NSW GOVERNMENT

Transport Access Program

North Strathfield Station Upgrade

Review of Environmental Factors

Artist's impression of North Strathfield Station Upgrade, indicative only, subject to detailed design

October 2018

North Strathfield Station Upgrade
Review of Environmental Factors

Transport Access Program
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Contents

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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
ARI	Average Recurrence Interval
ASA	Asset Standards Authority (refer to Definitions)
ASS	Acid Sulfate Soils
BCA	Building Code of Australia
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CAMBA	China-Australia Migratory Bird Agreement
Canada Bay LEP	Canada Bay Local Environmental Plan
CBD	Central Business District
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CERT	Carbon Estimate and Reporting Tool
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
CSR	Combined services route
DBH	Diameter Breast Height
DBYD	Dial Before You Dig
D&C	Design & Construct
DDA	*Disability Discrimination Act 1992* (Cwlth)
DoE	Commonwealth Department of the Environment
DP&E	NSW Department of Planning and Environment
DSAPT	*Disability Standards for Accessible Public Transport (2002)*
DSI	Detailed Site Investigation (Phase II Contamination Investigation)
ECM	Environmental Controls Map
EMS	Environmental Management System

Term	Meaning
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
ETS	Electronic Ticketing System
EWP	Elevated Work Platform
FM Act	*Fisheries Management Act 1994* (NSW)
HA	Hectares
Heritage Act	*Heritage Act 1977* (NSW)
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2000).
JAMBA	Japan-Australia Migratory Bird Agreement
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007* (NSW)
L_{xxx}	See 'noise averaging periods' in Definitions section below
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
MCA	Multi-Criteria Analysis
NCA	Noise Catchment Area
NES	National Environmental Significance
Noxious Weeds Act	*Noxious Weeds Act 1993* (NSW)
NPfI.	*Noise Policy for Industry*
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
NSRU	North Strathfield Rail Underpass

Term	Meaning
OEH	NSW Office of the Environment and Heritage
OOHW	Out of hours works
PA system	Public Address system
PDP	Public Domain Plan
PEA	Preliminary Environmental Assessment
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RailCorp	(former) Rail Corporation of NSW
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	*Roads Act 1993* (NSW)
Roads and Maritime	NSW Roads and Maritime Services (formerly Roads and Traffic Authority)
RoKAMBA	Republic of Korea-Australia Migratory Bird Agreement
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SoHI	Statement of Heritage Impact
TCP	Traffic Control Plan
TfNSW	Transport for NSW
TGSI	Tactile Ground Surface Indicators (“tactiles”)
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
UDP	Urban Design Plan
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)

Definitions

Term	Meaning
'A' Frequency weighting	Frequency weightings are used to adjust sound level meters so that they are measuring and reporting noise levels that represent what humans hear. The human ear is more sensitive to midrange frequencies between 500Hz and 6kHz (for example a child's scream) and less sensitive to very low or very high pitch noises. Sound level meters have inbuilt frequency weighting networks that very roughly approximate the human loudness response at low sound levels. It should be noted that the human loudness response is not the same as the human annoyance response to sound. Here low frequency sounds can be more annoying than midrange frequency sounds even at very low loudness levels. The 'A' weighting is the most commonly used frequency weighting for occupational and environmental noise assessments.
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.
B-Double	A B-double is a combination of a prime mover towing two semi-trailers all connected by B-couplings
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
Decibel (dB)	The decibel (dB) is a unit used to measure the intensity of a sound by comparing it to a given value on a logarithmic scale. The logarithmic scale allows a wide range of values to be compressed into a more comprehensible range, typically 0–120 dB. Noise levels in decibels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dB, and another similar machine is placed beside it, the level will increase to 53 dB (from 10 log10 (10(50/10) + 10(50/10)) and not 100 dB. The human ear has a vast sound-sensitivity range of over a thousand billion to one so the logarithmic decibel scale is useful for acoustical assessments.
dBA	see 'A' Frequency weighting
Design and Construct Contract	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Construction Contractor. Construction The Contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to TfNSW acceptance). The Construction Contractor is therefore responsible for all work on the project, both design and construction.
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).

Term	Meaning
Disability Standards for Accessible Public Transport	The Commonwealth *Disability Standards for Accessible Public Transport 2002* ("Transport Standards") (as amended) are a set of legally enforceable standards, authorised under the Commonwealth *Disability Discrimination Act 1992* (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Frequency	The number of oscillations or cycles of a wave motion per unit time. 1 Hz is equivalent to one cycle per second. 1000 Hz is 1 kHz.
Hertz (Hz)	The unit used to measure frequency of sound expressed by cycles per second.
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 averaging periods	Noise can be measured over various periods of time. The five 'averaging periods' used in this report are described below: o $L_{Aeq(15\ min)}$ describes an average noise level across a period of time (either day, evening, night, or over a 15-minute period). It accounts for the full range of noise levels encountered in a given area over a given period. o L_{A90} describes the noise level that occurs for 90 per cent of the time and therefore describes the background noise level. o L_{A10} describes the noise level that occurs for 10 per cent of the time and therefore describes what the environment is like during the nosiest periods. o L_{Amax} describes the average maximum noise level recorded at any point in time.
Noise catchment area (NCA)	Areas containing noise sensitive receivers that have been categorised based on a similar noise environment.
Noise management level (NML)	An NML is a criteria for managing noise levels associated with an activity. They are site/project specific and are calculated based on the level of ambient noise (represented by the rating background level (RBL)) already at the site. An NML will consist of the RBL plus an allowable increase in noise emissions (e.g. RBL + 10dB). If noise emissions increase above the NML, sensitive receivers are likely to be disturbed. There are usually two types of NML, 'noise affected' and 'highly noise affected.' The noise affected level represents the point above which there may be some community reaction to noise. The highly noise affected level represents the point above which there may be strong community reaction to noise.

Term	Meaning
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches).
NSW Train Link	From 1 July 2013, NSW Trains (NSW Train Link) became the new rail provider of services for regional rail customers.
Opal card	The integrated ticketing smartcard being introduced by TfNSW.
Out of hours works	Defined as works *outside* standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act, in this instance, TfNSW.
Rail possession	Possession is the term used by railway building/maintenance personnel to indicate that they have taken possession of the track (usually a section of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
Tactiles	Tactile tiles or Tactile Ground Surface Indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.
The Proposal	The construction and operation of the North Strathfield Station Upgrade.
Vegetation Offset Guide	The TfNSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.5 of the EP&A Act. The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.

Executive summary

Overview

Transport for NSW (TfNSW) is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the North Strathfield Station Upgrade (the Proposal). The Proposal is part of the Transport Access Program which is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Description of the Proposal

The key features of the Proposal are summarised as follows:

- provision of three new lifts and associated weather canopies to allow for access to each of the station platforms and Queen Street from the existing footbridge
- footbridge connection from lift 1 at the Queen Street entrance to existing pedestrian footbridge
- upgrade of existing platform surfaces (re-grading/re-asphalting) at locations across platforms to provide compliant accessible paths and ramps to station amenities
- modifications to existing canopies to accommodate new lift on Platform 3
- installation of solar panels on new canopies at the Hamilton Street entrance to Platform 3
- modifications to the existing station building including:
    - upgrade of the existing unisex (ambulant) toilet
    - upgrade of the existing family accessible toilet
    - new Station Services Equipment Room
- installation of new combined services route from Queen Street to new Station Services Equipment Room the within the platform building
- installation of stormwater drainage connection from new lifts and associated canopies to existing stormwater system
- upgrade of the existing footpaths including widening of footpaths at the Queen Street entrance, re-grading and widening of footpaths from the Hamilton Street entrance to Platform 3
- provision of one new DDA compliant on-street parking space and upgrade to kiss-and-ride space along Queen Street to the south of the station entrance, including new kerb and ramps
- landscaping and planting works within the station precinct
- ancillary works including adjustments to lighting, electrical upgrades, electronic ticketing, new seating, improvement to station communications systems (including CCTV cameras), public address, hearing loops, wayfinding signage and installation of tactile ground surface indicators (TGSIs).

Subject to approval, construction is expected to commence in early 2019 and take around 12 months to complete. A detailed description of the Proposal is provided in Chapter 3 of this REF.

Need for the Proposal

The NSW Government is committed to facilitating and encouraging use of public transport, such as trains, by upgrading stations to make them more accessible, and improving interchanges around stations with other modes of transport such as buses, bicycles and cars. The Transport Access Program is an initiative targeted at achieving compliance with the Disability Standards for Accessible Public transport (DSAPT) Regulations across the Network.

North Strathfield station does not currently meet key requirements of the Disability Standards for Accessible Public Transport (DSAPT) or the *Commonwealth Disability Discrimination Act 1992* (DDA). It also does not allow for equitable access to the station platforms.

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

- stations that are accessible to customers with disabilities, customers who are less mobile, parents/carers with prams and customers with luggage
- improve customer experience (weather protection, better interchange facilities and visual appearance)
- minimal pedestrian conflict and crowding points
- improved integration with surrounding precinct
- improved customer safety
- improved wayfinding in and around the station
- respond to the heritage values of the site
- improved customer amenity
- improved pedestrian links between Queen Street, Hamilton Street East and Pomeroy Street.

The Proposal is consistent with NSW planning strategies, including *NSW: Making It Happen* (NSW Government 2015) and the *Future Transport Strategy 2056* (TfNSW 2018a). The Proposal would also ensure that North Strathfield station would meet legislative requirements under the *Disability Standards for Accessible Public Transport 2002* (DSAPT).

Design options considered

Three concept design options were developed to address accessibility requirements and objectives. These included:

- Options 1 and 2 which would retain the existing footbridge with three new lifts to the platforms and Queen Street. Option 2 also included consideration for a commuter car park with DDA compliant spaces, interchange upgrades and Kiss and Ride Facilities.
- Option 3 involved construction of a new footbridge to the north of station building. The footbridge would have three lifts between the platforms and Queen Street. This option also included a commuter car park and interchange upgrades.

The preferred option (a modification of Option 2) was selected to progress to the next phase of planning. A detailed description of the Proposal options considered is provided in section 2.3 of this REF.

Statutory considerations

The EP&A Act provides for the environmental impact assessment of development in NSW. Division 5.1 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under the EP&A Act.

The *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development and is the key environmental planning instrument which determines that the permissibility of the Proposal under Division 5.1 of the EP&A Act.

Clause 79(1) of the Infrastructure SEPP states that

> *'Development for the purpose of a railway or rail infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land*.'

Clause 78 defines 'rail infrastructure facilities' as including elements such as:

> *'(d) railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms*
>
> *(e)'public amenities for commuters*
>
> *(f) 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 Division 5.1 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 5.5 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

Chapter 6 of this REF presents the environmental impact assessment for the North Strathfield station Upgrade, in accordance with these requirements.

Community and stakeholder consultation

Under the Infrastructure SEPP, consultation is required with local councils or public authorities in certain circumstances, including where Council managed infrastructure is affected. Consultation has been undertaken with Sydney Trains, Canada Bay Council and Building Code of Australia (BCA)/DDA specialists during the development of design options and the preferred option. Consultation with these stakeholders would continue through the detailed design and construction of the Proposal.

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

- 'pop-up community information sessions
- direct notification to community stakeholders
- public display of the REF at various locations for community feedback.

Community consultation activities for the Proposal would be undertaken during the public display period of this REF. The REF would be displayed for a period of approximately two

weeks. Further information about these specific activities is included in Section 4.5 of this REF.

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

- Canada Bay (Concord) Library
  60 Flavelle St, Concord NSW 2137
  (02) 9911 6210
- Strathfield Main Library
  65-67 Rochester Street, Homebush NSW 2140
  (02) 8762 0222
- TfNSW Office at Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood.

The REF would also be available to download from the TfNSW website[1],yoursay page[2] a Project Infoline (1800 684 490) and email inbox (projects@transport.nsw.gov.au) would be available for members of the public to make enquiries.

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

Feedback can be sent to:

- projects@transport.nsw.gov.au
- **Transport Access Program – North Strathfield**

  Associate Director, Environmental Impact Assessment
  Transport for NSW
  Locked Bag 6501
  St Leonards NSW 2065

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

Figure 1.1 presents an overview of the consultation and planning process and the current status of the Proposal.

[1] http://www.transport.nsw.gov.au/projects/current-projects/north-strathfield-station-upgrade
www.yoursay.transport.nsw.gov.au/northstrathfield

Figure 1.1 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

The Proposal would provide the following benefits:

- a station that is accessible to people with a disability, limited mobility, parents with prams and people with luggage
- upgraded buildings and facilities for all modes that meet the needs of a growing population
- improved interchange and access facilities along Queen Street and Hamilton Street for transport customers.

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

- temporary impacts on local traffic flow associated with construction traffic and construction of the DDA compliant parking on Queen Street
- introduction of new elements, such as the lifts and associated weather canopies, to the visual environment
- temporary noise and vibration impacts associated with construction activities

- temporary disruptions to station facilities and amenities during construction (during planned track possessions), including temporary closures of the North Strathfield station and restricted pedestrian movements
- potential sediment mobilisation, dust generation and erosion risk during construction.

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

Conclusion

This REF has been prepared having regard to sections 5.5 and 5.7 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The detailed design of the Proposal would also be designed in accordance with the *NSW Sustainable Design Guidelines – Version 4.0* (TfNSW, 2017 taking into account the principles of ecologically sustainable development (ESD).

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

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

1 Introduction

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

1.1 Overview of the Proposal

1.1.1 The need for the Proposal

The NSW Government is committed to facilitating and encouraging use of public transport, such as trains, by upgrading stations to make them more accessible, and improving interchanges around stations with other modes of transport such as buses, bicycles and cars. The Transport Access Program is an initiative targeted at achieving compliance with the Disability Standards for Accessible Public transport (DSAPT) Regulations across the Network.

North Strathfield Station has been identified for an accessibility upgrade as it currently does not meet key requirements of the Disability Standards for Accessible Public Transport (DSAPT) or the *Commonwealth Disability Discrimination Act 1992* (DDA). It also does not allow for equitable access to the station platforms. North Strathfield Station comprises one island platform and one side platform. A footbridge and stairs currently provide the only means of access to the island platform. The side platform is accessible via the footbridge and stairs from the east or by existing pedestrian ramps from the west and north.

The following accessibility issues have been identified at North Strathfield Station and have been addressed in the design of the upgrade:

- access to North Strathfield Station is currently via stairs only, and therefore and it does not have accessibility for wheelchairs
- there is currently a lack of DDA compliant accessible car parking spaces or kiss and ride facilities
- some of the existing paths facilitating access to the station or interchange between modes are not currently compliant with DDA standards
- the existing platforms provide irregular tactile pavers with inadequate contrast throughout the precinct
- existing platform cross falls are not DDA compliant in certain areas.

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

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- provision of three new lifts and associated weather canopies to allow for access to each of the station platforms and Queen Street from the existing footbridge
- footbridge connection from lift 1 at the Queen Street entrance to existing pedestrian footbridge
- upgrade of existing platform surfaces (re-grading/re-asphalting) at locations across platforms to provide compliant accessible paths and ramps to station amenities

- modifications to existing canopies to accommodate new lift on Platform 3
- installation of solar panels on new canopies at the Hamilton Street entrance to Platform 3
- modifications to the existing station building including:
  - upgrade of the existing unisex (ambulant) toilet
  - upgrade of the existing family accessible toilet
  - new Station Services Equipment Room
- installation of new combined services route from Queen Street to new Station Services Equipment Room the within the platform building
- installation of stormwater drainage connection from new lifts and associated canopies to existing stormwater system
- upgrade of the existing footpaths including widening of footpaths at the Queen Street entrance, re-grading and widening of footpaths from the Hamilton Street entrance to Platform 3
- provision of one new DDA compliant on-street parking space and upgrade to kiss-and-ride space along Queen Street to the south of the station entrance, including new kerb and ramps
- landscaping and planting works within the station precinct
- ancillary works including adjustments to lighting, electrical upgrades, electronic ticketing, new seating, improvement to station communications systems (including CCTV cameras), public address, hearing loops, wayfinding signage and installation of tactile ground surface indicators (TGSIs).

Subject to planning approval, construction is expected to commence in early 2019 and take around 12 months to complete.

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

1.2 Location of the Proposal

The Proposal would involve upgrade works to North Strathfield Station, approximately 12kilometres west of Sydney's Central Business District (CBD). The regional context of the Proposal is shown in Figure 1.1.

The Proposal is in the suburb of North Strathfield and the City of Canada Bay Local Government Area (LGA), to which the *Canada Bay Local Environmental Plan 2013* (Canada Bay LEP) applies. North Strathfield Station is surrounded a combination of urban land uses including a small shopping area to the east of the station (along Queen Street), medium density housing (typically to the east) and various commercial buildings to the west.

The McDonald College (drama school) and Our Lady of the Assumption Primary School are also located immediately west of the station (shown in Figure 6.4).

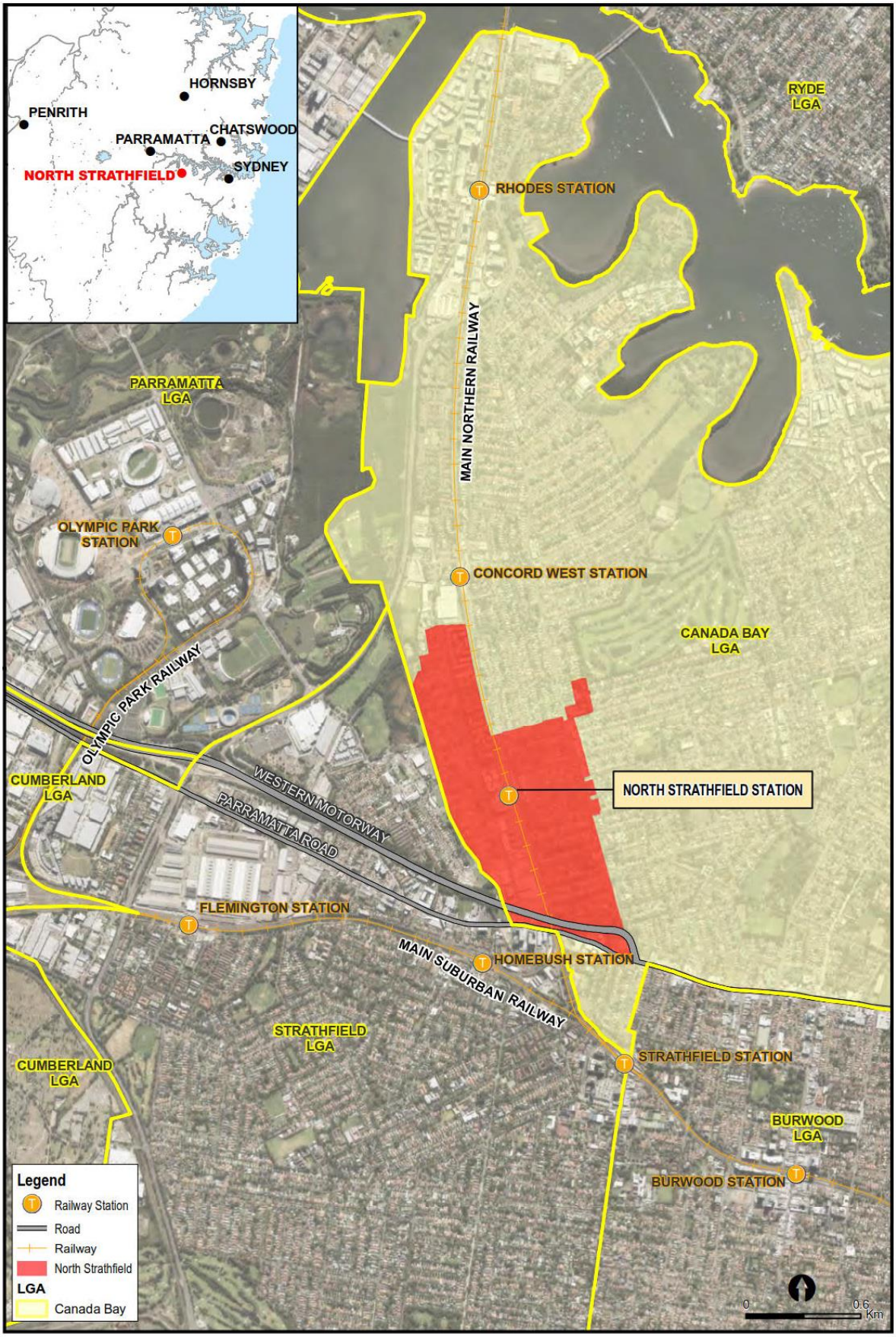


Figure 1.1 Regional context

The Proposal is generally bounded by Queen Street to the east, Pomeroy Street to the north, and Hamilton Street and McDonald College to the west. The majority of the Proposal is located within the station precinct itself, with some works also proposed along the west side of Queen Street and at the eastern end of Hamilton Street (refer to Figure 1.2).

North Strathfield Station is serviced by the Main Northern Line (T1 service), with about 5,500 passenger trips (combined entry and exit) recorded at the station on an average weekday in May 2017 (TfNSW, 2017a). The predicted 2036 (+15 percent) patronage for this station is about 13,300 passengers per weekday.

1.3 Existing infrastructure and land uses

The North Strathfield Station is comprised of an island platform (Platforms 1 and 2) and a western side platform (Platform 3). A site locality plan for North Strathfield Station is shown in Figure 1.2.

The island platform includes a single-storey, heritage listed brick building containing a station office, staff and public amenities and waiting room. The island platform and building date from circa 1918 and have been generally unaltered since that time (Photo 1.1). The heritage listing of the North Strathfield Station applies to the station building and interior, platforms and landscaped gardens at the Queen Street access (refer to section 6.5 for details).

The Platform 3 (Photo 1.2), is currently not in use and contains a small shelter to the north of the footbridge.

1.3.1 Station access

The station is bound by two overhead bridges; Pomeroy Street bridge (traffic and pedestrians) to the north of the station and a footbridge to the south. The footbridge provides access via stairs, to the station platforms. On the western side, footbridge stair access is via a long pedestrian ramp to Pomeroy Street to the north (Photo 1.3) and a shorter ramp to Hamilton Street East to the south. A landscaped forecourt is located at the Queen Street entrance (Photo 1.4). The footbridge was replaced in the 1990s with a concrete deck and reinforced concrete stairs (Photo 1.5).

1.3.2 Interchange facilities

Public transport and other interchange facilities surrounding the station include:

- existing bus stop located on the eastern side of the station along Queen Street to the north of Wellbank Street
- an existing single kiss-and-ride space along Queen Street to the south of Wellbank Avenue
- an existing single kiss-and-ride space within the cul-de-sac of Hamilton Street

Figure 1.2 Site locality map

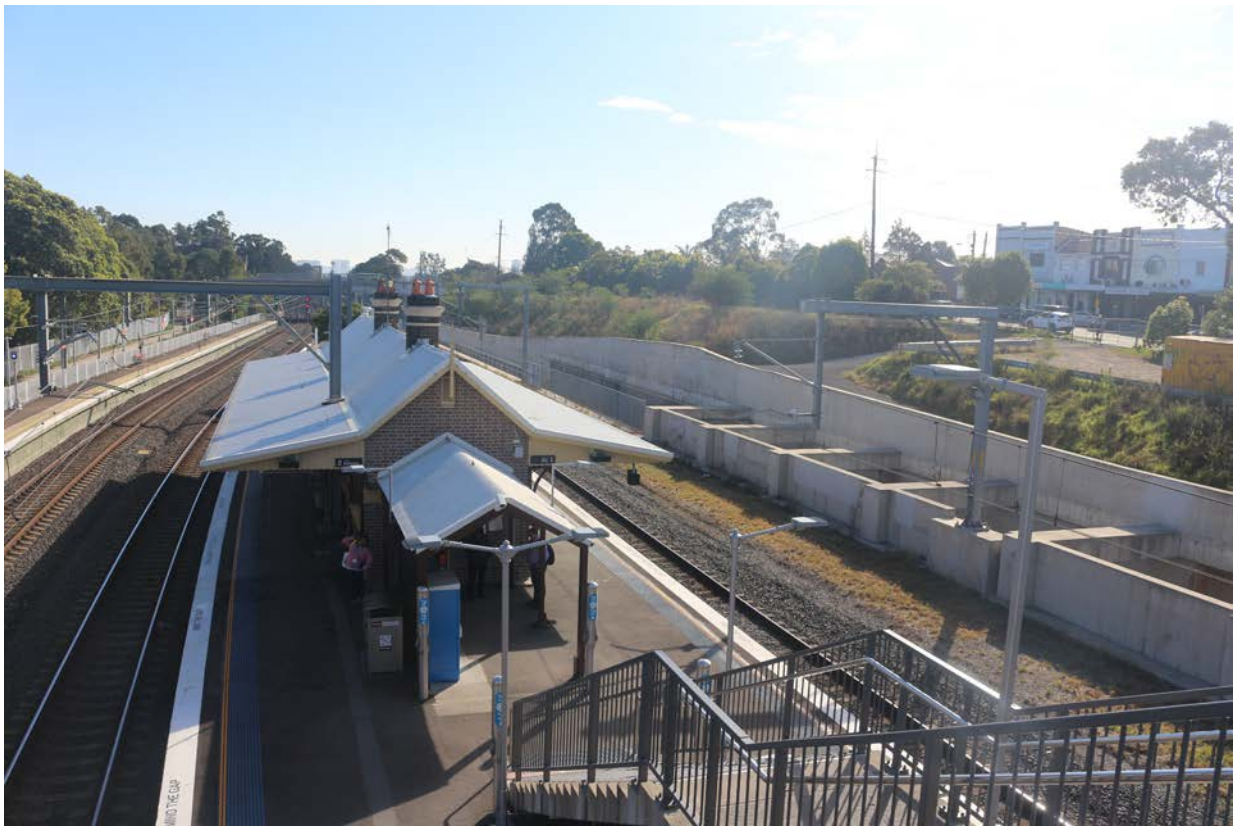


Photo 1.1 Photo showing the existing island platform, Platforms 1 and 2, looking north

Photo 1.2 Photo showing the existing western side platform (Platform 3), looking south-west

Photo 1.3 Photo showing the pedestrian ramp to Pomeroy Street, looking north

Photo 1.4 Photo showing the existing landscaped forecourt at the Queen Street entrance

Photo 1.5 Photo showing the existing pedestrian footbridge, looking east from Platform 3

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the North Strathfield Station Upgrade. For the purposes of these works, TfNSW is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of section 5.5 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (the EP&A Regulation).

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

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

Refer to Chapter 3.2.8 for more information on statutory considerations.

2 Need for the Proposal

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

2.1 Strategic justification

2.1.1 Overview

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

The North Strathfield Station Upgrade, the subject of this REF, forms part of the Transport Access Program. This program is an initiative targeted at achieving compliance with the Disability Standards for Accessible Public transport (DSAPT) Regulations across the transport network.

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

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

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

TfNSW has also developed a *Future Transport Strategy 2056* (TfNSW, 2018a), an overarching strategy, supported by a suite of plans, for transport in NSW to the year 2056. Future Transport 2056 ensures that NSW is prepared for rapid changes in technology and innovation to create and maintain a world-class, safe, efficient and reliable transport system over the next 40 years.

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 (an increase of around 15 percent to 2036) and changing travel patterns.

The *Disability Inclusion Action Plan 2018-2022* (TfNSW, 2017c) was developed by TfNSW, in consultation with the Accessible Transport Advisory Committee, which is made up of representatives from peak disability and ageing organisations within NSW. The Plan discusses the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provide a solid and practical foundation for future progress over the next five years. The Proposal has been developed in consideration of the objectives outlined in this Plan.

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

2.1.2 Objectives of the Transport Access Program

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

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

2.1.3 Objectives of the Proposal

The specific objectives of the North Strathfield Station Upgrade are to:

- provide a station that is accessible to those with a disability, the ageing and parents/carers with prams and customers with luggage
- improve customer experience (better interchange facilities)
- integrate the project with the surrounding area
- improve customer safety
- improve wayfinding in and around the station
- protect and enhance heritage features and significant trees
- maximise the amenity of the public domain
- improve pedestrian connectivity between Queen Street, Hamilton Street East and Pomeroy Street
- Provide an efficient and functional solution which enhances and contributes to local amenity and prosperity.

2.2 Design development

The existing station layout does not meet the requirements of the Commonwealth *Disability Discrimination Act 1992* (DDA Act) or the Disability Standards for Accessible Public Transport (DSAPT). It also does not allow for equitable access to the station platforms.

A Concept Design Report was finalised in 2018 (WSP, 2018), consistent with the primary objectives of the Transport Access Program.

The development of the concept design involved identifying current deficiencies of the North Strathfield Station and opportunities for improving accessibility and customer experience with respect to the DDA Act or DSAPT requirements (Table 2.1).

Table 2.1 Current deficiencies of the North Strathfield Station and opportunities identified in the concept design

Aspect	Deficiencies	Opportunities
Station platform	• Platforms have sections that may exceed 1:40 gradient.	Re-grading of platforms to address sections with non-conforming gradients. Re-alignment of fencing to widen western platform.
Existing ramps	• Hamilton Street ramp gradient may exceed 1:20 and cross falls may exceed 1:40. • Pomeroy Street ramp has trip hazards, poorly formed landings, no TGSI and non-complying gradient.	Modification of existing ramps and walkways for compliance.
Lifts	• There are no lift connections between the footbridge and platforms or Queen Street entry.	Installation of lifts at all three access points to the footbridge; Queen Street, Hamilton Street and island platform.
Stairs	• Existing stairs contain inconsistent risers, treads and tactile.	Upgrade non-compliant stairs.
Toilets	• Non-compliant unisex (ambulant) toilet	Modification of existing unisex toilet into a compliant ambulant toilet. Upgrade of the existing family accessible toilet.
Wayfinding	• Existing signage will be inadequate once lifts are installed.	Upgrade wayfinding to address the inadequate signage.
Waiting Area	• Existing waiting area on island platform is non-compliant.	Upgrade access to the existing waiting area.
Accessible paths and footpath	• Accessible paths and footpath between accessible parking/ kiss-and-ride to station FAT and boarding points may be inadequate.	Re-grading and path works where required.
DDA Parking	• No existing DDA accessible car park serving the station.	Construction of an accessible car space at Queen Street.
Accessible kiss-and-ride	• Non-compliant tactile. Non-compliant footpath.	Re-grading and path works. Replace TGSI.
Pedestrian Road Safety	• No tactile indicators at pedestrian crossings.	TGSI at pedestrian crossings
Security	• Additional security measures required with the inclusion of new infrastructure assets	Installation of CCTV in suitable area.

The proposed options which have been developed (refer to section 2.3 below) would each provide compliant access between the public domain, station and across the rail corridor using the existing footbridge. The major portion of the works for each of the options would be the installation of new lifts and upgrading of the Queen Street entrance.

The concept design has also considered the heritage value of North Strathfield station and station precinct as well as the local heritage trees in the vicinity of the station.

2.3 Alternative options considered

Three concept design options were developed to address accessibility requirements and objectives. Key features of each option are outlined below (Parsons Brinckerhoff, 2015).

2.3.1 Option 1

Key features of Option 1 included:

- retention of the existing footbridge
- provision of new lifts to Platforms 1 / 2 and 3 from the existing footbridge
- provision of a new lift at Queen Street end of the existing footbridge with option for a DDA compliant ramp
- partial canopy coverage
- provision of DDA compliant parking on Queen Street
- upgrade of kiss-and-ride facilities.

2.3.2 Option 2

Key features of Option 2 included:

- retention of the existing footbridge
- provision of new lifts to Platforms 1 / 2 and 3 from the existing footbridge
- provision of a new lift at Queen Street end of footbridge
- canopy coverage from existing entrance to the platforms
- provision of a car park for commuters, including DDA compliant spaces
- additional interchange upgrades e.g. bus stops, taxi stands, bike storage and enhanced pedestrian access paths.
- upgrade of kiss-and-ride facilities.

2.3.3 Option 3

Key features of Option 3 included:

- construction of a new footbridge to the north of station building
- provision of new lifts to Platforms 1 / 2 and 3
- provision of new lift at Queen Street end of footbridge
- canopy coverage from existing entrance to the platforms
- consideration of commuter car park including DDA compliant spaces

- additional interchange upgrades e.g. bus stops, taxi stands, bike storage and enhanced pedestrian access paths.
- upgrade of kiss-and-ride facilities.

2.3.4 The 'do-nothing' option

Under a 'do-nothing' option, existing access to the platforms, footbridge and car park would remain the same and there would be no changes to the way the station and interchange currently operates.

The NSW Government has identified the need for improving the accessibility of transport interchanges, train stations and commuter car parks across NSW as a priority under the Transport Access Program. The 'do nothing' option was not considered a feasible alternative as it is inconsistent with NSW Government objectives and would not help encourage the use of public transport and would not meet the needs of the North Strathfield community.

2.3.5 Assessment of identified options

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

2.4 Justification for the preferred option

It was agreed that Option 2 would be further developed as the preferred Concept Design. The final preferred option was a modified version of Option 2 combining the station accessibility features of Option 2 (i.e. lift and ramp features) and the interchange components of Option 1 (i.e. DDA compliant parking provision and upgrade of kiss-and-ride facilities). Option 3 was discounted due to the potential impacts associated with providing a new / additional footbridge to the north of the station building.

Overall, it was agreed that a modified Option 2 would be further developed as the preferred option as it would:

- achieve DDA compliance
- achieve the required design modifications to the station without significant negative impact
- provide improved access from both the east and west of the station to all station platforms.
- The canopy coverage was removed from the scope of the preferred option due to the focus on providing accessibility upgrades as required by the DSAPT and DDA.

3 Description of the Proposal

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

3.1 The Proposal

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

The Proposal would include the following key elements:

- provision of three new lifts and associated weather canopies to allow for access to each of the station platforms and Queen Street from the existing footbridge
- footbridge connection from lift 1 at the Queen Street entrance to existing pedestrian footbridge
- upgrade of existing platform surfaces (re-grading/re-asphalting) at locations across platforms to provide compliant accessible paths and ramps to station amenities
- modifications to existing canopies to accommodate new lift on Platform 3
- installation of solar panels on new canopies at the Hamilton Street entrance to Platform 3
- modifications to the existing station building including:
    - upgrade of the existing unisex (ambulant) toilet
    - upgrade of the existing family accessible toilet
    - new Station Services Equipment Room
- installation of new combined services route from Queen Street to new Station Services Equipment Room the within the platform building
- installation of stormwater drainage connection from new lifts and associated canopies to existing stormwater system
- upgrade of the existing footpaths including widening of footpaths at the Queen Street entrance, re-grading and widening of footpaths from the Hamilton Street entrance to Platform 3
- provision of one new DDA compliant on-street parking space and upgrade to kiss-and-ride space along Queen Street to the south of the station entrance, including new kerb and ramps
- landscaping and planting works within the station precinct
- ancillary works including adjustments to lighting, electrical upgrades, electronic ticketing, new seating, improvement to station communications systems (including CCTV cameras), public address, hearing loops, wayfinding signage and installation of TGSIs.

Figure 3.1 shows the general layout of key elements for the Proposal. Elevations are shown in Figure 3.2 and Figure 3.3. An artist impression is shown in Figure 3.4.

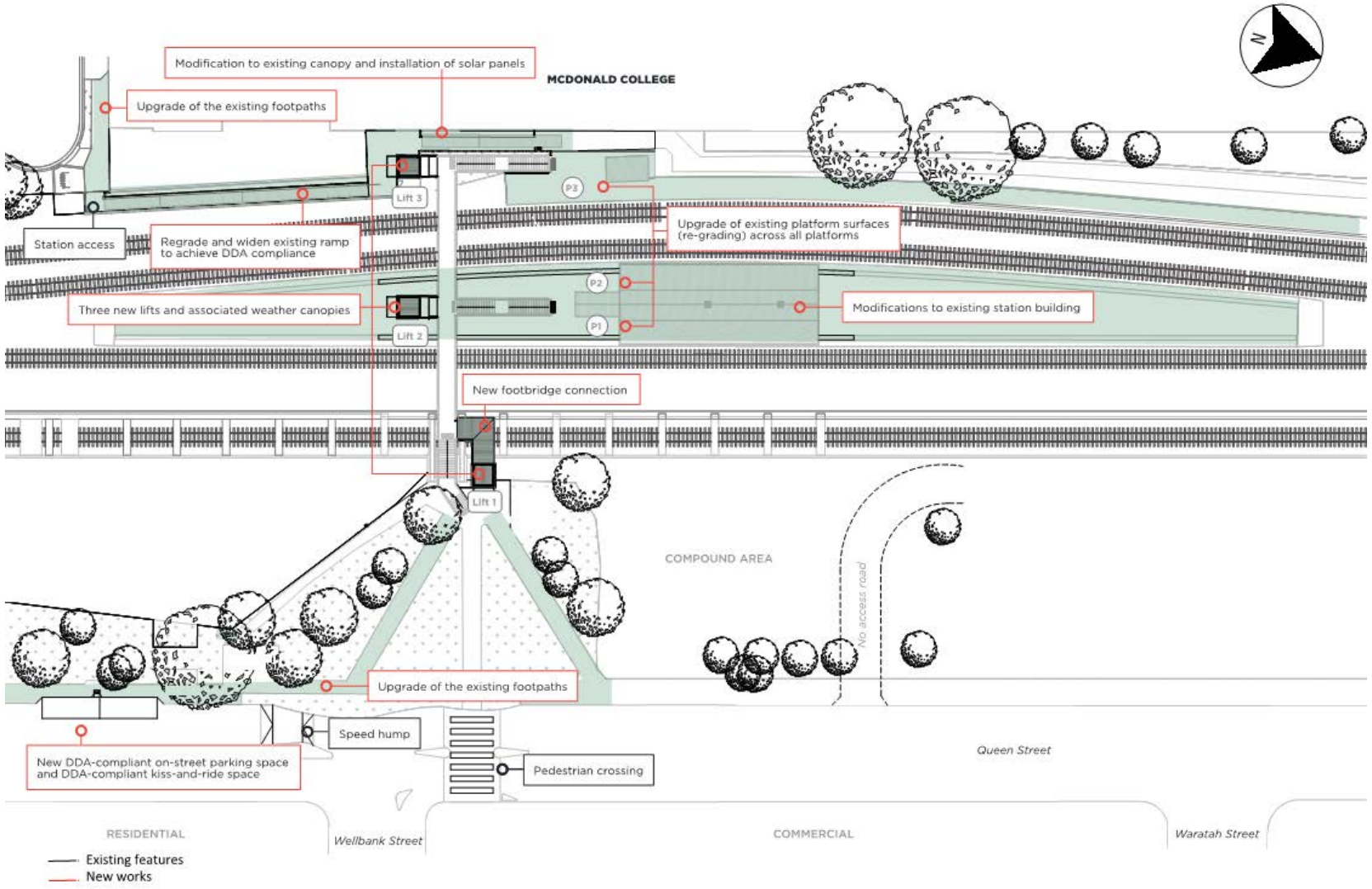
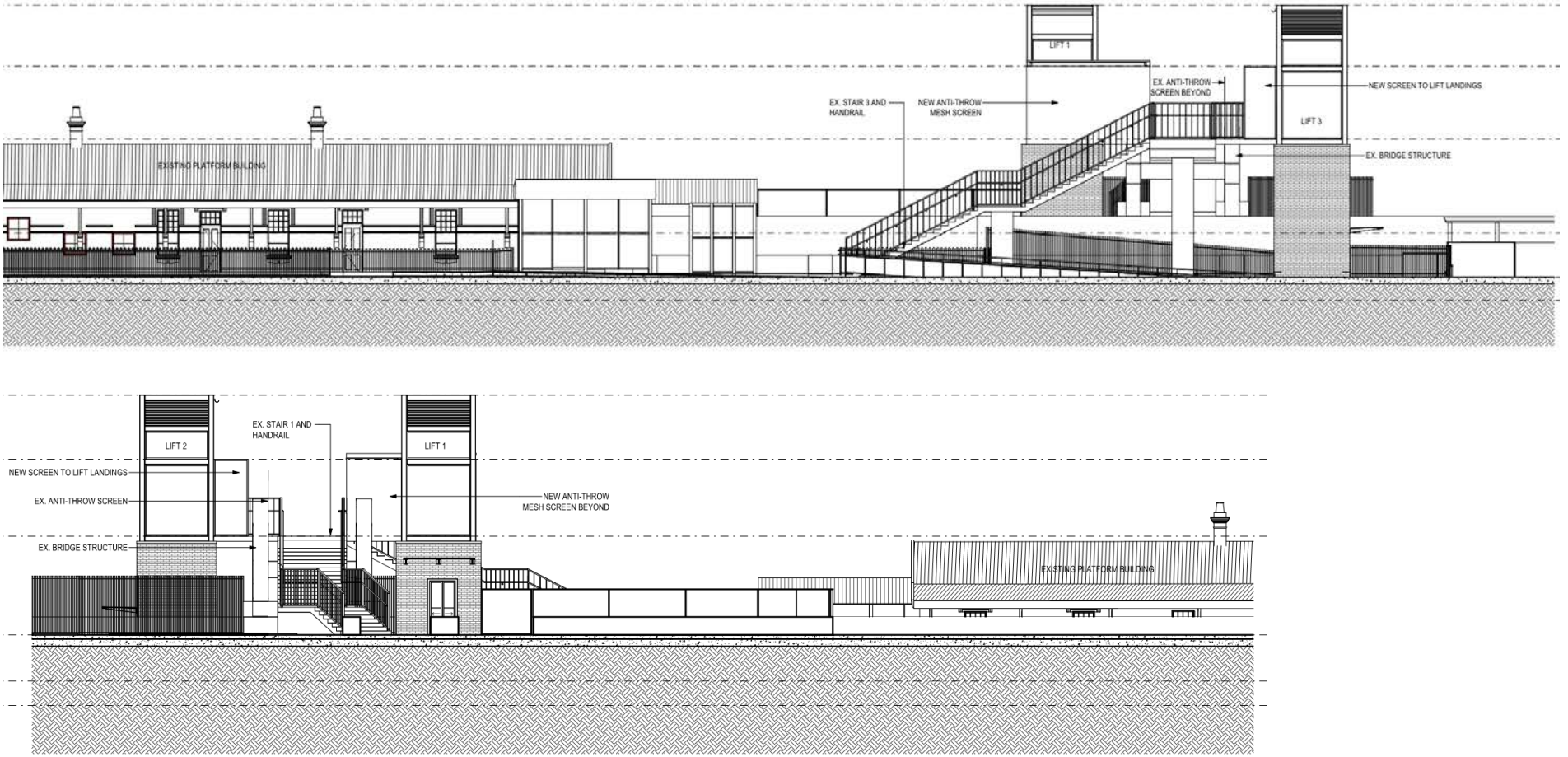
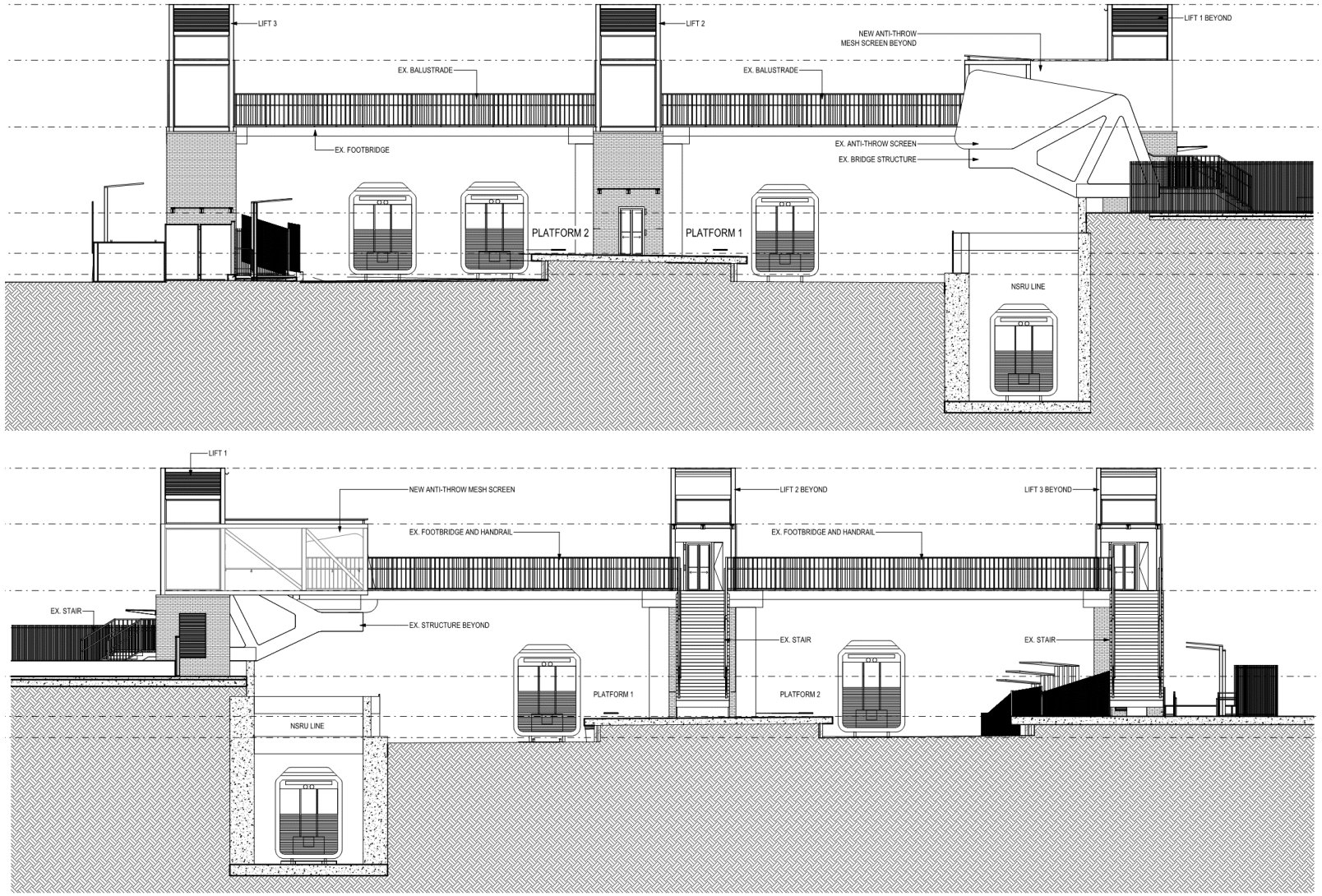


Figure 3.1 Key features of the Proposal



(Indicative only, subject to detailed design)

Figure 3.2 East elevation – Queen Street Entry



(Indicative only, subject to detailed design)

Figure 3.3 Cross sections

(Indicative only, subject to detailed design)

Figure 3.4 Artists impression

3.1.1 Scope of works

Station upgrade

Details of the proposed works to take place at the station to improve accessibility and customer experience are provided below:

- provision of three new lifts to allow for access to each of the station platforms and Queen Street from the existing footbridge. Each would include an entry landing at footbridge level and platform or footpath level and new canopies over lift entry at footbridge level for weather protection. Existing sections of footbridge balustrade, handrail and kerb would be removed as required to accommodate the new lifts.
- footbridge connection from lift 1 at the Queen Street entrance to existing pedestrian footbridge
- upgrade of existing platform surfaces (re-grading/re-asphalting) across all platforms to provide compliant accessible paths and ramps to station amenities
- modifications to existing canopies to accommodate the new lift on Platform 3
- installation of solar panels on new canopies from the Hamilton Street entrance to Platform 3
- upgrade of the existing footpaths including widening of footpaths at the Queen Street entrance, regrading and widening of footpaths from the Hamilton Street entrance to Platform 3

Upgrades to accessible parking and kiss-and -ride

The following works would be undertaken to provide upgrades to accessible parking and drop-off locations:

- provision of one new DDA compliant on street parking space and one DDA compliant kiss-and-ride space along Queen Street to the south of the station entrance, including new kerb and ramps
- relocation of bike racks to Hamilton Street East Entry and planting of new low shrub hedge to screen bin bay behind.

Station building modifications

The following modifications would be undertaken within the station building:

- modifications to the existing station building including:
  - upgrade of the existing unisex (ambulant) toilet
  - upgrade of the existing family accessible toilet
  - new Station Services Equipment Room

Ancillary works

The following ancillary works may also be required as part of the upgrade:

- installation of new combined services route from Queen Street to new Station Services Equipment Room the within platform building
- new stormwater drainage connection from new lifts and associated canopies to existing stormwater system
- services relocation and/or adjustments, including lighting and communications systems (e.g. CCTV), stormwater drainage, retaining walls, and overhead wiring
- new/upgraded wayfinding signage and provision of the statutory/regulatory signage
- landscaping and planting works within the station precinct
- adjustments to boundary fencing (where required)
- new TGSI (where required)
- temporary site compounds for storage of materials and equipment
- temporary works (where required) during construction in order to maintain existing pedestrian ‘level of service’.
- provision of temporary construction and laydown areas within the existing rail corridor (refer to section 3.2 for additional details).

Materials and finishes

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

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

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

- lift shafts – precast concrete with Colorbond façade and glass for upper sections
- pedestrian footbridge and paths – concrete with metal handrail
- platform stairs – concrete with metal handrail
- platform canopies – steel frame and Colorbond.

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

3.1.2 Engineering constraints

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

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

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

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

- existing conduit and transmission lines/electrical services
- telecommunication services
- stormwater services
- high pressure gas mains
- water and sewer services
- rail utilities, including signalling cabling and overhead wiring.

Other considerations: North Strathfield Station is listed on the RailCorp Section 170 Heritage and Conservation Register. The station has local historical significance and is a highly intact example of a late 19th to early 20th century standard type of railway station. The heritage listing applies to the station building, interior, platforms and landscaped gardens fronting Queen Street.

In addition, approximately 12 street trees (Brush Boxes *Lophostemon confertus*) is listed in Schedule 5 of the Canada Bay LEP (2013) are located along Queen Street.

3.1.3 Design standards

The Proposal would be designed having regard to the following:

- *Disability Standards for Accessible Public Transport 2002* (issued under the Commonwealth *Disability Discrimination Act 1992*)
- Building Code of Australia

- relevant Australian Standards
- Asset Standards Authority standards
- Sydney Trains standards
- *NSW Sustainable Design Guidelines – Version 4.*0 (TfNSW, 2017)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design (CPTED) principles
- other TfNSW policies and guidelines
- council standards, codes and guidelines (where relevant).

3.1.4 Sustainability in design

The development of the concept design for the Proposal has been undertaken in accordance with the project targets identified in TfNSW's Environmental Management System (EMS) and the *NSW Sustainable Design Guidelines - Version 4.0* (TfNSW, 2017) which groups sustainability into seven themes:

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

There are 14 compulsory requirements and 2 sub requirements that project teams are required to implement when there is confirmation that these individual initiatives are applicable to the project. Each compulsory requirement has an associated list of supporting initiatives.

These compulsory requirements have been reviewed and incorporated into the concept design (unless otherwise justified) and documented in a Sustainable Design Guidelines checklist that was approved by TfNSW (a summary is provided in Appendix C). The checklist and the requirements contained within would be reviewed again at the detailed design and construction phases, and submitted for approval by TfNSW.

3.2 Construction activities

3.2.1 Work methodology

Subject to approval, construction is expected to commence in early 2019 and take around 12 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with TfNSW.

The proposed construction activities for the Proposal are identified in Table 3.1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

Table 3.1 Indicative construction staging for key activities (subject to detailed design)

Stage	Activities	Timing
Site establishment and enabling works	• Site investigations and survey • establishment of site compounds (i.e. erect fencing, tree protection zones, site offices, amenities and plant/material storage areas) • establishment of temporary facilities as required (e.g. temporary access stairs, temporary toilets, construction lights etc.) • erect hoarding around the different work fronts at station • installation of power where required • traffic control measures.	Standard hours or 48-hour rail shutdown
Lift works (Lifts 2 and 3)	• relocation of existing services and installation of combined services route • removal of portion of canopy affected by Lift 3 • removal of existing railings and other existing footbridge components (as required) • piling waterproofing (as required), installation of reinforcement, formwork and concrete to form the lift pit • construction of lift shaft structure • lift installation and commissioning • architectural fit-out around lift shaft including new weather canopies and brick façade • Installation of new stormwater drainage pipework on Platform 1 and 2.	Standard hours or 48-hour rail shutdown
Lift works (Lift1 eastern entrance)	• relocation of existing services and installation of combined services route • removal of one tree and existing garden bed to accommodate area for new lift shaft • relocation of existing services • piling, waterproofing (as required), installation of reinforcement, formwork and concrete to form the lift pit • removal of existing railings and other existing footbridge components (as required) • construction of lift shaft structure and footbridge connection • lift installation and commissioning • architectural fit-out around lift shaft including new weather canopies and brick façade.	Standard hours or 48-hour rail shutdown

Stage	Activities	Timing
Platforms (Platforms 1, 2 & 3)	• trenching for a combined services route (CSR) • installation of new stormwater from new lift canopies to existing stormwater • platform regrading and asphalt resurfacing • ancillary works including adjustments to lighting, electrical upgrades, electronic ticketing, new seating, improvement to station communications systems (including CCTV cameras), public address, hearing loops, wayfinding signage and installation of tactile ground surface indicators (TGSIs)	Standard hours or 48-hour rail shutdown
New walkway construction	• demolition of existing non-compliant ramp • excavation and regrading of existing walkway areas.	Standard hours or 48-hour rail shutdown
Station building works	• reconfiguration of internal station building areas to allow for upgrades to existing unisex and Family Accessible Toilets	Standard hours
Upgrades to accessible parking and kiss-and-ride	• regrading and re-asphalting of existing pedestrian paths to interchange locations • installation of new kerb and ramps at the proposed kiss-and-ride and DDA compliant car park locations • relocation of bike racks to station entry (Hamilton Street East)	Standard hours
Demobilisation	• installation of ancillary features and landscaping • removal of hoardings • commissioning of lifts 1, 2 and 3 • clearing of site of construction materials and equipment	Standard hours

3.2.2 Plant and equipment

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

- trucks
- jack hammer
- chainsaw
- piling rig
- franna/mobile cranes
- bobcat
- excavator
- dump trucks (hi-rail, rubber tyred)
- demolition/road saw
- concrete boom/line pump
- concrete truck
- lighting tower
- coring machine
- water cart
- suction trucks
- forklift
- hi-rail plant
- asphalt paving machine
- vibrating roller/compaction plate
- road rail excavator
- hand tools
- skip trucks
- hammer drills
- torque wrenches and

- impact wrenches
- grinders and bar
- benders
- elevated work platform (EWP).

3.2.3 Working hours

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

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

Certain works may need to occur outside standard hours and would include night works and works during routine rail possessions which are scheduled closures that would occur regardless of the Proposal when part of the rail network is temporarily closed and trains are not operating.

Out of hours works are required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers; and to ensure the safety of railway workers and operational assets. It is estimated that approximately four rail possessions would be required to facilitate the following:

- detailed site survey, services investigations and/or geotechnical investigations within and around the tracks
- installation of construction hoardings to platforms
- construction works including site establishment, removal of some existing structures
- piling, excavation for lift pits and installation of lift shafts
- excavations on platform for CSR
- platform regrading/resurfacing
- regrading and installation of some walkways

Out of hours works may also be scheduled outside rail possession periods. Approval from TfNSW would be required for any out of hours work and the affected community would be notified as outlined in the TfNSW *Construction Noise and Vibration Strategy* (TfNSW, 2018b) (refer to Section 6.3 for further details).

3.2.4 Earthworks

Excavations and earthworks would generally be required for the following:

- the construction of the lift shafts would require open cut excavations through both the existing garden bed (eastern lift) and existing platform areas (central and western lift) including excavation into the existing soil/fill at these locations
- CSR trenching requires trenching along platforms
- the construction of upgraded footpath areas would require some minor excavation and regrading
- regrading/re-asphalting of platforms
- other minor civil works including footings and foundations for structures, drainage/stormwater works, and trenching activities for service adjustments and relocations

Excavated material would be reused onsite where possible or disposed of in accordance with relevant legislative requirements. It is estimated that around 200 cubic metres of earthworks would be required to accommodate the lift shafts, ramp construction and other ancillary works.

3.2.5 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal, and would consider the requirements of the *NSW Sustainable Design Guidelines – Version 4.0* (TfNSW, 2017). Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

3.2.6 Traffic access and vehicle movements

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

- potential higher level of platform congestion arising from restricted access to these areas
- temporary minor increase in walking distance for rail customers during construction works requiring closure of Hamilton street access to station Platform 3
- higher road safety risk levels associated with construction vehicle and pedestrian interactions
- conflicts between buses and construction related vehicles accessing the site compound at the bus stop
- minor disruptions to pedestrian/cyclist movements in and around the station and bus stop
- a minor increase in traffic on the local road network.

3.2.7 Ancillary facilities

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. An area for a construction compound has been proposed on the eastern side of the existing rail corridor, between the tracks adjacent to Platform 1 and Queen Street (Figure 3.5). The area nominated for the compound is within the existing rail corridor, owned by Sydney Trains. This site was previously used as a compound site for the construction of the North Strathfield Rail Underpass and is currently a cleared area. Impacts associated with utilising this area have been considered in the environmental impact assessment including requirements for rehabilitation.

Additional areas along the eastern side of the rail corridor (adjacent to the North Strathfield Rail Underpass dive) would also potentially be required for material laydown (to the south of the station/platforms).

Subject to ongoing development of the construction methodology, temporary access to The McDonald College site may be required to allow for crane/lifting operations during the installation of the western lift. This would be subject to further discussion with The McDonald College and refinement of the final construction methodology.

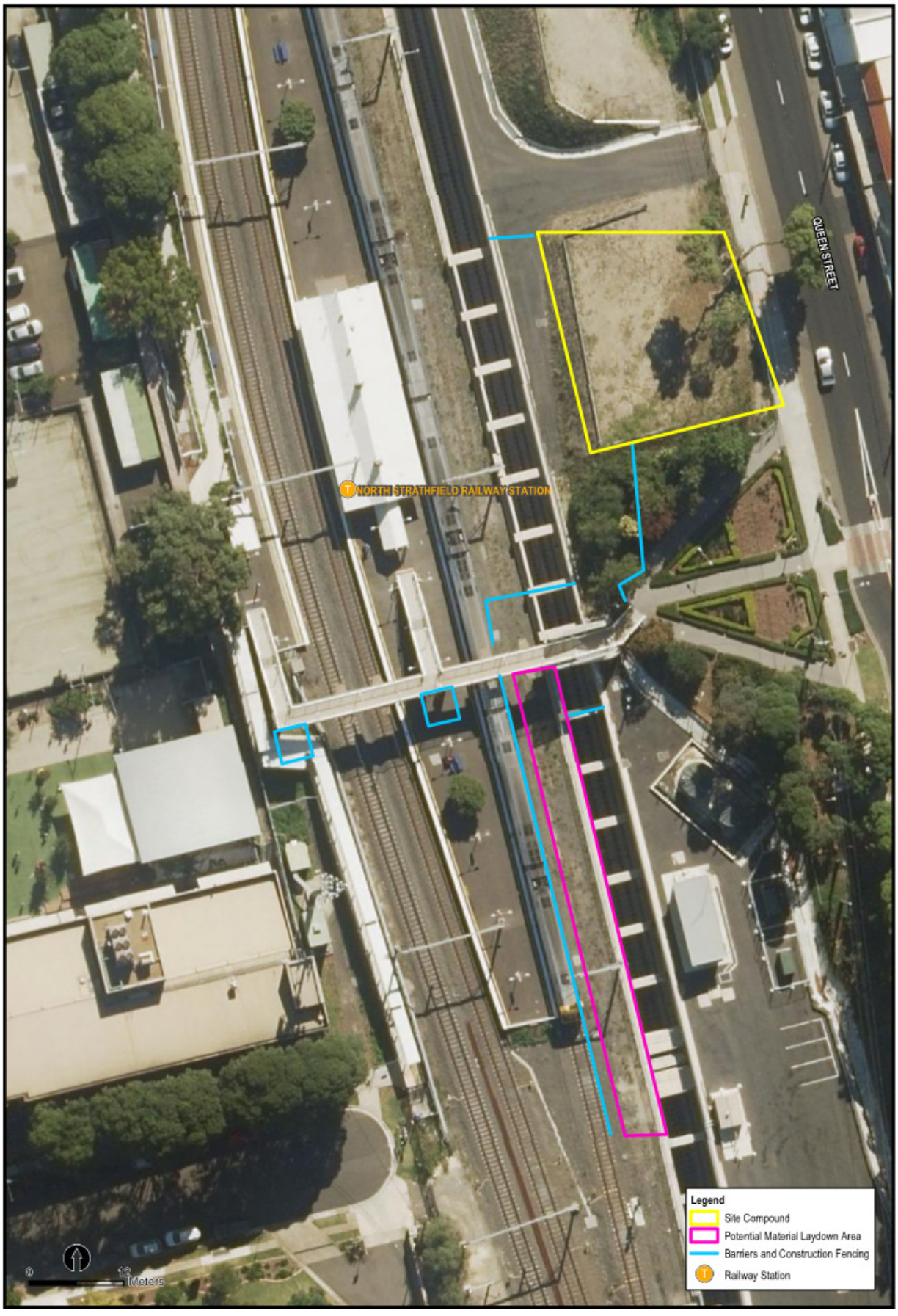


Figure 3.5 Proposed works zone and nominated compound area(s)

3.2.8 Public utility adjustments

The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. It is likely some services may require relocation, including existing electrical, water and sewer services where they are located within the vicinity of proposed works for the upgrades to the existing toilet facilities. Additional utility adjustments may be required to accommodate new infrastructure (such as the new lifts).

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

Relocation or other works that may affect services would be undertaken in consultation with the respective utility authorities.

3.3 Property acquisition

TfNSW does not propose to acquire any property as part of the Proposal.

3.4 Operation management and maintenance

Structures constructed under this Proposal would be maintained by Sydney Trains. However, it is expected that adjacent garden/ landscape areas would continue to be maintained by Canada Bay Council.

4 Statutory considerations

4.1 Environment Protection and Biodiversity Conservation Act 1999

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

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

4.2 NSW legislation and regulations

4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under Part 4 of the Act.

In accordance with section 5.5 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal.

Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) defines the factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act has a significant impact on the environment. Chapter 6 of the REF provides an environmental impact assessment of the Proposal in accordance with clause 228 and Appendix B specifically responds to the factors for consideration under clause 228.

4.2.2 Other NSW legislation and regulations

Table 4.1 provides a list of other relevant legislation applicable to the Proposal.

Table 4.1 Other legislation applicable to the Proposal

Applicable legislation	Considerations
Contaminated Land Management Act 1997 (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the Office of Environment and Heritage (OEH), and potentially investigate and remediate land if contamination is above EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated (refer Section 6.8).
Crown Lands Act 1987 (NSW)	The Proposal does not involve works on any Crown land.
Disability Discrimination Act 1992 (DDA Act) (Cwlth)	The Proposal would be designed having regard to the requirements of this Act. The key objective of the project is to improve the accessibility of North Strathfield Station which is consistent with the objectives of this Act.

Applicable legislation	Considerations
Heritage Act 1977 (Heritage Act) (NSW)	Two listed heritage items are within the Proposal area: • North Strathfield Railway Station Group, which is listed on the RailCorp Section 170 Heritage and Conservation Register (Item 4801029) • 12 street trees (Item I397) located along the western side of Queen Street, listed in Schedule 5 of the Canada Bay LEP 2013 heritage register A heritage (including archaeological) assessment has been undertaken for the Proposal and is summarised in Section 6.5. The archaeological assessment concluded that there is a low risk of exposing historical archaeological relics during construction and that no archaeological approvals under Section 139 would be required. However, if unexpected archaeological items are discovered during the construction of the Proposal, all works would cease and appropriate advice sought, in accordance with TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2016b). Formal notification is to be provided by the asset owner to the Heritage Council regarding the partial demolition of elements associated with the North Strathfield Group at least 14 days prior to the demolition of these structures in accordance with section 170A(1)(c) of the Heritage Act. No items of State heritage significance were identified near the Proposal, and therefore an approval under Section 60 of the Heritage Act would not be required.
National Parks and Wildlife Act 1974 (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from OEH for the destruction or damage of Indigenous objects. The Proposal is unlikely to disturb any Indigenous objects (refer Section 6.4). However, if unexpected archaeological items or items of Indigenous heritage significance are discovered during the construction of the Proposal, all works would cease and appropriate advice sought. Additionally, as identified in Table 5.1 below, the Proposal would not involve impacts to land reserved for, or adjacent to, land reserved under the NPW Act.
Biosecurity Act 2015 (NSW)	No Priority Weeds listed under the Biosecurity Act 2015 for the Greater Sydney Region were identified in the study area. Appropriate management methods would be implemented during construction (refer Section 6.7).
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the PoEO Act, TfNSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the CEMP to be prepared and implemented by the Contractor.
Sydney Water Act 1994 (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
Biodiversity Conservation Act 2016(BC Act) (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 Section 6.7).

Applicable legislation	Considerations
Roads Act 1993 (Roads Act) (NSW)	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads. The majority of roads surrounding the Proposal area are local roads, managed and maintained by Canada Bay Council (refer to Section 6.1 for more information). The Proposal would involve works on Queen Street to the east of the station and Hamilton Street East to the west of the station, which are not identified as classified roads. No approvals under the Roads Act are therefore expected to be required. However, the works would be undertaken in consultation with Canada Bay Council including obtaining Road Occupancy Licence(s) for temporary road closures to facilitate works (where required).
Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)	TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared for the Proposal.
Water Management Act 2000 (NSW)	The Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management works, drainage or flood works, controlled activities or aquifer interference.

4.3 State Environmental Planning Policies

4.3.1 State Environmental Planning Policy (Infrastructure) 2007

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

Clause 79 of the Infrastructure SEPP allows for certain types of development to be carried out by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act). Specifically, Clause 79(1) of the Infrastructure SEPP states that

> *'Development for the purpose of a railway or rail infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land*.'

Clause 78 defines 'rail infrastructure facilities' as including elements such as:

> *'(d) railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms*
>
> *(e)'public amenities for commuters*
>
> *(f) associated public transport facilities for railway stations…*

Consequently, development consent is not required for the Proposal which is classified as a rail infrastructure facility, however the environmental impacts of the Proposal have been assessed under the provisions of Division 5.1 of the EP&A Act.

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

Section 5.2 of this REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP. It is noted that the Infrastructure SEPP prevails over all other environmental planning instruments except where *State Environmental Planning Policy (Major Development) 2005* or *State Environmental Planning Policy (Coastal Management) 2018* applies. The Proposal does not require consideration under these SEPPs and therefore do not require further consideration as part this REF.

4.3.2 State Environmental Planning Policy 55 – Remediation of Land

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

Section 6.8 of this REF contains an assessment of the potential contamination impacts of the Proposal. It is not expected that any large scale remediation (Category 1) work would be required as part of the Proposal. The proposed land use does not differ to the existing use and is, therefore, unlikely to be affected by any potential contaminants that exist within the rail corridor.

4.4 Local environmental planning instrument and development controls

The Proposal is located within the Canada Bay LGA. The provisions of the Infrastructure SEPP mean that Local Environmental Plans (LEPs), prepared by councils for an LGA, do not apply. However, during the preparation of this REF, the provisions of the *Canada Bay Local Environmental Plan 2013* were considered.

4.4.1 Canada Bay Local Environmental Plan 2013

The *Canada Bay Local Environmental Plan 2013* (Canada Bay LEP) is the governing plan for the Canada Bay LGA, including North Strathfield. Table 4.2 summarises the relevant aspects of the Canada Bay LEP applicable to the Proposal. Figure 4.1 shows the relevant section of the zoning map from the Canada Bay LEP, with the indicative location of the Proposal.

Table 4.2 Relevant provisions of the Canada Bay LEP

Provision description	Relevance to the Proposal
Clause 2.3 – Zone objectives and Land Use Table	**Applicable land zones** • Under the Canada Bay LEP, the Proposal is located in areas zoned as: • SP2 Infrastructure (Rail) for the proposed works associated with the station platform and buildings • B1 Neighbourhood Centre and R3 Medium Density Residential for the proposed works associated with the footpaths and access on Queen Street • B3 Commercial Core for the proposed works associated with footpaths and access on Hamilton Street East **Zone objectives** The objectives of the applicable land zones are as follows: • SP2 Infrastructure (Rail) – to provide for infrastructure and related uses and to prevent development that is not compatible with or that may detract from the provision of infrastructure

Provision description	Relevance to the Proposal
Clause 2.3 – Zone objectives and Land Use Table (cont.)	• B1 Neighbourhood Centre – to provide a range of small scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood.R3 Medium Density Residential– to provide for the housing needs of the community within a medium density residential environment, to provide a variety of housing types within a medium density residential environment and to enable other land uses that provide facilities or services to meet the day to day needs of residents. • B3 Commercial Core– to provide a wide range of retail, business, office, entertainment, community and other suitable land uses that serve the needs of the local and wider community, to encourage appropriate employment opportunities in accessible locations and to maximise public transport patronage and encourage walking and cycling. The Proposal is consistent with the objectives of these zones. **Permissible development within land zones** Development for the purposes of a rail infrastructure facility is permissible with consent under the provisions of the SP2 Infrastructure (Rail) zone, and road development is permissible with consent under the B1 Neighbourhood Centre, R3 Medium Density Residential and B3 Commercial Core zones. However, as the provisions of the Infrastructure SEPP prevail over the Canada Bay LEP, development consent from Canada Bay Council is not required.
Clause 5.10 – Heritage Conservation	Clause 5.10 of the Canada Bay LEP provides for the protection of items, places and archaeological sites which have been identified in the Canada Bay LEP as having heritage significance. The street trees on Queen Street (referred to under the LEP as the 'Street Trees' – Item I397) are listed on the heritage schedule of the Canada Bay LEP (Schedule 5). A series of other heritage items are listed on the Canada Bay LEP in the immediate vicinity of the Proposal including: • Bakehouse Quarter (former Arnott's complex) (item 541) • Substation (40A George Street) (Item 213) A discussion of potential impacts to local heritage and the requirements for consent is provided in section 6.5.
Clause 6.1 – Acid Sulfate Soils (ASS)	The Proposal site is not located on land that is mapped as having potential for ASS.
Clause 6.2 - Earthworks	Clause 6.2 of the Canada Bay LEP aims to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. By virtue of clause 5(3) and 79 of the Infrastructure SEPP, the Proposal is permissible without development consent. Consideration of the potential impacts and mitigation measures for earthworks for the Proposal is outlined in Section 6.8.
Clause 6.3 – Flood planning	The Proposal site is not located on land that is mapped as flood prone.
Clause 6.4 – Terrestrial biodiversity	The Proposal site is not located on land that is mapped as having terrestrial biodiversity.

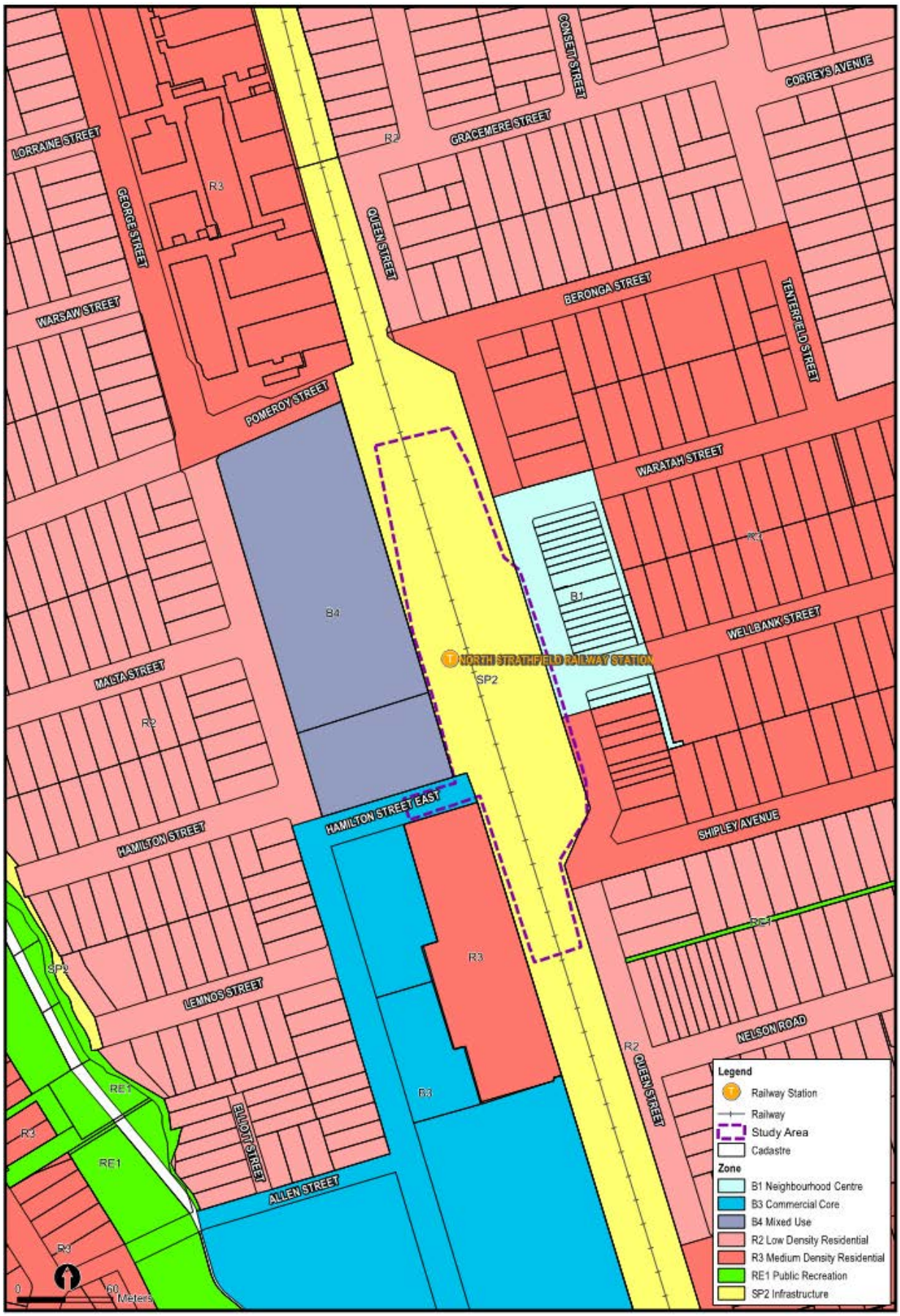


Figure 4.1 Canada Bay LEP zoning map

4.5 NSW Government policies and strategies

Table 4.3 provides an overview of other NSW Government policies and strategies relevant to the Proposal.

Table 4.3 NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Commitment	Comment
Future Transport Strategy 2056 (TfNSW, 2018)	*Future Transport 2056* is an update of NSW's *Long Term Transport Master Plan*. It is a suite of strategies and plans for transport to provide an integrated vision for the state. The strategy places the customer at the centre of works undertaken by TfNSW. It includes issue specific and place based supporting plans that seek to integrate transport modes. The strategy outlines 6 state-wide outcomes • customer focused • successful places • a strong economy • safety and performance • accessible services	The Proposal supports the vision of the *Future Transport Strategy* by providing accessible services for people who find it difficult to access public transport services. New lifts and accessible paths as proposed by the Proposal would provide a more physically accessible network allowing greater choice for people with mobility constraints to access public transport. Greater accessibility would also mean better connections to places and opportunities for employment, education, business and enjoyment.
Disability Action Plan 2012-2017 (TfNSW, 2012b)	The *Disability Action Plan 2012-2017* was developed by TfNSW in consultation with the Accessible Transport Advisory Committee, which is made up of up of representatives from peak disability and ageing organisations within NSW. The Disability Plan discusses the challenges, the achievements to date, the considerable undertaking that is required to finish the job, and provides a solid and practical foundation for future progress over the next five years.	The Proposal has been developed with consideration of the objectives outlined in this Plan and seeks to improve and provide equitable access to public transport facilities.
Sydney's Walking Future - Connecting people and places (TfNSW, 2013a)	*Sydney's Walking Future* outlines the NSW government's efforts to: • promote walking for transport • connect people to places through safe walking networks around activity centres and public transport interchanges.	The Proposal would facilitate walking by removing physical barriers to accessible public transport and by providing accessible cross corridor access, hence contributing a relative reduction in local trips via private cars.

Policy/Strategy	Commitment	Comment
NSW State Infrastructure Strategy 2018-2038 (NSW Government, 2018)	The *NSW State Infrastructure Strategy 2018–2038* builds on the NSW Government's major long-term infrastructure plans over the last seven years. The strategy sets out the government's priorities for the next 20 years, and combined with the *Future Transport Strategy 2056*, the *Greater Sydney Region Plan* and the *Regional Development Framework*, brings together infrastructure investment and land-use planning for our cities and regions. Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal.	The Proposal supports investment in rail infrastructure, and aligns with the need to continue to provide urban public transport to support Sydney's increasing population. The Proposal is also consistent with overall aims and objectives of the *Future Transport Strategy 2056* to improve transport infrastructure across NSW.
NSW: Making It Happen (NSW Government, 2015)	In September 2015, the NSW Government announced a series of State Priorities as part of *NSW: Making It Happen* (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. *NSW: Making it Happen* focuses on 12 key 'priorities' to achieve the NSW Government's commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services. One of the 12 priorities identified as part of *NSW: Making It Happen* relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.	The Proposal would assist in meeting the priority to develop and invest in transport infrastructure by improving accessibility to public transport and encouraging greater use of public transport.
YOUR Future 2030 (Canada Bay Council, 2018)	The *Community Strategic Plan* identifies the plans and aspirations for the future of Canada Bay LGA. Strategy 1.1.1 of the plan is to promote disability inclusion to enhance positive community attitudes and behaviours and improved access to create a more liveable community for people with disability.	The Proposal would assist in meeting the objectives of the Canada Bay Council Your Future 2030 plan, as it would make public transport facilities in Canada Bay LGA more accessible for people with a disability.

Policy/Strategy	Commitment	Comment
A Metropolis of Three Cities – The Greater Sydney Region Plan (Greater Sydney Commission, 2018)	*A Metropolis of Three Cities* is a plan designed to complement the *Future Transport 2056* plan and *State Infrastructure Strategy* by aligning land use, transport and infrastructure planning. It aims to reshape Greater Sydney as three unique but connected cities. The Proposal would form part of the proposed Central River City, which would be focused around Greater Parramatta. It is important for this Central River City to invest in a wide variety of infrastructure and services and improve amenity.	The Proposal particularly supports Objective 6 of the Three Cities Plan, which is to ensure 'services and infrastructure meet communities' changing needs', as it would increase the accessibility of places and transport for all people that use North Strathfield Station.
Disability Inclusion Action Plan 2017-2021 (Canada Bay Council, 2017)	Canada Bay Council's *Disability Inclusion Action Plan* addresses the ongoing needs, issues, barriers, and concerns of people with disability and those who support them. Outcome 2 Liveable Communities of the plan includes to "improve access (footpaths, signage, maps, ramps) and to improve amenities (shade, street furniture, toilets, public spaces).".	The Proposal would assist in implementing action TC4 Better Public Transport – *advocate for improved public and community transport services within the LGA.*

4.6 Ecologically sustainable development

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

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

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the North Strathfield Station Upgrade. Section 3.1.4 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5 Community and stakeholder consultation

Chapter 5 discusses the consultation undertaken to date for the Proposal and the consultation proposed for the future. This chapter discusses the consultation strategy adopted for the Proposal and the results of consultation with the community, relevant government agencies and stakeholders.

5.1 Stakeholder consultation during concept design

Key stakeholders for North Strathfield Station, comprising TfNSW, Sydney Trains and Canada Bay Council, were engaged in the development of the Concept Design Plan to provide insights into the station's deficiencies and future development and growth plans, and to also participate in the development and assessment of the station improvement options.

Workshops and meetings undertaken during the development of the concept design included:

- options assessment workshops with relevant TfNSW and Sydney Trains representatives
- TfNSW design and sustainability panel presentation
- safety meetings

The following meetings were undertaken as part of the design development:

- Stakeholder workshop 1 – Options assessment. Attendees included representatives from a range of Transport for NSW divisions and Sydney Trains.
- Design and sustainability presentation to TfNSW Design and Sustainability Panel
- Safety meeting
- Stakeholder workshop 2 – Preferred option development. Attendees were as workshop 1.

5.2 Consultation requirements under the Infrastructure SEPP

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

Table 5.1 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Table 5.1 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 | Consultation with Councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility.	The Proposal includes works that would: • disrupt pedestrian and vehicle movements • impact on road pavements under Council's care and control • impact on Council operated footpaths. Consultation with Canada Bay Council would be undertaken throughout the detailed design and construction phases in line with legislative requirements. TfNSW would also notify/consult with Canada Bay Council as part of the planning approvals process during the public display of the REF.
Clause 14 | Consultation with Councils – development with impacts on local heritage	Where railway station works: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area.	Two heritage items have the potential to be impacted by the Proposal. These items are: • North Strathfield Railway Station Group is listed on the RailCorp Section 170 Heritage and Conservation Register (item 4801029) (refer to Section 6.5). • Twelve street trees (I397)on Queen Street are listed in Schedule 5 of the Canada Bay LEP 2013 heritage register (refer to Section 6.5). The Proposal has been designed to avoid impact to these trees and appropriate mitigation measures will be implemented. Consultation with Canada Bay Council would be undertaken during the detailed design and construction phases of the Proposal.
Clause 15 | Consultation with Councils – development with impacts on flood liable land	Where railway station works: • impact on land that is susceptible to flooding – reference would be made to *Floodplain Development Manual: the management of flood liable land.*	The Proposal is not located on land that is susceptible to flooding. Consultation with Canada Bay Council is not required in regard to this aspect.

Clause	Clause particulars	Relevance to the Proposal
Clause 16 | Consultation with public authorities other than Councils	For *specified development* which includes consultation with the OEH for development that is undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974*, and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult with could include: • Roads and Maritime • Sydney Trains • OEH.	Consultation with other public authorities as specified in this clause is not required. However, consultation with Sydney Trains would be ongoing through the next stage(s) of the Proposal.

5.3 Consultation strategy

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

The objectives of the consultation strategy are to:

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

5.4 Public display

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

- public display of the REF at various locations
- distribution of a project newsletter at the station, and to local community and rail customers, outlining the Proposal and inviting feedback on the REF

- advertisement of the REF public display in local newspapers with a link to the TfNSW website that includes a summary of the Proposal and information on how to provide feedback
- consultation with Canada Bay Council, Sydney Trains and other key stakeholders
- 'pop-up' community information sessions near the station

Community consultation activities for the Proposal would be undertaken during the public display of this REF. Face to face activities such as pop-up stalls would be conducted with the community to encourage feedback and provide opportunities for the community to ask questions and be informed by the project team. The community and key stakeholders would be advised about these activities via advertisements in the local paper, distribution of flyers and a dedicated project page on the TfNSW website.

The display period of the REF would be advertised in the week that the public display commences. The REF would be displayed for a period of approximately two weeks.

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

- City of Canada Bay (Concord) Library
  60 Flavelle St, Concord NSW 2137
  (02) 9911 6210
- Strathfield Main Library
  65-67 Rochester Street, Homebush NSW 2140
  (02) 8762 0222
- Transport for NSW Office, Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood 2067.

The REF would also be available to download from the TfNSW website[2],yoursay page[2] a Project Infoline (1800 684 490) and email inbox (projects@transport.nsw.gov.au) would be available for members of the public to make enquiries.

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

5.5 Ongoing consultation

At the conclusion of the public display period for this REF, TfNSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by TfNSW before determining whether to proceed with the Proposal (refer Figure E1).

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

Should TfNSW determine to proceed with the Proposal, the project team would keep the community, councils and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of

[2] http://www.transport.nsw.gov.au/projects/current-projects/north-strathfield-station-upgrade
www.yoursay.transport.nsw.gov.au/northstrathfield

the Proposal. The interaction with the community would be undertaken in accordance with a Community Liaison Plan to be developed prior to the commencement of construction.

6 Environmental impact assessment

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

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

6.1 Traffic and transport

A *Traffic, Transport and Access Assessment* was prepared by WSP in August 2018 for this proposal, consisting of a desktop analysis and site visit. The following sections assess the potential impacts to road and rail users during the construction and operation stages of the Proposal, and provide mitigation measures to reduce these impacts

6.1.1 Existing environment

Site context

The T1 Northern Line operates between Hornsby and Chatswood via Epping and Strathfield. The existing road network around North Strathfield station mainly comprises of local roads (residential streets). Road access from the east is via Queen Street while access from the west is via Hamilton Street East. Pedestrian only access is available from the north-west via Pomeroy Street.

No timetabled or scheduled buses service the station. A non-scheduled bus stop is located along Queen Street about 30 metres from the station. This is used for special events and school services. There are no bus service or stops on the western side of the station. Two existing kiss and ride areas are located on Queen Street to the north and south of the pedestrian crossing. One additional kiss and ride area is located on Hamilton Street East.

Commercial traffic access the area, which supports the commercial properties to the east and west of the station. Currently construction activities are being undertaken along Hamilton Street East, for the renovations of Our Lady of the Assumption Primary School. There are bike racks on both sides of the station and bike storage lockers on Queen Street. There is no station car park, however there is time-restricted parking on the local roads nearby the station.

Surrounding road network

North Strathfield Station is surrounded by Pomeroy Street to the north, Queen Street to the east and George Street and Hamilton Street (East) to the west. Key features of this road network include:

- Queen Street is a local collector road which runs in a north-south direction adjacent to the railway line on the eastern side between Concord Road to the north and Parramatta Road to the south. Queen Street is two lane, two way with on street parking provision. It has a posted speed limit of 50 km/h.
- Hamilton Street (East) is a local street with a cul-de-sac at the eastern end which adjoins the railway line and station entrance on the western side. Hamilton Street also provides local residential apartment driveway access.

Parking

Across Hamilton Street East, approximately 24 car spaces are provided, ranging between 1/4P-2P, kiss and ride and unrestricted parking. As there is no dedicated commuter carpark, kerb side unrestricted parking is provided along Queen Street (north and southbound).

On the approach to the Queen Street entry to North Strathfield station, restricted 1P-2P parking and kiss-and-ride kerb side facilities are provided. Adjacent to the commercial block on Queen Street, opposite the station, additional 1P restricted parking is provided (Figure 6.1).

Figure 6.1 North Strathfield Station – surrounding road network and station parking

Public Transport

Rail

North Strathfield station presently serves an approximately 5,450 passenger trips (combined entry and exit) recorded at the station on an average weekday in May 2017 (most recent available statistics). The T1 Northern Line, operates between Hornsby, Epping and Strathfield, with occasional passing freight trains.

Bus

Presently there are no dedicated bus services that operate around the North Strathfield station local network. All bus stops associated with the station are located on the eastern side of the railway line on Queen Street. Two unmarked bus stops are provided on Queen Street, as a provisional bus facility, for track works, special events and school buses.

Pedestrian Infrastructure

Kiss-and-ride Facilities

Two formal kiss-and-ride facilities are located on Queen Street, south and north of the pedestrian crossing and one on Hamilton Street. These locations are further supplemented with kiss-and-ride shelter areas, tactile ramps and seating.

Taxi

Presently there are formal taxi rank within the North Strathfield Station local network.

Cyclist infrastructure

Existing bike racks and lockers are provided on both sides of the station, adjacent to the station entrances on Queen Street (south of Wellbank Street) and adjacent to the concrete footpath access from Hamilton Street (located under the existing footbridge). No formal cycleways were identified within the vicinity of the station precinct.

6.1.2 Potential impacts

a) Construction phase

Site compound and haulage routes

As described in section 3.2, the main site compound would be located within the (former) North Strathfield Rail Underpass compound area adjacent (on land between Queen Street and the rail corridor), north of the Queen Street station entrance as shown in Figure 6.2.

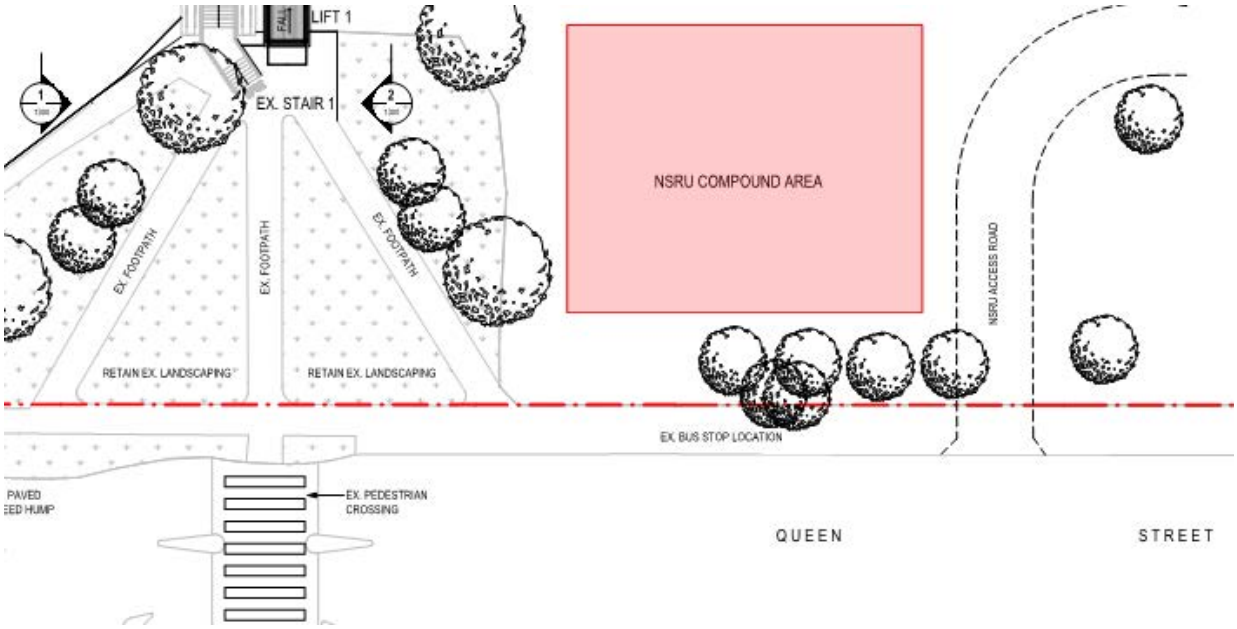


Figure 6.2 Proposed site compound location

The road network surrounding North Strathfield Station is well serviced by Roads and Maritime Services approved B-Double routes with M4 Motorway, Homebush Bay Drive, Parramatta Road and Concord Road approved to cater for 25/26 metre B-Doubles vehicles.

The final construction haulage route would be determined by the nominated construction contractor during the detailed design of the Proposal. However, due to the existing load limits on Waratah Street and Shipley Avenue, and the roundabout at the intersection of Queen Street and Beronga Street, heavy vehicles could access the worksite from the east via Concord Road and Wellbank Street. Wellbank Street is advantageous as it meets Concord Road at a signal controlled intersection. As such, right turns into and out of the intersection would be more easily facilitated.

Figure 6.3 outlines the potential haulage routes that would be available to suitably cater for heavy vehicle access to and from the construction site.

Figure 6.3 Potential haulage routes

Traffic

The vehicles generated on the existing road network as a result of the construction works are expected to be mostly light vehicles from construction workers with minimal heavy vehicle trips for delivery and removal of materials, plant, and equipment when required. The traffic generated as a part of the construction works would be approximately 20 light vehicles and 10 heavy vehicles per day during peak construction periods. Given the minimal traffic generated during construction, including both staff light vehicle trips and construction heavy vehicle trips, the surrounding road network and intersections are expected to be able to sustain project related vehicle trips and continue to perform within existing capacity.

Construction works are predominately going to be undertaken within the Sydney Trains boundary, with minimal works expected to be undertaken that will impact the traffic on the external road network. The main works that are likely to result in localised traffic impacts would be the construction of the DDA compliant parking on Queen Street. This would however be likely to have a minimal effect on local traffic flow in the area. Adequate road width exists, for local traffic to bypass any construction works that are being undertaken.

Overall the construction of the Proposal is anticipated to have short timelines and as such, any delays resulting from the proposed scope of works is expected to be brief and non-detrimental to the traffic flow on the external road network with the implementation of mitigation measures (refer to section 6.1.3).

Parking

Construction of the Proposal is not expected to result in substantial impacts to existing parking provisions along Queen Street or Hamilton Street (East).

Pedestrians and cyclists

Pedestrian and cyclist access through the precinct would be maintained throughout construction where possible. Where works are carried out that may potentially disrupt the existing pedestrian facilities, appropriate signs or traffic controllers would be positioned to notify pedestrians of the temporary arrangements.

- Construction work is expected to have a minor impact on the pedestrian and cycle network given the restricted space in which construction works are to be carried out. It is expected that as a part of the works, there may be restrictions and disruptions to pedestrian and bicycle manoeuvrability in close proximity to the following features of the Proposal:
    - Footpath upgrading to DDA compliance, on the South approach toward Queen Street which would impede pedestrian ingress and egress.
    - Installation of lifts on the footbridge. This has the potential to impact accessibility for customers, including reduced pedestrian path widths. For the installation of the eastern lift (at the Queen Street entrance), closure of the existing footbridge would be required (proposed to occur during scheduled possession period).

Construction works to be undertaken in close proximity to the existing footpaths and cycle facilities would occur infrequently with closures expected to be temporary with safe and suitable detours provided as a part of the construction traffic control.

Kiss-and-ride

During construction, there is potential for temporary disruptions to access the existing kiss-and-ride facility located on Queen Street, south of the pedestrian crossing. This would be due to construction of the new DDA compliant on street parking and kiss-and-ride zone, however the potential impacts would be expected to be short term.

No impacts are expected to the existing kiss-and-ride facility located on Hamilton Street (East) during construction.

Property access

Access to nearby properties would be maintained at all times and any impacts would be short-term during construction (unless agreed with the property owner/s in advance). Subject to accessibility and consultation, the construction works may be required to temporarily utilise the neighbouring school (The McDonald College and Our Lady of the Assumption Catholic primary school) property located the western side of railway corridor for significant material deliveries and cranage of the main lift components(s) to Platform 3. Where required, this would be undertaken only during school holiday period(s) and subject to prior consultation. Access through existing Telstra owned land on Hamilton Street East may also be required, subject to consultation.

Should the detailed design and construction staging of the Proposal identify impacts to residents and businesses, affected occupants would be consulted and notified prior to the scheduled works.

Emergency vehicle access

Access for emergency vehicles would be maintained in accordance with emergency vehicle requirements. Emergency services would be advised of all planned changes to traffic arrangements prior to applying the changes. Advice would include information about upcoming traffic disruptions, anticipated delays to traffic, extended times of work and locations of any road possessions.

b) Operational phase

Pedestrians

Once the Proposal is constructed, it is anticipated that the pedestrian access and flow would remain consistent as the Proposal has been designed to maintain/improve pedestrian manoeuvrability throughout the station precinct. The Proposal would also allow for accessible movement within the interchange across all transport modes, in particular to and from the train station platform, external road network and accessible parking spaces.

Traffic

The proposed scope of works is not anticipated to have a direct increase in traffic generation during operation.

Parking

Current car park demand surrounding north Strathfield Station is typically high with time-restricted on-street parking along Queen Street, Hamilton Street East and other surrounding local roads. The Proposal would result in minimal changes to the parking supply with a net decrease of two time-restricted, on-street parking spaces to the western kerb Queen Street (20 metres south of Wellbank Street) as a result of the provision of one new DDA compliant on-street parking space and one DDA compliant kiss-and-ride space along Queen Street to the south of the station entrance.

Public transport and pedestrian infrastructure

The Proposal does not include changes to existing bus/rail services and would not impact on the operation (service operation or timetabling) of public transport in the vicinity of North Strathfield Station.

The Proposal would include improved interchange facilities and pedestrian access to North Strathfield Station, which may increase rail patronage. It is anticipated that the additional rail patronage would mainly generate walking trips. It is anticipated that the extension of the existing kiss-and-ride, south of the Queen Street station entrance, would minimise motorists frequently stopping at informal locations which leads to traffic congestion.

As there are no dedicated bus stops for regular bus services at the station, there is expected to be no impacts to public bus services. In addition, there would be negligible impacts to the existing bus stops located on both sides of Queen Street which are exclusively used for special events and track works.

The proposed scope of works is not anticipated to have any impacts on cyclists or bicycle facilities. The existing bike racks would be relocated to the station entrance at Hamilton Street East. This is not anticipated to impact cyclists as the same number of racks would be provided for the station.

Property access

The Proposal would not result in changes to private property access during operation.

6.1.3 Mitigation measures

The following mitigation measures are proposed with respect to potential traffic and transport impacts:

- Prior to the commencement of construction, a Construction Traffic Management Plan would be prepared as part of the Construction Environmental Management Plan and would include at a minimum:
    - ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised.
    - maximising safety and accessibility for pedestrians and cyclists.
    - ensuring adequate sight lines to allow for safe entry and exit from the site.
    - ensuring access to the railway station, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made).
    - managing impacts and changes to on and off street parking and requirements for any temporary replacement provision.
    - parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
    - routes to be used by heavy construction related vehicles to minimise impacts on sensitive land uses and businesses.
    - details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired.
    - measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP.
- Consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.
- Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
- Road Occupancy Licences for temporary road closures would be obtained, where required.
- To minimise traffic impacts to the existing kiss-and-ride during construction of the proposed DDA car park and kiss-and-ride south of the Queen Street entrance, the bus zone north of the Queen Street entrance can be utilised, as alternative restricted parking and as an extension of kiss-and-ride kerb length. Adequate road and footpath width is available, to safely delineate oncoming pedestrian and vehicular traffic.

- In parallel with the installation of the lift adjacent to Queen Street, staircase access to the North Strathfield Station footbridge should be maintained. Where closure of the bridge cannot be avoided or is required outside of possession period(s), provision for short term bussing to Hamilton Street (East) would be considered.
- All works with the potential to impact pedestrian movements such as lifting should be carried out during scheduled track possession periods.
- Staging of the Hamilton Street East footpath is necessary to minimise the impacts to pedestrians and cyclists accessing the station from the proposed footpath works and lift installation. A parallel emergency footpath exists, should pedestrians need to be re-directed, to bypass construction activities.
- If any closure of the existing footbridge would be required for the lift installation, the construction works should be programmed to undertake during a scheduled track possession period to minimise the impacts to pedestrians.

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

This section provides a summary of the *Visual Impact Assessment* prepared by IRIS Visual Planning + Design (2018). The methodology used to undertake this assessment is provided in Section 6 of *Technical Paper 1 – Landscape and visual amenity assessment*.

The assessment included a desktop analysis and site inspection to identify the potential visual impacts of the Proposal on views to the station from surrounding publicly accessible areas.

6.2.1 Existing environment

North Strathfield station is an important landmark and visual feature in the local landscape. The visual significance of the station is reflected in its listing on the RailCorp Section 170 Heritage and Conservation Register. The landscaped garden, which is located at the Queen Street entrance to the station, also 'adds greatly to the suburban setting of Queen Street' (NSW State Heritage Register, 2009).

The landform surrounding the station generally falls from north to south. North Strathfield Station sits slightly below Queen Street in the east and level with areas to the west. To the north of the station, as the landform rises, the railway corridor goes into a vegetated cutting and passes beneath the Pomeroy Street overbridge which provides east-west connectivity over the railway line and elevated views to the station. Areas to the east and west of the rail corridor are characterised by a mix of historic and modern residential, commercial and educational buildings.

The existing visual conditions of the study area are described in the following paragraphs and illustrated in Figure 6.4.

Views from Queen Street in the east

The existing station footbridge and stairs are visible from Queen Street over existing heritage gardens. This view is framed by trees but has a background which includes the existing rail corridor with overhead wiring and associated equipment, a telecommunications tower, commercial and residential buildings.

There are also views to the station over the existing rail corridor land, which is currently largely cleared of vegetation and includes maintenance tracks. In these views, the roof of the station heritage platform can be seen above the intervening landform.

View from the north

The heritage platform building is a prominent feature in views from the north. This includes views from the station platforms and the footpath to the west of the rail corridor.

View from Hamilton Street East the southwest

Although there is a station entry on Hamilton Street East, the view to the station is visually cluttered and the station buildings do not have a great visual presence. The existing footbridge can be seen from this location, with a glimpsed view to the heritage station platform building through this clutter of elements.

Figure 6.4 Landscape and visual features of the site

Views at night

At night, the study area is an area of moderate district brightness, with the existing commercial centre, roads, station and railway corridor creating a moderately well-lit at environment night, primarily due to street lights from the surrounding street network.

6.2.2 Potential impacts

The following viewpoints were selected as representative of the range of views to the site and the proposed development:

- Viewpoint 1: View southwest from Queen Street
- Viewpoint 2: View southwest from Queen Street near the corner with Waratah Street
- Viewpoint 3: View south from the footpath to the west of the station
- Viewpoint 4: View south from Station platform
- Viewpoint 5: View northeast from Hamilton Street East

The location of these viewpoints is shown on Figure 13 below.

Figure 6.5 Viewpoint location plan

a) Construction phase

Viewpoint 1: View south west from Queen Street

A lift work area would be established in the middle ground of the Queen Street station entrance. The works would include the removal of vegetation within the footprint of the works (including one tree and adjacent garden area), and construction and installation of the lift. The character of this construction activity would contrast somewhat with the heritage and leafy character of the station and streetscape.

This would create a minor reduction in the amenity of this view, and result in a *minor visual impact* during construction.

Photo 6.1 Viewpoint 1: View looking south west from eastern side of Queen Street - existing view

Viewpoint 2: View southwest from Queen Street near the corner with Waratah Street

A construction compound would be established in the middle ground of the view, to the east of the station along Queen Street. Trucks and construction vehicles would be seen travelling along Queen Street, between the main construction compound and lift work area. This compound would obstruct views to the station heritage building and some of the proposed construction activity within the station. However, it is likely that there would be some visibility of the construction of the central and western lift structures.

Whilst the visual condition of the existing rail corridor does not currently contribute to the amenity of this section of Queen Street, the character of this construction activity would further contrast with the heritage and leafy character of the streetscape.

This would create a considerable reduction in visual amenity of this view, and result in a *moderate adverse visual impact* during construction.

Photo 6.2 Viewpoint 2: View southwest from Queen Street near the corner with Waratah Street

Viewpoint 3: View south from the footpath to the west of the station

Three visually separate lift work areas would be seen in the background of this view, to the south of the existing footbridge. Each work area would include construction equipment and works rising above the existing built form and rising above the backdrop of trees. There may also be works seen within the main construction compound. In the middle ground, platform regrading works and works associated with the upgrading of the toilets would be visible.

The character of this construction activity would contrast with the heritage and leafy character of the station. This would result in a minor reduction in the amenity of this view, and a *minor adverse visual* impact during construction.

Photo 6.3 Viewpoint 3: View south from the footpath to the west of the station – existing view

Viewpoint 4: View south from station Platform 1/2

Activities at the three lift work areas would be seen in the background of this view, to the south of the heritage platform building. The construction works at the Queen Street station entrance would also be visible from this location (left of view), with works including the removal of a tree, and construction of a new lift. Works to construct the central platform lift and western lift would be partly screened by the station platform building, with some elements rising above the roofline of the platform building visible amongst the overhead wiring and associated equipment and adjacent to telecommunications tower. In the foreground, platform regrading works and works associated with the upgrading of the toilets would be visible.

The character of this construction activity would contrast somewhat with the heritage and leafy character of the station, resulting in a minor reduction in the amenity of this view. This would result in a *minor adverse visual impact* during construction.

Photo 6.4 Viewpoint 4: View south from station Platform 1/2

Viewpoint 5: View northeast from Hamilton Street East

Three visually separate lift working areas would be visible in the middle and background of the view. Works to construct the western lift would be the most prominent in this view. During construction, the view to the heritage station building, on the central island platform, would be obstructed. In the background, the works to construct the central platform and eastern lifts.

The works would extend across a large portion of this view however it would be set back in the middle to background of the view. This view to the station is currently visually cluttered and the heritage listed station buildings do not have a strong visual presence. The character of this view is strongly influenced by the rail infrastructure and the construction activity would be somewhat absorbed into the view of the station.

This would result in a minor reduction in the amenity of this view, resulting in a *minor adverse visual impact* during construction.

Photo 6.5 Viewpoint 5: View northeast from Hamilton Street East

Views at night

During construction, the work areas and adjacent main construction compound would be lit for security. However, it is unlikely that these areas would be used on an ongoing basis for construction activity during evening hours (other than for specific activities or where works are undertaken during possession periods).

Generally, the character of the construction works at the lift work areas and main construction compound at night would be visually absorbed into the surrounding brightly lit environment. The works would create a minor reduction in amenity and result in *negligible adverse visual impact* during construction.

b) Operational phase

Viewpoint 1: View south west from Queen Street

From this location, all three new lifts would be visible, with the eastern lift and existing stairs being the focal point, in the middle ground of the view (refer to Photo 6.6). The new western lift would be located to the southwest (left) of the footbridge. In the middle to background of the view, the central platform and eastern lifts would be visible, rising above the footbridge. Each lift would rise approximately six metres above the footbridge, partially obstructing views to the rail corridor and residential apartments beyond. The visual impact of the lifts is reduced by the simple form and material palette of a steel frame with louvres and glass infill panels.

In the foreground, rectification works to the ornamental gardens at the Queen Street entrance would be reinstated, including the installation of replacement trees adjacent to the lift (where possible) or within the wider station precinct, providing some additional screening to the rail corridor and built form to the west of the rail corridor.

The proposed lifts at platform level reference the existing material palette of the heritage platform buildings and therefore not competing visually with the heritage structures, which are out of view.

Overall, the station would have an increased visual prominence in this view. The proposed station additions would constitute a minor improvement in the amenity of this view. They would be in character with the developed nature of the station, and the ornamental gardens and streets plants along Queen Street would remain as an important visual feature. This would result in a *minor beneficial visual impact* during operation.

Photo 6.6 Indicative artist's impression of the new eastern station entrance (looking east from Queen Street

Viewpoint 2: View southwest from Queen Street near the corner with Waratah Street

During operation, the main construction compound would be reinstated as a maintenance area, restoring the view to the heritage platform station building. The view would also include the existing footbridge to the south of the platform building (centre of view) and retained stairs leading to the island platforms. This footbridge would also include the new central platform and western lifts to the south and rising above the footbridge.

The simple form and the steel framed structure with glass infill panels and louvres would have some transparency, reducing the visual bulk of the structure.

Overall, the new structures would comprise a small part of this view, and the proposal would be largely absorbed into the background of this view. This would result in no perceived change in visual amenity of this view, and a *negligible visual impact* during operation.

Viewpoint 3: View south from the footpath to the west of the station

Three new lifts would be visible in the background of this view, rising above the footbridge. The eastern and western station entrance would be partly screened by vegetation alongside the rail corridor and Queen Street ornamental gardens.

Whilst there would be more built form in the background of this view, the visual bulk of the lifts would be reduced by the simple form and use of glazing on the upper levels. The brick base to the lifts, at platform level, draw upon the character of the existing heritage buildings and would recede somewhat in this view. The heritage platform building would remain the focal point of the view. Due to the scale of the changes, and distance from the heritage buildings, this would result in a minor reduction in the amenity of this view, and a *minor adverse visual impact* during operation.

Viewpoint 4: View south from station Platform 1/2

The new eastern, central platform and western lifts would be located in the background of this view, behind the existing heritage listed island platform building (refer to Photo 6.7). Each lift would rise above the footbridge and be a new skyline element in this view.

The eastern, at the Queen Street entry, would be the most clearly seen from this angle, set amongst the existing vegetation of the Queen Street entry gardens. The central and eastern lifts would be somewhat screened by the platform building, but the upper level of the lifts would rise above the heritage platform building.

The lifts would have a simple form and material palette of steel frame with louvres, glass infill panels and a brick base which would not compete visually with the heritage platform buildings. The character of these structures would be visually distinct from the highly ornate heritage architecture. Furthermore, the exposed steel frame of glass and louvres, would visually break up the scale of the lifts and reduce the visual bulk of the structures. Overall, due to the scale of built form, and extent visible in the context of the heritage building, this would result in a minor reduction in the amenity of the view. This would result in a *minor adverse visual impact* during operation.

Photo 6.7 Indicative artist's impression of the proposed station upgrade (looking north from Platform 1/2)

Viewpoint 5: View northeast from Hamilton Street East

Three new lifts would be visible in front of the existing footbridge. The lift structures would rise about six metres above the footbridge level. The lifts would transform this view, becoming a prominent new feature in the middle to background of this view.

The exposed steel frame with louvres and glass infill panels, used on the lifts would create some transparency and visual lightness, reducing the visual bulk of the structures.

The glimpsed view to the heritage station platform building would be restored and framed somewhat by the new built form.

Overall, the new station buildings would be visually consistent with the character of the station and be largely absorbed into this view. This would result in no perceived change in the amenity of this view, and a *negligible visual impact* during operation.

Views at night

During operations, the upgraded station would continue to be brightly lit for security and safe use at night. The new platform lifts would be seen in context with the existing station lighting, commercial buildings and street lights along Queen Street.

The station is likely to create minor additional sky glow above the site. However, existing trees and intervening built form would largely screen views to the addition lighting associated with the station from the schools and areas to the west. Similarly, trees to the east of the station along Queen Street would visually separate and screen views to this additional lighting.

It is possible that there would be additional skyglow seen from the residential buildings to the southwest of the site. From this location, there is views across the station, which is brightly lit at night. The lighting for the project would use technologies to minimise light spill and skyglow.

Generally, the character of the proposed station upgrade at night would be visually absorbed into the surrounding brightly lit environment and the safety of the precinct would be improved. Overall, this would result in no perceived change in the amenity of views at night, resulting in a *negligible visual impact* at night during operation.

6.2.3 Mitigation measures

The following mitigation measures are proposed with respect to potential visual impacts:

An Urban Design Plan (UDP) would be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Sustainability and Precincts and Urban Design teams, prior to finalisation of the detailed design. The UDP, at a minimum, would address the following:

- the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns (including consideration of Crime Prevention Through Environmental Design principles). This is to include but not be limited to:
    - connectivity with surrounding local and regional movement networks including street networks, other transport modes and active transport networks. Existing and proposed paths of travel for pedestrians and bicycles should be shown
    - integration with surrounding local and regional open space and or landscape networks. Existing and proposed open space infrastructure/landscape elements should be shown
    - integration with surrounding streetscape including street wall height, active frontages, awnings, street trees, entries, vehicle cross overs etc.

    - integration with surrounding built form (existing or desired future) including building height, scale, bulk, massing and land-use
    - design detail that is sensitive to the amenity and character of heritage items located within or adjacent to the Proposal site.
- A Public Domain Plan (PDP) would be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Sustainability and Precincts and Urban Design teams, prior to finalisation of the detailed design. The PDP, at a minimum, would address the following:
    - materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences
    - location and design of pedestrian and bicycle pathways, street furniture including relocated bus and taxi facilities, bicycle storage (where relevant), telephones and lighting equipment
    - landscape treatments and street tree planting to integrate with surrounding streetscape
    - opportunities for public art created by local artists to be incorporated, where considered appropriate, into the Proposal
    - total water management principles to be integrated into the design where considered appropriate
    - design measures included to meet the TfNSW *NSW Sustainable Design Guidelines -Version 4.0* (TfNSW, 2017)
    - identification of design and landscaping aspects that will be open for stakeholder input, as required.
- All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to AS 1158 Road Lighting and AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting.
- The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
- Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
- Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
- During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.

Refer to Table 7.1 for a list of proposed mitigation measures.

6.3 Noise and vibration

This section provides a summary of the *Noise and Vibration Impact Assessment* prepared by WSP (2018) (Technical Paper 2). The assessment included background ambient noise monitoring and noise modelling for various stages of construction works to predict the potential impacts of Proposal on noise and vibration.

6.3.1 Existing environment

Sensitive receivers

Receivers potentially sensitive to both noise and vibration in the following categories as defined in Noise Policy for Industry (NPfI) (EPA, 2017) and Interim Construction Noise Guideline (ICNG) (DECC, 2009) have been identified in the surrounding area:

- residential
- commercial
- educational institutions
- active recreation areas.

Sensitive receivers are outlined in Table 6.1 and shown in Figure 6.6.

Table 6.1 Noise Catchment Area (NCA) and classification of representative receivers

NCA	Receiver Type	Address	Receiver ID
1	Residential	2A Hamilton Street, North Strathfield	R1
	Commercial	13 George Street, North Strathfield	C1
	Educational	1A Hamilton Street, North Strathfield (The McDonald College) and Our Lady of the Assumption Catholic Primary School	E1
	Active recreation	17 George Street, North Strathfield	AR1
2	Residential	19-21 George Street, North Strathfield	R2
3	Residential	58 George Street, North Strathfield	R3A
	Residential	72 George Street, North Strathfield	R3B
	Residential	88 George Street, North Strathfield	R3C
4	Residential	48 George Street, North Strathfield	R4
5	Residential	53 Queen Street, North Strathfield	R5
6	Residential	73 Queen Street, North Strathfield	R6
	Commercial	81-83 Queen Street, North Strathfield	C2
7	Residential	121 Queen Street, North Strathfield	R7
8	Residential	27 Beronga Street, North Strathfield	R8

Figure 6.6 Sensitive receivers and noise monitoring locations

Background noise levels

The prevailing background and ambient noise levels surrounding the site were determined through a combination of unattended and operator attended noise surveys in general accordance with the Australian Standard 1055-1997- Acoustics-Description and Measurement of Environmental Noise (AS 1055) and the NPfI.

Two noise monitoring locations (NM01 and NM02) were used to characterise the existing noise environment at representative residential receivers on either side of the station, shown in Figure 6.6. The background characteristics for each site included:

- At NM01, the background levels were characterised by general urban hum. Ambient noise levels were influenced by traffic along George Street, bird noise, train pass-bys, and aircraft fly-overs.
- At NM02, the background levels were characterised by general urban hum from distant traffic. Ambient noise levels were controlled by light traffic along Wellbank Street, with train pass-bys and aircraft fly-overs contributing.

The results of the un-attended and attended noise surveys and observations are detailed in Table 6.2 and Table 6.3.

Table 6.2 Summary of unattended noise monitoring results

LOCATION	RATING BACKGROUND LEVEL (RBL) dBA1,2			AMBIENT NOISE LEVEL dBA Leq, 15 minute		
	Day	Evening	Night	Day	Evening	Night
NM01	48	46	41	61	60	55
NM02	44	45	41	62	61	57

1. Rating Background Level (RBL) The overall single-figure background level representing each assessment period (daytime/evening/night-time) as defined in the NPfI.
2. Time periods defined as – Day: 7am to 6pm Monday to Saturday, 8am to 6pm Sunday; Evening: 6pm to 10pm; Night: 10pm to 7am Monday to Saturday, 10pm to 8am Sunday.

Table 6.3 Summary of attended noise measurement results

Location	Time	dBA Leq(15min)	dBA L90(15min)	Observations
NM01	11:40am – 11:55am	60	47	Aircraft: up to 65 dBA Car pass-bys: up to 63 dBA Birds: around 50-54 dBA
NM02	12:40pm – 12:55pm	60	50	Aircraft: up to 65 dBA Car pass-bys: up to 63 dBA Distant traffic: around 47 dBA

The results of the survey were used to set Noise Management Levels in accordance with the *Interim Construction Noise Guideline* (DECCW, 2009) and noise triggers for operational noise in accordance with the NPfI.

6.3.2 Potential impacts

a) Construction phase

Predicted noise levels

The predicted noise levels for each scenario are presented in Table 6.4 outlining the noise level within each NCA for each representative receiver type. Predicted noise levels at buildings within each NCA is presented in Appendix B of the *Noise and Vibration Impact Assessment* (WSP, 2018).

The maximum noise level assessment is presented in Table 6.5. The predicted noise levels have been assessed at the closest affected representative receiver within each NCA.

The calculations are conservative as they include all equipment operating simultaneously at their closest point to the receiver in a worst case 15-minute period. Actual noise levels from the construction site would be expected to be lower. Where a predicted noise level exceeds a less stringent management level, it follows that the more stringent management levels are also exceeded.

The formatting within the construction noise assessment tables indicates the following:

- The orange shaded cells show exceedances of the standard hours day period.
- The yellow shaded cells show exceedances of the out-of-hours day period.
- The green shaded cells show exceedances of the out-of-hours evening period.
- The blue shaded cells exceedances of the out-of-hours night period.
- The **cells with red text** show exceedances of highly noise affected noise management levels.

Where a predicted noise level exceeds a less stringent management level, it follows that the more stringent management levels are also exceeded.

The formatting within the sleep disturbance maximum noise level table indicates the following:

- The grey shaded cells show exceedances of the RBL + 15 screening criteria.
- The blue shaded cells show exceedances of the L_{max} screening criteria.

Table 6.4 Predicted construction noise levels

NCA	RECEIVER ID	RECEIVER TYPE	NOISE MANAGEMENT LEVEL				ACTIVITY PREDICTED NOISE LEVEL dBA $L_{eq,\ 15\ minute}$					
			STANDARD HOURS	OUT-OF-HOURS DAY	OUT-OF-HOURS EVENING	OUT-OF-HOURS NIGHT	ACTIVITY 1	ACTIVITY 2	ACTIVITY 3	ACTIVITY 4	ACTIVITY 5	ACTIVITY 6
1	E1	Educational	55	55	-	-	*87*	*> 90*	*68*	*> 90*	*85*	*75*
	R1	Residential	58	53	51	46	***79***	***77***	61	***> 90***	74	74
	C1	Commercial	70	70	70	70	71	73	61	*85*	66	72
	AR1	Active Recreation	65	65	65	65	*80*	*> 90*	64	*> 90*	86	73
2	R2	Residential	58	53	51	46	65	65	52	***79***	66	62
3	R3A	Residential	58	53	51	46	61	60	43	***75***	68	68
	R3B	Residential	58	53	51	46	56	68	53	70	70	65
	R3C	Residential	58	53	51	46	60	50	36	74	50	47
4	R4	Residential	58	53	51	46	48	62	46	60	55	57
5	R5	Residential	54	49	49	46	59	71	57	72	70	73
6	R6	Residential	54	49	49	46	***76***	***75***	66	***88***	74	***90***
	C2	Commercial	70	70	70	70	*79*	*76*	68	*> 90*	*75*	*> 90*
7	R7	Residential	54	49	49	46	62	69	58	***76***	74	68
8	R8	Residential	54	49	49	46	61	64	52	***75***	67	62

Note 1: Activity descriptions are outlined in Technical Paper 2 – Noise and vibration assessment, and noise management level periods in Table 3.5 of Technical Paper 2.

Note 2: Activities 2, 3 and 4 occur during Standard Hours and Out-Of-Hours Works. Activities 1, 5, and 6 only occur during Standard Hours.

Table 6.5 Predicted sleep disturbance assessment

NCA	RECEIVER ID	NOISE MANAGEMENT LEVEL (NML)		ACTIVITY PREDICTED MAXIMUM NOISE LEVEL LMAX DBA			
		RBL +15 SCREENING CRITERIA	MAXIMUM NOISE LEVEL EVENT	ACTIVITY 1	ACTIVITY 2	ACTIVITY 3	ACTIVITY 4
1	R1	56	65	87	85	69	> 90
2	R2	56	65	73	73	60	87
3	R3A	56	65	69	68	51	83
	R3B	56	65	64	76	61	78
	R3C	56	65	68	58	44	82
4	R4	56	65	56	70	54	68
5	R5	56	65	67	79	65	80
6	R6	56	65	84	83	74	> 90
7	R7	56	65	70	77	66	84
8	R8	56	65	69	72	60	83
9	R9	56	65	87	85	69	> 90

Note 1: Activity descriptions are outlined in Technical Paper 2, and noise management level periods in Table 3.5 of Technical Paper 2.

Assessment of predicted noise levels

During the majority of the construction activities, the predictions indicate that construction noise levels could significantly impact the closest receivers. This is expected to occur during the worst case 15 minutes when works are carried out during standard hours or rail possessions. These impacts include exceedance of noise management levels, highly noise affected properties, and in some cases sleep disturbance. However, works are expected to take place intermittently over a 12-month period, so these exceedances will not occur continuously over the duration of the proposal. Out of hours works generally should only take place during rail possessions (occurring over a 48-hour period on a weekend) with only four rail possessions expected to occur over the duration of the proposal.

The predictions are based on a worst case 15-minute period. As these predictions are highly conservative and it is understood that the proposed works are short term in nature, actual noise levels from the construction site are expected to be lower.

During standard hours work activities 5 and 6 (Station building works and parking upgrades respectively), exceedances are predicted to occur at representative residential receivers in all NCA, except NCA 4, by greater than 30 dB. The residential representative receiver at NCA 6 is predicted to be highly noise affected during activities 1 (site establishment) and 6 (parking upgrades), and NCA 1 is predicted to be highly noise affected during activity 1.

Predicted noise levels indicate exceedances of standard hours and out-of-hours NMLs at all NCA residential representative receivers during activities 1, 2, and 4 (Site establishment, lift works within at platforms and new walkway construction).

Activity 3 (Lift works adjacent to Queen Street) is predicted to cause exceedances at all NCAs during out-of-hours works, with the exception of NCA 3.

Activity 4 (new walkway construction) is predicted to cause the greatest exceedances of night time NMLs, with exceedances of greater than 30 dB at NCA 1. All other NCAs, except NCA 4 and 5, are predicted to be highly noise affected during activity 4.

Maximum noise level exceedances are predicted to occur during all out-of-hours work activities at all NCAs, with the exception of R3A, R3C, and R4 during activity 3.

All non-residential representative receivers assessed are predicted to exceed NMLs during all activities. NMLs only apply when the premises are in use and therefore the premises would only be impacted when it is occupied.

Construction traffic noise

The potential for noise impacts to occur due to light and heavy vehicle movements on public roads generated by the construction work has also been assessed in accordance with the Road Noise Policy (RNP) (EPA, 2011). Overall, the noise increase due to increased traffic is expected to be negligible along Concord Road. While considered to be a low overall risk, construction traffic has the potential to exceed the night time RNP noise criteria when all vehicles use this road in a one hour period.

Vibration

Certain construction activities would require the use of vibration intensive equipment that may affect the nearest sensitive receivers. The vibration intensive plant nominated as part of the work is jack hammering (Activities 2, 4, 5, and 6 – lift construction, walkway construction, station building works and parking upgrades).

Minimum working distances for vibration intensive plant have been outlined to comply with human comfort and cosmetic damage vibration limits. If minimum working distances are complied with, no adverse impacts are expected for cosmetic damage or human response on nearby sensitive receivers.

b) Operational phase

For operational noise, the mechanical plant selections have not yet been finalised. However, it is not expected that the mechanical plant would have a significant noise impact. Any mechanical plant, equipment or other operational noise source proposed is to be designed to meet the NPfI noise triggers identified in this report.

6.3.3 Mitigation measures

The following mitigation measures are proposed with respect to potential noise and vibration impacts:

- Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Strategy* (TfNSW, 2018b) and the Noise and Vibration Impact Assessment for the Proposal (specialist name, year). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
- The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:
    - regularly briefing workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise
    - avoiding any unnecessary noise when carrying out manual operations and when operating plant
    - ensuring spoil is placed and not dropped into awaiting trucks
    - avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable
    - switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded
    - avoiding deliveries at night/evenings wherever practicable
    - no idling of delivery trucks
    - keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site
    - minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.
- The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:
    - maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances
    - using the most suitable equipment necessary for the construction works at any one time
    - directing noise-emitting plant away from sensitive receivers
    - regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc.

    - using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works
    - use of quieter and less vibration emitting construction methods where feasible and reasonable.
- Works would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any works outside these hours may be undertaken if approved by TfNSW and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.
- Where the L_{Aeq} (15minute) construction noise levels are predicted to exceed 30 dBA above the Rating Background Level and/or 75 dBA (total including RBL) at nearby affected sensitive receivers, respite periods would be observed, where practicable, and in accordance with the TfNSW *Construction Noise and Vibration Strategy* (TfNSW, 2018b). This would include restricting the hours that very noisy activities can occur.
- To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (WSP, 2018) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
- Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with:
    - for structural damage vibration - *German Standard DIN 4150: Part 3 – 1999 Structural Vibration in Buildings: Effects on Structures* and *British Standard BS 7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)*
    - for human exposure to vibration the acceptable vibration - values set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) which includes British Standard BS 7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).
- Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the works and all heritage listed buildings and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).

Refer to Table 7.1 for a list of proposed mitigation measures.

6.4 Indigenous heritage

6.4.1 Existing environment

An assessment was undertaken for the Proposal with consideration of the requirements identified in the *Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010). An AHIMS search with a buffer of 200 metres was undertaken on 12 July 2018 for the Proposal area. The search identified that there are no Aboriginal sites or places recorded or declared in or near the Proposal area (OEH, 2018).

The Proposal area is highly modified, suggesting that the presence of Indigenous objects is unlikely. There are no nearby landscape features (such as nearby waterways, sand dune systems, ridge tops, ridge lines, headlands, cliff faces and rock caves/shelters) that might indicate an increase potential for Indigenous objects.

6.4.2 Potential impacts

a) Construction phase

Construction of the Proposal would involve minor excavation and ground disturbance for the following activities:

- the foundations and pits for the new lift shafts would require excavation into existing platforms, rock, soils and fill up to a depth of around three metres. Piling would result in depths up to around eight metres
- minor excavation for the construction/re-grading for compliant ramps and pavement works within the station precinct
- minor excavation of platform services to allow for CSR works, typically to a depth of around one metre.

Ground disturbing activities have the potential to impact Indigenous objects, if present. Based on the AHIMS search results and the modified landscape, the Proposal is unlikely to impact Indigenous heritage during construction.

b) Operational phase

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

6.4.3 Mitigation measures

The following mitigation measures are proposed with respect to potential Indigenous heritage impacts:

- All construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to the Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites.
- If unforeseen unidentified Indigenous objects are uncovered during construction, the procedures contained in the TfNSW *Unexpected Heritage Finds Guideline* (TfNSW, 2015b) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the OEH and the Local Aboriginal Land Council.

  If human remains are found, work would cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.5 Non-Indigenous heritage

This section provides a summary of the *Statement of Heritage Impact* prepared by Extent Heritage Advisors (2018). The methodologies used to undertake this assessment are provided in section 1.3 of *Technical Paper 3 – Statement of Heritage Impact*.

6.5.1 Existing environment

Historical background

North Strathfield Railway Station was opened on 9 June 1918, as an island platform with a standard brick station building on the platform. Access to the station was via a footbridge at the Sydney-end of the platform. A number of industrial sidings were laid in near North Strathfield station.

In 1924, with electrification of the rail network pending, a new third platform was brought in on the Down relief line at North Strathfield with a small station building on the platform. The Down relief line and platform (Platform 3) remain in everyday service, but the Up relief line was taken out of service some years ago. No platform was ever provided on this line. The pedestrian overbridge was replaced in the late 1980s by a modern concrete beam bridge, in the same location and with the same basic arrangement.

In 2013, construction commenced on the North South Rail Underpass line in this vicinity, a freight line which operates parallel to the suburban passenger lines and runs alongside the North Shore Line to Hornsby. This line, at North Strathfield, was designed to dive below the existing railway triangle further south at North Strathfield and is in a cutting as it passes through North Strathfield Station. This line was completed in 2014.

Listed heritage items

The desktop search identified

Two listed heritage items within the Proposal area:

- North Strathfield Railway Station Group, which is listed on the RailCorp Section 170 Heritage and Conservation Register (Item 4801029)
- 12 street trees on Queen Street (‘Street Trees’ – Item I397), listed in Schedule 5 of the Canada Bay LEP 2013.

No heritage items listed on the World, Commonwealth or National Heritage Lists, the Register of the National Estate or NSW State Heritage Register within proximity of the Proposal.

A summary of these items is provided below with additional information included in *Technical Paper 3 – Statement of Heritage Impact*.

A map of the heritage items and places surrounding the North Strathfield station are shown in Figure 6.7.

Figure 6.7 Heritage items within the vicinity of North Strathfield station

North Strathfield Railway Station Group

North Strathfield Railway Station Group is listed on the RailCorp (Sydney Trains) Section 170 Heritage and Conservation Register (#4801029).

The following Statement of Significance for *North Strathfield Railway Station Group* has been reproduced from the RailCorp Heritage and Conservation Register, as provided in the online State Heritage Inventory database (OEH, 2018a):

> *North Strathfield Railway Station has local heritage significance as the establishment of the station in 1918 encouraged the rapid subdivision and development of the area, particularly to the east of the train line. The station is a highly intact, good example of the standard type railway station that was installed along the Short North line during the late 19th and early 20th centuries. The station building contains some significant internal early fabric including a pair of ticket windows with original timber architraves and copper coin trays which are rare as the only known examples of their type extant on the Short North line.*

The ornamental garden fronting Queen Street with pathways, garden furniture, small shrubbery and two rows of brushbox are identified as part of the physical description for the North Strathfield Railway Station Group.

Street Trees – Adjacent to North Strathfield Railway Station

The 'Street Trees – Adjacent to North Strathfield Railway Station' listed in the Canada Bay LEP (2013) (#397) is stated as a *characteristic street planting row of brushbox from c.1940s, forming a significant element in streetscape* (Perumal Murphy Pty Ltd, 1998).

6.5.2 Potential impacts

a) Construction phase

Assessment of construction impacts

Table 6.6 identifies the individual components of the proposed works and considers the potential impacts of the works upon the heritage significance of North Strathfield Railway Station.

Table 6.6 Potential impacts to heritage associated with the Proposal

Component		Assessment
Eastern Entrance - Queen Street		
Lift Access	• New lift L1 including entry landings at street & footbridge level and new canopy to lift entry at footbridge level.	There is no heritage fabric associated with the Queen Street pedestrian entry, nor the overhead pedestrian bridge. There are no significant views or vistas affected by these changes. The present design of the Proposal in this vicinity has minimised any effects upon the landscaped park and ornamental garden (included in the listing for the North Strathfield Railway Station Group). Whilst there would be some temporary effects, (for example: disturbance of ground, creation of vehicle paths) to the gardens during construction, the long-term effects are considered to be negligible.

Component		Assessment
		This component of the Proposal would have no heritage impact the Queen Street pedestrian entry, or on the station building and platforms as neither structures are visible from Queen Street owing to the dense foliage along the street. However, the lift will create an additional visual element in the landscape of the station but as simple, functional element which will deliver a new utility to the station its impact on the heritage significance of the overall station is considered to be acceptable.
Pedestrian road safety improvements	• New TGSI to existing pedestrian crossing • New minimum 1.8 m wide concrete foot path to comply with AS1428 • Provision of one new DDA compliant on-street parking space close to the station entrance on Queen Street. • New kerb and kerb ramp for dedicated accessible parking and accessible kiss & ride • New re-directed footpath - protect existing heritage trees	Heritage fabric associated with this location are the trees planted between the footpath and the rail corridor. The works would not affect the heritage listed trees. There are no significant views or vistas affected by these changes. This component of the Proposal would have no heritage impact.
Western Entrance – Hamilton Street		
Lift Access	• New lift L3 including entry landing at footbridge level and new canopy over lift entry at footbridge level remove section of footbridge balustrade. • New compliant walkway and pavement from new lift L3 to existing stair on Platform 3 to comply with AS1428 cross falls & gradient, protect, retain - make good existing canopy. • New canopy to lift L3 at ground level entry • Under stairs area to be fenced off.	There is no heritage fabric associated with the footpath and kerb from Hamilton Street to the western station entrance. There are no significant views or vistas impacted by these changes. The works necessary for the installation of the lift would affect only recent pavements and subsurface fill materials of no significance. The canopy is attached to the new fabric of the lift and would not affect any heritage fabric. The stairs are part of the relatively recent overhead bridge. The fencing of the ‘under-stairs’ area would not have any heritage impact. The lift would create an additional visual element in the landscape of the station but as simple, functional element which would deliver a new utility to the station its impact in terms of the overall heritage significance of the station building and platforms is considered as acceptable.

Component		Assessment
Pedestrian road safety improvements	• Modified footpath and kerb ramp for DDA parking at the Hamilton Street entrance. • Added TGSI on the existing footpath at the Hamilton Street entrance. • New minimum width 1.8m concrete footpath to comply with AS 1428 • Modify handrails as required • New bench seats at 60m	There is no heritage fabric associated with the footpath and kerb at Hamilton Street, nor with the footpath from Hamilton Street to the western station entrance. There are no significant views or vistas affected by these changes. This component of the Proposal would have no heritage impact on the station building or platforms as neither of these structures are visible from Hamilton Street.
Island Platform (Platforms 1 & 2)		
Lift access	• New lift L2 including entry landing at footbridge level and new canopy over lift entry at footbridge level - remove existing section of footbridge balustrade, handrail & kerb as required. • New canopy to lift L2 ground level entry • Under stairs area to be fenced off.	The only heritage fabric associated with this Lift location is the platform surface. The works necessary for the installation of the lift would affect only recent pavements and subsurface fill materials of no significance. The canopy would be attached to the new fabric of the lift and would not affect any heritage fabric. The stairs are part of the relatively recent overhead bridge. The fencing of the 'under-stairs' area would not have any heritage impact. Whilst this new lift would sit within an important view or vista along the railway line to the south, this view is already dominated by the new concrete overbridge and these additional structures would be consistent with this element and would form a component of it. This may have a minor adverse effect upon the nature and extent of this view but it would have no substantive impact on the heritage values of North Strathfield Station. There has always been a pedestrian bridge in this location. The lift would create an additional visual element in the landscape of the station but as simple, functional element which would deliver a new utility to the station its impact in terms of the overall heritage significance of the station building and platforms is considered as acceptable.

Component		Assessment
Pedestrian safety improvements	• Platform pavements re-graded as required to provide a compliant accessible pathway from new lift to station amenities	The only heritage fabric associated with this element of the Proposal is the platform surface. However, the works necessary for the reconfiguration of the platform surfaces would affect only recent pavements and subsurface fill materials of no significance. There is no heritage fabric directly associated with the location of the handrails for the family accessible toilet entry. This would be a new element in close proximity to the station platform building and would have a minor adverse effect upon the view of the building from the north, however, as such elements are common and utilitarian in a positive context, their installation would have no substantive impact on the heritage values of North Strathfield station. This component of the Proposal would have no heritage impact.
Platform Building Alterations	• Conversion of the Existing Staff Toilet and 'Comms' Room to a single large 'Comms' room. • Conversion of the existing northern store room into a staff toilet • Refitting of the interiors of the existing Unisex Ambulant and Family Accessible toilets.	This work would involve the removal of existing non-original interior fittings and fixtures to reinstate the original single room space. This would then be fitted with free-standing 'Comms' equipment. The key alteration to existing fabric would be to the pedestrian door to the western platform, which would be re-hung to swing outwards. The majority of this work represents the removal of existing non-heritage fabric and is a positive heritage impact. The re-hanging of the door is a minor adverse impact which is reversible and of little long-term consequence, as the original arrangement would be obvious in the door framing and can be returned in the future. The creation of a staff toilet in this space represents a new interior fitout of this room with little impact upon the original fabric of the building. Whilst it represents a change of use, it would have no substantive heritage impact, and can therefore be characterised as a minor change The present interior fittings and finishes of these two toilet spaces are non-original and of relatively recent origin. Their removal and replacement with new fittings and new finishes would not affect any heritage fabric. Whilst this work represents a change of interior finishes, it would have no substantive heritage impact.

Summary of potential construction impacts

Overall, the majority of the components of the Proposal would not have any impact upon significant fabric of North Strathfield station, as they are related to the roadside and pedestrian access pathways leading to the Station. There would be no direct or indirect effects upon the significant trees located along Queen Street.

The installation of the pedestrian lifts from the overhead bridge to the platform level would add a set of new structures to the station but would not directly affect any heritage fabric to any substantive degree. The present overhead bridge is relatively new and formed of reinforced concrete and these new structures would be materially and visually consistent with this material and the visual context created by the bridge. The lift towers would be notable additional visual elements in the landscape of the station but they are simple, functional elements which are common in similar environments and unremarkable. Their functionality and their essential character as the expression of a necessary and welcome new utility provide a context which justifies some degree of impact as reasonable and, consequently, acceptable.

The lifts' location in relation to the significant building on Platform 1 / 2 is sufficiently detached that they would not affect any views to the station and only marginally affect views away from the station. The excavations and minor alterations to the platform pavements to allow the footings for the bases of the lifts would not have any heritage impact.

The regrading of pavements and adjustments to the platform surfaces to make them more accessible are minor works which would not have any adverse impact upon heritage fabric, nor would the addition of TGSI upon the pavements. Platform pavements are utilitarian fabric of little heritage significance and their rearrangement to better serve their purpose is consistent with the operation of the railway station as a public transport facility.

The installation of handrails for the family accessible toilet entry would be in close proximity to the Station platform building, however, as such elements are common and utilitarian in a positive context, their installation would have no substantive impact on the heritage values of North Strathfield station.

Similarly, new and additional wayfinding signage, which would be consistent with the Sydney Trains Signage Policy (for Heritage Items), is a minor change of negligible heritage impact.

b) Operational phase

The Proposal would create three new vertical elements associated with the three lift structures. In all three cases, there are no significant views to or from the North Strathfield station affected in a negative manner. The station itself sits in a cutting and there are limited views of the platform building from any public area apart from on the pedestrian overbridge. From most external aspects, these modern structures would be consistent with the general view-scape and context, leaving the platform building as a singular and picturesque element within the railway cutting. The proposed works would not have an adverse impact upon the views of the platform building.

North Strathfield station has already been notably changed by the construction of the NSRU Line and the replacement of the pedestrian overbridge with the modern concrete structure. These elements surround the island platform and frame the central platform building. In the light of the general suburban context of large modern buildings and the mixed railway context, these new structures would not have a substantive adverse impact upon the setting of the island platform and its station building.

6.5.3 Mitigation measures

The following mitigation measures are proposed with respect to potential non-Indigenous heritage impacts:

- A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.

- In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in the TfNSW *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and OEH. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
- During construction, suitable measures would be put in place to ensure the retained heritage elements are protected from damage. Measures may include hoardings, use of spotters during the movement of equipment and other measures as necessary. Any accidental damage to a heritage item is to be treated as an incident, with appropriate recording and notification.
- On completion of works, an update would be prepared for the Section 170 Heritage and Conservation Register, with required details.
- A heritage conservation architect should be engaged for the detailed design process and to inform the detailed design recommendations. Specifically:
    - The heritage conservation architect should advise on the materials and finishes palette.
    - The heritage architect should advise on the design of the new upper addition of the former Booking Office. Any new materials should aim to reproduce the original as closely as possible.
    - The heritage architect should advise on the design of the balustrade around the platform stairs. This is with respect to the relocation of panels and the design of mesh infill additions between the rails.

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.6 Socio-economic impacts

6.6.1 Existing environment

The North Strathfield station services the Northern via Strathfield Line. North Strathfield is the 96th busiest railway station on the Sydney Trains network, with approximately 5,500 passenger trips (combined entry and exit) recorded at the station on an average weekday in May 2017 (TfNSW, 2014).

The proposed works associated with the Station Platform and buildings are in an area zoned as SP2 Infrastructure (Rail). Works outside of the Station Platform are in the following zones (Figure 4.1):

- B1 – Neighbourhood Centre (Queen Street)
- R3 – Medium Density Residential (Queen Street)
- B3 – Commercial Core (Hamilton Street East)

A number of social and business groups in the study area have the potential to be influenced by the Proposal. Potential sensitive receivers include:

- local residents, particularly those located within streets adjacent to the rail corridor (Queen Street), as well as residents located within streets that provide access to the construction sites for construction vehicles

- local businesses surrounding North Strathfield station, particularly those located on Queen Street
- educational facilities such as The McDonald College and Our Lady of the Assumption Catholic Primary School
- entertainment and leisure facilities located within the Bakehouse Quarter
- commuters including train passengers and motorists using North Strathfield station and its surrounding streets (i.e. rail passengers who travel through the area).

A review of the 2016 Australian Bureau of Statistics (ABS) Census data was undertaken for North Strathfield. The suburb of North Strathfield has a population of 4,800 people with a median age of 32 years. Of this population, around 2,440 were employed and train was identified as the second most common method of travel to work (around 34 percent of employed people aged over 15 years). Around an additional three percent were identified as using a combination of train and bus to travel to work (ABS, 2016).

6.6.2 Potential impacts

a) Construction phase

The construction of the Proposal has the potential to temporarily impact commuters, pedestrians, residents, motorists, businesses, educational facilities and other receivers due to:

- temporary impacts to local traffic movements due to increase in truck movements in the area, delivering site materials, plant and equipment
- temporary changes to existing pedestrian access from Queen Street through to Hamilton Street East and George Street
- temporary restricted pedestrian movements along the station platform
- temporary disruption to existing station facilities and amenities (e.g. street furniture, bicycle storage, kiss-and-ride facilities and platform toilets)
- temporary reduction of parking in the area resulting from construction workforce vehicles
- temporary closures of North Strathfield station to accommodate construction works (during previously scheduled rail possession periods)
- construction noise, dust and visual impacts.

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

Construction works would be undertaken to ensure pedestrian and cyclist access to and through the precinct would be maintained. Cyclists may be temporarily impacted by the relocation of the bike racks. Where works are carried out that may potentially disrupt the existing pedestrian facilities, appropriate signs or traffic controllers would be positioned to notify pedestrians of the temporary arrangements.

During the construction of the lifts, a work zones would also need to be created which may restrict some pedestrian movements within the station precinct and along section(s) of the central platform.

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

b) Operational phase

Overall, the Proposal would provide positive socio-economic benefits to North Strathfield and the Canada Bay LGA, including:

- improved accessibility for customers at North Strathfield station providing accessible pedestrian route to the station platforms through the provision of upgraded footpaths and lifts, compliant with key DDA and DSAPT requirements
- improved station facilities and amenities, including improved access to the waiting room, provision of an ambulant toilet, wayfinding, new tactiles and DDA compliant parking/drop-off
- potential increased use of public transport to and from North Strathfield station
- additional lighting and CCTV would provide positive CPTED outcomes for the area.

6.6.3 Mitigation measures

The following mitigation measures are proposed with respect to potential socio-economic impacts:

- a Community Liaison Plan would be prepared prior to construction to identify all potential stakeholders and the best practice methods for consultation with these groups during construction. The Plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable
- contact details for a 24-hour construction response line (1800 775 465), Project Infoline (1800 684 490) and email address (projects@transport.nsw.gov.au) would be provided for ongoing stakeholder contact throughout the construction phase
- the community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.7 Biodiversity

This section provides a summary of the *Ecological Impact Assessment* (Technical Paper 4) prepared by WSP (2018) and the *Arboricultural Impact Assessment* (Technical Paper 5) prepared by Earthscape Horticultural Services (2018). The methodologies used to undertake these assessments are provided in Technical Paper 4 and Technical Paper 5 respectively.

6.7.1 Existing environment

Vegetation communities

All vegetation observed within the study area comprised of ornamental planted exotic and native garden specimens that do not form part of any recognised native NSW Plant Community Type. No threatened ecological communities were identified within the study area.

Planted trees

The eastern side of the site contains a linear park with a number of mature trees. These include a variety of non-local native and exotic species.

Dominant semi-mature to mature trees observed included: *Angophora floribunda* (Rough-barked Apple), *Auranticarpa rhombifolia* (Syn. *Pittosporum rhombifolia* – Diamond-leaf Pittosporum), *Brachychiton acerifolius* (Illawarra Flame Tree), *Cinnamomum camphora** (Camphor Laurel*), *Corymbia calophylla* (Marri) (Photo 6.8), *Corymbia ficifolia* (Red Flowering Gum), *Fraxinus graffithii* (Evergreen Ash), *Grevillea robusta* (Silky Oak), *Lagerstroemia indica* (Crepe Myrtle), *Lophostemon confertus* (Brush Box) (Photo 6.9 and Photo 6.8).

Photo 6.8 *Corymbia calophylla* and *Lophostemon confertus* along fence line

Photo 6.9 *Lophostemon confertus* along fence line

Flora

No threatened flora species were identified during site inspections. Background investigations identified 36 threatened flora species listed under the BC Act and/or EPBC Act that were considered to have the potential to occur within the locality of the study area. Following field surveys, it is considered that the study area is unlikely to provide habitat to threatened flora species and no threatened flora is likely to be affected by the Proposal.

Weeds

No Priority Weeds listed under the *Biosecurity Act 2015* for the Greater Sydney Region were identified in the study area

Fauna

The fauna habitat within the study area is limited, with a majority of existing vegetation in the form of planted ornamental native and exotic trees and shrubs.

A majority of the existing vegetation within the study area has been cleared for urban development and what remains is landscape gardens and plantings. The habitat and vegetation within the study area provides limited resources and lacks important features such as hollow bearing trees, rocky outcrops, dense litter layer or fallen woody debris. The study area does not provide any significant habitat for fauna. Species likely to utilise resources are those that are well adapted to urban environments or those species that are highly mobile (i.e. birds and bats).

Two existing *Auranticarpa rhombifolia* (Syn. *Pittosporum rhombifolia* – Diamond-leaf Pittosporum) trees on the eastern side of the station have the potential to provide some foraging habitat for highly mobile common frugivorous species (i.e. fruits). It is unlikely that these resources are heavily utilised or relied upon by majority of local fauna but instead are intermittently used whilst foraging within the greater locality.

Photo 6.10 *Auranticarpa rhombifolia* (Syn. *Pittosporum rhombifolia* – Diamond-leaf Pittosporum) – trees proposed to be retained

Photo 6.11 Two *Auranticarpa rhombifolia* (Syn. *Pittosporum rhombifolia* – Diamond-leaf Pittosporum) – left tree proposed to be retained, right tree proposed to be removed

No threatened fauna species were identified during site inspections. Background investigations identified 95 threatened fauna species listed under the BC Act and/or EPBC Act that have been previously recorded or have the potential to occur within the locality. The likelihood of these species occurring within the study area was determined based on field investigations and fauna habitat available. It is considered unlikely that any threatened fauna would occur or utilise the habitat within the study area.

Migratory species

Migratory species are protected under international agreements, to which Australia is a signatory, including Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA), Republic of Korea-Australia Migratory Bird Agreement (RoKAMBA) and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Migratory species are considered Matters of NES and are protected under the EPBC Act. A total of 49 species listed as migratory under the EPBC Act were identified during background investigations that have been previously recorded or have the potential to occur within the locality. Of these, no species are considered likely to utilise the habitat present within the study area.

The habitats within the study area are unlikely to constitute important habitat for any of the listed species. The habitat present is unlikely to support significant proportions of the population of any migratory species, nor are the habitats critical to any life stage of these species. Due to their mobile nature, the mentioned species are likely to utilise higher quality habitat within the greater locality and where more extensive tracts of native vegetation occur.

6.7.2 Potential impacts

a) Construction phase

Direct impacts

Direct impacts to biodiversity as a result of the Proposal are considered negligible due to the existing disturbed nature of the available habitat and the nature of the construction works to be undertaken. Vegetation clearing would be minimal (removal of one *Auranticarpa rhombifolia* (Syn. *Pittosporum rhombifolia* – Diamond-leaf Pittosporum) and some associated excavation of the existing garden bed).

No impacts to remnant native vegetation or high quality fauna habitat are expected as a result of the Proposal. Direct mortality or trauma to fauna is also expected to be minimal as habitat to be removed is of low quality (i.e. planted native trees and landscape gardens).

Impacts to threatened fauna

No threatened fauna are likely to be significantly impacted by the Proposal. It is unlikely that any threatened fauna identified within the locality would have a moderate to higher likelihood to utilise the habitat within the study area, nor are any threatened fauna likely to be reliant on the habitat to be removed or impacted.

Removal of vegetation

The removal of one *Auranticarpa rhombifolia* (Syn. Pittosporum rhombifolia – Diamond-leaf Pittosporum) tree in the form of planted native vegetation and associated landscape gardens would be undertaken as part of the Proposal. This tree was planted as a landscape feature and is not naturally occurring vegetation. The impact to this vegetation is unlikely to constitute important biodiversity value.

The vegetation identified within the study area does not contain important habitat features (i.e. hollows for breeding) for any potential threatened species known or predicted to occur within the locality. Given this, the Proposal is considered unlikely to significantly affect threatened species or ecological communities, or their habitats.

Potential environmental impact of noise, light and vibrations on wildlife

It is likely that noise from the existing rail corridor and arterial roads would already impact background levels of noise in the study area. However, construction and operation phases of the Proposal (along with its ancillary activities) may cause disturbance to animals. The impacts from noise emissions are likely to be localised close to the project and are not likely to have a significant long-term impact on wildlife populations, given that populations are already exposed to noise associated with the existing rail corridor. Furthermore, it is likely that most animal species would habituate to periodic noise disturbance from regular maintenance activities (Forman et al. 2000).

Weeds

The Proposal is unlikely to impact any Priority Weeds listed under the *Biosecurity Act 2015* for the Greater Sydney Region such that they would pose a risk to any areas of native vegetation.

b) Operational phase

The operation of the Proposal is not anticipated to result in any further impacts to biodiversity.

6.7.3 Mitigation measures

The following mitigation measures are proposed with respect to potential biodiversity impacts:

- Construction of the Proposal would be undertaken in accordance with the TfNSW *Vegetation Management (Protection and Removal) Guideline* and the TfNSW *Fauna Management Guideline* and the TfNSW *Biodiversity Offsets Calculator*.
- All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.

- Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. The tree nominated to be removed in the Arboricultural Impact Assessment Report (Earthscape Horticultural Services, 2018) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal.
- Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Arboricultural Impact Assessment Report (Earthscape Horticultural Services, August 2018). Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs.
- Where the loss of trees is unable to be mitigated, Transport for NSW would replace the tree removed as a result of the project in accordance with the TfNSW *Vegetation Offset Guide* (2016). In accordance with Section 5 of the guideline, four trees would be required to meet this offset requirement.
- In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
- Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete the TfNSW Removal or Trimming Application form and submit it to TfNSW for approval.
- For new landscaping works, mulching and watering would be undertaken until plants are established.
- Weed control measures, consistent with the TfNSW *Weed Management and Disposal Guideline,* would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the Proposal. This would include the management and disposal of weeds in accordance with the *Noxious Weeds Act 1993.*

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.8 Contamination, landform, geology and soils

A *Stage 1 Contamination Assessment Report* (Parsons Brinckerhoff and GHD, 2009) and *Stage 2 Contamination Assessment Report* (Golder Associates 2011) were prepared for the North Strathfield Rail Underpass proposal, adjacent North Strathfield Station. A desktop geology and contaminated land assessment of North Strathfield Station was undertaken for the Preliminary Environmental Assessment (PEA) for the Proposal (Lotsearch, 2018). An updated desktop assessment was also undertaken as part of this REF. The findings of these studies are summarised below.

6.8.1 Existing environment

Landform, geology and soils

The Proposal is underlain by Ashfield Shale (Wianamatta Group), which comprises laminate and dark grey siltstone, and Bringelly Shale, which comprises shale with occasional calcareous claystone, laminate and coal.

The Proposal is underlain by the Blacktown Soil Landscape. This is described as gently undulating rises on Wianamatta Group shales and Hawkesbury shale. This landscape has broad rounded crests and ridges with gently inclined slopes, usually less than five percent. The landscape comprises shallow to moderately deep (less than one metre) soils on crests, upper slopes and well-drained areas with deep (1.5 to three metres) soils on lower slopes and in areas of poor drainage.

Limitations associated with the soil landscape include moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage.

The topography of the North Strathfield Station and the rail corridor is relatively flat, with a gentle downwards slope on the western side of the station and slightly steeper upwards slope on the eastern side. Minor fill may have been required to achieve the current grades at the station.

Existing ground modification within the station precinct include excavations, earth filling, construction of retaining walls, railway tracks and platforms and building of structures.

Acid sulphate soils

The Atlas of Australian Acid Sulphate Soils shows that there is an extremely low probability of encountering acid sulfate soils (ASS) within the Proposal site (one to five percent, resulting in their 'C' classification). Areas of low (six to 70 percent) and high (greater than 70 percent) ASS probability were identified about 250 metres to the west and 320 metres to the north west of the Proposal respectively. These areas are associated with low-lying land near Powell Creek and the Allen Street Reserve.

Salinity

Based on the Australian Groundwater Explorer site (Australian Bureau of Meteorology. 2018) , the likelihood of the occurrence of saline soil conditions is considered to be low.

Contamination

Given the historical use of the station as a rail corridor, there is potential for contaminants to be present within the soils underlying the station. Historic activities associated with rail corridors that have the potential to result in contamination include the introduction of fill materials including ash, fuel or oil spills and accidental leaks or spills from maintenance and operational activities. Given the age of the building, there is also potential for asbestos materials and lead paint to be encountered. To the west of the existing rail corridor, the area was originally used for industrial purposes, with much of these developments since demolished to make way for residential dwellings. The eastern side of the corridor has mainly remained an area of low density residential development.

A search of the public register of notices issued by the NSW EPA under *Contaminated Land Management Act 1997* was undertaken on 27 July 2018. Two contaminated sites were recorded within North Strathfield including the existing Budget service station on Concord Road (located about 350 metres to the east) and the former Caltex service station on Concord Road (located about 450 metres to the south east).

One licensed activity under the *Protection of the Environment Operations Act 1997* was identified as being registered for John Holland and Sydney Water Corporation, associated with the NSRU works.

6.8.2 Potential impacts

a) Construction phase

The Proposal would require excavation work for the installation of foundations and footings for new lift shafts and lifts. Other trenching or excavation may be required for footpath and road works, relocation of services, drainage works and minor tree removal.

Soil disturbance

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

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

Such impacts can be a nuisance to community members, and lead to an adverse environmental impact on biodiversity, for example through the introduction of sediment into waterways. These impacts are expected to be minor due to the limited level of ground disturbance required for the Proposal and the relatively flat topography and stability of the Proposal site.

Erosion risks can be adequately managed through the implementation of standard measures as outlined in *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) (the Blue Book).

Contamination

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

The Proposal has the potential to disturb contaminated material. As there is potential for onsite contamination, chemical testing and visual characterisation would be undertaken to confirm the composition and nature of excavated material. Where spoil is classified as unsuitable for reuse it would be transferred to an appropriately licensed offsite facility.

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

b) Operational phase

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

6.8.3 Mitigation measures

The following mitigation measures are proposed with respect to potential soil and contamination impacts:

- Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the ‘Blue Book’ Managing Urban Stormwater: Soils and Construction Guidelines (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.

- Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.
- Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
- All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2015g).
- Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW Chemical Storage and Spill Response Guidelines (TfNSW, 2015g) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
- In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.
- The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:
    - identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities
    - detail other onsite management practices such as keeping areas free of rubbish
    - specify controls and containment procedures for hazardous waste and asbestos waste
    - outline the reporting regime for collating construction waste data.
- An appropriate unexpected contamination finds protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements.
- All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.
- All spoil and waste must be classified in accordance with the Waste Classification Guidelines Part 1: Classifying waste (EPA, 2014) prior to disposal.
- Any concrete washout would be established and maintained in accordance with the TfNSW *Concrete Washout Guideline* – draft (TfNSW, 2015i) with details included in the CEMP and location marked on the ECM.

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The Proposal site is located within the Parramatta River Catchment Estuary. The nearest watercourse is Powell Creek, located about 300 metres to the west of the station. The creek is a highly-modified tributary of the Parramatta River.

Groundwater

A search of NSW OEH data in February 2018 indicated there are 10 groundwater bores within 500 metres of the station. The nearest bore is located more than 460 metres to the west and is used for monitoring purposes. The recorded depth to groundwater was 1.4 metres below surface (NSW OEH, 2017). Given this bore is in the low-lying areas of the Bicentennial Park it is not likely to indicate the groundwater depth around the station precinct.

Flooding

The Proposal site is not located within a flood planning area, nor is it within any flood prone land as confirmed by a review of the *Powell Creek and Saleyards Creek Revised Flood Study* (WMA Water, 2016). Rail corridor drainage and station precinct runoff generally discharges locally to closed Council drainage lines, which eventually discharge to the Parramatta River. As existing overland flows do not cross the rail corridor and station, and the proposed design would not impact existing drainage along Queen Street, no increase in potential flooding as a result of the Proposal is expected.

6.9.2 Potential impacts

a) Construction phase

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

Activities that would disturb soil during construction work would have the potential to impact on local waterways as a result of erosion and sedimentation.

Additionally, while groundwater levels were not determined as part of this assessment, areas of excavation may need to be locally dewatered as a result of groundwater seepage or rainfall runoff (such as within the vicinity of the excavations for the western lift). Incorrect dewatering may pose risks to nearby waterways where run-off travels from the site to these areas.

b) Operational phase

The Proposal is unlikely to have a major impact on the hydrology of the Proposal site or the surrounding area.

Removal of one tree, part of the existing garden bed and regrading of access footpaths would result in minor alterations to the existing surface water flow regime within the station precinct and surrounding streets due to minor increases in hardstand areas.

Alterations to the surface water flows would likely be within the capacity of the stormwater network and as such, impacts would be minor.

6.9.3 Mitigation measures

As noted in Section 6.8.3, a site-specific Erosion and Sediment Control Plan would be prepared and implemented for the Proposal to manage risks to water quality. Additional mitigation measures that would be required for construction include would include:

- Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' Managing Urban Stormwater: Soils and Construction Guidelines (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
- Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.
- Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
- All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2015g).
- Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW Chemical Storage and Spill Response Guidelines (TfNSW, 2015g) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
- In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.
- The existing drainage systems would remain operational throughout the construction phase.
- Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the Waste Classification Guidelines (EPA, 2014) and the TfNSW *Water Discharge and Reuse Guideline* (TfNSW, 2015b).

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.10 Air quality

6.10.1 Existing environment

Regional air quality

The broader Sydney East monitoring region provides the most representative air quality monitoring results for North Strathfield. The Sydney East region includes air quality monitoring sites at Macquarie Park, Chullora, Rozelle, Lindfield, Randwick and Earlwood. The closest monitoring sites to the Proposal site are Chullora and Rozelle however both of these sites are noted as non-conforming to the requirements of the Australian Standard AS/NZS 3580.

A search of the daily regional air quality index for the Sydney East region for last year (July 2017 to July 2018) showed that the region experienced:

- very good air quality on 2.7 per cent of days
- good air quality on 66.1 per cent of days
- fair air quality on 21.3 per cent of days
- poor air quality on 5.5 per cent of days
- very poor air quality on 2.7 per cent of days
- hazardous air quality on 1.6 per cent of days.

Air pollutant sources

Based on the land uses surrounding North Strathfield Station, the existing air quality is likely to be characteristic of an urban environment.

A search of the National Pollutant Inventory undertaken on 30 July 2018 for the 2016 to 2017 reporting period identified no registered facilities within the Canada Bay LGA. The search identified 72 air polluting substances from 20 sources in the Canada Bay LGA.

Sensitive receivers

Sensitive receivers near the Proposal site include:

- local residents, particularly those located within streets adjacent to the rail corridor (Queen Street), as well as residents located within streets that would provide access to the station precinct for construction vehicles
- local businesses surrounding North Strathfield Station, particularly those located on Queen Street
- educational facilities such as The McDonald College and Our Lady of the Assumption Catholic Primary School
- entertainment and leisure facilities located within the Bakehouse Quarter
- commuters, train passengers and motorists commencing or completing their journeys from both within the study area and further afield (i.e. rail passengers who travel through the area).
- staff at North Strathfield Station.

6.10.2 Potential impacts

a) Construction phase

Potential air quality impacts during construction would be temporary and associated with dust particles and emissions of carbon monoxide, sulphur dioxide, particulate matter (PM_{10}), nitrous oxides, volatile organic compounds, and polycyclic aromatic hydrocarbons from the combustion of diesel fuel and petrol from construction plant and equipment.

Anticipated sources of dust and dust-generating activities include:

- excavation for the new lifts to access the station platform
- other trenching or excavation for footpath and road works
- upgrade of surrounding interchange facilities (kiss-and-ride, etc.)
- impacts to the garden bed at the pedestrian footbridge near Queen Street
- stockpiling activities
- dust generated from the loading and transfer of material from trucks
- other general construction works.

The Proposal would be likely to have minimal impact on air quality as it would not involve extensive excavation or other land disturbance with the potential to generate significant quantities of dust. The operation of plant, machinery and trucks, as well as construction traffic, may also lead to increases in exhaust emissions in the local area however these impacts would be minor and short-term.

b) Operational phase

Overall impacts on air quality during the operation of the Proposal would be negligible as the Proposal would not result in a change in land use.

Additionally, as the Proposal would increase access to public transport, the use of public transport would be expected to increase and lead to a relative reduction in the amount of private vehicle related emissions in the long-term.

6.10.3 Mitigation measures

The following mitigation measures are proposed with respect to potential air quality impacts:

- Air quality management and monitoring for the Proposal would be undertaken in accordance with the TfNSW *Air Quality Management Guideline* (TfNSW, 2015h).
- Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
- Plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling.
- Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
- To minimise the generation of dust from construction activities, the following measures would be implemented:
    - apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces)
    - cover stockpiles when not in use

- appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading
- prevent mud and dirt being tracked onto sealed road surfaces.

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.11 Other impacts

6.11.1 Services/utilities

The Proposal has the potential to impact services such as from direct impact from excavation activities or from operation of other equipment, if services are not appropriately identified and protected or relocated. A DBYD search identified a number of utilities in the vicinity of the proposed works including:

- existing conduit and transmission lines/electrical services
- telecommunication services
- stormwater services
- high pressure gas mains
- water and sewer services
- rail utilities, including signalling cabling and overhead wiring and associated equipment.

The detailed design of the Proposal would be undertaken to avoid services where feasible. Relocation or other works that may affect services would be undertaken in consultation with the respective utility authorities.

6.11.2 Waste

Construction

The construction of the Proposal would generate a range of waste streams including:

- asphalt and concrete
- surplus building materials
- excavated spoil
- building material wastes (including metals, timbers, plastics, packaging, fencing etc.)
- electrical wiring and conduit waste (from electrical connections)
- hazardous chemical wastes (e.g. fuels)
- green waste (including weeds)
- demolition waste from the footpath works, footbridge modifications, platform pavement, preparations to upgrade the existing toilet facilities and non-compliant tactiles
- general waste, including food scraps generated by construction workers.

Appropriate planning of construction activities would ensure that the volume of surplus materials is minimised. Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). A Waste Management Plan would be prepared that would identify all potential waste streams associated with the works and outline methods of disposal, reuse and recycling as well as other onsite waste management practices.

The handling, storage, transport and disposal of asbestos and hazardous waste (including lead waste) would be in accordance with the requirements of relevant EPA and Safe Work NSW guidelines.

Waste management targets in consideration of the TfNSW *NSW Sustainable Design Guidelines – Version 4.0* (TfNSW, 2017b) would be developed for the Proposal and would include reuse and recycling.

Operation

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

Mitigation measures

The following mitigation measures are proposed with respect to potential waste impacts:

- The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:
    - identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities
    - detail other onsite management practices such as keeping areas free of rubbish
    - specify controls and containment procedures for hazardous waste and asbestos waste
    - outline the reporting regime for collating construction waste data.

Refer to Table 7.1 in Section 7.2 for a list of proposed mitigation measures.

6.12 Cumulative impacts

6.12.1 Existing or potential projects

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

A search of the Department of Planning and Environment's Major Projects Register, Sydney East Joint Regional Planning Panel Development and Planning Register, and Canada Bay Council Development Application Register on 1 August 2018 identified a number of proposals and projects within the Canada Bay LGA.

The following current and proposed projects have been identified as the most likely to contribute to cumulative impacts from the Proposal, due to their scale and/or proximity to the Proposal site:

- WestConnex M4 East.
- small-scale projects in the area surrounding the Proposal site.

WestConnex M4 East is a 33-kilometre motorway currently being constructed to improve connectivity between industrial, commercial and residential areas in Sydney's west, south-west and east. The M4 East is the first underground section of WestConnex and involves the construction of twin tunnels of approximately 5.5 kilometres in length from Homebush to Haberfield and associated surface works to connect to the existing road network. Construction of the project commenced in March 2016 and completion is expected by 2019.

The WestConnex M4 East tunnel passes under the Main Northern Line approximately 600 metres south of North Strathfield Station. The M4 road passing over the railway is also being widened as part of the works. An interchange at Concord Road, North Strathfield, is currently under construction approximately 800 metres south-east of the site.

No other major development proposals have been identified in the vicinity of the Proposal site. Other developments likely to occur within the locality would be small scale projects such as residential dwellings in adjacent residential areas.

6.12.2 Potential impacts

Construction

There are two construction compounds for the WestConnex M4 East works located within one kilometre of the Proposal site (CSJ, 2017). Construction-related traffic would likely be using the same road network which may increase traffic congestion in the area.

There is potential for air quality and noise impacts from WestConnex construction compounds to also affect sensitive receivers near the Proposal site, however these impacts are unlikely to be significant.

Other potential cumulative impacts arising from the Proposal works being undertaken simultaneously with the above projects would include:

- construction noise and vibration
- reduced visual amenity
- parking restrictions
- restricted pedestrian and cyclist movements.

Operation

Operational traffic and transport impacts are likely to be positive, as traffic congestion may be slightly improved due to increased public transport use as a result of both the Proposal.

6.12.3 Mitigation measures

During construction, the works would be coordinated with WestConnex construction activities. Consultation and liaison would occur with Canada Bay Council, RailCorp/Sydney Trains, and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

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.

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 a minimal impact on the performance of the surrounding road network.

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

6.13 Climate change and sustainability

6.13.1 Greenhouse gas emissions

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

Projects are required to establish a baseline footprint using the Carbon Estimate and Reporting Tool (CERT) and demonstrate a reduction of construction related GHG emissions of at least five percent from the established project baseline (note: The project baseline is automatically generated within the CERT tool, refer to CERT user manual for details). Due to the small scale of the Proposal and the short term temporary nature of the individual construction works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Table 7.1.

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 North Strathfield. A modal shift in transport usage may reduce the amount of fuel consumed by private motor vehicles with a corresponding relative reduction in associated greenhouse gas emissions in the local area.

6.13.2 Climate change

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

Climate change could lead to an increase in the intensity of rainfall events, whereby the rainfall excepted to occur in a 100-year average recurrence interval flood event would occur more frequently. Such changes in weather in the region are unlikely to impact on the operation of the Proposal with respect to issues such as increased flooding (for more information on flooding refer to Section 6.9).

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

6.13.3 Sustainability

The design of the Proposal would be based on the principles of sustainability, including the consideration of the TfNSW *NSW Sustainable Design Guidelines – Version 4.0* (TfNSW, 2017) and the TfNSW *Environmental Management System* (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.1.4 for more information regarding the application of these guidelines.

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

7 Environmental management

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

7.1 Environmental management plans

A CEMP for the construction phase of the Proposal would be prepared in accordance with the requirements of the TfNSW 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 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 7.1. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 7.1 Proposed mitigation measures

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

No.	Mitigation measure
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by TfNSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
	Traffic and site access
8.	Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum: • ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised • maximising safety and accessibility for pedestrians and cyclists • ensuring adequate sight lines to allow for safe entry and exit from the site • ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off street parking and requirements for any temporary replacement provision • parking locations for construction workers away from stations and busy residential areas and details of how this would be monitored for compliance • routes to be used by heavy construction related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP. Consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.
9.	Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
10.	Road Occupancy Licences for temporary road closures would be obtained, where required.
11.	In parallel with the installation of the lift adjacent to Queen Street, staircase access to the North Strathfield Station footbridge should be maintained. Where closure of the bridge cannot be avoided or is required outside of possession period(s), provision for short term bussing to Hamilton Street (East) would be considered
12.	All works with the potential to impact pedestrian movements such as lifting should be carried out during scheduled track possession periods
13.	Staging of the Hamilton Street East footpath is necessary to minimise the impacts to pedestrians and cyclists accessing the station from the proposed footpath works and lift installation. A parallel emergency footpath exists, should pedestrians need to be re-directed, to bypass construction activities

No.	Mitigation measure
14.	If any closure of the existing footbridge would be required for the lift installation, the construction works should be programmed to undertake during a scheduled track possession period to minimise the impacts to pedestrians.
	Urban design, landscape and visual amenity
15.	An Urban Design Plan (UDP) would be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Sustainability and Precincts and Urban Design team, prior to finalisation of the detailed design. The UDP, at a minimum, would address the following: • the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns (including consideration of Crime Prevention Through Environmental Design principles). This is to include but not be limited to: o connectivity with surrounding local and regional movement networks including street networks, other transport modes and active transport networks. Existing and proposed paths of travel for pedestrians and bicycles should be shown o integration with surrounding local and regional open space and or landscape networks. Existing and proposed open space infrastructure/landscape elements should be shown o integration with surrounding streetscape including street wall height, active frontages, awnings, street trees, entries, vehicle cross overs etc. o integration with surrounding built form (existing or desired future) including building height, scale, bulk, massing and land-use • design detail that is sensitive to the amenity and character of heritage items located within or adjacent to the Proposal site.
16.	A Public Domain Plan (PDP) would be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Sustainability and Precincts and Urban Design team, prior to finalisation of the detailed design. The PDP, at a minimum, would address the following: • materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences • location and design of pedestrian and bicycle pathways, street furniture including relocated bus and taxi facilities, bicycle storage (where relevant), telephones and lighting equipment • landscape treatments and street tree planting to integrate with surrounding streetscape • opportunities for public art created by local artists to be incorporated, where considered appropriate, into the Proposal • total water management principles to be integrated into the design where considered appropriate • design measures included to meet the TfNSW *Sustainable Design Guidelines -Version 4.0* (TfNSW, 2017) • identification of design and landscaping aspects that will be open for stakeholder input, as required.
17.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting.*
18.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.

No.	Mitigation measure
19.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
20.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
21.	During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.
	Noise and vibration
22.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Strategy* (TfNSW, 2018b) and the Noise and Vibration Impact Assessment for the Proposal (WSP, 2018). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
23.	The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include: • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • avoiding any unnecessary noise when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks • avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded • avoiding deliveries at night/evenings wherever practicable • no idling of delivery trucks • keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site • minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.

No.	Mitigation measure
24.	The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include: • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction works at any one time • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc. • using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works • use of quieter and less vibration emitting construction methods where feasible and reasonable.
25.	Works would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any works outside these hours may be undertaken if approved by TfNSW and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.
26.	Where the $L_{Aeq\ (15minute)}$ construction noise levels are predicted to exceed 75 dBA and/or 30 dBA above the Rating Background Level at nearby affected sensitive receivers, respite periods would be observed, where practicable, and in accordance with TfNSW's *Construction Noise and Vibration Strategy* (TfNSW, 2018b). This would include restricting the hours that very noisy activities can occur.
27.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (WSP, 2018) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
28.	Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with: • for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 *Structural Vibration in Buildings: Effects on Structures* and British Standard *BS 7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)* • for human exposure to vibration the acceptable vibration - values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) which includes British Standard BS *7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).*
29.	Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the works and all heritage listed buildings and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).

No.	Mitigation measure
	Indigenous heritage
30.	All construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to the Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites.
31.	If unforseen Indigenous objects are uncovered during construction, the procedures contained in the TfNSW *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the OEH and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.
	Non-Indigenous heritage
32.	A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
33.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in the TfNSW *Unexpected Heritage Finds Guideline* (TfNSW, 2015a) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and OEH. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
34.	During construction, suitable measures would be put in place to ensure the retained heritage elements are protected from damage. Measures may include hoardings, use of spotters during the movement of equipment and other measures as necessary. Any accidental damage to a heritage item is to be treated as an incident, with appropriate recording and notification.
35.	On completion of works, an update would be prepared for the Section 170 Heritage and Conservation Register, with required details.
36.	A heritage conservation architect should be engaged for the detailed design process and to inform the detailed design recommendations. Specifically: — The heritage architect should advise on the materials and finishes palette. — The heritage architect should advise on the design of the new upper addition of the former Booking Office. Any new materials should aim to reproduce the original as closely as possible. — The heritage conservation architect should advise on the design of the balustrade around the platform stairs. This is with respect to the relocation of panels and the design of mesh infill additions between the rails.

No.	Mitigation measure
	Socio-economic
37.	A Community Liaison Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
38.	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.
39.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.
	Biodiversity
40.	Construction of the Proposal must be undertaken in accordance with the TfNSW *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2015d) and the TfNSW *Fauna Management Guideline* (TfNSW, 2015e).
41.	All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.
42.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Ecological Impact/Arborist Assessment (WSP, 2018 and Earthscape Horticultural Services 2018) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below.
43.	Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Ecological Impact/Arborist Assessment (WSP, 2018 and Earthscape Horticultural Services 2018). Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs.
44.	Where the loss of trees is unable to be mitigated, Transport for NSW would replace the tree removed as a result of the project in accordance with the TfNSW *Vegetation Offset Guide* (2016). In accordance with Section 5 of the guideline, four trees would be required to meet this offset requirement.
45.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
46.	Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete the TfNSW Tree Removal or Trimming Application form and submit it to TfNSW for approval.
47.	For new landscaping works, mulching and watering would be undertaken until plants are established.

No.	Mitigation measure
48.	Weed control measures, consistent with the TfNSW *Weed Management and Disposal Guideline* (TfNSW, 2015f), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the *Noxious Weeds Act 1993.*
	Soils and water
49.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
50.	Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.
51.	Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
52.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2015g).
53.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2015g) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
54.	In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.
55.	The existing drainage systems would remain operational throughout the construction phase.
56.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and the TfNSW *Water Discharge and Reuse Guideline* (TfNSW, 2015b).
	Air quality
57.	Air quality management and monitoring for the Proposal would be undertaken in accordance with the TfNSW *Air Quality Management Guideline* (TfNSW, 2015h).
58.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.

No.	Mitigation measure
59.	Plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling.
60.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
61.	To minimise the generation of dust from construction activities, the following measures would be implemented: • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.
	Waste and contamination
62.	The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum: • identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data.
63.	An appropriate unexpected contamination finds protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements.
64.	All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.
65.	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste (*EPA, 2014) prior to disposal.
66.	Any concrete washout would be established and maintained in accordance with the TfNSW *Concrete Washout Guideline* – draft (TfNSW, 2015i) with details included in the CEMP and location marked on the ECM.
	Climate change and sustainability
67.	Detailed design of the Proposal would be undertaken in accordance with the *TfNSW Sustainable Design Guidelines – Version 4.0* (TfNSW, 2017).

No.	Mitigation measure
	Cumulative impacts
68.	The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP, and implemented as appropriate.

8 Conclusion

This REF has been prepared in accordance with the provisions of section 5.5 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:

- stations that are accessible to people with a disability, limited mobility 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.

The likely key impacts of the Proposal are as follows:

- temporary impacts on local traffic flow associated with construction traffic and construction of the DDA compliant parking on Queen Street
- introduction of new elements, such as the lifts and associated weather canopies, to the visual environment
- temporary noise and vibration impacts associated with construction activities
- temporary disruptions to station facilities and amenities during construction, including temporary closures of the North Strathfield Station (during planned track possessions) and restricted pedestrian movements
- removal of one tree to accommodate the new lift at the Queen Street entrance
- potential sediment mobilisation, dust generation and erosion risk during construction.

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

The Proposal would also take into account the principles of ESD (refer to Section 3.1.4 and Section 4.6). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

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Appendix A Consideration of matters of National Environmental Significance

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

Matters of NES	Impacts
Any impact on a World Heritage property? Two World Heritage properties occur within a ten-kilometre radius of the site. Both heritage places are located on Cockatoo Island and will not be impacted by the Proposal.	Nil
Any impact on a National Heritage place? One National Heritage places occurs within a ten-kilometre radius of the site. This place is located on Cockatoo Island and will not be impacted by the Proposal.	Nil
Any impact on a wetland of international importance? No wetlands of international importance are located within a ten-kilometre radius of the site. One wetland of National importance is located within ten kilometres within Bicentennial Park, Homebush. This wetland would not be impacted by the Proposal.	Nil
Any impact on a listed threatened species or communities? Based on available habitat and the potential impacts of the Proposal, it is unlikely that any threatened species or community will be impacted.	Nil
Any impacts on listed migratory species? No listed migratory species are likely to utilise the habitat within the study area.	Nil
Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.	Nil
Any impact on a Commonwealth marine area? The Proposal would not impact on a Commonwealth marine area.	Nil
Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Proposal is not related to coal seam gas or mining,	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal would not impact on Commonwealth land.	Nil

Appendix B Consideration of clause 228

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

Factor	Impacts
(a) Any environmental impact on a community? There are potential impacts to the community associated with the construction phase of the Proposal. Mitigation measures in Table 7.1 would minimise the potential adverse impacts of the Proposal. There would be positive long-term impacts associated with the operational phase of the Proposal.	Minor
(b) Any transformation of a locality? One tree would be removed as a result of the Proposal. The Station would have an increased visual prominence resulting from the installation of three lifts. The new elements would be consistent with the Station. The landscaped gardens at the Queen Street entrance retained. The Proposal would have a positive contribution to the locality through improving accessibility to the Station.	Minor
(c) Any environmental impact on the ecosystem of the locality? There are potential impacts to the ecosystem surrounding the station associated with the construction phase of the Proposal, including the removal of one tree. Mitigation measures in Table 7.1 would minimise the potential adverse impacts of the Proposal. There are no long-term impacts associated with the operational phase of the Proposal.	Minor
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? There are potential short-term reductions to environmental qualities and values associated with the construction of the Proposal. Mitigation measures in Table 7.1 would minimise the potential adverse impacts of the Proposal. The Proposal would improve the value of the locality through improving accessibility to the Station.	Minor
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? North Strathfield Station is listed on the RailCorp Section 170 Heritage and Conservation Register. The heritage listing applies to the station building, interior, platforms and landscaped gardens fronting Queen Street. The Proposal would retain heritage values.	Minor
(f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)? Based on available habitat and the potential impacts of the Proposal, it is considered unlikely that any threatened fauna would be impacted.	Nil

Factor	Impacts
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal would not have any impact on endangering any species.	Nil
(h) Any long-term effects on the environment? There are no long-term effects on the environment resulting from the Proposal.	Nil
(i) Any degradation of the quality of the environment? There is no anticipated degradation of the quality of the environment resulting from the Proposal.	Nil
(j) Any risk to the safety of the environment? Mitigation measures in Table 7.1 would minimise the potential adverse impacts of the Proposal, including risks to environmental safety.	Nil
(k) Any reduction in the range of beneficial uses of the environment? The Proposal would not reduce the range of beneficial uses of the environment.	Nil
(l) Any pollution of the environment? Mitigation measures in Table 7.1 would minimise the potential adverse impacts of the Proposal, including pollution.	Nil
(m) Any environmental problems associated with the disposal of waste? Mitigation measures in Table 7.1 would minimise the potential adverse impacts of the Proposal, including waste management.	Nil
(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal would not place increased demand on resources that are, or are likely to become, in short supply. The Proposal may result in lower car dependence, reducing use of fossil fuels associated with car transport.	Nil
(o) Any cumulative environmental effect with other existing or likely future activities? Works would be coordinated with any other construction activities in the area, through consultation and liaison with Canada Bay Council, RailCorp/Sydney Trains, and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.	Nil
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The Proposal would not impact on coastal processes and is not subject to coastal hazards, including those projected under climate change conditions.	Nil

Appendix C Sustainable Design Guidelines checklist

Compulsory initiatives

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
2A		All new electrical equipment (for the final asset) to be at least market average star rating. In categories where no star ratings are available, equipment purchased should be recognised as high efficiency either by being ENERGY STAR accredited, in a high efficiency band under Australian Standards or being above-average efficiency of Greenhouse and Energy Minimum Standards (GEMS) registered products.	D	Yes
5	Materials and waste	100% of useable spoil (by weight) to be beneficially reused for all projects generating >300m^3 of spoil.	C	Yes
8A		All new water-using appliances, shower heads, taps and toilets must be at least the average Water Efficiency Labelling Scheme (WELS) star rating by product type.	D	Yes
9	Pollution control	All surface coatings to comply with the Australian Paint Approval Scheme (APAS) Volatile Organic Compounds Limits where fit for purpose.	D	Yes
10		All mobile non-road diesel plant and equipment (with an engine greater than 19kW) to report engine conformity with relevant United States Environmental Protection Agency (US EPA), European Union (EU) or equivalent emissions standards and the fitting of any exhaust after-treatment devices. Reporting should be in accordance with the Air Emission Data Workbook – 9TP-FT-439.	C	Yes

Initiative	Theme	Description	Design (D) or Construct (C) interface	Under consideration
11	Biodiversity	All projects with non-significant biodiversity impacts to comply with the Infrastructure and Services Vegetation Offset Guide as applicable.	D	Yes
12	Community Benefit	All projects must: i. meet steel and timber sustainable procurement requirements; and ii. undertake sustainable procurement training for high impact suppliers.	D	Yes
13		All projects to address the urban design principles in the TfNSW Interim Urban Design Best Practice Guidelines within their urban design and landscaping plan (UDLP).	D	Yes
14		The project is awarded at least 1 point for a single initiative against the ISCA Innovation Credit Inn-1 OR The project makes a contribution to industry and/or the local community in line with the project legacy categories specified (Note: the requirements are determined by CapEx).	D	Yes