industrial scale buildings with working frontages facing the station. To the south, the Homebush West Town Centre has a much finer grid pattern of streets, and is characterised by a mix of historic and contemporary residential and commercial buildings, including numerous authentic Chinese and Vietnamese restaurants, Asian green grocers and butchers. Surrounding the town centre are leafy residential areas.

The rail corridor includes catenary (wire support) structures with overhead wires, and rail tracks with regular trains moving along the alignment, east to west. These elements create a strong visual line across the landscape. The station and railway land has considerable visual clutter and can be viewed from public areas of the station, and locations along the north and south of the corridor.

The Crescent has a straight alignment east to west where it is located along the southern boundary of the railway corridor. The Crescent has a predominantly leafy, tree-lined character, and offers glimpses and filtered views to the station along its length.

A number of local landmarks are located along The Crescent, including the St Dominic's Church buildings, grand residential homes, units and corner stores.

To the south of The Crescent there is a mixed architectural character, with buildings of varying ages and styles, unified by the use of red and brown brick construction on key landmark buildings.

Two storey brick retail buildings surround the corner of Henley Road, acting as a visual marker, identifying the main commercial street and town centre. The footpaths are visually enclosed by awnings, and street trees. A mix of shops with retail frontages spill out onto the streets, creating a vibrant, community character.

To the east, the rail corridor is screened somewhat by vegetation on the corridor and street trees on The Crescent. Adjacent to the station, viewed from the West Homebush Town Centre, the station is screened by shrub and street tree planting. To the west, views to the station are more open, where the corridor narrows and there is limited opportunity for planting. In this area, the Sydney Markets and elevated footbridge can be clearly seen across the station platforms.

Sydney Markets, located to the north of the study area, has a distinct character. Large industrial scale buildings with loading bays and 'back of house' working areas face the station and railway line. These buildings are set within large, open forecourts with heavy vehicles loading bays, large shipping containers and forklifts transporting goods from these loading bays into the markets.

From areas to the west of the station, fencing, equipment and storage areas block views to the station and railway corridor. From areas to the east of the station, the views between the railway corridor and the Markets are more open. In these views, the station precinct is seen with the main station concourse building visually prominent, elevated above the station platforms.

The public areas of the Markets are located further north, and there is no visibility between the commercial areas of the Markets and the station precinct.

6.2.2 Potential impacts

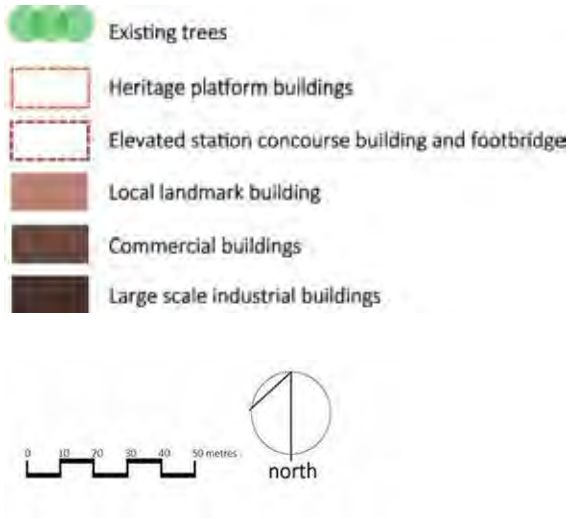
The greatest visual impacts would be from the proposed new station entry and traffic arrangements in The Crescent, the new overhead concourse, lifts and stairs to the platforms, and the new alignment of the footbridge which would serve to connect the cross-corridor pedestrian movement.

The *Visual Impact Assessment, Flemington Station Upgrade* report finds that the Proposal would create some visual impacts due to its size and scale, and the loss of vegetation. However, these impacts would include temporary moderate to minor adverse impacts during construction, and minor adverse to negligible visual impacts during operations.

Generally the station architecture is in scale with the development potential of the area to the south, with heights allowable in the Local Environmental Plan being consistent with the overall height of the proposed new station buildings.

The character of the existing townscape, particularly at the Sydney Markets and the existing rail infrastructure, has the capacity to visually absorb the character and scale of the proposal. The station architecture would form a visual transition from the large-scale Markets character, which is widely seen from The Crescent and Flemington Station, to the commercial town centre of West Homebush.

The upgraded station would provide a local visual landmark when approached from the north and south, with the scale and prominence of this structure being consistent with the local importance of this important public transport node.



1 Views from the pedestrian walkway

2 Elevated concourse buildings

3 Views filtered through trees to the station buildings

4 Two storey commercial buildings in The Crescent

5 St Dominic's Catholic Church and Church buildings

6 Existing trees to the northern side of The Crescent filter and soften views to the rail corridor and station buildings

7 Historic brick wall, creates a visual edge to station

8 Historic station buildings located on the station platforms, seen from surrounding streets through trees

9 Rail corridor creates a strong visual and physical barrier through the area, separating Homebush West from the Sydney Markets

10 Sydney Markets buildings create a strong and visually dominant edge (indicated by zig-zag lines) and enclose views to the north

Figure 15: Local landscape character plan

Source: IRIS Visual Planning + Design

(a) Construction phase

Within the station itself, impacts relate to works in relation to:

- Construction of a new overhead concourse, three new lifts, and three sets of stairs in a new location, with new canopies and a new footbridge to meet the existing Sydney Markets footbridge at the rail corridor boundary
- Works (mainly interior) to the heritage buildings on Platforms 1/2 and 3/4
- Demolition of existing canopies
- Relocation of seating and Opal ticket readers.

In relation to the above works, visual impacts would typically arise as a result of:

- Removal of trees
- Construction fencing/hoarding
- Temporary site signage
- Cranes and other construction machinery
- Construction compound and construction worker parking
- Temporary lighting
- Temporary pedestrian detours and associated signage
- Relocation of services
- Relocation of the bus and taxi zones and associated signage outside the station
- Demolition of redundant canopies, buildings, footbridge and stair structures.

Works would involve cranes, piling rigs, materials and equipment transport and storage, and temporary road and pedestrian diversions.

When construction works are seen in the foreground of views, such as from the Markets footbridge, the station platforms, and from the footpaths on The Crescent, this would result in a considerable reduction in visual amenity, particularly where pedestrian movement is diverted and hoardings limit views and access around the station and adjacent streets. This would result in a temporary moderate adverse visual impact during construction.

This impact would be reduced when seen in the middle and background of views, such as from The Crescent, and Henley Road. The change in character seen in these views would be more easily absorbed into the view, seen against the semi-industrial character of the Sydney Markets.

It is expected that this would result in a considerable reduction in the amenity of the views, and a temporary minor to moderate adverse visual impact during construction.

These works would be temporary in nature (up to 24 months) and therefore visual impacts as a result of these items would be temporary.

(b) Operational phase

The design seeks to achieve the following architectural and urban design objectives:

- a slimline overhead footbridge to minimise visual impact on sensitive viewpoints
- a design which is sympathetic to the heritage elements of the station
- entrances which are clearly legible and visible from pedestrian desire lines
- transparency which reduces the perception of bulk, improved lines of sight from the bridge and from surrounding areas, and
- improved passive surveillance for a safe and secure rail environment.

The *Visual Impact Assessment, Flemington Station Upgrade* report identifies key viewpoints and potential impacts from the works. Visual impacts of the Proposal are illustrated at Figure 16: View south from the Sydney Markets footbridge, indicating proposed new works (Viewpoint 1) to Figure 18: View east along The Crescent toward the new station entry (Viewpoint 7).

During operation, the following permanent structural elements would contribute to visual impact:

- New overhead concourse, and three new lifts and three sets of stairs in a new location
- New footbridge and removal of the dog-leg in the current alignment of the footbridge
- New platform canopies
- Return to use of the existing heritage platform buildings
- Reallocation of road space in The Crescent, including:
  - Re-positioning of the marked pedestrian foot crossing, taxi rank and bus zone
  - New bus shelter and relocated taxi shelter on The Crescent
  - New bike racks
  - New kiss and ride zone
- New wayfinding and road signage
- New landscaping
- New permanent screening and fencing.

Figure 16: View south from the Sydney Markets footbridge, indicating proposed new works (Viewpoint 1)

Note: Red outline and shading indicates items proposed to be removed.

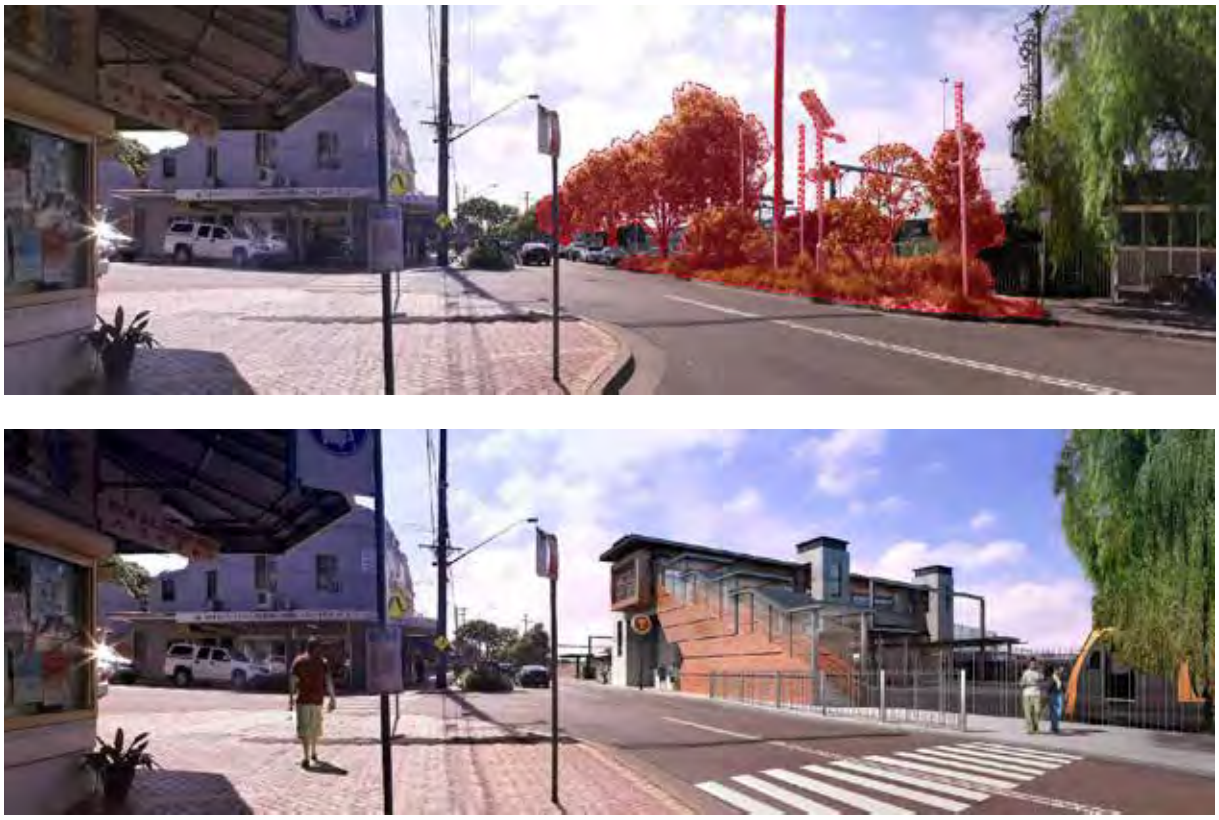


Figure 17: View west along The Crescent to the intersection with Henley Street and proposed new station entry (Viewpoint 5)

Note: Red outline and shading indicates items proposed to be removed.

Figure 18: View east along The Crescent toward the new station entry (Viewpoint 7)

Note: Red outline and shading indicates items proposed to be removed.

The *Visual Impact Assessment, Flemington Station Upgrade* report indicates key views, and their impacts are discussed below. Figure 19: Site viewpoint plan indicates key viewpoints and Table 11: Viewpoint analysis provides an analysis of the impacts from the Proposal.

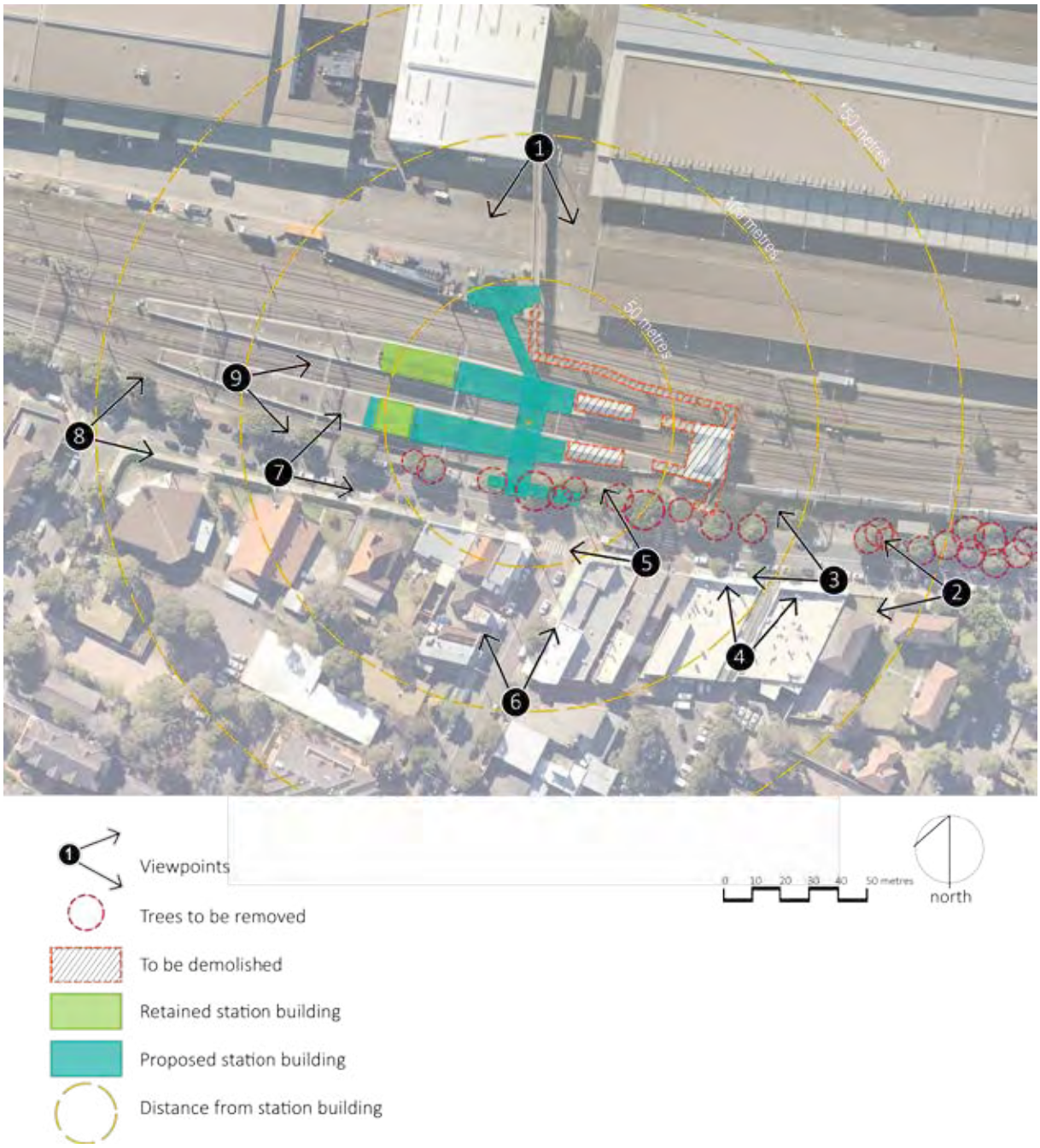


Figure 19: Site viewpoint plan

Source: IRIS Visual Planning + Design

Visual sensitivity

Visual sensitivity refers to the nature and duration of views. Locations from which a view would potentially be seen for a longer duration, where there are higher numbers of potential viewers and where visual amenity is important to viewers can be regarded as having a higher visual sensitivity.

Table 11: Viewpoint analysis

			Operation			
			Day		Night	
Viewpoint number and location		**Visual sensitivity**	**Visual modification**	**Visual impact**	**Visual modification**	**Visual impact**
01	View south from the Sydney Markets footbridge	Local	Noticeable improvement	Minor beneficial	Noticeable improvement	Minor beneficial
02	View west along The Crescent, near the intersection with Hampstead Road	Neighbourhood	Noticeable improvement	Negligible	Noticeable improvement	Negligible
03	View west along The Crescent to the existing station buildings	Neighbourhood	Noticeable improvement	Negligible	Noticeable improvement	Negligible
04	View north from the Arcade at No. 95 The Crescent	Neighbourhood	No perceived change	Negligible	No perceived change	Negligible
05	View west along The Crescent to the Intersection with Henley Road and proposed station buildings	Local	Noticeable improvement	Minor beneficial	Noticeable improvement	Minor beneficial
06	View north along Henley Road to The Crescent and station beyond	Local	Noticeable improvement	Minor beneficial	Noticeable improvement	Minor beneficial
07	View east along The Crescent, adjacent to the existing station buildings	Local	Noticeable improvement	Minor beneficial	Noticeable improvement	Minor beneficial

			Operation			
			Day		Night	
Viewpoint number and location		Visual sensitivity	Visual modification	Visual impact	Visual modification	Visual impact
08	View east along The Crescent, from the shops at the intersection with Hornsey Road	Local	Noticeable improvement	Minor beneficial	Noticeable improvement	Minor beneficial
09	View east along Flemington station platform	Local	Noticeable improvement	Minor beneficial	Noticeable improvement	Minor beneficial

Views from within the station

The station is a community gathering place and forms a main entry to the town centre. Views on the platform include the historic character brick station platform buildings, and existing elevated station buildings.

While the elevated station building and stairs would be removed, the brick station buildings, would be returned to functionality. Three lift structures would be visible on the street and on each island platform. These would be linked by a concourse which would be seen elevated and crossing the station from the Markets in the north, across the station and to The Crescent in the south.

This structure would be considerably larger in size and scale to the existing station buildings, rising to three stories in height and aligned across the view, extending 50-75 metres. The mass of this building could be reduced somewhat by the use of steel mesh throw screens in the elevated concourse. Angled lines would also visually break-down the mass of the structure.

The station would be seen as a transition in scale between the Markets and the main street of West Homebush, and would be absorbed into the surrounding townscape character.

This alteration to the views would result in a noticeable improvement in the amenity of these views, and a minor beneficial visual impact from the station.

Views from Sydney Markets

The existing buildings to the southern precinct of Sydney Markets are large in scale, with a height of approximately 9-15m and a considerable bulk, with some buildings being in excess of 100m long. The removal of the extended footbridge and station buildings to the east would remove this visual clutter. However, a large new structure, rising some 8 metres above the already elevated footbridge level, would be constructed at the terminus of views from the footbridge.

The bulk of the station buildings, as seen from the Markets, would form a visual transition as it steps-up from the footbridge level, to the Markets footbridge structure, and then to the station concourse bridge and lift structures beyond.

These structures would be constructed of a range of different materials and treatments to visually 'break-up' the scale of these structures. Furthermore, the design of these building elements has intentionally created visual interest through articulation of the building facades, creating shadow and depth.

The Markets footbridge would be enclosed in semi-transparent anti-throw structures, formed in an asymmetrical shape to disguise the scale and underlying bulky form of the structure.

Views from the Markets footbridge are of local visual sensitivity, as the route from the public areas of the Markets and the station is well-used and connects two local landmarks.

From the Markets footbridge, the new station buildings would block views to the roofscape of West Homebush, seen from this location. As this new station building would be seen as a number of built elements, with a layering of building shapes and forms, it would blend somewhat with the roofscape visible in the surrounding view.

Overall, it is considered that there would be a considerable alteration to these views resulting in a minor beneficial impact on the amenity of views from the Sydney Markets footbridge.

Views west from The Crescent

Views west towards the station from The Crescent are of neighbourhood visual sensitivity, as they are local routes, connecting residential areas with the station and the main commercial streets of West Homebush.

In a number of these views, the existing elevated station building is visible, and would be removed. In addition, a number of trees adjacent to the station would be removed, opening up views to the new station buildings and increasing the visibility of the Sydney Markets beyond.

The new station buildings would be seen in the background of these views, seen as a number of separate elements, visually broken-up by their shape and materials, and with some transparency achieved through the use of steel mesh throw screens and angled lines of the panel frames.

This alteration to the views would typically result in a noticeable improvement in the amenity of these views, and a negligible visual impact in views at a distance.

Views east from The Crescent

Views east towards the station from The Crescent are of local visual sensitivity, as this area is local route connecting the residential areas of West Homebush with the station and it is representative of views community gathering places such as the local corner store, and community church buildings.

In these views, a number of street trees which currently create a green edge to the station would be removed. This would open up views to the new station buildings and increase the visibility of the Sydney Markets beyond.

In these views, the new station structure would be elevated, rising to approximately three storeys above the surrounding ground level. Views to the existing brick station buildings would be opened up somewhat. The station buildings would be seen as a number of separate elements, visually broken-up by their shape and materials, and with some transparency achieved through the use of steel mesh throw screens and angled lines of the panel frames.

The scale of the proposal would create a visual transition between the commercial areas, visible in the background, and the Markets, which are clearly visible in views from this area. The visual prominence of the Church would be maintained. This would be visually compatible with the surrounding character and be absorbed into the character of the surrounding townscape.

This alteration to the views, would result in a noticeable improvement in the amenity of these views and a minor beneficial visual impact, from The Crescent.

Vegetation removal: The loss of vegetation along The Crescent and rail corridor, not only has an impact on visual amenity but on the shade and comfort of the pedestrian footpaths, waiting areas and taxi pick up areas. In some areas these trees cannot be replaced due to the constraints of adjacent infrastructure and limited space. This results in an adverse landscape impact.

Station entries: The intent is to create highly legible entry markers on each side of the corridor by creating defined station entries. The stair entrance from The Crescent would create a 'blank' wall, and this could be softened by public art. These entry markers would enhance the cross-corridor connection and provide a landmark feature for the existing civic nodes and act to reinforce the local identity. Existing footpaths would be widened to provide more trafficable space at the bottom of the new stair on The Crescent.

Concourse: The use of modern materials, construction techniques and detailing would be used to distinguish the age of the new concourse and the lift shafts from the historic elements of the station. Otherwise, materials, colours and finishes would be compatible with those used in the significant buildings at the site. The colour and texture of new materials would be recessive, to reduce any visual dominance of the station.

The roofline of the main concourse structure would not mimic or 'match' that of the original platform buildings, but would respond to the existing built form in such a way as to complement the historic character of the place and blend into the broader landscape. A low-pitched or skillion roofline is therefore considered appropriate.

The main structure of the covered concourse and associated lift shafts would be located as far as possible from the platform buildings to reduce the visual dominance of the footbridge at the station. Stairways would be oriented towards the platform buildings.

The profile of awnings over the concourse stairs would provide a visual transition from the modern design of the concourse to the original designs of the platform buildings. Carefully positioned gaps and/or modulations in roof form would be used, if practicable, to open up views to the older buildings and sympathetically negotiate the transition between old and new. Lighting would be provided via pole-mounted luminaries.

Materials and colours selected for the covered concourse are non-reflective, to mitigate against glare of adjacent road users or shine into nearby private properties.

Footbridge: The proposed new footbridge is to be a low-key contemporary design with a light-weight form with open or transparent sides or sections, to reduce the visual dominance of the footbridge at the station. The design would retain and/or enhance views to the original platform buildings.

A trapezoidal switch-back structure is proposed to tie in the different heights between the station footbridge and the Sydney Markets footbridge.

Views and vistas from the footbridge would be maintained by the use of a transparent anti-throw screen material. A random appearance would be created by repeating and mirroring the triangulated pattern of the screen supports.

Lifts

The lift shafts would be through-lifts, designed with a low-scale to respond to the existing scale and proportions of the platform buildings and shop fronts along The Crescent. A simple geometric form is considered appropriate.

Three new lift towers would be attached to the new overhead concourse. The scale impact of the lift shafts would be minimised by limiting the height of the lift shafts to around two (2) metres above the top of the footbridge roof.

Anti-throw screens

There is an opportunity to manipulate the forms and colours of the screens to generate a vibrant and fresh aesthetic to the new footbridge. The rectilinear form of the proposed footbridge would be interrupted by the angle framing of the anti-throw screens. A random appearance would be created by repeating and mirroring the triangulated pattern of the screen supports.

Bus, taxi and kiss and ride: The existing bus zone would be moved to align with the new station entrance. A new bus shelter and bike racks would be provided in the current location of the station entry, and a new accessible drop off zone would be provided for taxi and kiss and ride customers.

Pedestrian access: The existing marked pedestrian foot crossing in The Crescent would be relocated. Road space adjacent would be re-allocated to suit the new position of the station entry. The Proposal would see reallocation of existing road space in accordance with interchange guidelines, where modes of transport are prioritised in favour of sustainable modes.

Overall, weather protection would be improved and the Proposal would result in a significant improvement in pedestrian amenity. The new entries would facilitate self orientation through natural way-finding.

Platform canopies: New canopies would be provided on either side of the stairs in order to maintain continuous cover along the platform to the platform buildings. These canopies would be an almost flat roof construction with a soffit cladding. To visually separate the canopies from the platform buildings, new transparent roofs would be installed, terminating at the platform building roof fascia.

The profile of the new awnings along the platform would respond to the form of the canopy over the new concourse and stairs. These new awnings would be recognisably new, while still respecting the historic character of the station, and this would be achieved through the use of modern materials and/or detailing.

Bicycle: New bicycle rack parking would be provided on The Crescent.

Flora and fauna: Landscape impacts on the southern side of the station (The Crescent) include revegetation of the area near the eastern end of the station, where approximately 10 trees would be removed for a construction zone. Trees would be offset in accordance with the TfNSW *Vegetation Offset Guide*. The plant species palette selected would be a combination of natives and exotics and would be selected in consultation with Council.

Platform: The heritage station buildings are to be returned to functionality, with little impacts to the exterior of the building, with the exception of the removal of the screen wall at the western end of Platform 3/4 and the addition of a new entrance into the staff office via a new door on the eastern end of the building.

The relocation of seating and bins on both platforms would be necessary to maintain accessible paths. Readers for the Opal ticketing system would be located at the bottom of the stairs and in front of the lifts at platform level.

Balustrades, handrails and anti-throw screens: Balustrades, handrails and anti-throw screens would be stainless steel/galvanised with a light silver finish.

Street furniture: Any new street furniture would be installed in consultation with Council.

Wayfinding and signage: The upgrade of wayfinding signage for the Flemington Station precinct is a necessary part of the station upgrade and would improve customer experience. Existing signage would be relocated and modified. New signage would address changes to the interchange with regard to other upgrade works (including bus stops, accessible parking, lifts, stairs, taxi rank, kiss and ride and bicycle parking).

Graffiti minimisation: Additional measures would be applied to reduce graffiti, including through sealing station surfaces and by providing station security through effective design and CCTV cameras.

Views at night: At night, the study area is considered to be of high district brightness, with the existing Flemington Station, Henley Road in the West Homebush town centre, and Sydney Markets being brightly lit. Surrounding this, the residential areas are of moderate district brightness, with lighting associated with the residential properties and street lights.

The station would be brightly lit at night, and more visually prominent due to the height and scale of the new station buildings. The station is likely to create additional sky glow above the site. As the station and its environment are already brightly lit there is unlikely to be any glare created by the project. Furthermore, due to the separation of the station from residential and commercial areas by The Crescent roadway, it is not expected that there would be any light trespass onto adjacent properties.

At night, there would be additional lighting provided by the upgraded station and interchange, and the station would be more visually prominent due to the removal of existing street trees, and greater height of the buildings. This would be an incremental increase from the current lit character of the station and would be consistent with the character of the Markets, seen beyond the station, which is brightly lit at night.

Generally, the character of the proposed station upgrade at night would be visually absorbed into the surrounding brightly lit environment, whilst the legibility of the precinct will be improved. At night the alterations to the view would be noticeable and result in a negligible to minor beneficial visual impact.

Overshadowing: Overshadowing of adjacent properties would be limited to the winter months, due to:

- The general north to south orientation of the station concourse overbridge
- The separation of the proposed station building from neighbouring residential and commercial areas by The Crescent.

In addition, the use of semi-transparent steel mesh throw screens would reduce the depth of shadow thrown by the proposed station building in some areas.

The properties that would be impacted by overshadowing in winter are the commercial properties on the corner of The Crescent and Henley Road. In addition to these buildings, the public footpaths located adjacent to the proposed station buildings, along The Crescent, would also experience overshadowing during winter. Refer to shadow diagrams below - Figure 20: Shadow diagram - June 9am, Figure 21: Shadow diagram - June 12pm and Figure 21: Shadow diagram - June 12pm.

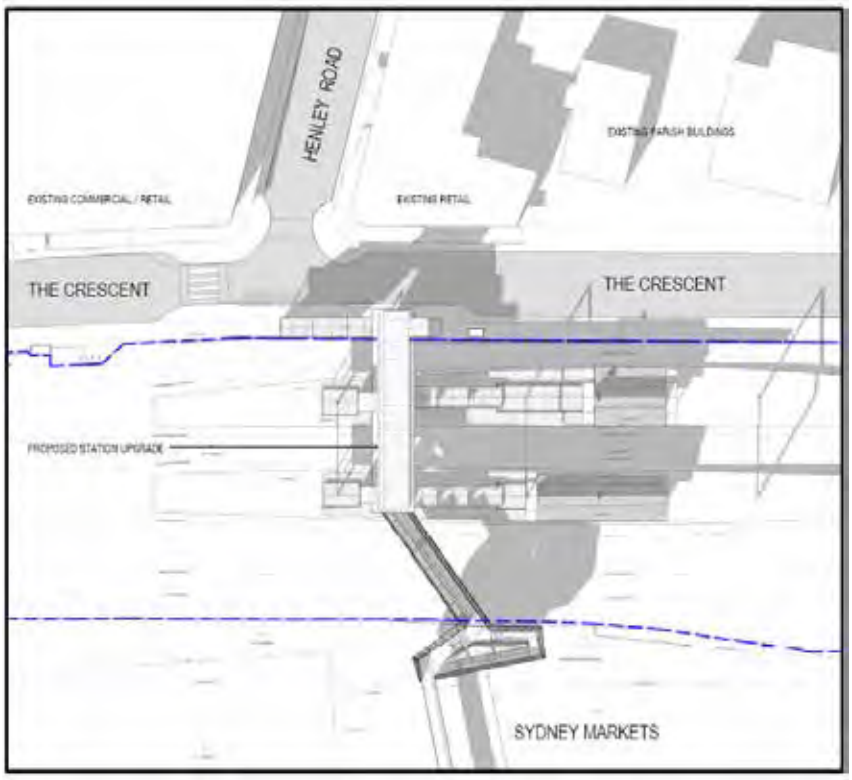


Figure 20: Shadow diagram - June 9am

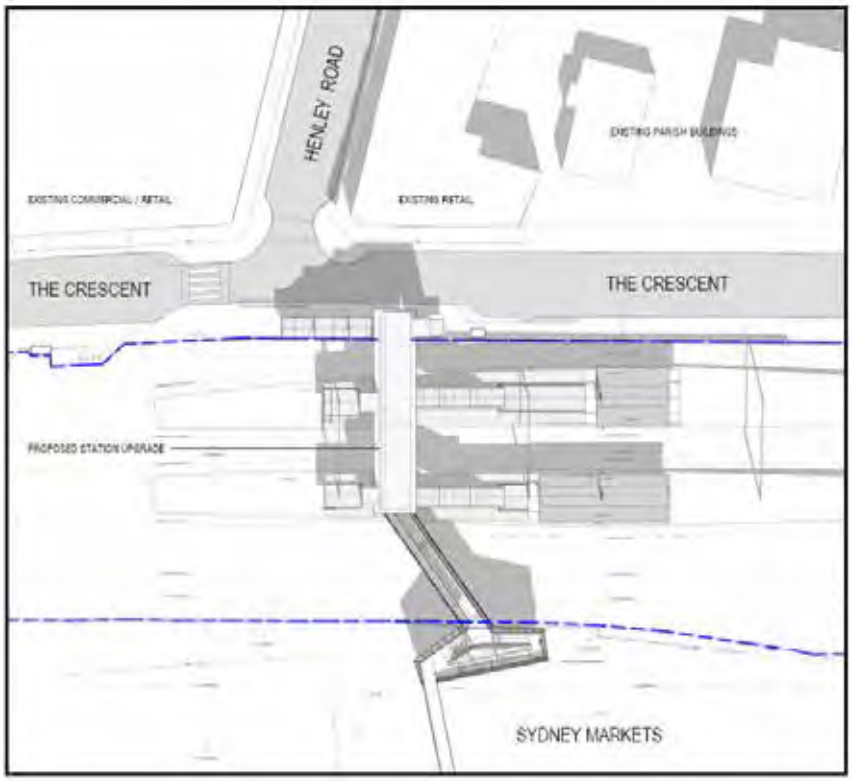


Figure 21: Shadow diagram - June 12pm

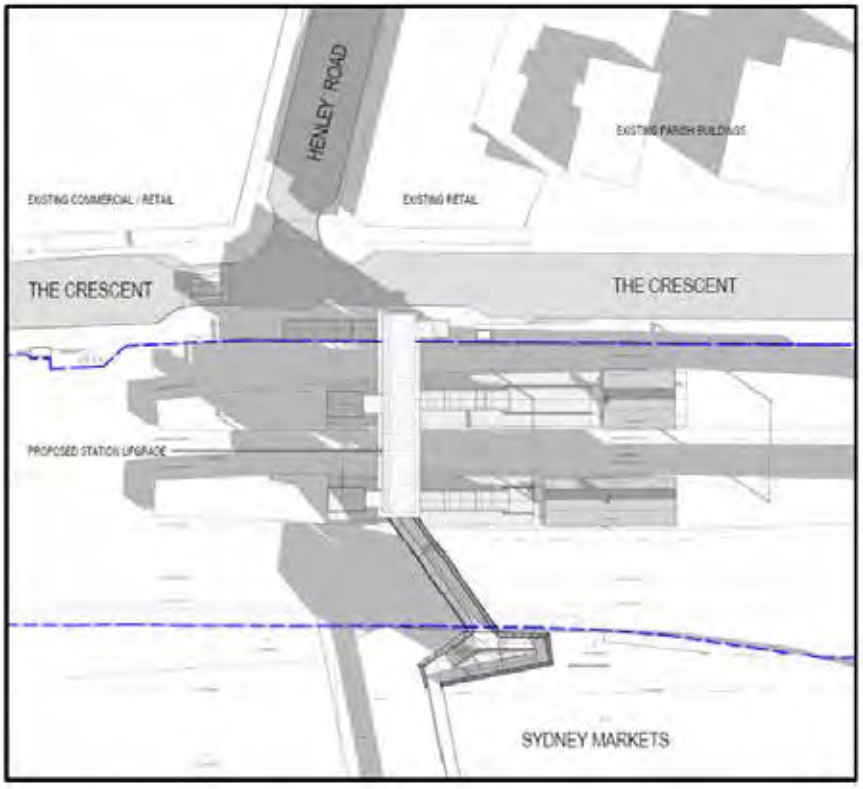


Figure 22: Shadow diagram - June 3pm

6.2.3 Mitigation measures

- Construction sites would be managed to minimise visual impacts:
  - equipment and facilities would be consolidated to maximise the area of useable public realm and maintain pedestrian permeability
  - elements e.g. materials and machinery would be stored behind fencing/hoarding
  - fencing would be screened, with shade cloth or similar material where necessary to minimise visual impacts from external viewpoints
  - regular maintenance of site hoarding and perimeter areas would be undertaken, including the prompt removal of graffiti
  - construction sites and work areas would be kept tidy and well maintained at all times.
- During construction, light spill from the rail corridor into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas while ensuring that the site complies with Australian Standards but is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
- Finishes and materials would be complementary to the existing locality and landscape, would minimise reflective surfaces with a preferred use of muted/less intrusive colours, and would involve consultation with Council.
- Any areas of 'blank' wall would be softened by appropriate plantings and/or artwork to meet visual amenity and sustainability guidelines.

- Specifically designed lighting equipment would be installed to minimise the upward spread of light near to and above the horizontal. Care would be taken when selecting luminaries to ensure that appropriate units are chosen and that their location would reduce spill light and glare to a minimum.
- Opportunities for the inclusion of street trees adjacent to the station on The Crescent would be considered, including in the vicinity of the new bus shelter, at the terminus of Henley Road, and adjacent to the kiss and ride parking bay.
- Maintenance of structures as a result of this Proposal would be the responsibility of Sydney Trains on completion.

6.3 Noise and Vibration

A *Noise and Vibration Impact Assessment* for the Proposal was carried out by AECOM in July 2014. The findings of the report are summarised below.

6.3.1 Associated Policies and Guidelines

Noise and vibration guidelines and standards for construction and operation of projects that are referenced in this study include:

- *Interim Construction Noise Guideline* (ICNG), (former) Department of Environment and Climate Change (DECC), 2009.
- *Assessing Vibration: A Technical Guideline* (AVATG), (former) Department of Environment and Conservation (DEC), 2006.
- *NSW Road Noise Policy* (RNP), Department of Environment, Climate Change and Water (DECCW), 2011.
- *NSW Industrial Noise Policy* (INP), Environment Protection Authority (EPA), 2000.
- *Construction Noise Strategy* (CNS) (former) Transport Construction Authority (TCA), 2011.
- DIN Standard 4150: Part 3 1999 Structural Vibration in Buildings - Effects on Structures, 1999.
- British Standard 7385: Part 2 1993 Evaluation and Measurement of Vibration in Buildings,1993.
- British Standard 6472: Part 1 2008 Evaluation of Human Exposure to Vibration in Buildings, 2008.

6.3.2 Existing environment

The station is located within a mixed use environment which comprises residential, commercial, industrial, and retail uses. In addition a community centre and places of worship are located close to the station.

Centenary Drive is located to the west of the site and is considered to be an arterial road. The Crescent is adjacent to the work site and is considered to be a sub-arterial road as per categories within the *NSW Road Noise Policy* (RNP).

6.3.3 Noise terminology

Terminology

The descriptors L_{Aeq}, L_{A10} and L_{A90} are used to quantify the acoustic environment.

The subscript "A" indicates that the noise levels are filtered to match normal human hearing characteristics (i.e. A-weighted).

- $L_{A1(1minute)}$ the "typical maximum noise level" for an event, used in the assessment of potential sleep disturbance during night-time periods. Alternatively, assessment may be conducted using the L_{Amax} or maximum noise level.
- $L_{Aeq(15minute)}$ the "energy average noise level" evaluated over a 15-minute period. This parameter is used to assess the potential construction noise impacts.
- L_{A90} the "background noise level" in the absence of construction activities, are the levels exceeded for 90% of the measurement period. This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively. Noise sources contributing to the background noise are constant in nature, such as mechanical plant or steady streams of traffic.
- The $L_{Aeq(15\ minute)}$ construction Noise Management Levels (NMLs) are based on the L_{A90} background noise levels. The L_{A90} is usually synonymous with the Rating Background Level (RBL).

6.3.4 Noise-sensitive receivers

Residential receivers potentially affected by the project works are scattered around the work area. Three noise catchment areas (NCA) were identified as representing the residential receivers potentially affected by the works. A description of the receivers within each NCA is described in Table 12: Noise catchment area description.

Table 12: Noise catchment area description

NCA	Description
1	Residential receivers – Three and four storey residential houses
2	Comprises of three setbacks of receivers. From closest to furthest from the works area, these layers are described as: (a) Mixed-used residential and retail receivers (b) Multi-storey residential apartments receivers (c) Single storey residential apartments receivers
3	Residential receivers - Single storey residential houses

Unattended noise monitoring was conducted to determine existing background noise levels at sensitive receivers in the vicinity of the works. Noise loggers were placed at the locations indicated in Figure 23: Receivers and logger locations. The noise loggers monitored noise levels continuously from 15 to 22 July 2014. During the measurement period for this assessment, periods of adverse weather occurred during three daytime periods, and the data was adjusted accordingly. The results of the unattended noise monitoring show low evening and lower night-time noise levels typical of a suburban environment.

6.3.5 Existing noise environment

Attended measurements were made by AECOM personnel on Tuesday, 22 July 2014 during daytime standard working hours. The noise measurements were taken within each NCA. The measurements were taken with the purpose of qualifying and quantifying the noise environment in the vicinity of the nearest and potentially worst affected receivers.

The ambient noise environment for NCA 1, north-west of Flemington Station and the works area, is considered to be urban. The attended measurements indicate that the acoustic environment is dominated by fast-moving traffic travelling along Centenary Drive and Marlborough Road, with a minor contribution from vehicle pass-bys along local roads.

NCA 2 comprises mixed-used residential and retail receivers, multi-storey residential apartment receivers, and single-storey residential apartments receivers. Some of these are located to the south of Proposal site. NCA 2 is characterised by road traffic moving along The Crescent and pedestrian activity from the nearby retail and commercial centre. Rail noise and public address announcements from Station can be heard at receivers close to the works area. The NCA 2 is considered to be suburban as it is characterised by local traffic flows with some limited commerce/ industry. The results of the unattended noise monitoring show low evening and lower night-time noise levels. These characteristics are typical of a suburban environment.

NCA 3 is also a suburban environment. The acoustic environment is relatively quiet compared to NCA 1 and 2. It is influenced by a small volume of through traffic and fauna noises.

6.3.6 Construction Noise Impact Assessment Framework

Residential receivers

The *Interim Construction Noise Guideline* (ICNG) provides the assessment framework to consider the impacts of construction noise on residences and other sensitive land uses. It does this by presenting assessment approaches that are tailored to the scale of construction projects.

The ICNG identifies recommended noise goals (referred to as noise management levels (NMLs) for works affecting nearby receivers.

For construction work during standard daytime hours, a $L_{Aeq(15minute)}$ Noise Management Level (NML) of the L_{A90} + 10 dBA applies for residential receivers. This represents a noise level where community reaction to construction noise would be expected.

Where the predicted levels exceed the NML, all feasible and reasonable work practices should be applied to minimise the potential noise impacts. Where $L_{Aeq(15minute)}$ construction noise levels are predicted to exceed 75 dBA, a receiver may be considered "highly noise affected" and additional measures, such as the implementation of respite periods, may need to be considered.

Residents are usually most annoyed by work at night-time as it has the potential to disturb sleep. Factors that may be important in assessing the extent of impact on sleep include how often high noise events occur at night, the predicted maximum noise levels at night, whether there are times when there is a clear change in the noise environment (such as early morning shoulder periods), and the degree of maximum noise levels above the background levels at night.

Commercial receivers

The ICNG explains that due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining management levels is separated into three categories:

- industrial premises: external $L_{Aeq(15minute)}$ 75 dBA
- offices, retail outlets: external $L_{Aeq(15minute)}$ 70 dBA
- other businesses that may be very sensitive to noise, where the noise level is project specific.

Figure 23: Receivers and logger locations

Other sensitive land uses

The ICNG's quantitative assessment method includes guidance on how to establish NML's for some 'other sensitive land uses' such as such as educational institutions, aged care facilities and hospitals, however management levels are not specified for all classifications of sensitive land use.

Where other sensitive land uses are identified within a construction noise catchment, the following guidance is given:

The proponent should undertake a special investigation to determine suitable noise levels on a project-by-project basis; the recommended 'maximum' internal noise levels in AS 2107 Acoustics – Recommended design sound levels and reverberation times for building interiors may assist in determining relevant noise levels (Standards Australia 2000).

The construction noise management levels for residential and other sensitive land uses are detailed in Table 13: Construction noise management levels – Residential receivers and Table 14.

Table 13: Construction noise management levels – Residential receivers

Noise Catchment Area	Period	RBL, L_{A90} dB(A)	Standard Hours Noise Management Levels, L_{Aeq} dB(A)	Out of Hours Noise Management Levels, L_{Aeq} dB(A)
1	Day	49	59	54
	Evening	47	N/A	52
	Night	42	N/A	47
2	Day	49	59	54
	Evening	47	N/A	52
	Night	47	N/A	52
3	Day	45	55	50
	Evening	44	N/A	49
	Night	43	N/A	48

Table 14: Construction noise management levels – Other receivers

Land Use	Noise Management Levels, $L_{Aeq, 15min}$ (applies when properties are in use)
Classrooms at schools and other educational institutions	55 dB(A)[1]
Places of worship	55 dB(A)[1]
Community centre	55 dB(A)[1]
Commercial premises (including offices, retail outlets)	70 dB(A)
Industrial premises	75 dB(A)

Note 1: These management levels are based upon a 45 dB(A) internal noise management level and a 10 dB reduction through an open window.

6.3.7 Operational Noise Impact Assessment Framework

The noise limits for operational noise emissions are derived from the NSW EPA's *Industrial Noise Policy* (INP).

The INP provides criteria for the assessment of noise impacts associated with industrial activities. It aims to balance the need for industrial activity with the desire for quiet within the community. The INP sets two separate noise criteria: one to account for intrusive noise and the other to protect the amenity of particular land uses. These criteria are to be met at the most-affected boundary of the receiver property.

To provide for protection against intrusive noise, the INP states that the L_{Aeq} noise level of the source, measured over a period of 15 minutes, should not be more than 5 dB above the ambient (background) L_{A90} noise level, measured during the daytime, evening and night-time periods at the nearest sensitive receivers.

To provide protection against impacts on amenity, the INP specifies suitable maximum noise levels for particular land uses and activities during the daytime, evening and night-time periods.

6.3.8 Potential impacts

Construction phases

Six distinct stages of construction have been assumed to occur for the footbridge and concourse upgrade works. These stages are defined as follows:

1. Relocation of services
2. Piling works
3. Preparation of structural works
4. Construction access bridge, deck support system, lift shafts and stairs
5. Construction of external cladding
6. Demolition of existing structure.

Construction noise impacts

Noise sources and their respective sound power levels for each stage of works are shown in Table 15: Indicative construction activities.

Table 15: Indicative construction activities

Activities	Construction periods	Equipment	Sound power level per unit, dB(A)
1) Relocation of services and preparation of structure	Daytime only	Excavator	99
		Truck	98
		Vibrating plate compactor	108
		Hand tools	94

Activities	Construction periods	Equipment	Sound power level per unit, dB(A)
2) Relocation of services and preparation of structure – Piling works	a) Daytime – weekend possessions	Piling rig	107
		Generator	101
		Truck	98
		Concrete pump	106
		Franna cranes	93
	b) Evening and night time – weekend possessions	Piling rig	107
		Lighting generator	77
		Generator	101
		Truck	98
		Franna cranes	93
3) Relocation of services and preparation of structure – Preparation of Structure works	a) Daytime – weekend possessions	Mobile crane	100
		Generator	101
		Hand tools	94
		Concrete pump	106
		Franna cranes	93
		Trucks	98
	b) Evening and night time – weekend possessions	Mobile crane	100
		Generator	101
		Lighting generator	77
		Hand tools	94
		Franna crane	93
		Truck	98

Activities	Construction periods	Equipment	Sound power level per unit, dB(A)
4) Construction of Access Bridge, Deck Support System, Lift Shafts and Stairs	a) Daytime – weekend possessions	Jackhammer	108
		Generator	101
		Piling rig	107
		Truck	98
		Concrete pump	106
		Concrete truck	106
		Mobile crane	100
		Hand tools	94
		Jackhammer	108
		Franna cranes	93
		Elevated Work Platforms (EWP)	87
	b) Evening and night time – weekend possessions	Generator	101
		Piling rig	107
		Truck	98
		Concrete truck	106
		Mobile crane	100
		Hand tools	94
		Jackhammer	108
		Franna cranes	93
		Lighting generators	77
		Elevated Work Platforms (EWP)	87
5) Construction of external cladding	Daytime only	Hand tools	94
		Elevated Work Platforms (EWP)	87

Activities	Construction periods	Equipment	Sound power level per unit, dB(A)
6) Demolition of existing structure and site clearing (Existing footbridge and concourse)	a) Daytime – weekend possessions	Bobcat	104
		Jackhammer	108
		Excavator with hammer	121
		Truck	98
		Concrete saw	115
		Excavator	99
		Crane	106
		Oxygen and acetylene cutting equipment	93
		Grinders	108
		Elevated Work Platforms (EWP)	87
		Generators	101
	b) Evening and night time – weekend possessions	Trucks	98
		Excavator	99
		Crane	106
		Oxygen and acetylene cutting equipment	93
		Grinders	108
		Lighting generators	77
		Elevated Work Platforms (EWP)	87
		Generators	101

Modelling

In order to assess noise impact from the site during construction, a noise model was created to represent 'reasonable' worst periods of upgrade works. The upgrade works have been modelled in SoundPLAN Version 7.3.

Noise emissions from the construction sites have been modelled. However, it can be expected that there may be differences between predicted and measured noise levels due to variations in instantaneous operating conditions, plant in operation during the measurement and also the location of the plant equipment. The acoustic shielding calculated in the model due to fixed building structures will also vary as the construction equipment moves around the site.

Construction noise assessment

The result of construction noise assessment shows that exceedances are expected for residential receivers during the works, as shown in Table 16: Predicted construction noise results for nearest receivers - daytime and Table 17.

Table 16: Predicted construction noise results for nearest receivers - daytime

Work package	Number of residential building receivers				Number of other sensitive receivers exceeding the NMLs
	Exceeding 75 dB(A)	Exceeding the background noise level (RBL) by dB			
	> 75 dB(A)	10 - 20 dB(A)	20 - 30 dB(A)	> 30 dB(A)	
1	2	9	3	0	11
2	1	11	2	0	13
3	1	7	2	0	12
4	2	26	6	1	17
5	0	1	0	0	1
6	8	98	25	6	30

Table 17: Predicted construction noise results for nearest receivers – evening/night

Work package	Number of residential building receivers				Number of other sensitive receivers exceeding the NMLs
	Exceeding 75 dB(A)	Exceeding the background noise level (RBL) by dB			
	> 75 dB(A)	10 - 20 dB(A)	20 - 30 dB(A)	> 30 dB(A)	
2	1	11	2	0	11
3	0	9	2	0	9
4	1	26	6	1	16
6	3	55	5	3	18

Sleep disturbance assessment

As works will be undertaken during the night-time period during rail possessions, sleep disturbance is required to be assessed.

The predicted $L_{A1(1min)}$ noise level contours indicate that in some instances the 'awakening reaction' criterion may be exceeded at some locations during the construction, demolition and services relocation stages. The typical outdoor to indoor noise reductions provided by most standard dwellings (i.e. without acoustical treatment) is generally accepted as being 10 dB with windows open and a minimum of 20 dB with windows closed. Therefore, by closing their windows during noisy activities, residents can potentially attenuate external noise levels by 20 dB.

In addition, the predicted construction noise levels are typically the worst case noise levels, therefore the majority of the actual LA1 noise levels are likely to be less than those predicted.

6.3.9 Vibration-sensitive receivers

Construction vibration assessment criteria

Vibration, at levels high enough, has the potential to cause damage to structures and disrupt human comfort. Vibration and its associated effects are usually classified as continuous, impulsive or intermittent as follows:

- Continuous vibration continues uninterrupted for a defined period, and includes sources such as machinery and continuous construction activities, for example, a tunnel boring machine.
- Impulsive vibration is a rapid build up to a peak followed by a damped decay. It may consist of several cycles at around the same amplitude, with durations of typically less than two seconds and no more than three occurrences in an assessment period. This may include occasional dropping of heavy equipment or loading activities.
- Intermittent vibration occurs where there are interrupted periods of continuous vibration, repeated periods of impulsive vibration or continuous vibration that varies significantly in magnitude. This may include intermittent construction activity, impact pile driving, or jack hammers.

The effects of vibration in buildings can be divided into three main categories – those in which the occupants or users of the building are inconvenienced or possibly disturbed, those where the building contents may be affected and those in which the integrity of the building or the structure itself may be prejudiced.

Guidance on appropriate plant and equipment and associated recommendations for safe working distances is provided in a number of publications, as detailed below.

The recommended safe working distances for building structural damage and human comfort are identified in the EPA's *Assessing Vibration: a technical guideline* (DEC, 2006).

Structural damage

At present, no Australian Standards exist for the assessment of building damage caused by vibration.

DIN 4150 provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration, and are presented in Table 18: DIN 4150: Structural damage safe limits for building vibration below.

Table 18: DIN 4150: Structural damage safe limits for building vibration

Group	Type of structure	Vibration velocity in mm/s			
		At foundation at a frequency of			Vibration at the horizontal plane of the highest floor
		Less than 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
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 (eg buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Human comfort

The assessment of intermittent vibration outlined in the NSW EPA guideline *Assessing Vibration: A Technical Guideline* is based on Vibration Dose Values (VDVs). The VDV accumulates the vibration energy received over the daytime and night-time periods.

Construction vibration impacts

Vibration intensive works are proposed to occur as part of the Flemington Station footbridge and concourse upgrade works. The works may include the use of these items of equipment:

- Excavator with hammer
- Jackhammer
- Vibrating plate compactor.

The safe working distances of these items of equipment are shown in Table 19: Safe working distances of vibration intensive equipment. The vibrating compactor plates generate similar or less vibration than small vibratory rollers, therefore the safe working distances of small vibration rollers have been used in lieu of quantitative safe working distances.

Table 19: Safe working distances of vibration intensive equipment

Plant	Rating/ Description	Safe Working Distance			
		Cosmetic Damage			Human Response
		Heritage	Residential	Industrial	
Small hydraulic hammer	(300 kg - 5 to 12 T excavator)	4 m	2 m	< 1 m	7 m
Medium hydraulic hammer	(900 kg – 12 to 18 T excavator)	12 m	7 m	2 m	23 m
Large hydraulic hammer	(1600 kg – 18 to 34 T excavator)	34 m	22 m	7 m	73 m
Vibratory Roller	< 50 kN (Typically 1-2 T)	8 m	5 m	2 m	15-20 m
Jackhammer	Handheld	1 m nominal	1 m nominal	< 1 m	Avoid contact with structure

Table 20: Preferred and maximum vibration dose values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime (7 am – 10 pm)		Night-time (10 pm – 7 am)	
	Preferred	Max	Preferred	Max
Critical areas	0.1	0.2	0.1	0.2
Residences	0.2	0.4	0.13	0.26
Offices, schools, educational institutions and places of worship	0.4	0.8	0.4	0.8
Workshops	0.8	1.6	0.8	1.6

Noise and vibration impact summary

(a) Construction phase

Noise

The predicted construction noise levels exceed the applicable construction noise management levels for all scenarios at residential and commercial receivers.

Exceedances of the NMLs are also predicted for both residential receivers and other sensitive receivers, such as commercial, retail, school and church receivers, during the works.

The greatest impacts are associated with the demolition stages. During this stage of works, exceedances at the most affected receiver (96 The Crescent - mixed use) for the daytime, evening and night time periods are 41, 35 and 35 dB(A) respectively. Demolition plant during daytime works includes higher sound power levels from concrete saws and excavators with hammers which contributes to the higher predicted noise levels.

The majority of the other sensitive receivers are commercial enterprises and will therefore not will be operating during the evening time periods. Accordingly, the predicted number of receivers is a worst case.

These impacts are common for construction projects in urban areas, particularly where sensitive receivers are in close proximity to construction activities. In accordance with the requirements of the ICNG and the TfNSW *Construction Noise Strategy,* suitable mitigation measures, as detailed in Section will be implemented to minimise these impacts. Impacts may not be reduced to negligible levels for all receptors during all construction activities. However the recommendations are designed to ensure that any residual impacts are minimised as far as is practically achievable.

Traffic

The road traffic noise associated with construction activities was assessed in accordance with EPA's *NSW Road Noise Policy* (EPA, 2011). The road traffic noise assessment associated with construction indicates compliance with the NSW RNP acoustic criteria, as the noise increase on construction routes is predicted to be negligible.

Vibration

Safe working distances to nearby structures have been recommended. If the safe working distances are maintained then no adverse impact from the vibration intensive works is likely in terms of human response or cosmetic damage.

- The size of the breaker to be used has not been confirmed and is subject to detailed design. If a breaker with a weight of less than 12T is used, then the activities are unlikely to give rise to vibration levels which may cause human discomfort or any cosmetic or structural damage to nearby buildings if used within the rail corridor or at the perimeter of the works area.

The use of less vibration intensive methods of construction or equipment is preferred where possible, to reduce annoyance and potential for cosmetic damage. All equipment would be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts.

(b) Operational phase

It is understood that operations of Flemington Station would remain unchanged due to the proposed upgrade. Therefore, operational noise impact from Flemington Station is unlikely to increase following the completion of the station accessibility upgrade.

Any mechanical plant (such as ventilation) installed due to the proposed station accessibility upgrade would be designed to achieve the project specific operational noise criteria, free from annoying sound characteristics such as tonality, low frequency, impulsiveness and intermittency.

6.3.10 Mitigation measures

During design

- Reference should be made to ASA Engineering Standard ESB 002 *Station Design and Standard Requirements* which set out guidelines for the incorporation of acoustically absorptive finishes which can control reverberance and improve speech intelligibility from the Station Public Address system.

Construction

- A Construction Noise and Vibration Management Plan (CNVMP) would be devised and implemented in accordance with the requirements of the *Construction Noise Strategy* (TfNSW, 2012), the EPA's *Interim Construction Noise Guideline,* and the *Noise and Vibration Impact Assessment* for the Flemington Station Upgrade (AECOM, 2014).

The CNVMP would include all reasonable and feasible mitigation options to manage the noise emissions from the site and also any complaints which may occur due to the construction activity noise. The CNVMP would consider measures to reduce the source of noise levels from construction and vibration by construction planning and equipment selection where reasonably practicable.

- To reduce the construction noise impact from human activities, reasonable and feasible noise mitigation options should be considered, including:
- Regularly training workers and contractors (such as at toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise
  - Using only the equipment necessary for the upgrade works at any one time
  - Avoiding any unnecessary noise when carrying out manual operations and when operating plant
  - Avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where possible.
  - Switching off any equipment not in use for extended periods e.g. heavy vehicles engines should 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 on site. No dropping of materials from height where practicable, throwing of metal items and slamming of doors.
- To reduce the construction noise and vibration impacts from mechanical activities, reasonable and feasible noise mitigation options should be considered, including:
  - Selection of appropriate plant to minimise noise emissions
  - Maximising the offset distance between noisy plant and adjacent sensitive receivers.
  - Directing noise-emitting plant away from sensitive receivers, where practicable.
  - Using non-tonal reversing alarms, ('quackers') for all plant regularly used on site (greater than one day
  - Regularly inspecting and maintaining plant, and operating plant in accordance with manufacturer's specifications, to reduce the potential for adverse noise and/ or vibration impacts (including from rattling hatches, loose fittings etc.)
  - Using quieter and less vibration emitting construction methods where feasible and reasonable.

- Impacts from construction traffic would be reduced by:
  - Advising truck drivers of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices (i.e. minimising the use of engine brakes, and no extended periods of engine idling).
  - Locating site access and egress points away from residences and other sensitive land uses, where feasible and reasonable.
  - Arranging construction sites to limit the need for reversing associated with regular /repeatable movements (e.g. trucks transporting spoil) to minimise the use of reversing alarms.

In addition:

- Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding should take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.
- Planning of the higher Noise Management Level exceedance activities/locations would be undertaken predominantly during less noise-sensitive periods, where practicable.
- Prior to commencement of the demolition work, dilapidation surveys would be required for adjacent heritage items.
- The dilapidation survey would document the current structural condition of these buildings/structures. The dilapidation surveys would be repeated after the project is complete. The post completion dilapidation surveys would identify any impact on the receiver buildings as a result of the construction work. Critical buildings to be surveyed would include Flemington station buildings on Platforms 1-4.
- If vibration intensive equipment is to be used within the safe working distances for cosmetic damage, then attended vibration measurements would be undertaken when work commences, to determine site specific safe working distances.
- Vibration intensive work would not proceed within the safe working distances unless a vibration monitoring system is installed approximately a metre from the building footprint, to warn operators (via flashing light, audible alarm, SMS etc.) when vibration levels are approaching the peak particle velocity objective.

6.4 Indigenous heritage

An Aboriginal Heritage Inventory Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around Flemington Railway Station) with a 200 metre radius, on 2 July 2014. The closest Aboriginal site was over two kilometres away and would not be impacted by the Proposal.

The Proposal is located in an area that has been highly modified for a range of uses. The site has low archaeological potential and therefore it is considered unlikely that any Indigenous heritage items would be located in the vicinity of the proposal, due to the past history of disturbance.

6.4.1 Potential impacts

(a) Construction phase

As no known Indigenous heritage items are located in the vicinity of the proposal works and the potential for unknown items is low, the Proposal is unlikely to affect Indigenous heritage during construction.

(b) Operational phase

As no known Indigenous heritage items are located in the vicinity of the proposal works and the potential for unknown items is low, the Proposal is unlikely to affect Indigenous heritage during operation.

6.4.2 Mitigation measures

No potential impact to Indigenous heritage is anticipated as a result of the Proposal. Nevertheless, if Aboriginal objects are located during works, all works must stop in the vicinity of the find, and TfNSW must be notified immediately. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained before works recommence in the area.

6.5 Non-indigenous heritage

The existing platforms and existing building are listed on the RailCorp s170 Register as an item of local significance for its historical and aesthetic values.

Australian Museum Consulting (AMC) was engaged to undertake a comparative analysis of extant (existing) Overhead Booking Offices built between 1900 and 1939. The objective of the report was to understand the number of Overhead Booking Offices extant within the network, their integrity, significance and condition. Based on this understanding, AMC identified constraints and opportunities for their ongoing management, followed by conservation management strategies.

The study identified that the Flemington Overhead Booking Office was integral to the station precinct and held historical aesthetic, social and representative significance at a local level. Although the overall integrity of the station group is fair (AMC, 2014b) and while the setting, form and function were substantially intact, there have been significant interventions in the fabric that are unsympathetic to the original style and character.

6.5.1 Existing environment

The current Station precinct encompasses a number of elements that are listed as contributory items to the overall local heritage significance of the Flemington Railway Station Group (SHI No. 4801933).

The primary elements of the precinct, comprising the Station Platforms, Platform Buildings, Overhead Booking Office, and Station Concourse/Footbridge and Staircases, all built around 1924. The Station Signal Box, which is also listed as an element of heritage significance, was added to the Group shortly afterwards in 1929. The most recent Station element included in the listing description for the Flemington Railway Station Group are the canopies on Platforms 1/2 and 3/4, which were introduced to the precinct in around 1994. Of these listed elements, only the Signal Box is unaffected by the proposed upgrade works.

There are no other heritage items in the vicinity of the Proposal.

Statement of Significance

Flemington Station is of historical, aesthetic, representative, and potentially social significance on a local level, primarily as a station which was part of the 1920s quadruplication of the Main Western line between Flemington and Lidcombe, replacing the previous 1880s Flemington Station site further east.

The Group is of local heritage and aesthetic significance as it provides a cohesive, relatively intact example of an early twentieth century railway station, with the primary station structures and infrastructure all dating to the 1920s and displaying the typical

architectural style, features and detailing of the 1920s railway architecture. The Group is also significant as it provides a good representative example of the design and construction methods employed at metropolitan railway stations across Sydney in the early twentieth century.

The high integrity of the group and the lack of major modifications or alterations to the Group since the 1920s allow the original elements of the Group to visually interact with and complement one another, providing an excellent representative example of a 1920s railway station precinct. Modern features and infrastructure introduced to the item are largely sympathetic to, and complementary of, the overall heritage character of the broader group and are not visually intrusive, nor do they obstruct or detract from the visual aesthetic of the heritage items. The significance of the station also extends to its historical association with the 1880s Flemington stockyards and the Sydney Markets since 1975.

Figure 24: Flemington Station s170 heritage curtilage

6.5.2 Potential impacts

For the consideration of heritage impacts, the proposed upgrade works can be broadly classified under three categories, as detailed below.

Key new additions

The Proposal includes the following works:

- Construction of a new covered concourse providing access from The Crescent to both of the island platforms
- Construction of a new footbridge, to link to the existing footbridge inside the Sydney Markets property boundary

- Installation of new platform canopies extending from the covered Footbridge to the existing platform buildings, providing weather protection along the concourse/ footbridge, stairs and along the platforms, and
- Installation of new lifts and stairs providing accessibility to The Crescent entrance/ exit and to both of the station island platforms.

The introduction of new additions to the Flemington Railway Station Group, including a new concourse and footbridge and canopies will change the layout, aesthetic and heritage character of Flemington Railway Station. The installation of these items will result in the demolition of the original Station Footbridge, Concourse Area and Overhead Booking Office, which are highly visible components of the Group and are primary contributors to the overall significance and visual cohesion of the Group. These new additions will introduce a new visual element to the station precinct, and will alter its overall aesthetic and character.

However, the new structures, will adopt design principles which will differentiate these elements as modern additions to the station precinct, whilst being sympathetic to the heritage values of the remaining group elements.

Modifications to existing heritage elements

Proposed works comprise:

- Platform resurfacing/re-levelling and provision of tactiles
- Modification and refurbishment of the platform buildings on Platforms 1/2 and 3/4 to house new station facilities, including accessible toilets (Platform Buildings 1/2 and 3/4), a new communications room (Platform Building 1/2 only), and a station office (Platform Building 3/4 only)
- Modifications to The Crescent interchange to accommodate the new station entry/ exit point and create a transport interchange hub. This includes: modifications to kerbs and road realignment adjacent to the station, relocation of the existing pedestrian crossing and bus stop closer to the new station entry, provision of a new bus shelter and bike racks in the location of the current station entry, and new accessible drop-off zones created for taxi and kiss and ride customers.

The Platform Buildings on both island platforms are currently utilised only for storage purposes. They are not utilised for their original purpose of waiting areas and toilet facilities for station patrons. As such, the current use of these items does not contribute to their significance.

The external changes to the Platform 1/2 building are minimal (see Figure 25: Platform 1/2 Building). However, it is recommended that the free-standing screening wall at the western end of the building (as indicated in Figure 25: Platform 1/2 Building) is retained to preserve the heritage fabric, and this will be amended at detailed design.

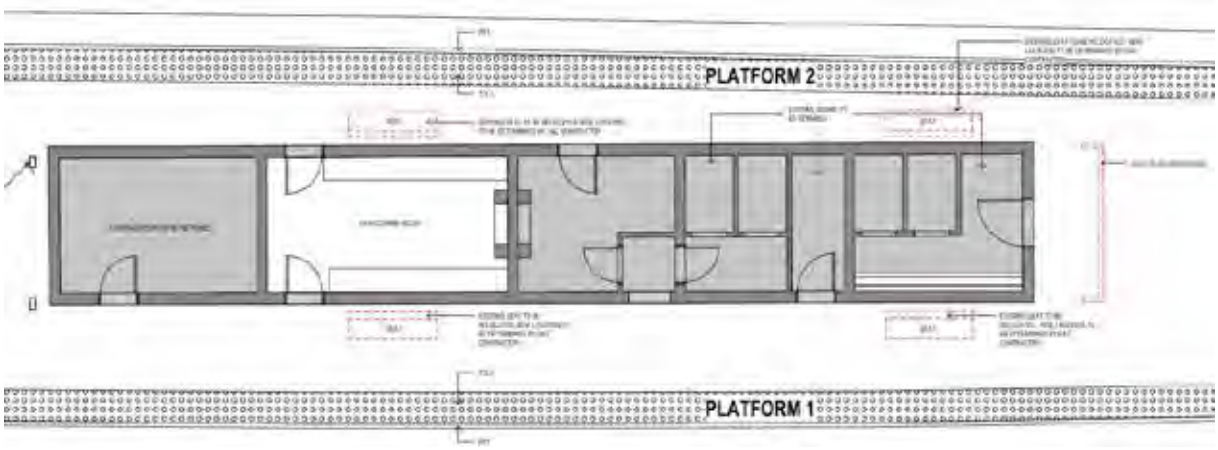


Figure 25: Platform 1/2 Building

Note: Red broken lines indicate items to be removed/relocated. This diagram also indicates the proposed demolition of the free-standing screening wall at the western end of the building.

The alterations to the Platform 3/4 building include the demolition of the free-standing screening wall at the western end of the building to allow for DDA-compliant access to the door at that end of the building (see Figure 26: Platform 3/4 Building). Internally, three walls are proposed for removal.

The former men's toilets are proposed to become a Family Accessible Toilet (FAT), which will involve the removal of a partial height dividing wall, as shown in Figure 26: Platform 3/4 Building.

A similar partial height dividing wall is proposed for removal from the former women's toilets. In order to allow for DDA-compliant access; the former wall screening the ladies room is also proposed for removal. The former access door will be permanently closed and the room utilised as a staff office.

In order to provide DDA-compliant access to the station office, a new doorway is proposed to be created in the eastern façade of the Platform 3/4 building. The opening will be located within the chimney breast, with the chimney to be retained and supported by a lintel over the door. The chimney sides would be maintained within the building.

The proposed change of use for these two platform buildings would see these structures refurbished and restored to their original historical function, providing services for railway customers. It is considered that the proposed works would have a positive impact on, and be beneficial to, the heritage significance of these items.

Demolition and partial demolition of existing elements

The existing c.1994 free-standing canopies on both platforms would be removed during construction (and replaced with more extensive canopies). The freestanding wall associated with the western end of Platform Building 3/4 would also be removed to provide DDA-compliant access to the proposed new family accessible toilet.

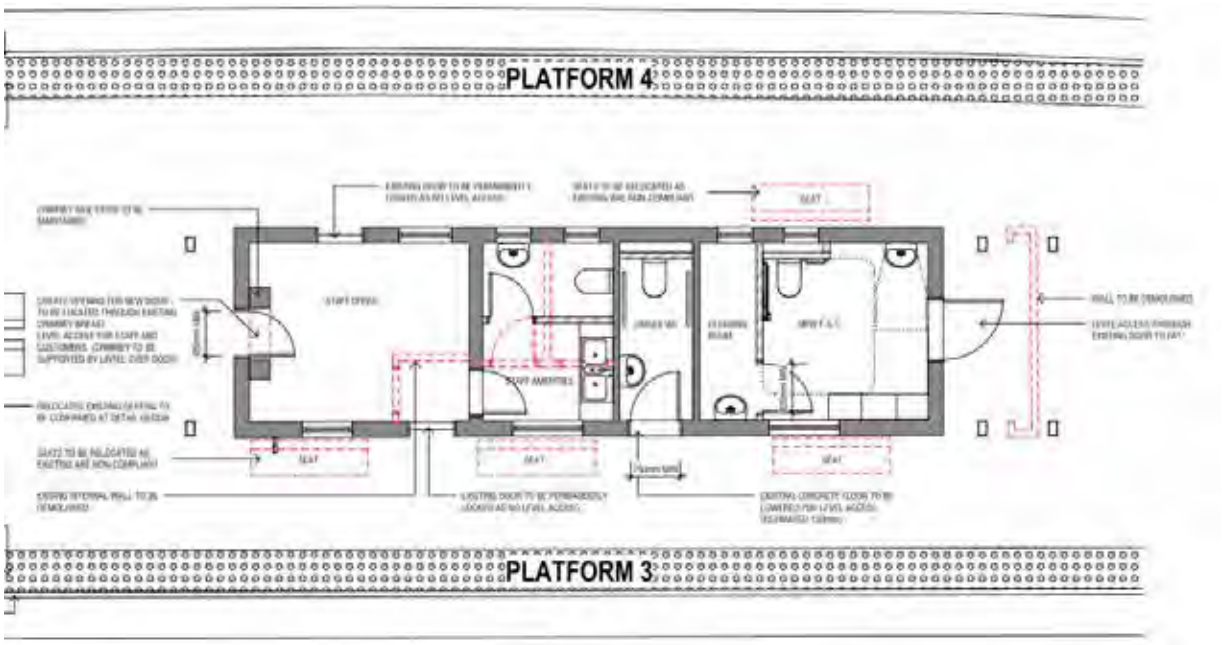


Figure 26: Platform 3/4 Building

Note: This diagram also indicates the walls proposed for demolition, including the existing screen wall at the western end of the building.

Following construction of a new covered concourse and pedestrian footbridge, it is proposed to:

- Demolish the existing weatherboard Overhead Booking Office
- Demolish the section of the Station Footbridge from The Crescent to the junction with the Sydney Markets footbridge/property boundary.

The concept design also proposes to demolish the freestanding wall associated with the western end of Platform Building 1/2. This is not recommended from a heritage perspective, and would be amended at detailed design.

The design process for the selected option, as detailed in Sections and 2.2.2, took into consideration the existing heritage elements and significance of the Flemington Railway Station Group, and was designed to be as sympathetic to its heritage values and character as possible within the constraints imposed by the required policies, codes and standards.

The proposed demolition of the existing overhead concourse and footbridge triggers a s170 notification from RailCorp to the Heritage Division of the Office of Environment & Heritage.

The impact of removal of the existing station footbridge, concourse and overhead booking office will be mitigated by adopting a design for the new infrastructure which is sympathetic to the heritage values of the remaining Group elements, and through the implementation of measures such as undertaking a full archival recording prior to demolition and introducing interpretive signage to the station precinct upon completion of the works.

The removal of the modern canopies on the island platforms will have no impact on the overall heritage significance of Flemington Railway Station Group.

The removal of the screening walls from the western ends of the Platform building will have negligible impact on the significance of the buildings as a whole.

Archaeological potential

Historical research has ascertained that the Original Flemington Railway Station was located to the east of the present Station. The proposed works do not extend this far to the east. There are no known archaeological deposits associated with the Original Flemington Station, or with any other historic items, that would be impacted by the proposed works.

6.5.3 Mitigation measures

- A suitably qualified and experienced heritage architect will be engaged to provide input to, and review of, the detailed design of the Proposal.
- The heritage curtilage of the station would be identified on the Environmental Constraints Maps (ECMs) developed for construction to ensure unintended impacts do not occur.
- The Contractor would provide a heritage induction to workers before construction begins, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
- Archival recording would be undertaken of the Station Footbridge, Concourse and Overhead Booking Office in accordance with relevant NSW heritage guidelines. The archival recording should contain the following:
  - an Archival Record in accordance with: *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office 1998) and *Photographic Recording of Heritage Items Using Film or Digital Capture* (NSW Heritage Office 2006). In addition, internal and external scanning of the station building is to be undertaken with a 3D laser device, in a suitable electronic data format (i.e. CAD software or equivalent)
  - a photographic record of the items, including the interior of the Overhead Booking Office
  - scale plans and elevations of all items
  - a written report documenting the elements
  - references for all known reports regarding these items
  - references for any available historical images and/or plans held in relevant repositories, such as the State Library of NSW, and the Sydney Trains Plans Office.
- The final design would be sympathetic to the original design of the heritage building, through its form, scale and materiality. The materials and colour palette for the overhead footbridge would be sympathetic to the heritage context of the railway station, and be visually recessive. The use of unobtrusive, modern, light materials, such as glass panelling and slim frame elements would reduce the bulk of the Proposal, reducing the visual impact of the additional items.
- Detailed design would specifically address drainage at the base of the original platform buildings with sub-floor ventilation to be installed/retained/maintained to minimise the possibility of future building damage, including from termite attack.
- The heritage brick wall opposite the platforms on the boundary with The Crescent does not currently comply with the standard for a rail boundary fence/barrier. An initial structural assessment indicates that the wall is not structurally sound and should be replaced. Detailed design must specifically address this issue, with the wall to be retained if reasonably practicable.

- For any alterations to the platform building, as much as practicable of the original fabric of the building, and internal features would be retained in situ. Any new partitions are to be timber-framed to allow future removal with minimal impacts to the original fabric. Any ceiling services are to be suspended/limited to avoid penetrations into the ceiling, and service penetrations into external walls are to be minimised.
- The finishes to the heritage building would be treated in a similar colour and finish to the existing, and any new fixtures (electrical or plumbing conduits) are to be sympathetically attached to the walls with minimal impact to original fabric (i.e. colour and fixings)
- New awnings would be readily identifiable and are not to be attached to the original fabric of the station buildings. At a minimum, a short gap should be retained between old and new fabric. A transparent section of roofing could also be used to open up views to the building from the stair canopies.
- To effectively mitigate potential impacts of vibration on the Flemington Station heritage platform buildings, activities that cause vibration would be managed in accordance with German Standard DIN 4150 – Part 3 (DIN 1999) heritage specifications.
- If previously unidentified Indigenous or non-indigenous heritage/archaeological items are uncovered during the works, all works must cease in the vicinity of the material/find and professional advice is to be immediately sought. Works in the vicinity of the find must not re-commence until clearance has been received from OEH and/or TfNSW.
- When undertaking platform works adjacent to the platform station buildings, the fabric of the station building would be protected from damage through implementation of a suitable protective medium. Adequate measures would be taken to protect existing steps, posts, door jambs and weatherboard panels from direct contact with any new surface materials.
- Heritage interpretation panels would be developed and installed within the station precinct which includes specific content for those elements being demolished as part of the Proposal.
- The Contractor would investigate reuse of elements of the 1924 structures in conjunction with the new design, as part of the heritage interpretation. These could potentially include the original trestles, hand rails and newels.

6.6 Socio-economic impacts

6.6.1 Existing environment

The Flemington Station catchment generally comprises the suburb of Homebush West and the western half of the suburb of Homebush. Major features of the area which provide drivers for public transport demand include local schools (including Homebush Boys High School) and Sydney Markets.

Flemington Station and its interchange facilities have the potential to provide increased access to jobs in the Sydney CBD as well as within the sub region, including Parramatta (Regional City) and Burwood (Major Centre).

In 2011, the estimated population for Homebush West was 5,720 and 6,479 for Homebush. The population densities were 36.51 and 30.44 persons per hectare respectively.

From 2006 to 2011, Homebush West's population increased by 1,545 people (37.0%). This represents an average annual population change of 6.5% per year over the period. The corresponding figures for Homebush were 888 people (15.9%).

In the suburbs of Homebush West and Homebush, 19.2% of the population was aged between 0 and 17, and 9.1% were aged 60 years and over, which is lower than for Greater Sydney (22.9% and 18.0% respectively). However, in terms of travel demand, there is a larger than average proportion of 'Young workforce' who would appear to contribute to the higher than average proportion of persons travelling by train to work, as indicated below.

The major differences between the age structure of Homebush West/ Homebush and Greater Sydney were:

- A larger percentage of 'Young workforce' (30.5% / 25.9% compared to 15.4%)
- A smaller percentage of 'Empty nesters and retirees' (4.0% / 4.8% compared to 9.0%)
- A smaller percentage of 'Seniors' (3.7% / 4.3% compared to 7.2%)
- A smaller percentage of 'Older workers & preretirees' (9.0% compared to 12.2%)

Given the close proximity of the two suburbs to the rail network, the proportion of residents who travelled by train greatly exceeds the Greater Sydney average, whereas the proportion of residents travelling by car or bus is lower than the Greater Sydney average.

Analysis of the families with children in Homebush West in 2011 compared to Greater Sydney shows that there was a larger proportion of couples with young children, and a smaller proportion of couples with older children (corresponding figures for Homebush are similar to that for Greater Sydney).

Overall, analysis of the proficiency in English data of the population in 2011 compared to Greater Sydney shows that there was a lower proportion of people who spoke English only, and a higher proportion of people who spoke another language and English not well or not at all.

Sources: www.censusdata.abs.gov.au
http://profile.id.com.au/strathfield

6.6.2 Potential impacts

(a) Construction phase

The proposed works could have potential impacts to local businesses, pedestrians and drivers during the construction phase of the interchange upgrade. This would potentially include:

- Changes to access arrangements including pedestrian diversions
- Relocation of buses and taxis and demolition of shelters during construction
- Pedestrian/vehicle conflicts
- Temporary changes to traffic and parking conditions
- Temporary loss of parking spaces
- Construction noise and visual impacts
- Short delays to commuters accessing the platforms
- The existing retail area immediately outside the station in The Crescent may experience disruptions, due to temporary changes to pedestrian or delivery activities

- There are a number flag/banner poles in The Crescent used to signify public/private events, that would need to be removed and stored for the duration of construction. The future location of these poles will be subject to further consultation with Strathfield Council.
- TfNSW would negotiate with Council to acquire a small area of The Crescent for the new lift and stairs which encroach on the road reserve.

(b) Operational phase

As well as catering for public transport access for the elderly, those with disabilities, or those with shopping, prams, luggage etc., the proposed upgrade to the station and interchange provides improved accessibility for the large numbers of people visiting Sydney Markets.

The long term operational impacts of the Proposal would primarily be positive for the Homebush West Town Centre and surrounding area. The Proposal would provide improved amenity with links between different modes of transport, making access more convenient and efficient.

In particular, the impacts for those accessing Sydney Markets would be positive, given the improved accessibility for large numbers of people returning to the southern side of the rail corridor with purchased goods.

The Proposal is designed to minimise the opportunities for graffiti, by use of anti-graffiti coatings to surfaces that can be readily accessed.

Customers with hearing impairment would benefit through the installation of Audio Frequency Induction Loop (AFIL) facilities covering 80 percent of the station area.

The Proposal has been designed having regard to the four key principles established in the Crime Prevention Through Environmental Design (CPTED) criteria as follows:

- Natural surveillance – clear sight lines would be provided within through the station entry forecourts. The wider through areas, improved lighting and additional number of commuters using the facility would improve surveillance.
- Access control –pedestrian access points would be located in more highly visible locations
- Territorial reinforcement – the proposed works to the concourse and the forecourts are extensions to the existing rail infrastructure facilities and are appropriate for the interchange precinct and town centre
- Space/activity management – the proposed station upgrade has been designed to avoid creating spaces that would compromise the safety of users and adjoining residents.

The Proposal would facilitate extension of transport networks to connect the local population to the existing and proposed expanded employment opportunities at the major centres of Parramatta and Burwood. This would support a reduction in cross-regional trips, resulting in a relative decrease in demand for private vehicle use.

There are unlikely to be any long term negative socio-economic impacts as a result of the proposed works. Impacts are likely to be positive in terms of amenity, including public safety, security, views, and a sense of wellbeing.

6.6.3 Mitigation measures

Refer to Sections 6.1, 6.2 and 6.3 for discussion on the potential traffic, transport, visual and noise impacts arising from construction of the Proposal. In addition, the following mitigation measures are proposed to manage socio-economic impacts:

- A Community Liaison Plan would be developed by the Contractor and would identify all potential stakeholders and the methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and other stakeholders.
- The proposed sustainability criteria for the project would be designed to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
- Feedback through the submissions process would be encouraged and facilitate opportunities for the community and stakeholders to have input into the project, where possible.
- The community would be kept informed of construction progress, activities and potential impacts in accordance with a community liaison plan to be developed prior to construction.
- Contact details for a 24-hour construction response line, project infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.

6.7 Biodiversity

6.7.1 Existing environment

A *Flora and Fauna Impact Assessment* report was undertaken by Gould & Hunt (September 2014).

Flora

Whilst the site is largely set within an altered landscape providing few potential resources for threatened species, populations or endangered ecological communities, Downy Wattle (*Acacia pubescens)* is a plant species known from the area and which has been recorded in the locality within the rail corridor. It is listed as Vulnerable under both the TSC Act and EPBC Act.

Despite the potential for EECs and the Downy Wattle, on site vegetation surveys undertaken as part of the Flora and Fauna Impact Assessment (Gould & Hunt, 2014) did not identify the presence of any threatened species or EECs.

The vegetation on the south side of the rail corridor is located within a 3 – 4 m strip of land between the weld mesh fence and rail embankment, and is a mixture of shrub species that were planted by the former RailCorp during rehabilitation of this area, and weed species that have become established.

The adjacent street plantings across the study area are a mixture of native species and non-indigenous species. The dominant tree species is Brush Box (*Lophostemon confertus*) with occasional occurrences of Swamp Oak (*Casuarina glauca*). Other tree species include, Peppercorn Tree (*Schinus areira*), Arizona Smooth Bark Cypress (*Cupressus glabra*), Cabbage Palms (*Livistona australis*) and Frangipani (*Plumeria acutifolia*).

Vegetation within the rail corridor is dominated by weed species, including Panic Veldtgrass (*Ehrharta erecta*), Cobblers Pegs, Couch Grass (*Cynodon dactylon*), and Woolly Clover (*Trifolium tomentosum*).

All of the plants across the site have been planted and the majority of these species are not representative of species associated with the likely original vegetation communities, and many of them have been introduced from areas outside of Australia. However, none of the plant species recorded across the site of the station upgrade is listed as Noxious in the Strathfield LGA under the *Noxious Weeds Act 1993*.

Most of these trees are mature specimens around 8 metres in height, the majority of which are considered to be in Good or Good-Fair condition, with 36 of the 37 trees having a Safe Useful Life Expectancy (SULE) rating of 3, indicating that at the time of assessment these trees would viable for 5 to 15 years with an acceptable level of risk. Groundcover is largely absent as the area is either paved or bare ground, although in recently landscaped areas a variety of groundcover species have been planted, including Spiny-headed Mat-rush (*Lomandra longifolia*) and Canna sp.

Analysis of existing threatened species databases identified that four endangered vegetation communities (EECs) are predicted to occur within the locality as follows:

- Cumberland Plain Woodlands
- Shale / Sandstone Transition Forest
- Turpentine – Ironbark Forest in the Sydney Basin Bioregion
- Western Sydney Dry Rainforest and Moist Woodland on Shale.

Fauna

The planted street trees could provide potential roosting and foraging habitat for some avifauna. The trees however, do not contain obvious tree-hollows and therefore their value for hollow-dependent fauna (e.g. arboreal mammals, birds) habitat would be limited. Microchiropteran bats may be attracted to this area to forage on insects drawn by the street and station lights. The Grey-headed Flying-fox (*Pteropus poliocephalus*) may also forage across the site on occasion, as this species is regularly recorded in the area.

However, due to the general lack of roosting and breeding habitat for these species, it is likely that threatened species would roost within nearby areas supporting more extensive native vegetation stands (e.g. Cox's Creek Bushland Reserve, Mason Park Wetlands and the Cooks River foreshores network).

There are no significant trees as per Council's Significant Tree Register Index, in the vicinity of the site.

6.7.2 Potential impacts

(a) Construction phase

Flora impacts

A total of ten planted street trees would be removed to allow for the station upgrade. These include 8 x Brush Box (*Lophostemon confertus*), 1 x Arizona Smooth Bark (*Cupressus glabra)*, and 1 x Peppercorn Tree (*Schinus areira)*. (Tree numbers 12 to 16 and 19 to 23 – refer to Figure 27.)

All of these trees are considered to be mature specimens in Good to Fair-Good condition with diameter at breast height (DBH) ranging from 15-60cm.

In addition, 11 trees in The Crescent (near the eastern end of Flemington Station) may require removal for a construction zone for the duration of the works. These comprise seven Brush Box (*Lophostemon confertus*), three Swamp Oak (*Casuarina glauca*) and one Cabbage Palm (*Livistona australis*). Removal of these trees will be subject to the proposed construction contractor's site compound arrangement, to be submitted to TfNSW for approval prior to the establishment of the compound.

This loss would be offset at a ratio of 1:4 with the replanting of native species endemic to the area in accordance with the *Vegetation Offset Guide* (TfNSW 2012).

Indirect impacts are likely to be greatest in close proximity to the subject site, however the Proposal has the potential to have indirect impacts at greater distance, particularly where stockpiling or equipment storage is required.

Potential indirect impacts to vegetation include the following:

- Damage to vegetation resulting from machinery and soil compaction
- Introduction of noxious weed species or spread of those currently occurring within the study area construction plant and equipment
- Soil contamination resulting from fuel spills or other contamination.

Table 21: Details of potentially affected trees

No.	Species	Height (m)	DBH (mm)	Tree Age	Tree Health	Ecological Significance	Landscape Significance*	Retained?
1	*Brush Box* *Lophostemon confertus*	7	390	Mature	Good – Fair	Low	Low – Moderate	●
2	Swamp Oak *Casuarina glauca*	8	Multi-trunk	Mature	Good	Low	Low – Moderate	●
3	*Cabbage Palm x 2* *Livistona australis*	7	260	Mature	Good – Fair	Low	Low – Moderate	●
4	*Brush Box* *Lophostemon confertus*	7	480	Mature	Good – Fair	Low	Low – Moderate	●
5	*Swamp Oak (clump)* *Casuarina glauca*	8	Multi-trunk	Mature	Good	Low	Low – Moderate	●
6	*Brush Box* *Lophostemon confertus*	7	410	Mature	Good – Fair	Low	Low – Moderate	●
7	*Brush Box* *Lophostemon confertus*	7	250	Mature	Good – Fair	Low	Low – Moderate	●
8	*Brush Box* *Lophostemon confertus*	8	240	Mature	Good – Fair	Low	Low – Moderate	●
9	*Brush Box* *Lophostemon confertus*	7	200	Mature	Good – Fair	Low	Low – Moderate	●
10	*Brush Box* *Lophostemon confertus*	7	300	Mature	Good – Fair	Low	Low – Moderate	●
11	*Swamp Oak (clump)* *Casuarina glauca*	8	Multi-trunk	Mature	Good	Low	Low – Moderate	●

No.	Species	Height (m)	DBH (mm)	Tree Age	Tree Health	Ecological Significance	Landscape Significance*	Retained?
12	*Brush Box* *Lophostemon confertus*	7	480	Mature	Good – Fair	Low	Low – Moderate	○
13	*Brush Box* *Lophostemon confertus*	9	570	Mature	Good	Low	Low – Moderate	○
14	Arizona Smooth Bark Cypress *Cupressus glabra*	8	Multi-trunk	Mature	Good – Fair	Low	Low – Moderate	○
15	*Brush Box* *Lophostemon confertus*	8	550	Mature	Good	Low	Low – Moderate	○
16	*Peppercorn tree* *Schinus areira*	7	Multi-trunk	Mature	Good – Fair	Low	Low – Moderate	○
17	*Frangipani* *Plumeria acutifolia*	2 (Shrub)	Multi-trunk	Mature	Good	Low	Low – Moderate	○
18	*Frangipani* *Plumeria acutifolia*	2 (Shrub)	Multi-trunk	Mature	Good	Low	Low – Moderate	○
19	*Brush Box* *Lophostemon confertus*	8	390	Mature	Good	Low	Low – Moderate	○
20	*Brush Box* *Lophostemon confertus*	7	200	Mature	Good – Fair	Low	Low – Moderate	○
21	*Brush Box* *Lophostemon confertus*	9	350	Mature	Good	Low	Low – Moderate	○
22	*Brush Box* *Lophostemon confertus*	7	370	Mature	Good	Low	Low – Moderate	○
23	*Brush Box* *Lophostemon confertus*	7	340	Mature	Good	Low	Low – Moderate	○

No.	Species	Height (m)	DBH (mm)	Tree Age	Tree Health	Ecological Significance	Landscape Significance*	Retained?
24	*Brush Box* *Lophostemon confertus*	7	200	Mature	Fair	Low	Nil - Low	■
25	*Brush Box* *Lophostemon confertus*	7	320	Mature	Good	Low	Low – Moderate	■
26	*Brush Box* *Lophostemon confertus*	7	250	Mature	Good – Fair	Low	Low – Moderate	■
27	*Brush Box* *Lophostemon confertus*	8	360	Mature	Good – Fair	Low	Low – Moderate	■
28	*Brush Box* *Lophostemon confertus*	8	330	Mature	Good – Fair	Low	Low – Moderate	■
29	*Brush Box* *Lophostemon confertus*	7	400	Mature	Good – Fair	Low	Low – Moderate	■
30	*Brush Box* *Lophostemon confertus*	4	240	Mature	Good – Fair	Low	Low – Moderate	■

Note:

● = trees potentially requiring removal for the construction laydown area (area to be landscaped at completion of works)

O = trees to be removed

■ = trees to be retained. Refer to Figure 27 below for the location of each tree.

Source: Modified from data provided by Horticultural Management Services, www.hortmanagement.com.au

The *Flora and Fauna Impact Assessment* (Gould & Hunt, September 2014) identified that:

- Clearing of vegetation would result in temporary loss of some foraging and roosting habitat for birds and may also result in disruption to foraging habitat for microchiropteran bats and Grey-headed Flying-fox
- The Proposal is unlikely to cause substantial impacts to the ecology of the locality as the vegetation to be cleared consists of planted street trees which would be replanted in accordance with the TfNSW *Vegetation Offset Guide*, and this would result in a net gain in the overall number of trees in the study area.

Fauna impacts

Direct impacts on any threatened species, population or ecological community are not expected.

Construction activities could cause disruption through noise and vibration to fauna utilising the habitat within the study area. However, this disruption would be relatively minor and temporary and is unlikely to result in substantial long term impacts.

The street trees may on occasion provide stepping stone habitat for highly mobile species between areas to the south (e.g. Rookwood Cemetery and Cooks River Corridor) and the mosaic of habitat provided by the Millennium Parkland / Bicentennial Park and Mason Park approximately two kilometres to the north. There would be relatively minor disruption to the potential habitat between these locations as a consequence of removal of vegetation for the Proposal, although this is likely to be temporary as the vegetation would be replaced in accordance with the TfNSW *Vegetation Offset Guide* (2012).

- Vegetation removal would be limited to planted street trees and these would be replaced in accordance with TfNSW *Vegetation Offset Guideline* (2012) resulting in an overall net gain in vegetation.

Figure 27: Trees to be removed
(subject to detailed design)

Note: Trees & shrubs (17 & 18) labelled in RED to be removed

Trees labelled GREEN to be retained

Trees labelled in BLUE would be removed for a construction zone for the duration of the works.

(b) Operational phase

This Proposal is unlikely to cause substantial impacts to the ecology of the locality as:

- Direct impacts on any species, population or ecological community are not expected
- Vegetation removal would be limited to planted street trees. These would be replaced in accordance with TfNSW *Vegetation Offset Guideline* (2012) resulting in an overall net gain of vegetation. The plant species palettes developed for the Flemington Station Upgrade would be based on a number of guiding documents and existing site plant species.
- Generally, to enhance biodiversity:
  - Existing vegetation would be retained where possible
  - Native species palette would be used where appropriate
  - To soften hard treatments, low planting would be introduced.

It should be noted that additional tree clearing in The Crescent and Loftus Crescent would be undertaken as part of the Electrical Enabling Works associated with this upgrade.

6.7.3 Mitigation measures

- The Construction Environmental Management Plan would include the following migration/controls:
  - Identification and management of trees to be retained
  - Tree protection measures for construction process in accordance with AS 4970 – 2009
- Trees to be removed, and trees to be retained would be clearly demarcated on-site (where appropriate) prior to construction to avoid unintended vegetation removal
- Tree Protection Zones (TPZs) would be established to protect any adjacent trees
- In the case where any access is required within the TPZs for building purposes, access would be controlled in accordance with the recommendations of a suitably qualified arborist
- Any vegetation to be removed that has not been assessed in this REF would be subject to separate approval in accordance with TfNSW's *Application for Removal or Trimming Vegetation*
- A Site Arborist meeting Australian Qualifications Framework (AQF) Level 5 would be retained to provide advice for any potentially sensitive works in the vicinity of retained trees
- All workers would be provided with an environmental induction by the Contractor prior to commencing work on-site. This induction would include information on the ecological values of the site, protection measures to be implemented to protect biodiversity and penalties for breaches.
- Native trees to be removed to be chipped and reused as leaf mulch (as per AS 4454 and AS 4419) and placed within tree protection fencing.
- Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refuelling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the TPZs of existing trees to be retained. No backfilling would occur within the TPZs of existing trees.

- A Landscape Plan for the Proposal which would be prepared and implemented by the Contractor and would include:
  - Replanting in accordance with the requirements of in accordance with TfNSW's *Vegetation Offset Guide*:
    - Replacement vegetation would be selected in consultation with Strathfield Municipal Council as appropriate.
    - Replacement trees would be planted nearby if possible, otherwise an area for replanting would be negotiated with Council (or other suitable party)
    - Native species endemic to the area and suitable for planting in a road reserve and near to a rail corridor would be selected.

6.8 Contamination, landform, geology and soils

A *Geotechnical Investigation Report* and a *Limited Phase 2 Contamination Assessment* were carried out by Coffey (September 2014).

6.8.1 Existing regional environment

Regional geology and soil landscape

A review of the 1:100,000 Sydney Geological map indicates that the site is underlain by the Ashfield Shale of the Wianamatta Group. Ashfield shale is described as black to dark grey shale and laminate. The Sydney 1:100,000 Soil Landscape Series Sheet 9130 (Soil Conservation Service of NSW, 1989) indicates that the site is in an area underlain by 'Blacktown' soils which are typically associated with the undulating rises of Wianamatta shales.

Acid sulfate soils

A search was undertaken on 17 April 2014 using the NSW Natural Resources Atlas (http://www.nratlas.nsw.gov.au). The Acid Sulfate Soil (ASS) Risk Map indicates that there is no known occurrence of ASS at the site.

6.8.2 Existing site conditions

The topography of the site and surrounding area is relatively flat. The NSW Department of Lands Spatial Imagery Exchange (www.six.nsw.gov.au) indicates that the site lies at an elevation of approximately 20m Australian Height Datum (AHD).

Geotechnical investigation

Geotechnical investigations were carried out, and comprised the drilling of two (2) boreholes at the southern and northern extents of the proposed access bridge and two Dynamic Cone Penetrometer tests on the rail platforms. The boreholes indicate that the subsurface conditions generally comprise residual soil overlying weathered shale bedrock. The residual soil predominantly comprises Silty Clay or Clay of medium to high plasticity. The pocket penetrometer values indicate that the clay is stiff to hard.

Excavation for the lift pits and piles would require the removal of the residual clays and weathered shale. It is anticipated that the bulk excavation for the lift pits in the residual soil and Class V Shale would be readily achievable using hydraulic excavators.

The base of excavation for the majority of the proposed development will be located in residual soil/weathered rock. Foundations that could be considered for the proposed development include strip or pad footings in residual soil or weathered shale or bored piles founded in shale.

6.8.3 Contamination

Based on the results of the desktop assessment by Coffey Geotechnics Pty Ltd (Coffey), the site has been used as a railway station since before 1943, whilst the surrounding area land use changed from residential and farmland to commercial/industrial some time in the 1970s. This is also when Flemington Market appears to have commenced operation.

The contamination investigation was carried out by Coffey on 16 and 17 April 2014 and comprised of taking samples from the drilled boreholes. No evidence of gross contamination (staining or odour) was observed during the site walkover. Additionally no asbestos containing material or evidence of site filling (with the exception of railway ballast) was noted.

Evidence of other potential sources of contamination, such as underground or above ground storage tanks and industrial activities/processes, were not identified on site or land immediately surrounding the site. No observations of contamination or contaminating activities were noted during the site walkover.

The results of the limited Phase 2 contamination assessment identified the following potential sources of contamination:

- Limited use of pesticides – low likelihood
- Weathering of hazardous materials and uncontrolled demolition of site structures either currently or historically located on-site – moderate likelihood
- Fill materials of unknown origin – moderate likelihood
- Railway activities – moderate likelihood.

Coffey undertook a search of the NSW EPA Contaminated Land record. The register indicated that there are currently no notices issued for the site, or surrounding sites under the NSW *Contaminated Land Management Act 1997*.

6.8.4 Potential impacts

The Proposal would require some excavation work for the installation of footings for the lifts and overbridge structures. As indicated by the Coffey report (2014), the sub-surface material would likely classify as General Solid Waste (non-putrescible) as there were no significant contaminants found. Overall the soils on the site are not considered to pose a significant health risk to current and future occupants of the site or construction workers during the proposed redevelopment of the site for the Proposal.

During construction works, there is also the potential for soil to become contaminated through incidental chemical or fuel spills and leaks from construction plant and equipment.

There is the potential for erosion and sedimentation impacts as a result of water moving into and across the construction site during construction works. These potential impacts would be mitigated by the measures proposed below.

6.8.5 Mitigation measures

The following geotechnical and construction considerations would need to be considered at detailed design:

- Further investigations would to be undertaken to determine the presence and extent of any contamination within the Proposal site.

- The proposed sub-surface works to be undertaken in accordance with all appropriate regulations, standards and codes of practice with regard to working with potentially contaminated soils.
- Excavation/demolition/waste materials appropriately managed in accordance with relevant National Environment Protection Council (NEPC) and NSW EPA guidelines, including but not limited to the *Waste Classification Guidelines* (NSW EPA, 2009).
- Visual monitoring will be undertaken during construction to identify potential Contamination.
- The CEMP to be developed for the Proposal is to include an unexpected finds protocol, to be implemented during the station upgrade work
- If Contamination or the potential for Contamination is identified, a Contamination Investigation Report (CIR) is to be prepared to determine the nature, extent and degree of any contamination within the project area in accordance with the applicable EPA guidelines.
- If previously unidentified contamination (excluding asbestos) is discovered during Construction, work in the affected are must cease immediately, and an investigation must be undertaken and report prepared to determine the nature, extent and degree of any contamination. The level of reporting must be appropriate for the identified contamination in accordance with EPA Guidelines for Consultants Reporting on Contaminated Sites.

Should the CIR indicate that remediation is necessary to reduce or remove risks posed by contaminants in particular locations, then the land affected by construction must be remediated in accordance with a site specific Remedial Action Plan (RAP) prepared in accordance with the applicable NSW EPA guidelines.

- If potential asbestos containing materials are identified during Construction, works in the vicinity of the find are to cease immediately, and an investigation must be undertaken and a report prepared to determine the nature, extent and degree of the asbestos contamination, in accordance with EPA and NSW WorkCover guidelines.
  - Any required remediation activities must not take place until receipt of an asbestos contamination investigation report.
  - Works may only commence upon receipt of a validation report from a suitably qualified occupational hygienist that the remediation activities have been undertaken in accordance with the investigation report and remediation methodology.
- An Erosion and Sediment Control Plan is to be developed and implemented in accordance with the Landcom *"Managing Urban Stormwater: Soils & Construction* (2004) – the "Blue Book".
- A hazardous materials assessment to be carried out on the platform heritage buildings before any construction works which affects these buildings commences.

6.9 Hydrology and water quality

6.9.1 Existing environment

A Flood Study was prepared by KBR in September 2014. No creeks or rivers flow through or along the site boundaries.

Flemington Station is part of the Salesyard Creek catchment. Salesyard Creek flows through a concrete culvert under Sydney Markets and then joins Powells Creek at Bressington Park in Homebush.

A geotechnical investigation for the Flemington Station Upgrade Project was carried out by Coffey Geotechnics Pty Ltd (Coffey). No groundwater was observed in the non-cored section of the boreholes undertaken.

Strathfield Municipal Council has confirmed the following flood characteristics in the vicinity of the project site.

- A flood study for the Powells Creek and Salesyard Creek catchment completed in 1998 indicates that Flemington Station is not within the 1 in 100 year overland or mainstream flood zone.
- The existing ground in the vicinity of the project site is approximately 15 metres AHD which is significantly above the 1 in 100 year ARI flood level of 6 metres AHD downstream of The Crescent.

6.9.2 Potential impacts

Water quality

The redevelopment of the Flemington Station and precinct area would involve tree clearing, moving of soil and soil stockpiling. These activities could increase the risk of sediments entering the stormwater system through run-off from the site. Potential for contamination of local waterways also exists as a result of an incidental spills, or during periods of rainfall.

Hydrology

The proposed works will:

- Not alter/lower the existing ground levels
- Not change the current catchment characteristics such as percentage of impervious and pervious areas
- Not introduce obstructions that would affect the existing overland flow routes.

Therefore it is anticipated that the Proposal will have negligible localised impacts to local flood behaviour flood hazard risk.

The Proposal may impact upon Council's drainage infrastructure. Concourse canopy drainage will involve connection to the existing Council pit on The Crescent. The existing pit is to be rebuilt flush with the proposed footpath surface level and would no longer function as a kerb inlet pit. An additional drainage pit in the taxi zone/accessible parking bay has been proposed. Consultation with Council would be undertaken regarding these works.

There may be impacts on existing track drainage, and the need for additional drainage pipes to cater for the new canopy drainage would need to be investigated.

There is also the possibility of damage to unidentified water mains.

6.9.3 Mitigation measures

- Erosion and sediment control plans would be prepared in accordance with *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.
- Erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality

- Fuels, chemicals and liquids would be stored in appropriate impervious bunded areas, a minimum of 40 metres away from:
  - rivers, creeks or any areas of concentrated water flow
  - flooded or poorly drained areas
  - slopes above 10%.

Refuelling of plant and equipment, and vehicle wash down and/or cement truck washout would occur within these impervious bunded areas.

- Emergency spill kits would be kept on site at all times. All staff would be made aware of the location of spill kits and trained in their use
- The existing Sydney Trains and Council drainage systems would remain operational throughout the construction of the project.

6.10 Air quality

6.10.1 Existing environment

Regional sources

The Office of Environment and Heritage (OEH) monitors air quality across NSW. Ground-level ozone (a key component of photochemical smog which appears as white haze in summer) remains an issue for Sydney and concentrations generally continued to exceed national air quality standards on up to 16 days a year between 2009 and 2011.

Particle pollution (appearing as brown haze) generally meets standards in Sydney except when bushfires or dust storms occur, with concentrations exceeding national air quality standards on up to 18 days a year from 2009 to 2011.

Local sources

A number of non-industrial sources in the study area have the potential to influence the local air quality to varying degrees. These include:

- Vehicle exhaust from the surrounding road network, with particular focus on routes where there are a large number of heavy vehicles
- Lawn mowing (public open spaces)
- Train exhaust from diesel services along the existing rail corridor
- Domestic solid fuel burning.

These activities are likely to create emissions of Particulate Matter, Oxides of Nitrogen, Sulphur dioxide, Carbon monoxide, Volatile Organic Compounds and heavy metals.

Sensitive receptors

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

- Pedestrians and commuters within Flemington Station, Homebush West Town Centre, and Sydney Markets
- Customers and operators of businesses within the adjacent The Crescent retail/commercial area
- Adjacent residents (to the south of the station).

6.10.2 Potential impacts

(a) Construction phase

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

Anticipated sources of dust and dust-generating activities from the Proposal are as follows:

- Operation of earth moving/pile driving equipment, and cranes
- Dust from loading spoil material on trucks and excavators
- Wind erosion from exposed surfaces at disturbed areas.

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

Vehicular emissions are also likely during the construction phase of the Proposal. These emissions are associated with the combustion of diesel fuel and petrol. Emission rates and impact potential depend on the number and power output of the combustion engines, the quality of the fuel and the condition of the combustion engines.

Impacts from air emission sources

The activities which would result in areas of soils becoming exposed would include the works in The Crescent and the construction of the lift shafts, and footbridge footings.

The anticipated levels of Particulate Matter generated during construction are not likely to be excessive, given the small scale of the activity and provided suitable control measures are implemented, as outlined below. Particulate concentrations could be expected to decrease significantly with distance from the source. During unfavourable meteorological conditions, such as dry and windy conditions, dust emissions could be higher.

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

(b) Operational phase

The Proposal would not result in any significant changes to the number or frequency of trains operating within the rail corridor, nor would it result in the number or frequency of vehicles accessing the area.

Conversely, increased patronage of the rail system would likely reduce commuter vehicle movements on local roads and therefore the relative contribution from vehicle emissions would decrease as a result of the project.

6.10.3 Mitigation measures

- Methods of reducing emissions would be identified in the CEMP, including:
  - Measures to minimise or prevent the generation of air pollution and dust (including watering or covering exposed areas)
  - Covering vehicles transporting waste or other materials after loading to prevent wind blown dust, emissions and spillages
  - Restricting vehicle and machinery movements during construction to designated areas, and sealed/compacted surfaces where practicable

- Any visible dust leaving the construction site area as a result of construction works would be managed as per the project CEMP to be prepared by the Contractor
- Ensuring that vehicles, plant and equipment are maintained in accordance with their maintenance schedule and are regularly inspected to ensure efficient operation
- Hardstand material, rumble grids or other appropriate measures would be installed at entry and exit points to minimise tracking of dirt onto roadways where practicable
- Site rehabilitation of disturbed areas would be undertaken progressively as soon as practicable to minimise wind-blown dust generation
- Visual monitoring of dust to be undertaken, where visible levels of dust are high, on-site activities are to be reviewed, with additional control measures and/or varied site operations implemented if required
- All site vehicles and machinery would be switched off or throttled down to a minimum when not in use.

6.11 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.

The Community Liaison Plan would be a key tool to identify appropriate communication for sensitive receivers to keep them informed of major milestones and particular impacts that may directly affect them.

A search of the Department of Planning and Environment's Major Projects Register, Sydney East Joint Regional Planning Panel Development and Planning Register, and Strathfield Council Development Application Register on 27 November 2014 identified several developments in the nearby vicinity potentially under construction at a similar time, including: various residential, commercial and retail developments at the Campus Homebush site (Marlborough Road and Courallie Avenue), a residential and retail development at 32 The Crescent, Homebush, and a large residential development in Smallwood Avenue, Homebush.

During construction, the works would be coordinated with any other construction activities in the area, including the Flemington Station electrical enabling works. Consultation and liaison would occur with Strathfield Municipal Council, RailCorp/ Sydney Trains, Sydney Markets Limited and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

Traffic associated with the construction work is not anticipated to have a significant impact on the surrounding road network. Operational traffic and transport impacts would have 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 Section are implemented.

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

6.11.1 Mitigation measures

- During construction the works would be coordinated with any other construction activities in the area (Strathfield Municipal Council, RailCorp/Sydney Trains, Sydney Markets Limited and any other developers identified) to minimise cumulative construction impacts such as traffic and noise where feasible and reasonable.

6.12 Climate change and sustainability

6.12.1 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 a AS14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects*. The carbon footprint would to be used to inform decision making in design and construction.

Due to the small scale of the Proposal and the short term temporary nature of the individual construction works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Section .

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 West town centre. 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.

6.12.2 Climate change

TfNSW is committed to ensuring that the development, expansion and management of the transport network is sustainable and resilient to climate change.

KBR conducted a *Climate Change Assessment* on the Concept Design for the Flemington Station Upgrade (September 2014). The scope of the assessment was to:

- Provide future climate projections for the region relevant to the project
- Provide general asset vulnerabilities for the project, and
- Recommend possible control measures that could be used to mitigate these effects.

This assessment included assessing project specific risks from changes to the following climate variables:

- Temperature change (°C)
- Extreme heat – projected number of days above 35°C (days)
- Rainfall change – Annual (%)
- Wind speed (%)
- Relative humidity (%)
- Solar radiation (%)
- Evaporation increase (%)

- Very high or greater bushfire risk days/yr (days), and
- Sea level rise (metres increase).

The climate change assessment overview highlighted that the site may be vulnerable to temperature extremes (days over 35°C), and increased rainfall events which may lead to increased local flooding

However, with considered design, potential risks associated with these climate projections may be readily managed. In particular, recommendations were made on detailed design, and are included in the mitigation conditions below.

6.12.3 Sustainability

The design of the upgraded interchange would be based on the principles of sustainability, with the incorporation of the TfNSW *Sustainable Design Guidelines for Rail (Version 3.0)* and the TfNSW *Environmental Management System* (EMS).

A base target of silver (70 percent) has been set by TfNSW. Based on agreed initiatives, an aspirational target of Gold is achievable (overall percentage 81 percent) at Preliminary Design stage. The sustainability objectives selected during concept design would be considered further in design development, implemented in detail design and construction or discounted as deemed necessary with the project aspiration to achieve a minimum target of silver.

Sustainable design features which would be incorporated into the Proposal can be summarised as follows:

- Various construction and materials selection measures, including:
  - Water efficient fittings
  - Reduced power use
  - Photo-electric switches
  - Motion controlled switches
  - Timed switches.
- Protection for customers and electrical equipment from wind and rain during storm events.

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

6.12.4 Waste

Resource management hierarchy principles would be followed:

1. avoid unnecessary resource consumption
2. resource recovery (including reuse of materials, reprocessing, recycling and energy recovery)
3. disposal is undertaken (last resort option).

Waste minimisation initiatives would be incorporated into the Proposal and are summarised as follows:

- Reduction of waste to landfill (via recycling or reuse):
  - ensuring that at least 95 percent of construction waste generated during site preparation and construction is diverted from landfill
  - enabling waste segregation through provision of segregated waste receptacles

Waste material taken off site would be appropriately classified and managed in accordance with the *Waste Classification Guidelines* (OEH, April 2008). All waste documentation would be collated in accordance with these guidelines and provided to TfNSW as requested.

Sydney Markets Limited has expressed an interest in potential re-use of the dog-leg section of footbridge (that is to be removed at the completion of Stage 1 works) to extend the footbridge further into the Markets site.

6.12.5 Mitigation measures

- The detailed design process would be undertaken with reference to the TfNSW *Sustainability Design Guidelines for Rail (Version 3.0)* with a view to obtaining a Silver rating or better.
- The detailed design process would undertake a AS14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects*. The carbon footprint would to be used to inform decision making in design and construction.
- The detailed design process would undertake a *Climate Change Impact Assessment* to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc would be considered in the design.
- Tinting would be considered for the glass lift shafts and lift cars in order to reduce internal heat gain.
- Resource management hierarchy principles and waste minimisation features would be incorporated into the Proposal.
- Waste material would not to be left on site once the works have been completed.
- Working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day.

7 Environmental management

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

7.1 Environmental management plans

A construction environmental management plan (CEMP) for the construction phase of the Proposal would be prepared in accordance with the requirements of the Transport Projects Division Environmental Management System (EMS). The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and would outline a framework of procedures and controls for managing environmental impacts during construction.

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

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 22: Proposed mitigation measures below. These proposed measures would minimise the potential adverse impacts of the Proposal identified in
Chapter , should the Proposal proceed.

Table 22: Proposed mitigation measures

ID no.	Environmental safeguards
General	
1	An Environmental Design Constraints Map would be prepared prior to commencement of detailed design.
2	A project risk assessment including environmental aspects and impacts would be undertaken prior to the commencement of construction.
3	Weekly inspections to monitor environmental compliance and performance would be undertaken during construction.
4	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, mitigation measures and conditions of approval.

ID no.	Environmental safeguards
Traffic and Site Access	
5	Prior to the commencement of construction, a CTMP would be prepared as part of the CEMP which addresses, as a minimum, the following: • Traffic management, including adequate signage to inform motorists and pedestrians of the work site • Proposed road closures and associated traffic controls/mitigation to be implemented • impacts and changes to parking including proposed parking for construction workers: – The impacts of construction traffic and on deliveries on the local road network and the impacts on intersection operation would be minimised by undertaking construction vehicle traffic movements outside of AM and PM peak road traffic periods and outside of school peak periods where feasible – Signs would be provided at each access point to assist in deliveries to each work site – Construction vehicle parking would be limited to designated areas. Areas of temporary on-street parking during peak construction events would be identified in the CTMP to minimise the impact on surrounding properties and businesses. Opportunities for using an area within Sydney Markets for construction staff parking would also be considered in discussion with Sydney Markets Limited. – Where possible, alternative means of transport to and from the site for construction workers would be promoted e.g. encourage the use of public transport, car share or use of a shuttle bus service especially for construction staff not carrying heavy tools or equipment. • parking arrangements for construction staff • location of construction compounds • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for the relocation of the bus stops and taxi rank, including appropriate signage to direct patrons , and Consultation with the relevant roads authority would be undertaken during preparation of the CTMP, where required. The performance of all project traffic arrangements must be monitored during construction.
6	A Road Safety Audit would be undertaken during detailed design and design amendments made as required.
7	Heavy vehicles would be restricted to specified routes, with the aim of minimising impacts on local roads, high pedestrian areas and school zones. Where feasible, route markers would be installed for the guidance of heavy vehicles along designated routes.
8	The impacts of construction traffic and on deliveries on the local road network and the impacts of intersection operation would be minimised by undertaking construction vehicle traffic movements outside of AM and PM peak road traffic periods and outside of school peak hours where feasible

ID no.	Environmental safeguards
9	Investigation would be undertaken into the possibility of shuttling equipment and spoil on engineering trains
10	Pedestrian access to the station platforms would be maintained at all times trains are operational. Pedestrian paths that would be required to be closed off should be properly hoarded and provided with safe and convenient alternative crossing points.
11	Pedestrian access across the rail corridor would be maintained at all times (other than possible very minor interruptions
12	Temporary traffic management to be in place at The Crescent/Hornsey Road, The Crescent/Henley Road, and the Centenary Drive access point for critical activities. Traffic control staff to limit access to priority vehicles during critical activities if required
13	The queuing and idling of construction vehicles in residential streets to be minimised.
14	Road occupancy licences for temporary closure of roads would be obtained where required.
15	A pre and post construction assessment of road pavement assets would be conducted in areas likely to be used by heavy construction vehicles
16	Access to all private properties/businesses adjacent to the works would be maintained during construction, unless otherwise agreed by consultation with specific relevant property owners.
17	In order to manage risks of pedestrians crossing The Crescent away from the marked crossing, a pedestrian barrier on the north side of The Crescent would be installed.
18	In order to address potential pedestrian safety issues in the precinct, it is recommended that consideration be given to designating the section of The Crescent between Hornsey Road and Hampstead Road, and the section of Henley Road from Exeter Street to the station precinct as a 40 kilometre per hour High Pedestrian Activity Area (HPAA). This recommendation would need to be discussed with Strathfield Municipal Council's Local Traffic Committee.
19	Once the new interchange is operational, consideration would be given to traffic movement priority to Henley Road traffic. The degree of saturation of the Henley Road/The Crescent intersection may be lower under this operational scenario.
Urban design, landscape and visual amenity	
20	Construction sites would be managed to minimise visual impacts: Equipment and facilities would be consolidated to maximise the area of useable public realm and maintain pedestrian permeability Elements e.g. materials and machinery would be stored behind fencing/hoarding Fencing would be screened, with shadecloth or similar material where necessary to minimise visual impacts from external viewpoints Regular maintenance of site hoarding an perimeter areas would be undertaken, including the prompt removal of graffiti Construction sites and work areas would be kept tidy and well-maintained at all times.

ID no.	Environmental safeguards
21	During construction, light spill from the rail corridor into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas while ensuring that the site complies with Australian Standards but is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
22	Any areas of 'blank' wall would be softened by appropriate plantings and/or artwork to meet visual amenity and sustainability guidelines
23	Finishes and materials would be complementary to the existing locality and landscape, would minimise reflective surfaces with a preferred use of muted/less intrusive colours, and would involve consultation with Council
24	Specifically designed lighting equipment would be installed to minimise the upward spread of light near to and above the horizontal. Care would be taken when selecting luminaries to ensure that appropriate units are chosen and that their location would reduce spill light and glare to a minimum.
25	Opportunities for the inclusion of street trees adjacent to the station on The Crescent would be considered, including in the vicinity of the new bus shelter, at the terminus of Henley Road, and adjacent to the kiss and ride parking bay.
26	Maintenance of structures as a result of this Proposal would be the responsibility of Sydney Trains on completion
Noise and Vibration	
27	Reference should be made to ASA Engineering Standard ESB 002 Station Design and Standard Requirements which sets out guidelines for the incorporation of acoustically absorptive finishes which can control reverberance and improve speech intelligibility from the Station Public Address (PA) system.
28	A Construction Noise and Vibration Management Plan (CNVMP) would be devised and implemented in accordance with the requirements of the *Construction Noise Strategy* (TfNSW, 2012), the EPA's *Interim Construction Noise Guideline,* and the *Noise and Vibration Impact Assessment* for the Flemington Station Upgrade (AECOM, 2014). The CNVMP would include all reasonable and feasible mitigation options to manage the noise emissions from the site and also any complaints which may occur due to the construction activity noise. The CNVMP would consider measures to reduce the source of noise levels from construction and vibration by construction planning and equipment selection where reasonably practicable.

ID no.	Environmental safeguards
29	To reduce the construction noise impact from human activities, reasonable and feasible noise mitigation options should be considered, including: • Regularly training workers and contractors (such as at toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • Using only the equipment necessary for the upgrade works at any one time • Avoiding any unnecessary noise when carrying out manual operations and when operating plant • Avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where possible • Switching off any equipment not in use for extended periods e.g. heavy vehicles engines should 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 on site. No dropping of materials from height where practicable, throwing of metal items and slamming of doors.
30	To reduce the construction noise and vibration impacts from mechanical activities, reasonable and feasible noise mitigation options should be considered, including: • Selection of appropriate plant to minimise noise contributions • Maximising the offset distance between noisy plant and adjacent sensitive receivers. • Directing noise-emitting plant away from sensitive receivers. • Using non-tonal reversing alarms, ('quackers') for all plant regularly used on site (greater than one day). • Regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc. • Fitting mufflers/silencers to pneumatic tools (e.g. breakers) and use residential-grade mufflers on plant. • Using quieter and less vibration emitting construction methods where feasible and reasonable.
31	Impacts from construction traffic would be reduced by: • Advising truck drivers of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices (ie minimising the use of engine brakes, and no extended periods of engine idling). • Locating site access and egress points away from residences and other sensitive land uses, where feasible and reasonable. • Arranging construction sites to limit the need for reversing associated with regular /repeatable movements (eg trucks transporting spoil) to minimise the use of reversing alarms.

ID no.	Environmental safeguards
32	Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding should take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.
33	Planning of the higher Noise Management Level exceedance activities/locations to be undertaken predominantly during less noise-sensitive periods, where practicable.
34	Prior to commencement of the demolition work, dilapidation surveys would be required for adjacent heritage items. The dilapidation survey would document the current structural condition of these buildings/structures. The dilapidation surveys would be repeated after the project is complete. The post completion dilapidation surveys would identify any impact on the receiver buildings as a result of the construction work. Critical buildings to be surveyed would include the Flemington Station buildings on Platforms 1-4.
35	If vibration intensive equipment is to be used within the safe working distances for cosmetic damage, then attended vibration measurements would be undertaken when work commences, to determine site specific safe working distances.
36	Vibration intensive work would not proceed within the safe working distances unless a vibration monitoring system is installed approximately a metre from the building footprint, to warn operators (via a flashing light, audible alarm, SMS etc) when vibration levels are approaching the peak particle velocity.
Non-Indigenous Heritage	
37	A suitably qualified and experienced heritage architect would be engaged to provide input to, and review detailed design of the Proposal.
38	The heritage curtilage of the station would be identified on the Environmental Constraints Map (ECMs) developed for construction to ensure unintended impacts do not occur.
39	The Contractor would provide a heritage induction to workers before construction begins, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction
40	Archival recording would be undertaken of the Station Footbridge, Concourse and Overhead Booking Office in accordance with relevant NSW heritage guidelines. The archival recording should contain the following: • an Archival Record in accordance with the following guidelines: *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office 1998) and *Photographic Recording of Heritage Items Using Film or Digital Capture* (NSW Heritage Office 2006). In addition, internal and external scanning of the station building is to be undertaken with a 3D laser device, in a suitable electronic data format (i.e. CAD software or equivalent). • a photographic record of the items, including the interior of the Overhead Booking Office • scale plans and elevations of all items • a written report documenting the elements • references for all known reports regarding these items • references for any available historical images and/plans held in relevant repositories, such as the State Library of NSW, and the Sydney Trains Plans Office.

ID no.	Environmental safeguards
41	The final design would be sympathetic to the original design of the heritage building, through its form, scale and materiality. The materials and colour palette for the overhead footbridge would be sympathetic to the heritage context of the railway station, and be visually recessive. The use of unobtrusive, modern, light materials, such as glass panelling and slim frame elements would reduce the bulk of the Proposal, reducing the visual impact of the additional items.
42	Detailed design would specifically address drainage at the base of the original platform buildings with sub-floor ventilation to be installed/retained/maintained to minimise the possibility of future building damage, including from termite attack.
43	The heritage brick wall opposite the platforms on the boundary with The Crescent does not currently comply with the standard for a rail boundary fence/barrier. An initial structural assessment indicates that the wall is not structurally sound and should be replaced. Detailed design would specifically address this issue, with the wall to be retained if reasonably practicable.
44	For any alterations to the platform building, as much as practicable of the original fabric of the building, and internal features would be retained in situ. Any new partitions are to be timber-framed to allow future removal. Any ceiling services are to be suspended/limited to avoid penetrations into the ceiling, and service penetrations into external walls are to be minimised.
45	The finishes to the heritage building would be treated in a similar colour and finish to the existing, and any new fixtures (electrical or plumbing conduits) are to be sympathetically attached to the walls with minimal impact to original fabric (i.e. colour and fixings)
46	New awnings would be readily identifiable and are not to be attached to the original fabric of the station buildings. At a minimum, a short gap should be retained between old and new fabric. A transparent section of roofing could also be used to open up views to the building from the platform shelter.
47	To effectively mitigate potential impacts of vibration on Flemington Station and other heritage items, activities that cause vibration would be managed in accordance with German Standard DIN 4150 – Part 3 (DIN 1999 heritage specifications).
48	If previously unidentified Indigenous or non-indigenous heritage/archaeological items are uncovered during the works, all works must cease in the vicinity of the material/find and professional advice is to be immediately sought. Works in the vicinity of the find must not re-commence until clearance has been received from OEH or the relevant TfNSW environment manager.
49	When undertaking platform works adjacent to the platform station building, the fabric of the station building would be protected from damage through implementation of a suitable protective medium. Adequate measures would be taken to protect existing steps, posts, door jambs and weatherboard panels from direct contact with any new surface materials.
50	Heritage interpretation panels would be developed and installed within the station precinct which includes specific content for those elements being demolished as part of the Proposal.
51	The Contractor would investigate reuse of some elements of the 1924 structure in conjunction with the new design, as part of the heritage interpretation. These could potentially include the original trestles, hand rails and newels.

ID no.	Environmental safeguards
Indigenous Heritage	
52	If previously unidentified Indigenous heritage items are uncovered during the work, all work in the vicinity of the find would cease and appropriate advice be sought from OEH in order to mitigate potential impacts. Construction activities and machinery would be restricted to the designated work areas.
Socio-Economic Impacts	
53	A Community Liaison Plan would be developed by the Contractor and would identify all potential stakeholders and the methods for consultation with these grounds during construction. The plan would also encourage feedback and facilitate opportunities for the community and other stakeholders.
54	The proposed sustainability criteria for the project would be designed to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
55	Feedback through the submissions process would be encouraged and facilitate opportunities for the community and stakeholders to have input into the project, where possible.
56	The community would be kept informed of construction progress, activities and potential impacts in accordance with a Community Liaison Plan to be developed by the contractor prior to construction.
57	Contact details for a 24-hour construction response line, project infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.
Biodiversity	
58	The Construction Environmental Management Plan would include the following mitigations/controls: • Identification and management of trees to be retained • Tree protection measures for construction process in accordance with AS 4970 – 2009.
59	Trees to be removed, and trees to be retained would be clearly demarcated on-site (where appropriate) prior to construction to avoid unintended vegetation removal
60	Tree Protection Zones (TPZs) would be established to protect any adjacent trees.
61	In the case where any access is required within the TPZs for building purposes, access would be controlled in accordance with the recommendations of a suitably qualified Arborist.
62	Any vegetation to be removed that has not been assessed in this REF would be subject to separate approval in accordance with TfNSW's *Application for Removal or trimming Vegetation.*
63	A Site Arborist meeting Australian Qualifications Framework (AQF) Level 5 would be retained to provide advice for any potentially sensitive works in the vicinity of retained trees.

ID no.	Environmental safeguards
64	All workers would be provided with an environmental induction by the Contractor prior to commencing work on-site. This induction would include information on the ecological values of the site, protection measures to be implemented to protect biodiversity and penalties for breaches.
65	Native trees to be removed to be chipped and reused as leaf mulch (as per AS 4454 and AS 4419) and placed within tree protection fencing.
66	Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refuelling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the TPZs of existing trees to be retained. No backfilling would occur within the TPZs of existing trees.
67	A Landscape Plan for the Proposal would be prepared and implemented by the Contractor and would include: • Replanting in accordance with the requirements of in accordance with TfNSW's *Vegetation Offset Guide*: – Replacement vegetation would be selected in consultation with Strathfield Municipal Council as appropriate. – Replacement trees would be planted nearby if possible, otherwise an area for replanting would be negotiated with Council Native species endemic to the area and suitable for planting in a road reserve and near to a rail corridor would be selected.
Contamination, landform, geology and soils	
68	Further investigations would be undertaken to determine the presence and extent of any contamination within the Proposal site
69	The proposed sub-surface works to be undertaken in accordance with all appropriate regulations, standards and codes of practice with regard to working with potentially contaminated soils
70	Excavation/demolition/waste materials appropriately managed in accordance with relevant National Environment Protection Council (NEPC) and NSW EPA guidelines, including but not limited to the *Waste Classification Guidelines* (NSW EPA, 2009).
71	Visual monitoring will be undertaken during construction to identify potential Contamination.
72	The CEMP to be developed for the Proposal is to include an unexpected finds protocol, to be implemented during the station upgrade work
73	If Contamination or the potential for Contamination is identified, a Contamination Investigation Report (CIR) is to be prepared to determine the nature, extent and degree of any contamination within the project area in accordance with the applicable EPA guidelines.

ID no.	Environmental safeguards
74	If previously unidentified contamination (excluding asbestos) is discovered during Construction, work in the affected are must cease immediately, and an investigation must be undertaken and report prepared to determine the nature, extent and degree of any contamination. The level of reporting must be appropriate for the identified contamination in accordance with EPA Guidelines for Consultants Reporting on Contaminated Sites. Should the CIR indicate that remediation is necessary to reduce or remove risks posed by contaminants in particular locations, then the land affected by construction must be remediated in accordance with a site specific Remedial Action Plan (RAP) prepared in accordance with the applicable NSW EPA guidelines.
75	If potential asbestos containing materials are identified during Construction, works in the vicinity of the find are to cease immediately, and an investigation must be undertaken and a report prepared to determine the nature, extent and degree of the asbestos contamination, in accordance with EPa and NSW WorkCover guidelines. • Any required remediation activities must not take place until receipt of an asbestos contamination investigation report. • Works may only commence upon receipt of a validation report from a suitably qualified occupational hygienist that the remediation activities have been undertaken in accordance with the investigation report and remediation methodology.
76	An Erosion and Sediment Control Plan is to be developed and implemented in accordance with the Landcom "Managing Urban Stormwater: Soils & Construction (2004) – the "Blue Book".
77	A hazardous materials assessment to be carried out on the platform heritage buildings before any construction works which affects these buildings commences.
Hydrology and Water Quality	
78	Erosion and sediment control plans would be prepared in accordance with Managing Urban Stormwater: Soils and Construction Guidelines (Landcom). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.
79	Erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality
80	All fuels, chemicals and liquids would be stored a minimum of 40 metres away from: • rivers, creeks or any areas of concentrated water flow • flooded or poorly drained areas • slopes above 10%. Refuelling of plant and equipment would occur in impervious bunded areas located a minimum of 40 metres from drainage lines or waterways where sufficient space is available on site
81	Emergency spill kits would be kept on site at all times. All staff would be made aware of the location of spill kits and trained in their use
82	The existing Sydney Trains and Council drainage systems would remain operational throughout the construction of the project.

ID no.	Environmental safeguards
Air Quality	
83	Methods of reducing emissions would be identified in the CEMP, including: • Measures to minimise or prevent the generation of air pollution and dust (including watering or covering exposed areas) • Covering vehicles transporting waste or other materials after loading to prevent wind blown dust emissions and spillages • Restricting vehicle and machinery movements during construction to designated areas and sealed/compacted surfaces where practicable.
84	Any visible dust leaving the construction site area as a result of construction works would be managed as per the project CEMP to be prepared by the Contractor.
85	Ensuring that vehicles, plant and equipment are maintained in accordance with their maintenance schedule and are regularly inspected to ensure efficient operation.
86	Hardstand material, rumble grids or other appropriate measures would be installed at entry and exit points to minimise tracking of dirt onto roadways where practicable.
87	Site rehabilitation of disturbed areas would be undertaken progressively as soon as practicable to prevent or minimise wind-blown dust.
88	Visual monitoring of dust to be undertaken, where visible levels of dust are high, on-site activities are to be reviewed, with additional control measures and/or varied site operations implemented if required, in consultation with the TfNSW team.
89	All site vehicles and machinery would be switched off or throttled down to a minimum when not in use.
Cumulative Impacts	
90	During construction the works would be coordinated with any other construction activities in the area (with Strathfield Municipal Council, RailCorp/Sydney Trains, Sydney Markets Limited and any other developers identified) to minimise cumulative construction impacts such as traffic and noise where feasible and reasonable.
Climate change and Sustainability	
91	The detailed design process would be undertaken with reference to the TfNSW Sustainability Design Guidelines for Rail (Version 3.0) with a view to obtaining a Silver rating or better
92	The detailed design process would undertake a AS14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects*. The carbon footprint would to be used to inform decision making in design and construction.
93	The detailed design process would undertake a *Climate Change Impact Assessment* in accordance with to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc would be considered in the design.
94	Tinting would be considered for the glass lift shaft and lift car in order to reduce internal heat gain

ID no.	Environmental safeguards
95	Resource management hierarchy principles and waste minimisation features would be incorporated into the Proposal
96	Waste material would not to be left on site once the works have been completed
97	Working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day.

8 Conclusion

This REF has been prepared in accordance with the provisions of Part 5 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal would provide the following benefits:

- Increases accessibility for commuters with mobility impairment, those with shopping/luggage and parents with prams
- Contributes towards customer amenity by providing lifts and DDA-compliant access on the pedestrian footbridge to Sydney Markets (up to the RailCorp property ownership boundary). This would also assist in customers carrying bulky or heavy packages relating to purchases at Sydney Markets.
- Provides improved accessible customer facilities including a family accessible toilet
- Improved legibility, wayfinding and station entrance from The Crescent
- Improved waiting environment for bus passengers, kiss and ride, and taxi passengers
- Additional bicycle storage provided.
- ensure that the railway station and interchange facilities meet the future growth and transport needs of the Strathfield Local Government Area (LGA) and the wider Sydney region.

The key likely impacts of the Proposal are as follows:

- Disruptions to vehicle and pedestrian movements during construction
- Loss of 10 trees. In addition, 11 trees would be removed for a construction zone (but this area would be re-vegetated)
- Impacts on the heritage-listed platform buildings from modifications and additions
- Demolition of heritage structures:
  - the existing weatherboard Overhead Booking Office and section of the Station Footbridge from The Crescent to the junction with the Sydney Markets footbridge/property boundary. This will allow continued access to the Station and Sydney Markets for commuters and patrons during construction works.
  - a freestanding wall associated with the western end of Platform Building 3/4
- Demolition of the dog-leg section of the Sydney Markets footbridge
- Noise and vibration during construction, and
- Short-term visual impacts during construction and long-term visual impacts during operation.

The benefits are considered to outweigh the adverse environmental impacts of the Proposal.

The Proposal is consistent with the NSW Government's *Metropolitan Plan for Sydney 2036*, *NSW 2021* and *Long Term Transport Master Plan*, and is an integral part of the Transport Access Program. The Proposal would encourage greater use of public transport.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulations and the requirements of the EPBC Act (refer to Chapter 7, and Appendices). Should the project proceed, these impacts would be effectively managed through the proposed Flemington Station Upgrade CEMP, mitigation measures (refer to Section 7) and the conditions of approval. As a result, these environmental impacts are not considered to be significant. Accordingly an EIS is not required.

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

9 References

AECOM, November 2014 *Noise and Vibration Impact Assessment*

AECOM, October 2014, *Statement of Heritage Impact* (SoHI)

AM Consulting, June 2014, *Railway Overhead Booking Offices Heritage Conservation Strategy*

AM Consulting, April 2014, *Flemington Station Upgrade, Preliminary Heritage Advice*

Coffey, September 2014, *Geotechnical Investigation Report*

Coffey, September 2014, *Limited Phase 2 Contamination Assessment*

Department of the Environment, National Pollutant Inventory database http://www.npi.gov.au/

Department of Environment and Climate Change (DECC). 2009. *Interim Construction Noise Guideline*

Department of Environment and Conservation (DEC). 2006. *Assessing Vibration: A Technical Guideline*

Department of Premier and Cabinet. 2011. *NSW 2021 – A Plan to Make NSW Number One*

Department of Planning. 2010. *Metropolitan Plan for Sydney 2036.*

Department of Planning. 2005. *Metropolitan Strategy—City of Cities: A Plan for Sydney's*

Environment Protection Authority (2000) *Industrial Noise Policy*

Environment Protection Authority (2011) *NSW Road Noise Policy*

GHD, May 2011, *Flemington Station, Concept Design Report*

GHD Consultants, July 2014, *Traffic, Transport and Access Impact Assessment* (TTA&IA)

Gould & Hunt, November 2014, *Flora and Fauna Impact Assessment*

IRIS Visual Planning + Design, September 2014, *Visual Impact Assessment, Flemington Station Upgrade* (VIA)

KBR, September 2014, *Climate Change Assessment*

KBR, September 2014, *Flood Study*

Landcom, 2004, *Managing Urban Stormwater: Soils and Construction*, *Sydney*

Office of Environment and Heritage (OEH). 2013a
Aboriginal Heritage Information Management Systems (AHIMS). Accessed July 2014: http://www.environment.nsw.gov.au/awssapp/login.aspx

Strathfield Municipal Council, 2012, *Strathfield Local Environment Plan*

Sydney Markets, November 2006, *Sydney Markets Master Plan*

Transport for NSW, 2012, *Construction Noise Strategy*

Transport for NSW, 2012, *NSW Long Term Transport Master Plan*

Transport for NSW, 2012, *NSW Sustainable Design Guidelines – For Rail, Version 2.0*

Transport for NSW, 2012, *Sydney's Rail Future*

Transport for NSW, 2012, *Sydney's Walking Future*

Transport for NSW, 2012, *Vegetation Offset Guide*

Transport for NSW, 2012, 2012-2017 *Disability Action Plan*

Appendix 1 – Consideration of Clause 228 factors

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
Any environmental impact on a community? Comment: Some short-term impacts would be anticipated during construction, particularly in relation to noise, traffic and pedestrian access and visual impacts. Mitigation measures outlined in Table 22: Proposed mitigation measures would be implemented to manage and minimise any adverse impacts. There would be positive long-term impacts resulting from improved amenities and increased access for commuters.	minor
Any transformation of a locality? Comment: The Proposal would impact the locality visually, but the visual character and functions would be retained. The locality surrounding the Station would be impacted in a positive manner by providing a community focal point, improving place-making and providing legibility for the interchange functions.	minor
Any environmental impact on the ecosystem of the locality? Comment: With the proposed mitigation conditions in place, the Proposal is unlikely to impact the local ecosystem as confirmed in Section 6. Some tree removal would be required but such impacts are not expected to adversely affect any local ecosystems.	nil
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? Comment: Some short-term impacts are anticipated during construction, particularly in relation to noise and visual impacts. During operation the Proposal would have some impact to the visual amenity of the station and local area but would have positive safety and access outcomes. These include the introduction of accessible parking, formalised kiss and ride, new bus zone and shelter, bicycle storage and realigned roadways.	minor
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? Comment: The Proposal would have a positive effect on place-making and provides greatly improved access to Sydney Markets. The Proposal is designed to be as sympathetic to its heritage values and character as possible within the constraints imposed by the required policies, codes, standards, and constructability constraints. The platform buildings are returned to functionality, but the existing overhead concourse is to be demolished. Overall, effects are viewed as positive, particularly for the aesthetic, cultural and social values of the locality.	minor

Factor	Impacts
Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)? Comment: The Proposal is unlikely to have any impact on the habitat of protected fauna.	nil
Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Comment: The Proposal is unlikely to have an impact on endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.	nil
Any long-term effects on the environment? Comment: The overall impact of the proposed upgrade of Flemington Station to native flora and fauna is considered to be low. It is unlikely that the proposed works would result in a significant impact to threatened species, populations or communities. There would be a change to the visual environment with the introduction of the overhead footbridge, however choice of materials and finishes and landscaping would mitigate impacts.	nil
Any degradation of the quality of the environment? Comment: The Proposal is unlikely to have any degradation of the quality of the environment.	nil
Any risk to the safety of the environment? Comment: Construction of the Proposal would be managed in accordance with a CEMP to reduce any risks to the environment.	nil
Any reduction in the range of beneficial uses of the environment? Comment: Local users would be impacted by temporary changed access arrangements during construction. A Traffic Management Plan would be developed as part of the CEMP to manage traffic and access issues. During operation, the Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.	nil
Any pollution of the environment? Comment: There is potential for some short-term noise, air soil and water pollution during construction of the Proposal. These would be managed through the mitigation measures in Table 22: Proposed mitigation measures. During operation, the Proposal is unlikely to cause any pollution to the environment.	nil
Any environmental problems associated with the disposal of waste? Comment: The Proposal is unlikely to cause any environmental problems associated with the disposal of waste. All waste would be managed and disposed of in accordance with the OEH *Waste Classification Guidelines* (April 2008). Mitigation measures would be implemented to ensure waste is reduced, recycled or reused where applicable.	nil
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? Comment: The Proposal is unlikely to have any increased demands on limited resources.	nil

Factor	Impacts
Any cumulative environmental effect with other existing or likely future activities? Comment: Cumulative effects of the Proposal are described in Section . Where feasible, environmental management measures would be coordinated to reduce cumulative construction impacts. The Proposal is unlikely to have any significant long term cumulative impacts.	nil
Any impact on coastal processes and coastal hazards including those under project climate change conditions? Comment: The Proposal is not located on the coastline and has not been identified as within an area that would be subjected to increased sea level rise.	nil

Appendix 2 – 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 the Commonwealth Department of the Environment.

Factor	Impacts
Any impact on a World Heritage property? Comments: There are no World Heritage properties in the vicinity of the Proposal.	nil
Any impact on a National Heritage place? Comments: There are no National Heritage places in the vicinity of the Proposal.	nil
Any impact on a wetland of international importance? Comments: There are no wetlands of international significance in the vicinity of the Proposal.	nil
Any impact on a listed threatened species or communities? Comments: It is unlikely that the development of the Proposal would significantly affect threat-listed species or ecological communities.	nil
Any impacts on listed migratory species? Comments: It is unlikely that the development of the Proposal would significantly affect threat-listed migratory species.	nil
Any impact on a Commonwealth marine area? Comments: The works are not in the vicinity of a Commonwealth marine area.	nil
Does the Proposal involve a nuclear action (including uranium mining)? Comments: The Proposal does not involve a nuclear action.	nil
Additionally, any impact (direct or indirect) on Commonwealth land? Comments: The Proposal would not be undertaken on or near to any Commonwealth land.	nil