

Birrong Station Upgrade

Review of Environmental Factors



Artist's impression of the proposed Birrong Station Upgrade, subject to detailed design



Birrong Station Upgrade – Review of Environmental Factors

**Transport Access Program
Ref – 6343374**

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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
AS	Australian Standard
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BS	British Standard
CBD	Central Business District
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
CCTV	Closed circuit TV
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CNVMP	Construction Noise and Vibration Management Plan
CTMP	Construction Traffic Management Plan
DBH	Diameter Breast Height
DDA	<i>Disability Discrimination Act 1992 (Cwlth)</i>
DoEE	Commonwealth Department of the Environment and Energy
DP&E	(Former) NSW Department of Planning and Environment
DPIE	NSW Department of Planning, Industry and Environment
DSAPT	<i>Disability Standards for Accessible Public Transport (2002)</i>
ECM	Environmental Controls Map
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>

Term	Meaning
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
ICNG	<i>Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009).</i>
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>
IS rating	Infrastructure Sustainability rating under ISCA rating tool (v 1.2)
ISCA	Infrastructure Sustainability Council of Australia
LEP	Local Environmental Plan
LGA	Local Government Area
NES	National Environmental Significance (refers to matters of National Environmental Significance under the EPBC Act)
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
OEH	(Former) NSW Office of Environment and Heritage
PCT	Plant Community Type
PoEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
REF	Review of Environmental Factors (this document)
Roads Act	<i>Roads Act 1993 (NSW)</i>
SEPP	State Environmental Planning Policy
TfNSW	Transport for NSW
TPZ	Tree Protection Zone
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i>
WM Act	<i>Water Management Act 2000 (NSW)</i>

Definitions

Term	Meaning
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Construction Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
Construction Contractor	The entity appointed by TfNSW to undertake the construction of the Proposal. The Construction Contractor is therefore responsible for all work on the project, both design and construction.
Determining Authority	A Minister or public authority on whose behalf an activity is to be carried out or public authority whose approval is required to carry out an activity (under the EP&A Act).
Disability Standards for Accessible Public Transport	The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> (as amended) are a set of legally enforceable standards, authorised under the Commonwealth <i>Disability Discrimination Act 1992</i> (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Out of hours works	Defined as works <i>outside</i> standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act.
Rail Possession	A rail 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.
The Proposal	The construction and operation of the Birrong Station Upgrade.

Term	Meaning
Vegetation Offset Guide (TfNSW, 2016b)	<p>The TfNSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.5 of the EP&A Act.</p> <p>The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.</p>

Executive summary

Overview

Transport for New South Wales (TfNSW) is proposing to upgrade Birrong Station (the Proposal) to meet accessibility requirements outlined in the *Disability Discrimination Act 1992* (DDA). The Proposal would include a new footbridge, lift, ramps and stairs to improve accessibility at this location.

The Proposal is part of the Transport Access Program (TAP) which is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. The Proposal would provide safe and equitable access to the island platform at Birrong Station from the surrounding pedestrian network and would also improve customer facilities and amenity.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts of 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). TfNSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Proposal.

Subject to approval, construction is expected to commence in mid-2020 and take around 18 months to complete. A detailed description of the Proposal is provided in Chapter 3 of this REF. An overview of the Proposal is shown in Figure 1 below.

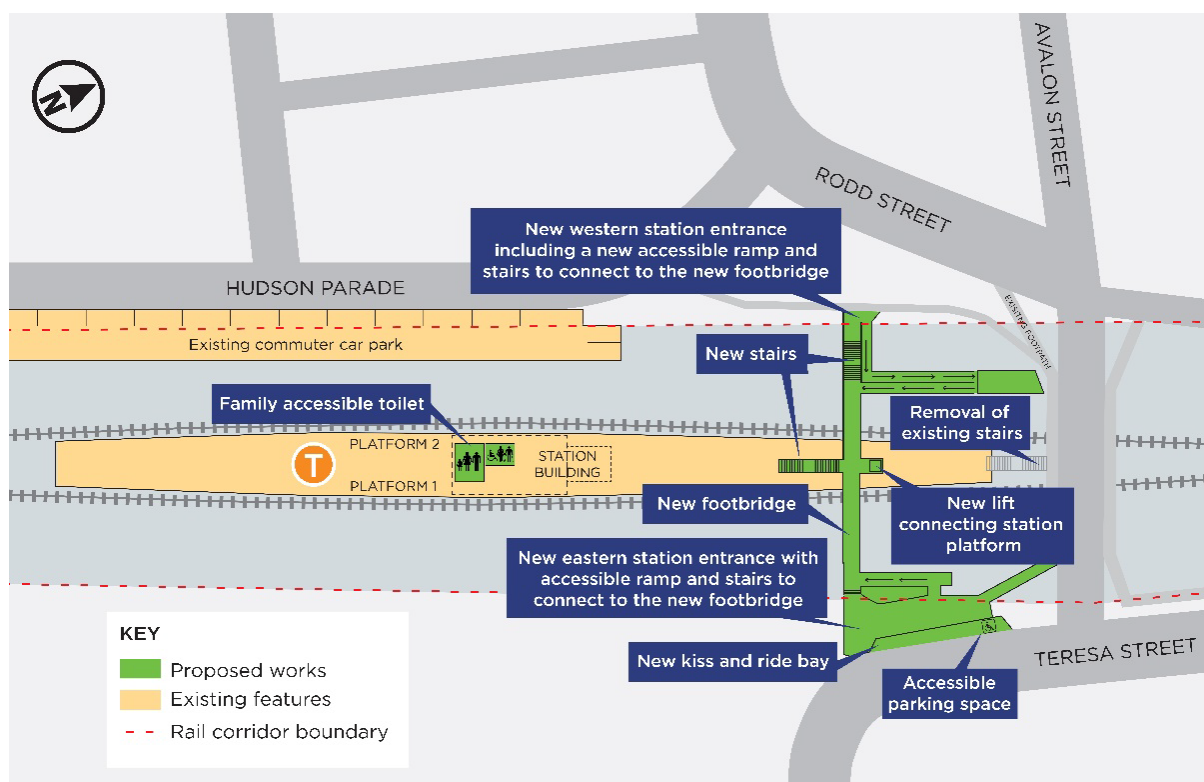


Figure 1 Proposed Birrong Station Upgrade (indicative only, subject to detailed design)

Need for the Proposal

The Proposal would ensure that Birrong Station would meet legislative requirements under the *Disability Discrimination Act 1992* (DDA) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT). The Proposal would provide improved and equitable access for the community including the elderly, people with limited mobility, and parents and carers with prams.

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

Chapter 2 of this REF further describes the need for the proposal and outlines the options considered in developing the design.

Community and stakeholder consultation

Community consultation activities for the Proposal would be undertaken during the public display period of this REF and the public invited to submit feedback to help TfNSW understand what is important to customers and the community. The REF would be displayed for a period of two weeks. Further information about these specific activities is included in Section 5 of this REF.

During this period a Project Infoline (1800 684 490) and email address (projects@transport.nsw.gov.au) would be also 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 – Birrong Station

Transport for NSW

Locked Bag 6501

St Leonards NSW 2065

Or submitted:

- In person at a project community information session
- Via the feedback form on www.transport.nsw.gov.au/birrong
- via the have your say page <https://www.nsw.gov.au/improving-nsw/have-your-say/birrong-station-upgrade/>

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

Figure 2 shows the planning approval and consultation process for the Proposal.

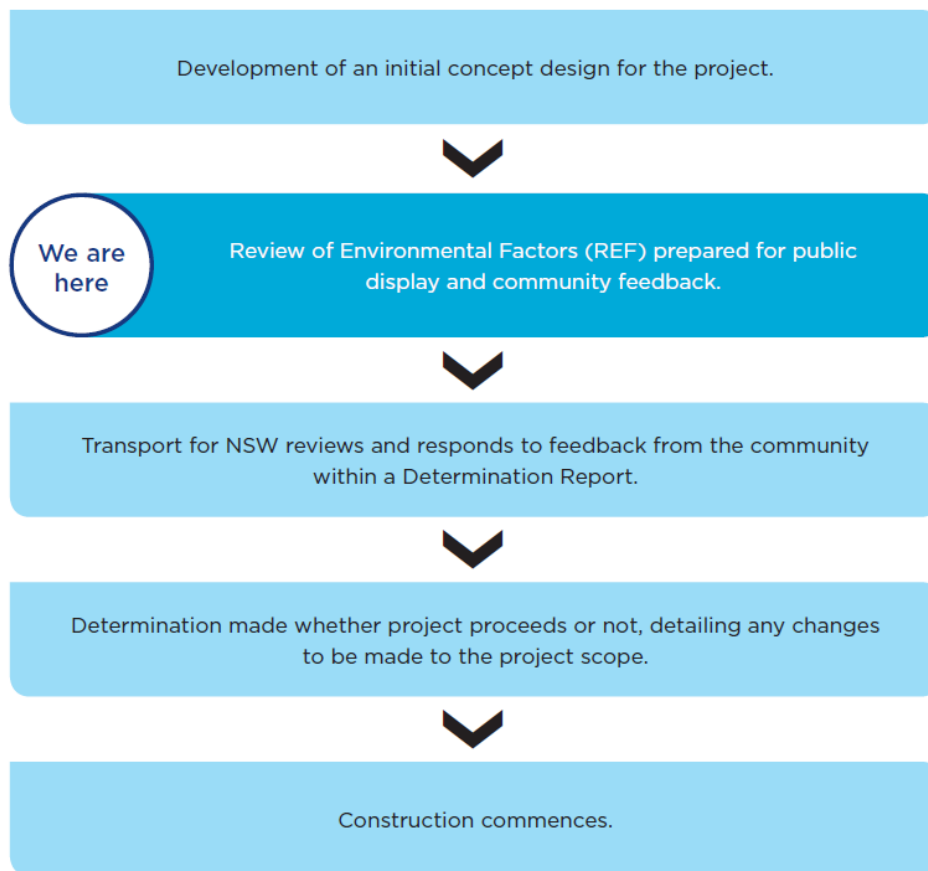


Figure 2 Planning approval and consultation process for the Proposal

Environmental impact assessment

The Proposal would provide the following benefits:

- improved and equitable access to Birrong Station for customers through the installation of a lift, new footbridge, accessible ramps, an accessible parking space and kiss and ride bay
- improved station amenity and safety for customers at the station by providing upgrades to toilets, new lighting, signage and CCTV.

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

- temporary changes to vehicle and pedestrian movements to, from and around the station during construction
- impacts to the visual environment of Birrong Station due to the removal of vegetation and installation of the footbridge, lift, and access path
- temporary noise and vibration impacts during construction
- removal of around 0.14 hectares of exotic and native vegetation (including one canopy tree) identified as part of a critically endangered ecological community listed under the *Biodiversity Conservation Act 2016*, *Cumberland Plain Woodland in the Sydney Basin Bioregion*.

Further information regarding these impacts and mitigation measures are provided in Chapter 6 and Chapter 7 of this REF.

Conclusion

This REF has been prepared having regard to sections 5.5 to 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 in accordance with the Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability Rating Scheme (v1.2) taking into account the principles of ecologically sustainable development (ESD).

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



Figure 3 Visual representation of the Proposal (indicative only, subject to detailed design).

1 Introduction

Transport for NSW (TfNSW) is the lead agency for integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Birrong Station Upgrade (the Proposal).

1.1 Overview

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

1.1.1 Objectives of the Transport Access Program

The Transport Access Program aims to provide:

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

1.2 The Proposal

The Proposal forms part of the Transport Access Program. The key features of the Proposal are summarised as follows:

- installation of a new pedestrian footbridge south of the existing Avalon Street overbridge
- construction of two new station entrances to connect to the new footbridge
- installation of a lift on the platform to provide access to the new footbridge
- a new accessible car parking space and kiss and ride
- upgrades to the existing family accessible toilet (to ensure DSAPT compliance) and upgrades to the existing unisex toilet to be a unisex ambulant toilet
- ancillary works including upgrades to station lighting, closed circuit television (CCTV) and communication systems.

Subject to planning approval, construction is expected to commence in mid-2020 and take around 18 months to complete.

A detailed description of the Proposal is provided in Chapter 3 of this Review of Environmental Factors (REF). An overview of the key features of the Proposal is also provided in Figure 1.

1.3 Location and existing infrastructure

Birrong Station is located at Rodd Street, Birrong around 21 kilometres south-west of the Sydney Central Business District (CBD). The station is within the City of Canterbury Bankstown local government area (LGA). Birrong Station is serviced by the T3 Bankstown Line and provides public transport links between Liverpool and Sydney (Central) and the City Circle via Bankstown (refer to Figure 4).

Land use surrounding the station is predominately low density housing, with the exception of Birrong Boys High School to the east and local businesses to the west. Under the Bankstown Local Environmental Plan (LEP), Birrong Station is zoned SP2 Rail Infrastructure Facility. Surrounding areas are predominantly R2 Low Density Residential with smaller areas nearby being zoned B1 Neighbourhood Centre and RE1 Public Recreation (refer to Figure 9). It is noted that the area surrounding Birrong Station has been earmarked for redevelopment by City of Canterbury Bankstown as part of the North Central Local Area Plan (BCC, 2016), however the details including a masterplan, timing, changes to land zoning, etc. are not yet available.

The station itself comprises an island platform, with pedestrian access currently available via uncovered stairs from the Avalon Street overbridge. The station building comprises existing amenities including a unisex toilet and family accessible toilet (which are not currently compliant with DSAPT). A commuter car park with 17 spaces is located parallel to Hudson Parade on the western side of the rail corridor, approximately 150 metres from the station entrance. Untimed parking is also available on surrounding streets. A no parking area to the east of the station on Teresa Street is currently used as an informal passenger drop-off and pick-up zone.

Locality Plan - Birrong Station Upgrade



Figure 4 Site locality



Figure 5 View north along platform 1 towards the existing stairs and footpath/road overbridge.



Figure 6 View south to the station from the footpath on Avalon Street overbridge.



Figure 7 View south towards the station showing the station building and example of the existing vegetation.

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the Birrong 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 *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation).

This assessment has also considered the 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 the Environment and Energy for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.

2 Need and options considered

Chapter 2 discusses the need and objectives of the Proposal, having regard to the objectives of the Transport Access Program (refer to Section 1.1.1).

2.1 Strategic justification

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

The Birrong Station Upgrade, the subject of this REF, forms part of the Transport Access Program which is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. The Proposal would improve accessibility of the station in line with the requirements of the *Disability Discrimination Act 1992* (DDA) (Commonwealth) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT).

Table 1 provides an overview of NSW Government policies and strategies relevant to the Proposal.

Table 1 Key NSW Government policies and strategies applicable to the Proposal

Policy/ Strategy	Overview	How the Proposal aligns
<i>Future Transport Strategy 2056</i> (TfNSW, 2018a)	<p><i>Future Transport 2056</i> is a suite of strategies and plans for transport to provide an integrated vision for the state.</p> <p><i>Future Transport 2056</i> identifies 12 customer outcomes to guide transport investment in Greater Sydney. These outcomes include convenient access to transport, providing 30-minute access for customers to their nearest centre by public transport, and the provision of accessible transport services.</p>	<p>The Transport Access Program is identified in the Strategy as an example of the NSW Government working to improve accessibility of the rail network. As identified in the Strategy, the delivery and modernisation of infrastructure will allow greater access for people with disabilities and those with limited mobility.</p> <p>The Proposal would assist in meeting the following State-wide outcomes detailed in <i>Future Transport 2056</i>:</p> <ul style="list-style-type: none"> encouraging active travel (walking and cycling) and using public transport a fully accessible network that enables barrier-free travel for all.
<i>Disability Inclusion Action Plan 2018-2022</i> (TfNSW, 2017a)	<p>The <i>Disability Inclusion Action Plan 2018-2022</i> (TfNSW, 2017a) was developed by TfNSW in parallel with the development of <i>Future Transport 2056</i>. The Plan builds on the objectives of <i>Future Transport 2056</i> in relation to accessibility to transport.</p>	<p>The Transport Access Program has been identified in this Plan as a key action to ensure transport networks in Sydney are accessible for all potential users.</p>

Policy/ Strategy	Overview	How the Proposal aligns
<i>A Metropolis of Three Cities - Greater Sydney Region Plan</i> (Greater Sydney Commission, 2018)	The <i>Greater Sydney Region Plan</i> is the NSW Government's 40-year land use plan for Sydney. It establishes a vision for a metropolis of three cities – the Eastern Harbour City, Central River City and Western Parkland City. One of the ten directions of the framework is a well-connected city, by developing a more accessible and walkable city, through optimising existing infrastructure where possible.	The Proposal would deliver on the customer focus and accessible services outcomes as it would enable equitable access to services and employment and social opportunities through investment in transport. The proposed upgraded interchange would promote public transport movements, as well as active transport linkages which contribute to the character and identity of the area.
<i>South District Plan</i> (Greater Sydney Commission, 2018)	The South District Plan has been prepared to align with the visions and objectives of the Greater Sydney Region Plan. The South District (which includes Birrong) is part of the Eastern Harbour City. Transport investments in the district are critical to support the ongoing strengths of the City.	Planning priority S6 of the Plan relates to <i>Creating and renewing great places and local centres</i> . The Proposal would assist in achieving objectives relating to accessibility, connectivity and amenity through the provision of upgraded, accessible transport infrastructure.
<i>Building Momentum – State Infrastructure Strategy 2018-2038</i> (Infrastructure NSW, 2018)	The <i>State Infrastructure Strategy 2018-2038</i> makes recommendations for each of NSW's key infrastructure sectors including transport. Public transport is viewed as critical to productivity, expanding employment opportunities by connecting people to jobs, and reducing congestion.	The Proposal would upgrade public transport services to provide access for a wider range of customers. It would also involve the upgrade of existing infrastructure which aligns with an objective of the strategy to optimise the use of the State's existing assets.

2.2 Objectives of the Proposal

A future needs analysis for the accessibility upgrade of the Birrong Station Precinct was conducted in order to inform the development of the concept designs. As part of this process, needs, issues, deficiencies and opportunities were considered and a series of objectives were identified that the Proposal aims to address.

The objectives of the Proposal were prepared with consideration of the overarching objectives of the Transport Access Program (refer to Section 1.1.1).

The objectives of the Proposal are:

- achieve compliance with the *Disability Standards for Accessible Public Transport 2002* (DSAPT)
- increase equity of access for all customers
- provide an accessible station, as part of a wider network of accessible stations, to encourage mobility impaired customers, the elderly and parents with prams to benefit from public transport
- improve customer safety
- promote interchange with other modes of transport
- minimise pedestrian conflict points and crowding points

- maximise architectural planning and urban design opportunities within the station precinct
- minimise environmental and social impacts and achieve an Excellent sustainability rating under the Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability Rating Scheme v1.2 (ISCA IS Rating Tool v1.2).

2.3 Options considered

Options for improving access to Birrong Station were developed following workshops with a stakeholder working group attended by TfNSW and Sydney Trains representatives. Three options were initially considered to address accessibility needs and other design standards and requirements. Each option is summarised below.

Works common to Options 1, 2 and 3 included an upgrade of the toilet to be a compliant ambulant toilet, some platform regrading around the station building, an upgrade of finishes and fittings to the existing family accessible toilet, new kiss and ride bay on the eastern side of the station, two accessible parking spaces to the eastern side of the station (adjacent to Birrong Boys High School staff car park entrance) and conversion of the two existing accessible parking spaces in the western commuter car park to two standard parking spaces.

Option 1 (upgrading existing access from the Avalon Street overbridge) included:

- widening the existing footpath along the Avalon Street overbridge and reducing the road width to accommodate the upgraded footpath
- a new entry concourse including a new lift and stairs to the platform

Option 2 (new footbridge with ramps at western and eastern entrances) included:

- a new footbridge in the alignment of Rodd Street including a new lift and stairs to the platform
- a new eastern entrance to the footbridge with an accessible ramp and stairs
- a new western entrance to the footbridge with an accessible ramp and stairs

Option 3 (new footbridge with lift at western entrance and ramp at eastern entrance) included:

- a new footbridge in the alignment of Rodd Street including a new lift and stairs to the platform
- a new eastern entrance to the footbridge with an accessible ramp and stairs
- a new western entrance to the footbridge with a new lift and stairs at the station entry.

A 'do-nothing' option was not considered as a feasible alternative as it would not meet the requirements of the DDA and DSAPT. A 'do-nothing' option would not assist in encouraging the use of public transport or meet the current and future needs of the Birrong community.

2.4 Preferred option

The design options were assessed in a multi-criteria analysis (MCA) that included consideration of factors such as customer experience, heritage and environment, accessibility, urban design / land use integration, modal integration, engineering and constructability, and facility and operations maintenance. This methodology addressed the strengths and weakness of each option and provided objectivity in the selection of the preferred option.

Option 1 was not considered suitable as it would cause significant disruption to customers accessing the station during construction and compromise access for buses and heavy vehicles during operation (due to reduced road widths).

Option 3 was not considered suitable due to safety and security concerns at the western lift due to distance from the station building (e.g. reduced passive surveillance opportunities) and increased lift wait times particularly during peak periods (due to having two lifts instead of one).

Option 2 was selected as the preferred option for the Birrong Station Upgrade as it would option would improve pedestrian safety by separating the station access from the overbridge. Existing station access would remain in place until operation commences, minimising inconvenience to customers during construction. More generally, this option would help to achieve improved precinct outcomes for Birrong with enhanced connectivity across the rail corridor. This option, which forms the Proposal, is described in detail in the following sections.

3 Proposal description

Chapter 3 describes the Proposal and summarises key design parameters and construction methodology. The description of the Proposal is based on a concept design and is subject to detailed design.

3.1 Scope of works

The Proposal involves an upgrade of Birrong Station as part of the Transport Access Program which aims to improve accessibility and amenity for customers. Key elements of the station upgrade are shown in Figure 1, with further details provided below:

New footbridge, lift and ramps:

- installation of a new pedestrian footbridge south of the existing Avalon Street overbridge which would provide access from Rodd Street (east) over the rail corridor to Rodd Street (west). The footbridge would comprise of a concrete structure with protection screens
- installation of one lift to provide access between the new pedestrian footbridge and the platform
- construction of a new eastern station entrance, to include accessible ramp and stairs to connect to the new footbridge, with landscaping near the entrance
- construction of a new western entrance, to include a new accessible ramp and stairs to connect to the new footbridge, with landscaping near the entrance
- removal of the existing stairs to the platform from the Avalon Street overbridge and reinstating the existing bridge parapet

Platform and station building works:

- localised platform regrading to ensure accessibility, tactile ground surface indicators and line marking as required for DSAPT compliance
- canopies at the boarding assistance zones (design of these canopies is yet to be determined and would be finalised in detailed design)
- conversion of the existing unisex toilet to a unisex ambulant toilet
- upgrades to the existing family accessible toilet including:
 - replacement of items for compliance with DSAPT
 - new entry ramp
 - extension of the roof canopy of the platform building to provide adequate shelter at the family accessible toilet entrance

Interchange upgrades:

- a signposted accessible kiss and ride bay on Teresa Street adjacent to the eastern station entrance, including associated road and kerb adjustments
- an accessible parking space to the eastern side of the station (adjacent to Birrong Boys High School staff car park entrance)
- conversion of the two existing accessible parking spaces in the commuter car park to standard car parking spaces

Electrical supply and systems work:

- upgrade to the station power supply and a new 11kV padmount substation to be located on the eastern side of the rail corridor, south of the proposed footbridge
- adjustments to station lighting, security systems including CCTV and communication systems including public announcement and hearing induction loops.

3.1.1 Materials and finishes

Materials and finishes for the Proposal have been selected based on the criteria of durability, low maintenance and cost effectiveness, to minimise visual impacts and to be aesthetically pleasing. Consideration has also been given to life cycle impacts which are calculated by assessing the environmental impacts of materials from the point of extraction, through to transportation, use, operation and end of life.

Subject to detailed design, the Proposal would include the following:

- lift shaft – concrete, steel, aluminium louvres, clear glass, prefinished metal roof sheeting
- canopies – steel and prefinished roof sheeting
- footbridge – precast concrete
- pedestrian paths and ramps – concrete base with stainless steel hand rails
- stairs – concrete base with stainless steel handrails and nosings
- balustrades and protection screens – powder coated aluminium
- toilets – high gloss white ceramic wall tiles, dark grey slip-resistant floor tiles.

3.2 Design development

3.2.1 Engineering and environmental constraints

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

- **Existing structures:** the accessibility, placement and integrity of existing structures including the existing platform, overbridge, footpaths, stairs, car park, station building, overhead wiring and associated support structures, and the pedestrian crossing.
- **Sydney Trains' requirements:** modifications for existing structures and new structures within the rail corridor must be designed and constructed with consideration of train impact loads, structural clearances to the track, and safe working provisions.
- **Utilities:** the location of utilities and services such as overhead electricity wiring and communications
- **Vegetation:** There are threatened species in the vicinity and the design aims to minimise vegetation removal.
- **Construction access:** There are limited scheduled Sydney Trains rail possessions that can be utilised. The adequacy of the overbridge load capacity for heavy plant e.g. concrete truck.

- **Public access:** Maintaining pedestrian access to the station during construction and ensuring safe public access during operation.

3.2.2 Design standards

The Proposal would be designed having regard to the following design standards:

- *Disability Standards for Accessible Public Transport 2002* (issued under the Commonwealth *Disability Discrimination Act 1992*)
- National Construction Code
- relevant Australian Standards
- Asset Standards Authority standards
- Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability Rating Scheme v1.2
- *TfNSW Urban Design Guidelines*
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008).
- Crime Prevention Through Environmental Design (CPTED) principles
- other TfNSW policies and guidelines
- relevant council standards.

3.2.3 Sustainability in design

The Proposal is targeting a rating of 'Excellent' using the ISCA IS Rating Tool v1.2. The rating scheme provides an independent and consistent methodology for the application and evaluation of sustainability outcomes in infrastructure projects. The sustainability outcomes address environmental, social, economic and governance aspects.

The IS Rating Scheme is grouped into six key themes:

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

These sustainability themes are divided into 15 performance categories, against which the Proposal would be independently assessed and assigned a rating level. The Proposal would need to achieve at between 50 and 75 points out of a possible 100 to be certified as 'Excellent'

3.3 Construction activities

3.3.1 Work methodology

Subject to approval, construction is expected to commence in mid-2020 and take around 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Construction Contractor in consultation with TfNSW.

The proposed construction activities for the Proposal are identified in Table 2. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised.

Table 2 Indicative construction staging for key activities

Stage	Activities
Site establishment	<ul style="list-style-type: none"> • establishment of site compound (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas etc.) • install temporary lighting, electrical boards • removal of vegetation to allow for construction of new footbridge and ramps • installation of safety barriers and hoarding around the nominated work zones on the platform
Main works	<p>Works to footbridge and lift (during scheduled Sydney Trains rail possessions):</p> <ul style="list-style-type: none"> • shoring and piling for the columns, lift shaft and new stairs • hoarding around new columns
	<p>Works to footbridge and lift (during standard construction hours):</p> <ul style="list-style-type: none"> • footbridge construction - piling for columns in embankments • construct pile cap for columns • lift shaft base slab and wall to be constructed • concrete pump to be placed on the existing road overbridge (traffic control to be exercised during the concrete pour) • construction of columns • construction of head stocks • construction of concrete slabs and ramp
	<p>Works to footbridge and lift (during scheduled Sydney Trains rail possessions):</p> <ul style="list-style-type: none"> • footbridge deck installation - shorter bridge deck to be installed first using 350 tonne crane and then longer bridge deck to be installed using 500 tonne crane • precast concrete lift shaft modules to be craned in • precast stairs to be installed using 350 a tonne crane • services work • installation of suspended concrete slab for access ramp
	<p>Works to lift and platform (during scheduled Sydney Trains rail possessions):</p> <ul style="list-style-type: none"> • install lift car and lift roof • installation of anti-throw screen structures • complete all services work
	<p>Works to lift and platform (during standard construction hours):</p> <ul style="list-style-type: none"> • finishing work and commissioning of lift • upgrades of station building toilets

Stage	Activities
	Demolition works (during scheduled Sydney Trains rail possessions): <ul style="list-style-type: none"> • installation of hoarding around existing stairs • infill existing opening on the existing bridge deck • demolition of existing stairs
Interchange works	<ul style="list-style-type: none"> • parking and footpath upgrades • signage and finishing works
Site demobilisation	<ul style="list-style-type: none"> • removal of all construction hoarding • removal of the site compound • defect resolution

3.3.2 Plant and equipment

An indicative list of plant and equipment that would be required is provided below. Additional equipment that would likely to be used would be identified during detailed design by the Construction Contractor.

- trucks (e.g. semi-trailer, tipper)
- generator
- chainsaw
- mulcher
- piling rig
- concrete pump/truck
- hirail (type of truck that can travel on railway tracks)
- excavator (with auger)
- mini excavator
- lighting tower
- coring machine
- vacuum truck
- wacker packer
- line marking truck
- water cart
- demolition saw
- jack hammer
- scissor lift
- franna crane
- mobile cranes
- plate compactor
- power tools (e.g. drill, hammer drill, saws, torque and impact wrenches and grinders).

3.3.3 Working hours

Most of the work 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.

Work outside of standard hours may be required occasionally at night, on weekends and during scheduled Sydney Trains rail possessions. These are scheduled line closures that would occur regardless of the Proposal when part of the rail network is temporarily closed for maintenance and trains are not operating.

Out of hours work is 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. Existing planned rail possessions would be utilised to complete a portion of the proposed work. It is estimated that approximately four rail possessions would be utilised to facilitate:

- overhead wiring works

- electrical upgrades (including the new 11kV padmount substation)
- excavation and installation of the footbridge and lift
- platform works (such as regrading, trenching for power/communications systems and installation of tactiles)
- reconfiguration of internal station buildings

Out of hours works may also be scheduled outside rail possessions. 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).

3.3.4 Earthworks

Excavations and earthworks would generally be required for the following:

- installation of the lift on the platform
- installation of footings for the footbridge, ramps and stairs
- installation and relocation of services and utilities.

Excavated material would be reused onsite where possible or transported to an appropriately licensed offsite waste disposal facility in accordance with relevant legislative requirements. It is estimated that approximately 150 cubic metres of excavated material would be generated by piling and lift excavation activities.

3.3.5 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 ISCA IS Rating Tool v1.2. Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

3.3.6 Traffic access and vehicle movements

The traffic generated during construction is likely to vary and would be confirmed in the detailed design and construction planning phase, however construction traffic would increase during scheduled Sydney Trains rail possessions. The traffic generated as a part of the construction works is not expected to exceed 20 light vehicles and 10 heavy vehicles per day during peak construction periods.

Traffic and transport impacts associated with the Proposal are assessed in Section 6.1 of this REF.

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

3.3.7 Temporary site facilities

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. Areas on the western site of the station, off Hudson Parade, have been identified for use as construction compound and stockpile areas. No public parking spaces would be temporarily affected by the establishment of the compound. Figure 8 shows the proposed work areas and construction compound area. The construction compound would be located on land owned by RailCorp. Impacts associated with

utilising this area have been considered in Chapter 6 of this REF, including requirements for rehabilitation.

3.3.8 Service relocation and adjustments

It is anticipated that some services would require relocation or upgrade in association with the Proposal including power supply upgrades for the new padmount transformer and modifications to low voltage cables, existing track stormwater pits and pipes and communications data cabling. Further consideration, consultation and environmental assessment would be undertaken as necessary during detailed design.

Construction Areas - Birrong Station Upgrade



Figure 8 Construction areas (indicative only)

3.4 Property acquisition

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

Road reserve land owned by City of Canterbury Bankstown would be required for temporary occupation to facilitate construction and would be reinstated upon completion. TfNSW intends to temporarily occupy part of the local road known as Rodd Street (west) for construction compound purposes, pursuant to the exemption from Section 138 of the *Roads Act 1993* provided in Clause 5 of Schedule 2 of the Roads Act.

New permanent structures would be constructed and located entirely within the RailCorp Land Ownership Corridor.

3.5 Operation and maintenance

The future operation and maintenance of Birrong Station is subject to discussions between Sydney Trains, TfNSW and the City of Canterbury Bankstown. However, the Proposal is not anticipated to significantly alter the current operating arrangements. The station itself, station car parks, the road overbridge, and structures and landscaping within the rail corridor is maintained and operated by Sydney Trains. Local roads, footpaths and bus stops would continue to be maintained and operated by the City of Canterbury Bankstown.

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (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.

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

4.1.2 Other Commonwealth legislation

The *Disability Discrimination Act 1992* (DDA Act) aims to eliminate as far as possible, discrimination against persons on the ground of disability in areas including access to premises and the provision of facilities, services and land. The Proposal would provide lifts to access the station, as well as upgrade some surrounding footpaths and upgrade general station infrastructure to make it more accessible for persons with a disability.

4.2 NSW legislation and regulations

4.2.1 Transport Administration Act 1988

The *Transport Administration Act 1988* establishes TfNSW as a public authority who is to exercise its functions in a matter that promotes certain common objectives, including to promote the delivery of transport services in an environmentally sustainable manner.

This REF has been prepared having regard to the specific objectives of TfNSW under the *Transport Administration Act 1988*:

- a) to plan for a transport system that meets the needs and expectations of the public
- b) to promote economic development and investment
- c) to provide integration at the decision-making level across all public transport modes
- d) to promote greater efficiency in the delivery of transport infrastructure projects
- e) to promote the safe and reliable delivery of public transport and freight services.

4.2.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (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 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.

4.2.3 Other NSW legislation and regulations

Table 3 provides a list of other relevant legislation applicable to the Proposal.

Table 3 Other NSW legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Biodiversity Conservation Act 2016</i> (BC Act)	The BC Act establishes a framework for assessing and protecting environmental and public interests. The proposal would involve the removal of around 0.14 hectares of exotic and native vegetation (including one canopy tree) identified as part of a critically endangered ecological community listed under the Biodiversity Conservation Act 2016, Cumberland Plain Woodland in the Sydney Basin Bioregion. This was assessed as not a significant impact as part of the biodiversity assessment (Umwelt, 2019).
<i>Biosecurity Act 2015</i>	Clause 22 requires any person who deals with a biosecurity matter has a duty to ensure that in so far as is reasonably practicable, the potential biosecurity risk is prevented, eliminated or minimised. Appropriate management methods would be implemented during construction if declared noxious weeds in the City of Canterbury Bankstown LGA are identified (refer to Section 6.6).
<i>Contaminated Land Management Act 1997</i> (CLM Act)	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).
<i>Crown Lands Act 1987</i>	The Proposal does not involve works on any Crown land.
<i>Heritage Act 1977</i> (Heritage Act)	The Proposal is not within the curtilage of any listed heritage item. If unexpected archaeological items are discovered during construction of the Proposal, all works would cease, and appropriate advice sought as per <i>TfNSW's Unexpected Heritage Finds Guideline</i> (TfNSW 2016a).
<i>National Parks and Wildlife Act 1974</i> (NPW Act)	Sections 86, 87 and 90 of the NPW Act require consent from OEH for the destruction or damage of Indigenous objects. The Proposal is considered unlikely to disturb any Aboriginal 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 as per the <i>TfNSW Unexpected Heritage Finds Guideline</i> (TfNSW, 2016a).

<i>Protection of the Environment Operations Act 1997 (PoEO Act)</i>	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 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 Construction Contractor.
<i>Roads Act 1993 (Roads Act)</i>	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads. The Proposal would involve works on Rodd Street/Teresa Street/Avalon Street which are local roads under the control of City of Canterbury Bankstown. Consent under the Roads Act is not required; however, Road Occupancy Licence/s would be obtained from Council for road works and any temporary road closures where required. Refer to Section 6.1.
<i>Sydney Water Act 1994</i>	The Proposal would not involve discharge of wastewater to the sewer.
<i>Waste Avoidance and Resource Recovery Act 2001 (WARR Act)</i>	TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared as part of the CEMP (refer to Section 6.11)
<i>Water Management Act 2000 (WM Act)</i>	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.

4.2.4 Key State Environmental Planning Policies

Table 4 provides a list of State Environmental Planning Policies applicable to the Proposal.

Table 4 State Environmental Planning Policies (SEPPs) applicable to the Proposal

Applicable Legislation	Considerations
<i>State Environmental Planning Policy (Infrastructure) 2007</i>	<p>The <i>State Environmental Planning Policy (Infrastructure) 2007</i> (Infrastructure SEPP) is the key environmental planning instrument which determines the permissibility of a proposal and under which part of the EP&A Act an activity or development may be assessed.</p> <p>Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act). Clause 78 defines '<i>rail infrastructure facilities</i>' as including elements such as '<i>railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms</i>', '<i>public amenities for commuters</i>' and '<i>associated public transport facilities for railway stations</i>'.</p> <p>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.</p> <p>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</p>

Applicable Legislation**Considerations**

REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP.

The Infrastructure SEPP prevails over all other environmental planning instruments except where State Environmental Planning Policy (Major Development) 2005, State Environmental Planning Policy (Coastal Management) 2018 applies. The Proposal does not require consideration under these SEPPs and therefore these instruments have not been further considered as part this REF. The Infrastructure SEPP prevails over all other environmental planning instruments except where State Environmental Planning Policy (Major Development) 2005, State Environmental Planning Policy (Coastal Management) 2018 applies. The Proposal does not require consideration under these SEPPs and therefore these instruments have not been further considered as part this REF.

State Environmental Planning Policy No 19 – Bushland in Urban Areas

A public authority shall not disturb bushland for a purpose referred to in clause 6(2) unless it has first had regard to the aims of this Policy.

This SEPP applies to the City of Canterbury Bankstown however the Proposal area is not located within bushland, and is not immediately surrounded by bushland. The nearest stands of substantial bushland are located over 500 metres away. The REF has considered the general aim of this SEPP through the assessment of biodiversity in this REF (refer Section 6.6), including measures to minimise clearing of native vegetation as far as possible (and offset cleared vegetation where required).

State Environmental Planning Policy 55 – Remediation of Land

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

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

4.2.5 Bankstown Local Environmental Plan 2015

The Proposal is located within the City of Canterbury Bankstown. The provisions of the Infrastructure SEPP mean that LEPs, prepared by councils for an LGA, do not apply. However, during the preparation of this REF, the provisions of the Bankstown LEP 2015 were taken into consideration.

Table 5 Relevant provisions of the Bankstown LEP 2015

Provision description	Relevance to the Proposal
<p>Clause 2.3 – Zone objectives and Land Use Table</p> <ul style="list-style-type: none"> • SP2 Infrastructure (rail corridor) • R2 Low Density Residential 	<p>The Proposal is located on land zoned SP2 Rail Infrastructure Facility and R2 Low Density Residential. The Proposal is not inconsistent with the land use objectives set out in the LEP and listed below.</p> <p>Objectives within the SP2 zone include:</p> <ul style="list-style-type: none"> • To provide for infrastructure and related uses. • To prevent development that is not compatible with or that may detract from the provision of infrastructure. <p>Relevant objectives within the R2 zone include:</p> <ul style="list-style-type: none"> • To enable other land uses that provide facilities or services to meet the day to day needs of residents.
<p>Clause 6.14 – Earthworks</p>	<p>This clause aims to ensure that earthworks for which development consent is required will not have a detrimental impact on 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.</p>

Figure 9 shows land use zoning under the Bankstown LEP.

LEP Zoning - Birrong Station Upgrade



Figure 9 Bankstown LEP zoning

4.3 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 Birrong Station Upgrade. Section 4.3 summarises how ESD has been incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5 Community and stakeholder consultation

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

5.1 Stakeholder consultation during concept design

As part of the design development for the Proposal, meetings and workshops were held to ensure that key stakeholders were involved in the collaborative design process. Key stakeholders for the Proposal include:

- TfNSW
- Sydney Trains
- City of Canterbury Bankstown.

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 13-16 of the Infrastructure SEPP require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

Table 6 provides details of consultation requirements under the Infrastructure SEPP for the Proposal. In this case, the relevant council is City of Canterbury Bankstown.

Table 6 Applicable Infrastructure SEPP provisions and consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 Consultation with Councils – development with impacts on council related infrastructure and services	<p>Consultation is required where the Proposal would result in:</p> <ul style="list-style-type: none"> • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility. 	<p>This clause is relevant to the proposal. There would be excavation on Council land, changes to pedestrian movements both during construction and operation, and potential impacts and potential for impacts on stormwater management.</p> <p>Consultation with City of Canterbury Bankstown has commenced in relation to this clause.</p>
Clause 15 Consultation with Councils – development with	<p>Where railway station works:</p> <ul style="list-style-type: none"> • impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development</i> 	<p>This clause is relevant to the Proposal. The station is susceptible to flooding from overland flows. The Proposal is unlikely to have an impact on hydrology in the surrounding area but</p>

Clause	Clause particulars	Relevance to the Proposal
impacts on flood liable land	<i>Manual: the management of flood liable land.</i>	this would be confirmed during detailed design. Consultation with City of Canterbury Bankstown has commenced in relation to this clause.
Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land	Where railway station works: <ul style="list-style-type: none"> impact on flood liable land – written notice must be given (together with a scope of works) to the State Emergency Service. Any response to the notice received from the State Emergency Service within 21 days after the notice is given must be taken into consideration. 	This clause is relevant to the Proposal. The station is susceptible to flooding from overland flows. Consultation with the State Emergency Service has commenced in relation to this clause.

5.3 Consultation strategy

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

The objectives of the consultation strategy are to:

- provide accurate and timely information about the Proposal and REF process to relevant stakeholders
- raise awareness of the various components of the Proposal and the specialist environmental investigations
- ensure that the directly impacted community is aware of the REF and consulted where appropriate
- provide opportunities for stakeholders and the community to express their 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.

5.3.1 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 outlining the Proposal and inviting feedback on the REF to the local community and rail customers at the station.

- 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 council/s, Sydney Trains, NSW Trains and other non-community stakeholders
- 'pop-up' community information sessions near the station
- targeted social media campaigns.

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The display period of the REF would be advertised in the week prior to the public display commencing. The REF would be displayed for a period of two weeks.

The REF would be placed on public display on the [TfNSW website¹](#), [NSW Government Have Your Say website²](#) and hard copies at the following locations:

- **Bankstown Customer Service Centre**

Upper Ground Floor
Bankstown Civic Tower
66-72 Rickard Road (Corner of Jacobs Street)
Bankstown

- **Regents Park Library**

1 Amy Street
Regents Park NSW

- **Transport for NSW Office**

Level 5, Tower A, Zenith Centre
821 Pacific Highway, Chatswood

Further information on the Proposal may be requested by contacting the Project Infoline (1800 684 490) or by [email³](#).

During the display period feedback from the community is invited and can be submitted in the following ways:

- Mail:
Transport Access Program – Birrong Station
Transport for NSW
Locked Bag 6501
St Leonards NSW 2065
- Email: projects@transport.nsw.gov.au
- TfNSW HaveYourSay website: <https://www.nsw.gov.au/improving-nsw/have-your-say/birrong-station-upgrade/>
- TfNSW website: <https://www.transport.nsw.gov.au/birrong>

Feedback received during the public display period will assist Transport for NSW in preparing plans for managing any impacts during the construction phase of the Birrong station upgrade.

¹ <https://www.transport.nsw.gov.au/birrong>

² <http://www.nsw.gov.au/improving-nsw/have-your-say/birrong-station-upgrade/>

³ projects@transport.nsw.gov.au

All feedback received by Transport for NSW will be considered and responded to in a Submissions Report. The report will be available to the public in early 2020. All community members who provide feedback will receive acknowledgement from Transport for NSW that their feedback has been received. They will also be contacted when the Submissions Report is available on the Transport for NSW website.

Please note Transport for NSW ensures all private information received from the community remains confidential.

Following the consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

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

6 Environmental impact assessment

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

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

6.1 Traffic and transport

A Traffic, Transport and Access Impact Assessment was prepared for the Proposal by SLR (2019a). The report provides an assessment of the potential impacts of the Proposal on traffic, transport and access. The findings of the assessment are summarised in this section.

6.1.1 Existing environment

Birrong Station is on the T3 Bankstown Line, and is the last station before the T3 line splits to branch towards Liverpool or to Lidcombe. Platform 1 serves the city-bound services, and Platform 2 serves Liverpool and Lidcombe services. Due to the rail stopping patterns, Birrong has become an interchange station for passengers wanting to transfer across these two branch lines.

Birrong Station consists of an island platform, with access to the station via stairs from the Avalon Street overbridge. A raised pedestrian crossing on the eastern side of the overbridge and pedestrian fences currently facilitate movement of pedestrians from both footpaths on either side of the overbridge.

Key roads within the Birrong Station precinct include Avalon Street, Teresa Street, Rodd Street and Hudson Parade. Traffic count data from Bankstown Council (2011) taken at the western end of the Avalon Street overbridge indicates a peak around 9am of around 300 vehicles in both directions, totalling 600 vehicles. Traffic on weekends has peaks throughout the day, reaching 200 vehicles in a peak hour on Saturdays and 100 vehicles in a peak hour on Sundays.

Birrong Station has a small commuter carpark located off Hudson Avenue on the western side of the station. There are currently two accessible parking spaces provided within the commuter carpark. An informal drop off and pick up only zone serving approximately 2-3 vehicles is provided on the corner of Rodd Street and Teresa Street.

Bus stop provision is currently limited. The nearest regular route bus stops are located 300m away on the eastern side of the station on Cooper Road at Birrong Boys High School (Stop ID 214336) and 600m away on the western side of the station on Auburn Road at Birrong Public School (Stop ID 214368, serving route 909).

A review of TfNSW crash data (2013-2017 inclusive) suggests that there are no significant road safety issues within the immediate vicinity of the station.

6.1.2 Potential impacts

Construction phase

Haulage routes

Birrong Station is situated approximately 1.5 kilometres north of the Hume Highway and approximately 1.3 kilometres west of Rockwood Road. Mapping prepared by the National

Heavy Vehicle Regulator indicates that both of these roads can accommodate larger vehicles including High Mass Limit 19 metre, 23 metre and 25/26 metre B-Doubles.

Heavy vehicle construction access would be available to both the eastern and western sides of the station via Rodd Street. It is assumed that heavy vehicle routes would be on the state road network, with possible local traffic control and parking restrictions on local roads to provide access to the site.

Broadly these construction routes are likely to include the following roads, subject to additional analysis during the detailed design phase:

- Hume Highway
- Roackwood Road
- Bruncker Road
- Cooper Road
- Rodd Street

Detailed assessments (e.g. swept paths, bridge rating analysis) to determine the suitability of these proposed routes for heavy vehicle use would be undertaken as the design progresses.

Pedestrian impacts

Birrong Station is a popular park and ride station and also provides an important pedestrian connection to the nearby schools of Birrong Boys High School, Birrong Girls High School and Birrong Public School. There is a need to ensure that any potential risks and/or confusion to pedestrians during the construction period are minimised. The following impacts to pedestrians are anticipated to arise from construction activities:

- Potential confusion and possible increased walking distances during the removal of the existing stairways and construction of new stairs and access path
- Potential higher levels of platform congestion arising from localised restrictions/narrowing of portions of the platform temporarily fenced off during construction of the lifts and internal station building modifications
- Elevated frequency of pedestrian and truck interactions particularly on Rodd Street, Avalon Street and Hudson Parade
- Potential confusion and loss of amenity for customers during the construction works including the visual impact of laydown / storage and amenities areas
- Delays to customers arising during construction including management of traffic and work activities
- Higher road safety risk levels associated with construction vehicle-pedestrian interaction, particularly on Rodd Street, Avalon Street and Hudson Parade
- Potential impacts to more vulnerable users, including school children travelling to and from Birrong Boys High School and Birrong Girls High School. School children may be required to alter their path of travel during these time times and would potentially require a safe temporary crossing on Teresa Street to facilitate safe movement around the construction zone.

Traffic impacts

The traffic generated during construction is likely to vary and would be confirmed as the design progresses. Construction traffic would increase during scheduled Sydney Trains rail possessions. The traffic generated during construction is not expected to exceed 20 light vehicles and 10 heavy vehicles per day during peak construction periods such as Sydney

Trains rail possessions. This is considered to be a minimal impact. The removal of the existing stairs to the platform from the Avalon Street road overbridge and reinstating the existing bridge parapet is likely to require partial road closures and potentially full road closures during certain times. The use of the construction plant on the rail overbridge would require traffic management. It is likely that drivers would experience some delay, however due to the relatively low traffic demand outside peak hours this is not expected to cause a significant reduction in travel time.

Traffic impacts are anticipated to be manageable with the implementation of relevant mitigation measures.

Parking impacts

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. Areas on the western side of the station, off Hudson Parade, have been identified for use as construction compound and stockpile areas. No public parking spaces would be temporarily affected by the establishment of the compound. Figure 8 shows the proposed work areas and construction compound area.

Property access

The Proposal is not expected to have any significant impact on access to existing residential properties in the vicinity of Birrong Station. A number of property accesses on Hudson Parade are situated adjacent to the construction access area, however this would not result in a loss of access to properties as construction vehicles would remain in parking areas or general work areas.

There are potential property access issues to Birrong Boys High School particularly given that some classes are held on Saturdays. Access to the parking area located off Teresa Street would likely be affected resulting in increased demand for parking on nearby residential streets.

Transport safety

During the construction period there would be an elevated frequency of pedestrian and truck interaction and higher road safety risk levels associated with construction vehicle and pedestrian interaction, particularly on Rodd Street, Avalon Street and Hudson Parade.

The staging of the construction works may result in potential confusion and loss of amenity for customers during works at the station due to potential footpath closures and/or diversions. Due to the altered conditions, particularly during peak periods, clear signage will be required and infrastructure be put in place in accordance with CTMPs to mitigate these potential impacts.

Operation phase

Public transport

The Proposal impacts to public transport, if any, would be minor and broadly positive given they would contribute to making travel by rail more accessible for the local community, particularly those with limited mobility.

Pedestrians

Pedestrian access to Birrong Station would be significantly improved through the installation of the new footbridge and elimination of the need for station users to access via the Avalon Street overbridge through the removal of the existing stairs to the platform. This would reduce walking distances for a majority of customers in the walking catchment and also from the commuter carpark.

The installation of one lift to provide access between the new pedestrian footbridge and the platform would provide the necessary access for disabled users, customers with limited

mobility, parents/carers with prams and customers with luggage. The new eastern and western entrances, both including new accessible ramps and stairs to connect to the new footbridge would significantly enhance the ability for the station to accommodate larger pedestrian flows during peak hours. These improvements would also enhance the visual appeal, sense of safety and wayfinding for pedestrians, as it would clearly indicate both accesses as opposed to the existing access on the overbridge.

Taxis

No formal taxi zones are included in the Proposal. As the demand for Taxis is relatively low at Birrong Station, it is not expected that this would have a significant impact on traffic operation. As it is proposed to include a new accessible space and kiss and ride facility in the space previously reserved as drop off and pick up only on Teresa Street, it is likely that taxis would make use of this facility on occasion.

Kiss and ride

The proposed kiss and ride bay on Teresa Street would provide increased opportunities for a safer and more efficient option for people dropping off and picking up passengers, particularly for people travelling from the eastern side of the station. The proposed new kiss and ride facility has the potential to improve congestion during peak periods and reduce illegal parking. As the proposed kiss and ride bay starts directly after the apex of a curve there may be potential safety issues in regard to managing the speed of vehicles entering the facility and also potential issues for drivers safely exiting the facility as vision of approaching vehicles may be obscured. The final design of the kiss and ride is subject to a road safety audit.

Road network

The Proposal would increase accessibility to Birrong Station and improve the customer experience and amenity, likely leading to a minor increase in utilisation and patronage. This would manifest in customers either travelling by train where they did not before, or by changing from another nearby station.

Due to the fact that no additional parking is being proposed, the limited opportunities to increase park and ride facilities close to the station and the existing dense urban environment, it is not expected that the proposal would have any major operational impacts in terms of an increase in traffic. Any increases in traffic are expected to be minor and would have a negligible impact on the surrounding road network or the amenity of local residents.

The new footbridge works on are not expected to create any significant change in operation on the surrounding road network, other than a potential localised increase in road safety due to pedestrians being redirected away from the narrow footpaths of the overbridge and general traffic.

Car parking

One new accessible parking space would be created on the eastern side of the station on Rodd Street. This would provide a significant improvement to the existing situation where currently the accessible parking spaces are non-compliant and require customers to navigate non-compliant grades at a distance of around 110 metres to the station access. The new accessible parking space is approximately 10 metres from the proposed eastern station entrance, representing a much more favourable situation for customers with limited mobility.

The Proposal does not result in the loss of standard car spaces. The two existing non-compliant accessible parking spaces within the commuter car park would be converted to standard parking spaces.

Overall, the Proposal has the potential to increase parking demand a minor amount given the accessibility improvements which may lead to a small increase in station utilisation and patronage.

Property access

The Proposal is not expected to have any impact on existing access to properties in the vicinity of Birrong Station.

Transport safety

The Proposal should improve pedestrian safety given that the improved footpaths and new footbridge and station entrances provide for increased space and manoeuvrability for pedestrians.

It is not expected that the Proposal would have any significant bearing on the road safety at surrounding intersections. In general, the improved access for pedestrians, particularly for less mobile pedestrians, would result in an increase in pedestrian safety.

6.1.3 Mitigation measures

Mitigation measures for the Proposal are listed in full in Section 7.2. Due to the higher pedestrian volumes at the station, minimising potential risks and confusion is important.

A Construction Traffic Management Plan inclusive would be prepared and submitted to the relevant roads authority. Other mitigation measures include ensuring adequate road signage during construction work, ensuring property access is not affected, and notifying the community of upcoming work and potential disruption. As the main station access on the Avalon Street overbridge would be removed, this has the potential to impact the usual travel patterns of many residents both east and west of the station. Residents should be notified well in advance of the alternate station accesses with appropriate advanced signage on key pedestrian routes approaching the station. Refer to Table 22 (ID8-12).

6.2 Landscape and visual amenity

A Landscape Character and Visual Impact Assessment was prepared for the Proposal by Envisage (2019). The assessment included a site inspection along with desktop analysis and assessment of the potential impacts of the Proposal on the character of the area, sense of place, views and potential visual receivers. The findings of the assessment are summarised in this section.

6.2.1 Existing environment

Landscape character

The existing landscape character is dominated by the surrounding low-density residences, the modest-sized station building, gently sloping landform and a relatively low tree cover. The existing residential area is mostly comprised of single-storey detached houses on moderate-sized blocks. Birrong Boys High on the eastern side of the station is the most dominant part of the existing built form, consisting of 2-3 storey older-style brick buildings alongside the railway corridor.

Birrong Station has a small station building with an attractive, traditional appearance. It sits on a central platform with a railway line on each side. North of the platform is the existing two-lane Avalon Street overbridge which has stairs to the platform. The overbridge has solid dark, brick parapet and a narrow pedestrian footpath along the southern side. Further north of the overbridge the landform slopes gently away and prevents views from that direction at ground-level.

Vegetation cover around the station is relatively low, with surrounding streets tending to have small street trees. The small public reserve alongside the corridor on the western side includes

a number of larger trees as does the larger public reserve on the opposite side to that reserve on Avalon Street. The reserve on the eastern side of the railway corridor is bare of trees.

The landscape character is typical of suburban streets and does not have any recognised landscape or heritage conservation value. The landscape character of the site and immediate surroundings is rated as having a **low** sensitivity to change.

Visual environment

Birrong Station has a relatively small visual catchment due to the surrounding topography which has a slight slope falling from east to west. The station sits within a cutting which limits views down to the station when on the eastern side unless close to the fenced boundary. The existing Avalon Street overbridge and brick parapets also blocks views from locations to the north-east (Teresa Street) and north-west (Magdella Street).

There are views available of the station building from the lower western side (Hudson Parade, Rodd Street and the public reserve on the immediate western side) and from the eastern side of Rodd Street. Views are also possible for pedestrians when descending the stairs from the Avalon Street overbridge and when looking through the break in the parapet created by the stairs. Road users in vehicles only have a brief opportunity to glimpse the station through the short gap in the bridge parapet.

An approximate viewing area (or viewshed) around the station is shown in Figure 10.



Figure 10 Approximate viewshed and representative viewpoints assessed

A number of representative public and private viewpoints (VPs) within the viewing area were identified for assessment. Viewpoint locations are shown in Figure 10 and existing views are shown in Figure 11, 13, 15 and 17. The sensitivity for each viewpoint is discussed in Table 7.

Table 7 Assessed viewpoints – sensitivity of each view toward the Proposal

Viewpoint	Sensitivity
VP1 – View from station platform	Low. The viewpoint is close to the Proposal site and there are direct views of that location by customers of the station. The existing view is typical of a small station in a residential environment, with the brick overbridge quite dominant in the scene and the higher embankment on the eastern side has minimal landscaping.
VP2 – View from Rodd Street (east)	Moderate. The viewpoint is close to the Proposal site and there are direct views of that location for a number of users, particularly associated with Birrong Boys High. However, the existing view is typical of the surrounding residential area.
VP3 – Northern end of Hudson Parade	Moderate. The viewpoint is close to the station (100m) and would have direct views of the Proposal. The affected area includes the public reserve on the eastern side.
VP4 – View from corner of Avalon Street and Magdella Street	Moderate. The viewpoint is close to the station (100m) and slightly elevated above the Proposal site (approximately 60m from the footbridge). The location of the Proposal lies between the station building and this viewpoint however, views of the station and carpark are limited by existing vegetation.

An assessment of visual impacts for each viewpoint is provided in Section 6.2.2

6.2.2 Potential impacts

Construction phase

Landscape character

During the construction phase, the Proposal is considered to have a high magnitude of change to landscape character. The construction area (including the compound) would be moderately large, involve large equipment and would dominate local character within the immediate area which would diminish the scenic quality of the landscape character, albeit only temporarily.

Based on a landscape sensitivity of low (refer to Section 6.2.1) and a magnitude of high, the landscape character impact during the construction phase has been assessed as moderate.

Visual environment

An assessment of impacts for the four viewpoints during the construction phase is provided below.

Viewpoint 1 – View from station platform

The magnitude of change to the view during construction is rated as moderate. The area of disturbance would extend over a significant portion of the viewed area seen by customers. Construction activities would be an immediately apparent part of the scene and there would be views of the construction compound and the incremental construction of the footbridge, lift shaft, and central stairs in particular.

Viewpoint 2 – View from Rodd Street (east)

The magnitude of change to the view during construction is rated as moderate. The area of disturbance would extend over part of the viewed area. The construction compound and more extensive works and access would be visible on the opposite, western side. Construction activities would be an immediately apparent part of the scene, with views of the incremental construction of the footbridge and lift shaft seen, with the closest views of the changes on the western side including the ramps immediately beside in closest proximity.

Viewpoint 3 – Northern end of Hudson Parade

The magnitude of change to the view during construction is rated as high. The Proposal would occupy a large proportion of the area seen. The area of disturbance would extend over a significant portion of the viewed area and the site compound would be closest to this viewpoint. Construction activities would be an immediately apparent part of the scene and there would be views of the incremental construction of the footbridge, lift shaft, and western ramp and stairs.

Viewpoint 4 – View from corner of Avalon Street and Magdella Street

The magnitude of change to the view during construction is rated as moderate. The Proposal would occupy a large proportion of the area seen. The area of disturbance would extend over a significant portion of the viewed area. Construction activities would be an immediately apparent part of the scene and there would be views of the construction compound and the incremental construction of the footbridge, lift shaft, and western ramp and stairs.

Operation phase

Landscape character

When operational, the station precinct would look substantially different due to the new large built structure (comprising the footbridge and lift shaft) contrasting with the scale of the existing station building. However, this change would occur within a landscape setting that is pleasant but does not have high scenic value.

During operation, the Proposal would have a low magnitude of change to landscape character. The Proposal would be a visible and recognisable new element within the overall scene, yet one that is relatively compatible with the surrounding character. The overall height would be approximately 11 metres above the railway platform to the lift roof, with the lift shaft protruding approximately 2.75 m above the height of the footbridge protection screens (with the screens three metres high). The proposed new station access and landscaping would increase the station's attractiveness and enhance local landscape character and the overall amenity for customers.

Based on the landscape sensitivity of low (refer to Section 6.2.1) and a magnitude of low, the landscape character impact during operation has been assessed as low.

Visual environment

The Proposal would be more visible than the existing station elements as it includes an elevated footbridge and even higher lift shaft protruding above the level of the cutting on each side.

An assessment of impacts for the four viewpoints during operation is provided below, along with photomontages (Figure 12, 14, 16 and 18) which give an indication of the proposed changes from each selected viewpoint.

Viewpoint 1 (VP1) – View from station platform

During operation, the magnitude of change to the view is rated as low:

- the footbridge and lift shaft would be a dominant part of the scene, introducing larger scale infrastructure, including the centrally located entry stairs
- these built elements would be seen by rail customers that would expect to see such infrastructure, with the new infrastructure of a larger scale in comparison to the existing station building, being a large, new built element
- over time, the planned tree planting on the western and eastern sides would mature and reduce the visual contrast and perceived scale of the footbridge on each side of the railway corridor.



Figure 11 Viewpoint 1 – existing view from eastern side of station building



Figure 12 Viewpoint 1 – simulated image (photomontage) of likely view of proposal from VP1

Viewpoint 2 (VP2) – View from Rodd Street (east)

During operation, the magnitude of change to the view is rated as **low**:

- the footbridge and lift shaft would be the dominant part of the scene and introduce a larger built element, yet from this location the difference in height would be less apparent due to its elevated location
- the access improvements and landscaping on the eastern side would in general enhance the setting of this part of the station entry
- over time, the planned tree planting would mature and soften the visual contrast of the new built elements seen from this side.



Figure 13 Viewpoint 2 – existing view from Rodd Street (east)



Figure 14 Viewpoint 2 – simulated image (photomontage) of likely view of proposal from VP2

Viewpoint 3 (VP3) – Northern end of Hudson Parade

Following construction, the magnitude of change to the view is rated as low:

- the footbridge and lift shaft would remain a dominant part of the scene and introduce a larger built element
- the access improvements and landscaping on the western side would in general enhance the setting of this part of the station entry
- over time, the planned tree planting would mature and reduce the visual contrast and perceived scale of the footbridge.



Figure 15 Viewpoint 3 – existing view from Hudson Parade (north)



Figure 16 Viewpoint 3 – Simulated image (photomontage) of likely view of proposal from VP3

Viewpoint 4 (VP4) – View from corner of Avalon Street and Magdella Street

During operation, the magnitude of change to the view is rated as low:

- the footbridge and lift shaft would remain a dominant part of the scene and introduce a larger built element
- the access improvements and landscaping on the western side would in general enhance the setting of this part of the station entry
- over time, the planned tree planting would mature and reduce the visual contrast and perceived scale of the footbridge.



Figure 17 Viewpoint 4 – Existing view from corner of Avalon Street and Magdella Street



Figure 18 Viewpoint 4 – Simulated Image (photomontage) of likely view of proposal from VP4

Summary of impacts

A summary of impacts on landscape character and the visual environment is provided in Table 8, Table 9 and Table 10.

Table 8 Summary – assessment of landscape character impacts

Phase	Sensitivity	Magnitude	Landscape character impact
Construction	Low	High	Moderate
Operation	Low	Low	Low

Table 9 Summary – assessment of impacts to viewpoints – construction phase

Viewpoint	Sensitivity	Magnitude	Assessed visual impact
VP1: View from station platform	Low	Moderate	Moderate-low
VP2: View from Rodd Street (east)	Moderate	Moderate	Moderate
VP3: View from the north of Hudson Parade	Moderate	High	High-moderate
VP4: View from corner of Avalon Street and Magdella Street	Moderate	Moderate	Moderate

Table 10 Summary – assessment of impacts to viewpoints – operational phase

Viewpoint	Sensitivity	Magnitude	Assessed visual impact
VP1: View from station platform	Low	Low	Low
VP2: View from Rodd Street (east)	Moderate	Low	Moderate-low
VP3: View from the north of Hudson Parade	Moderate	Low	Moderate-low
VP4: View from corner of Avalon Street and Magdella Street	Moderate	Low	Moderate-low

6.2.3 Mitigation measures

The Proposal is considered to incorporate several design features that form positive visual attributes. This includes the single lift shaft (rather than two), the proposed new station entrances including landscaping, and the retention of visual permeability of the station, with views still possible across the railway corridor.

Additional design measures that could be incorporated to improve visual outcomes are described in Section 7.2. These include ensuring that the design of the new structure is as visually lightweight as possible, screening the work site during construction, and considering further landscaping opportunities if possible. Refer to Table 22 (ID 13-19).

6.3 Noise and vibration

A Noise and Vibration Impact Assessment was prepared for the Proposal by SLR (2019b). The noise assessment included monitoring, modelling, analysis of the potential for impacts on residents and other sensitive receivers, and the identification of management measures where reasonable and feasible. The findings of the assessment are summarised in this section.

6.3.1 Existing environment

Noise catchments and sensitive receivers

Noise catchment areas (NCAs) around Birrong Station were identified as follows based on the type and location of potentially sensitive noise receivers in the area:

- NCA01 – Receivers located on the western side of the rail corridor. Mostly single storey residential buildings with two-storey mixed commercial units located adjacent to the station on Hudson Parade and one two-storey residential unit building located on Avalon Street. Closest receivers located approximately 30 metres west of the Birrong Station platform.
- NCA02 – Receivers located on the east side of the rail corridor. Mostly single storey residential buildings. Closest receivers generally located approximately 60 metres east of the Birrong Station platform. One educational receiver (Birrong Boys High School) with closest buildings located approximately 30 metres east of the Birrong Station platform.

Noise monitoring

Noise monitoring was undertaken in the field to assist in characterising the ambient and background noise environment around Birrong Station. Both unattended and operator attended noise monitoring was conducted at two locations – one on the western side of the station (L01) and one on the eastern side (L02). Monitoring results are tabulated in Table 11 and Table 12.

Daytime ambient noise levels at L01 were observed to be largely controlled by traffic movements along Avalon Street and train movements. Daytime ambient noise levels at L02 were observed to be largely controlled by traffic movements along Teresa Street, Rodd Street, and Avalon Street.

Table 11 Noise monitoring results – unattended (recorded between 14 October 2019 and 24 October 2019)

Measurement location	Period	Measured noise level L ₉₀ (dBA)	Measured noise level L _{Aeq} (dBA)	Measured noise level L _{A10} (dBA)	Measured noise level L _{A1} (dBA)
L01 – 1 Wentworth Street, Birrong	Day (7am-6pm)	38	52	54	60
	Evening (6pm-10pm)	39	51	55	61
	Night (10pm-7am)	32	47	47	59
L02 – 2 Teresa Street, Birrong	Day (7am-6pm)	41	54	56	63

Measurement location	Period	Measured noise level L ₉₀ (dBA)	Measured noise level L _{Aeq} (dBA)	Measured noise level L _{A10} (dBA)	Measured noise level L _{A1} (dBA)
	Evening (6pm-10pm)	40	53	55	61
	Night (10pm-7am)	34	51	50	59

Table 12 Noise monitoring results – operator attended (recorded on 14 October 2019)

Measurement location	Measured noise level L _{max} (dBA)	Measured noise level L _{Aeq} (dBA)	Measured noise level L ₉₀ (dBA)	Observations (dBA)
L01 – 1 Wentworth Street, Birrong	73	51	40	Light-vehicle passby: 52-66 Train passby: 53-57 Distant traffic: 38-41
L02 – 2 Teresa Street, Birrong	68	53	42	Light-vehicle passby: 56-62 Heavy-vehicle passby: 60 Distant traffic: 40-42

6.3.2 Potential impacts

Construction phase

Construction noise criteria

The assessment of construction noise impacts was undertaken in accordance with a series of industry practice guidelines, including:

- Department of Environment and Climate Change, 2009, *Interim Construction Noise Guideline* (ICNG)
- Australian Standards, 2016, *AS2107:2016 – Recommended design sound levels and reverberation times for building interiors*.

Based on noise criteria presented in these guidelines, and the measured background noise levels at the Proposal site (refer Section 6.3.1) a series of noise management levels (NMLs) have been derived for the Proposal, outlined in Table 13. In the event construction noise levels are predicted to be above these NMLs, reasonable and feasible measures (such as equipment selection and location, construction scheduling and respite periods) should be implemented to reduce noise levels as far as practicable.

As an educational institution, the NML for Birrong Boys High School is prescribed by the ICNG. Whilst the assessment has considered the external noise level, the criteria is an internal noise management level. As such, 10 dB noise reduction from outside to inside has been assumed. This is considered to be a typical assumption for a 'windows open' scenario.

Sleep disturbance noise goals have also been established for residential receivers which are based on the *NSW Roads Noise Policy* (Department of Environment, Climate Change and Water, 2011). Based on the Policy, the sleep disturbance criteria for both NCA are a screening level of 50-55 dB(A) L_{A1}(1 minute) and an awakening reaction at 60 to 65 dB(A) L_{A1}(1 minute).

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

Table 13 NMLs for construction

NCA	Standard hours (RBL + 10dB)	Out of hours – daytime ¹ (RBL + 5dB)	Out of hours – evening ¹ (RBL + 5dB)	Out of hours – night time ¹ (RBL + 5dB)	Sleep disturbance (RBL + 15dB)
NCA01 - Residential	48	43	43	37	47
NCA02 - Residential	51	46	45	39	49
NCA02 - Educational ³	55	55	n/a	n/a	n/a

Note 1: Standard hours are listed in Section 3.3.3. Out of hours 'Daytime' hours are 1pm to 6pm Saturday and 8am to 6pm Sunday. Out of hours 'Evening' hours are 6pm to 10pm Monday to Sunday. Out of hours 'Night-time' hours are 10pm to 7am Sunday to Saturday and 10pm Saturday to 8am Sunday

Note 2: Based on the 30 dBA minimum night-time RBL in accordance with the Noise Policy for Industry.

Note 3: ICNG internal goal + 10 dB as openable windows are assumed. An outside-to-inside attenuation of 10 dB is assumed.

Predicted construction noise impacts

To assess the potential impacts from the proposed works, the construction phases described in Chapter 3 were used to develop indicative construction scenarios comprising typical plant and equipment. The scenarios developed were:

- Site establishment
- Main works – during standard construction hours
- Main works – during scheduled Sydney Trains rail possessions
- Interchange works
- Site demobilisation

In order to quantify noise emissions from the proposed construction works, a 3D computer noise model was used to predict noise levels at the nearest receivers.

The predictions include the source noise levels of the anticipated equipment, the location of the nearest sensitive receivers, the number of plant items likely to be operating at any given time, the distance between the equipment and the receivers, and shielding or reflections provided by topography and/or buildings.

Predicted noise levels are provided in Noise and Vibration Impact Assessment for the Proposal (SLR, 2018b). The impacts are summarised in Table 14.

Table 14 Summary of predicted noise impacts

Work scenario	Summary of predictions	Timing and duration of work
Site establishment	At the most affected residential receivers, noise levels are predicted to exceed the daytime NMLs by up to 32 dB and 20 dB in NCA01 and NCA02 respectively. During the vegetation removal works (with use of chainsaw and wood chipper), the highest predicted daytime NML exceedances are 43 dB and 39 dB in NCA01 and NCA02 respectively.	Site establishment works are proposed to be undertaken during standard daytime construction hours only. The use of high noise equipment associated with vegetation clearing works

Work scenario	Summary of predictions	Timing and duration of work
	Sensitive receivers which are located further away from the proposed works areas would have lower NML exceedances.	is not anticipated to extend for more than a few days.
Main works – during standard construction hours	At the most affected residential receivers, noise levels are predicted to exceed the daytime NMLs by up to 21 dB for both NCA01 and NCA02 during these activities. NML exceedances of this magnitude would generally be limited to sensitive receivers with a direct line of site to the proposed equipment for these works.	Standard day time construction hours only.
Main works – during scheduled Sydney Trains rail possessions	During noise intensive work (use of jackhammer, concrete saw, vibratory roller), exceedances of the daytime NMLs are predicted up to 30 dB and 28 dB at the nearest residential receivers in NCA01 and NCA02 respectively. Exceedances of the night-time NMLs are predicted up to 40 and 41 dB at the nearest residential receivers in NCA01 and NCA02 respectively. An increased risk of sleep disturbance at many surrounding residential receivers is anticipated during these times. For the less intensive works scenarios (installation and fit-out tasks) more moderate NML exceedances are predicted – up to 16 dB and 14 dB in the daytime and 27 dB and 26 dB in the night-time for NCA01 and NCA02 respectively.	Standard day time hours and out of hours work – nights and weekends during scheduled Sydney Trains rail possessions.
Interchange works	During noise intensive work (use of jackhammer, concrete saw, vibratory roller), exceedances of the daytime NMLs up to 28 dB and 37 dB are predicted for the nearest residential receivers in NCA01 and NCA02 respectively during the proposed interchange upgrades, with the highest impacts predicted on Teresa/Rodd Street due to proximity to the work.	Standard day time construction hours only.
Site demobilisation	At the most affected residential receivers, noise levels are predicted to exceed the daytime NMLs by up to 32 dB and 20 dB, in NCA01 and NCA02 respectively. The noise profile of these works is similar to that of site establishment with the exclusion of the vegetation removal works.	Standard day time construction hours only.

Highly noise affected receivers

Receivers are considered to be highly noise affected if noise levels from construction exceed 75 dBA $L_{Aeq(15\text{minute})}$. Due to the close vicinity of the works to receivers directly adjacent to Birrong Station in both NCA01 and NCA02, worst case construction daytime noise levels are predicted above 75 dBA $L_{Aeq(15\text{minute})}$ during the operation of noise intensive equipment.

The location of receivers with potential to be highly noise affected during noise intensive times is shown in Figure 19.

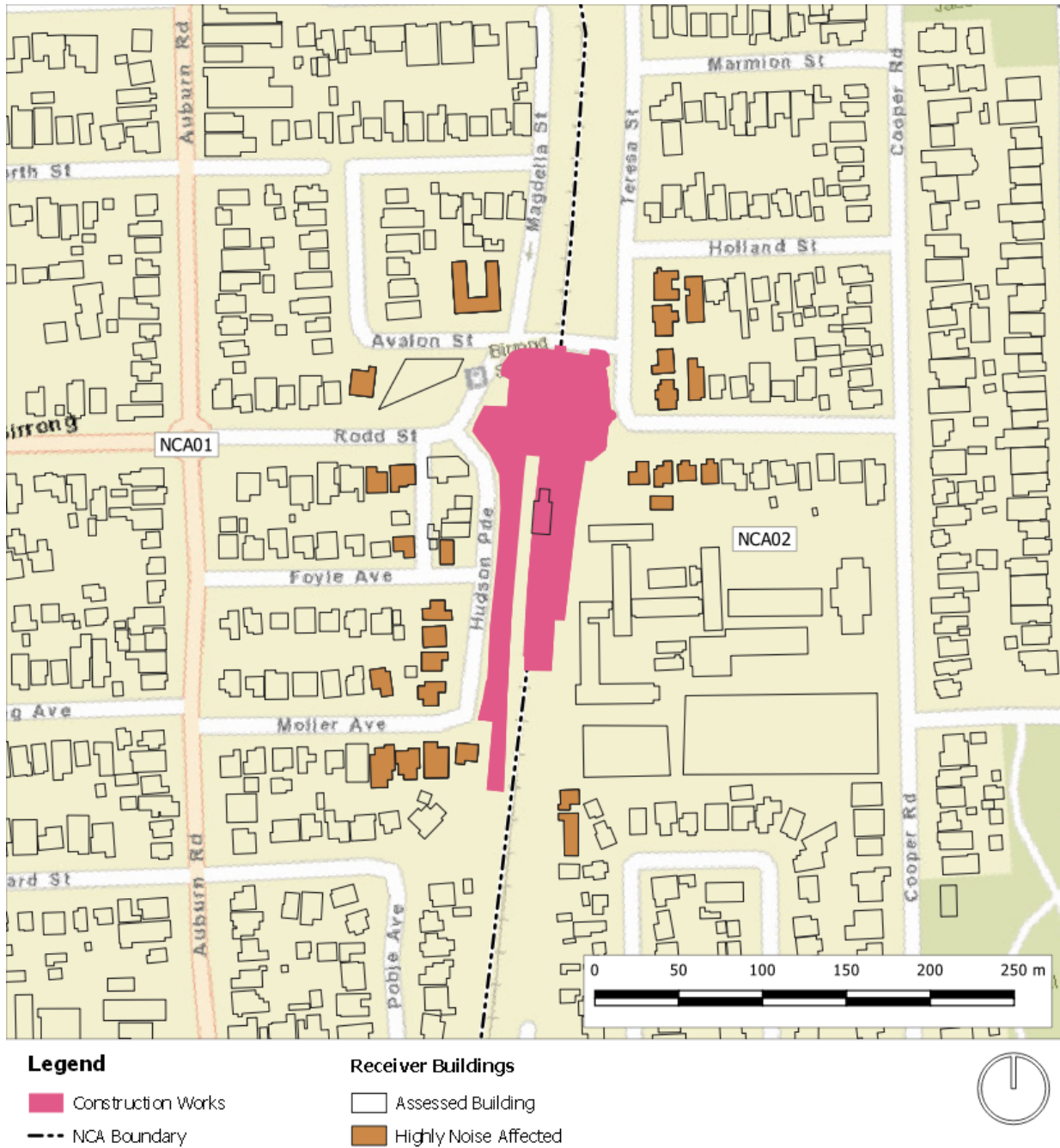


Figure 19 Highly noise affected receivers

Cumulative noise impacts

Cumulative noise impacts warrant assessment where more than one works scenario operates at the same time and in the same location such that the same receiver is impacted by noise from more than one works scenario. Generally, the proposed works are scheduled in consecutive phases and therefore cumulative noise impacts are not predicted as the assessment is controlled by noise impacts from the individual phases (as assessed).

Noise impacts at educational receivers

Birrong Boys High School is situated in NCA02, directly to the east of the existing Birrong Station and proposed construction works areas. Due to its immediate proximity to the works,

buildings at this school have the highest NML exceedances of all educational facilities in the study area with exceedances of between 6 dB and 33 dB, noting that this is based on windows being open at the facility, which may not be the case in practice.

Construction road traffic

Construction traffic is not expected to exceed 20 light vehicles and 10 heavy vehicles per day during peak construction periods (including scheduled Sydney Trains rail possessions) and would be less when works are undertaken during standard construction hours. The relatively small number of construction vehicles accessing the site is predicted to have an insignificant effect on existing road traffic noise levels and further consideration of noise impacts due to construction traffic is not required.

Construction vibration criteria

The assessment of construction vibration impacts was undertaken in accordance with a series of industry practice guidelines. Criteria for constant vibration and transient vibration are outlined in Table 15 and Table 16.

Table 15 Acceptable vibration dose values for intermittent vibration (m/s^{1.75}) (Source: EPA 2006)

Building type	Assessment period	Vibration dose value - preferred	Vibration dose value - maximum
Critical Working Areas (eg hospital operating theatres, precision laboratories)	Day or night time	0.10	0.20
Residential	Daytime	0.20	0.40
Residential	Night time	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night time	0.40	0.80

Table 16 Transient vibration guide values for minimal risk of cosmetic damage (Source: British Standards, 1993)

Type of building	Peak component particle velocity – 4Hz to 15Hz	Peak component particle velocity – 15Hz and above
Reinforced or framed structures industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Table 17 Recommended minimum working distances for vibration intensive plant

Plant item	Rating / description	Minimum working distance – cosmetic damage (BS7385)	Minimum working distance – human response (EPA, 2006)
Vibratory roller	< 50 kN (Typically 1-2t)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4t)	6 m	20 m
	< 200 kN (Typically 4-6t)	12 m	40 m
	< 300 kN (Typically 7-13t)	15 m	100 m
	> 300 kN (Typically 13-18t)	20 m	100 m
	> 300 kN (Typically > 18t)	25 m	100 m
Small hydraulic hammer	300 kg - 5 to 12t excavator	2 m	7 m
Medium hydraulic hammer	900 kg - 12 to 18t excavator	7 m	23 m
Large hydraulic hammer	1600 kg - 18 to 34t excavator	22 m	73 m
Jackhammer	Hand held	1 m (nominal)	Avoid contact with structure
Bored piling	< 800 mm	2 m	n/a

The minimum working distances for building damage should be complied with at all times. The distances are noted as being indicative and would vary depending on the particular item of plant and local geotechnical conditions. In relation to human comfort, the minimum working distances relate to continuous vibration. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods are allowed.

Construction vibration impacts

Vibration intensive equipment is proposed during the main works scenarios which include the use of a vibratory roller, jackhammers and bored piling. Based on the safe working distances presented in the TfNSW (2018b), indicative vibration levels at the representative receivers are shown in Table 18.

Table 18 Indicative vibration levels at nearby receivers

Receiver	Approximate distance to works ¹	Indicative vibration level (mm/s) ²
NCA01	35m	2.0 mm/s
NCA02	20m	4.8 mm/s

Note 1: Approximate distance of works areas within the Proposal area based on works areas shown in Figure 8.

Note 2: Estimated from the safe working distances specified in TfNSW (2018b) for a medium vibratory roller (< 50 kN, Typically 7-13 tonnes) and assumed dense rock.

In terms of potential cosmetic damage, the information presented in Table 18 indicates that the separation distance from the nearest receivers is sufficient to mitigate potential impacts for a medium sized vibratory roller. Other items of plant (jackhammer, bored piling) are associated with a lower vibration level, and are not identified any closer to the receivers than the vibratory rolling scenario. As such, it is considered that structural or cosmetic damage impacts from vibration intensive works are unlikely for the adjacent receivers.

In terms of human comfort, vibration at the nearest receivers is likely to be perceptible at times during the works. For vibratory rolling, where the nearest affected residential receiver is located approximately 20 m from the works area, assuming a medium vibratory roller operating continuously near the adjacent site boundary, it is anticipated that the day-time vibration dose value criterion of 0.4 m/s^{1.75} would be reached within an impractical working time.

For the majority of receivers surrounding the relevant works area which are situated around 50 m from the site boundary, the time to reach the day-time vibration dose value criterion of 0.4 m/s^{1.75} is anticipated to be in the region of 45 minutes for a medium vibratory roller operating continuously near the adjacent site boundary.

Operation phase

Operational noise criteria

The *Noise Policy for Industry* (EPA, 2017) sets out to control intrusive noise levels over the short term and also maintain noise amenity levels over the medium to long-term, relevant to land use. The EPA (2017) Policy includes procedures for establishing the project intrusiveness $L_{Aeq(15minute)}$ and project amenity $L_{Aeq(period)}$ noise levels, where the lower (i.e. more stringent) is then adopted as the project trigger noise level.

Applicable project trigger noise levels for all noise sensitive receiver areas surrounding the Proposal have been calculated and are shown in Table 19.

Table 19 Project trigger noise levels – residential

NCA	Time of day	Intrusive ¹ (dBA)	Amenity ² (dBA)	Overall project trigger noise level ³ (dBA)
NCA01	Day	43	58	43
	Evening	43	48	43
	Night	37	43	37
NCA02	Day	46	58	46
	Evening	45	48	45
	Night	39	43	39

Note 1: Project intrusive noise level is RBL + 5dB

Note 2: Project amenity (period) noise level is the prescribed amenity criteria minus 5dB

Note 3: Resulting project trigger noise level is the lower of the project intrusive and project amenity noise levels

Operational noise impacts

The key identified fixed noise sources associated with the station upgrade include a new power transformer and a new station lift. At this stage of the design specific transformer and lift systems have not been selected, which means it is too early to assess compliance with the applicable noise criteria. However given this type of noise source generally has relatively low noise emissions, it is anticipated that the transformer and lift system designs could be relatively easily mitigated if required during the detailed phase of the Proposal through the selection of appropriate equipment.

Cumulative noise impacts from all station noise sources should be assessed in the detailed design stage when selecting specific equipment locations and models for the lift facilities.

6.3.3 Mitigation measures

Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Construction Noise and Vibration Strategy* (TfNSW, 2018b), the Noise and Vibration Impact Assessment (SLR, 2019b) and in consultation with impacted receivers. The CNVMP would prescribe reasonable and feasible mitigation measures to minimise construction noise and vibration. For any highly affected noise receivers (over 75 dB), TfNSW would communicate with the impacted residents regarding the duration and noise level of the works, and by describing any respite periods that would be provided.

Mitigation measures are listed in full in Section 7.2 (refer Table 22, ID 20-29).

6.4 Aboriginal heritage

6.4.1 Existing environment

The Darug and Eora people were the original inhabitants of the Bankstown and Canterbury area, for many thousands of years before European settlement. These societies lived in a close relationship with their environment and reminders of their lifestyle can still be found in features in the landscape such as rock and overhang paintings, middens, rock shelters and axe grinding grooves (City of Canterbury Bankstown, 2019).

Certain landscape features, such as waterways, sand dunes, ridge tops, cliffs and rock caves can indicate the likely presence of Aboriginal sites. None of these landscape features are present immediately surrounding the station, which is located within a disturbed and developed area (i.e. a rail corridor surrounded by mainly residential and commercial development). The Proposal is not considered to be located within a high-risk landscape for Aboriginal heritage potential in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010). The extensive landscape modification and disturbance that has occurred due to development of the rail corridor across the Proposal area suggests that the presence of culturally sensitive buried items is unlikely within the boundaries of the Proposal.

The following searches were undertaken on 13 September 2019 to identify any registered Aboriginal objects, sites or places around Birrong Station:

- Aboriginal Heritage Information Management System (AHIMS) basic search
- NSW state heritage inventory (SHI) Aboriginal place search.

No AHIMS listed sites were identified as being located within 200 metres of the Proposal and the search of the SHI did not identify any gazetted Aboriginal places in this vicinity.

6.4.2 Potential impacts

Construction phase

Construction of the Proposal would involve some minor excavation and other ground disturbance, including:

- excavation at the location of the proposed footbridge footings and for the lift foundations and lift pits
- minor excavation for construction of ramps, station entrances and adjustments to parking and kerbs
- potential trenching excavation for electrical work.

Ground disturbing activities such as excavation have the potential to impact Aboriginal sites if present. As no known Aboriginal heritage items are located in the vicinity of the Proposal and no high-risk landscape features are located at or near the Proposal, the potential for unknown items to be present is considered low. As such, the Proposal is unlikely to affect Aboriginal heritage during construction. Management measures have been identified in the case of previously unidentified Aboriginal sites being found during construction (refer to Section 6.4.3).

Operation phase

Risks to Aboriginal heritage from the operation of the Proposal are not anticipated.

6.4.3 Mitigation measures

Mitigation measures are listed in full in Section 7.2. Proposed measures to manage potential impacts on Aboriginal heritage include incorporating Aboriginal heritage awareness into site inductions and a procedure should any unexpected Aboriginal artefacts be found. Refer to Table 22 (ID 30-31).

6.5 Non-Aboriginal heritage

6.5.1 Existing environment

Heritage register searches were undertaken on 16 September 2019 for the area surrounding the Proposal using the World Heritage List, Commonwealth Heritage List, National Heritage List, the Register of the National Estate (non-statutory archive), NSW State Heritage Register, RailCorp's Section 170 Heritage Conservation Register and the Bankstown LEP 2015 Schedule 5 Environmental Heritage.

The desktop search identified that Birrong Station is not listed on any of these registers.

Heritage listed items in the vicinity are listed in Table 20.

Table 20 Heritage items in proximity to the Proposal

Register	Item	Location / Distance from Proposal	Significance
Register of the National Estate (Non-statutory archive)	Potts Hill Reservoirs	Rookwood Road, Potts Hill, 400 m distant	National (non-statutory)
State Heritage Register	Potts Hill Reservoirs Site	Near Cooper Road, Birrong, 400 m distant	Heritage Act - s.170 NSW State agency heritage register (Sydney Water)
State Heritage Register	Pipehead to Potts Hill Pipelines	Frank Street (Pipehead) to Cooper Road (Potts Hill) Near Bagdad Street, Regents Park, 800 m distant	Heritage Act - s.170 NSW State agency heritage register (Sydney Water)
Bankstown LEP 2015 Schedule 5 Environmental Heritage	Allder's Farmhouse	49 Hill Road Birrong (off Rodd Street), 300 m distant	Local

6.5.2 Potential impacts

Construction phase

The Proposal is unlikely to impact on any listed heritage sites. The closest listed heritage site to the Proposal is Allder's Farmhouse, located on Hill Street, Birrong (off Rodd Street). Access by construction vehicles would take place along Rodd Street but these activities are not expected to impact on this item. The other listed heritage items are further away from the proposal site and are not expected to be impacted.

Construction works would be undertaken within previously disturbed areas and given the historical and ongoing development and modification in the area, no areas of specific archaeological sensitivity have been identified.

Operation phase

Risks to identified heritage items during the operation phase of the Proposal are not anticipated.

6.5.3 Mitigation measures

Proposed measures to manage potential impacts on non-Aboriginal heritage include an unanticipated finds protocol. Refer to Table 22 (ID 32).

6.6 Biodiversity

A Biodiversity Assessment was prepared for the Proposal by Umwelt (2019). The report includes consideration of threatened species in the vicinity and provides an assessment of potential impacts on biodiversity in the area based on a series of ecological database searches, desktop analysis and field survey. The findings of the assessment are summarised in this section.

6.6.1 Existing environment

Vegetation communities

One vegetation community is present in the study area, being Plant Community Type (PCT) 849 Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain. This community occurs on the western side of the study area, adjacent to the existing carpark and within the northern rail corridor (Figure 20). The canopy is dominated by grey box (*Eucalyptus moluccana*), while the mid-storey is comprised of flax-leaved paperbark (*Melaleuca linariifolia*), swamp oak (*Casuarina glauca*) and white cedar (*Melia azedarach*). Groundcover is sparse, comprised of patches of exposed earth, slashed grasses and exotic species including prairie grass (*Bromus catharticus*), lamb's tongues (*Plantago lanceolata*) and oats (*Avena* sp.), with some occurrences of native purple coral pea (*Hardenbergia violacea*).

This PCT covers 0.14 ha of the study area and is consistent with *Cumberland Plain Woodland in the Sydney Basin Bioregion* critically endangered ecological community (CEEC) under the BC Act. As this community occurs in a patch with an area of <5 ha, it does not meet any condition threshold for *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* CEEC under the EPBC Act.

All other vegetation occurring in the study area is highly disturbed through maintenance activities (i.e. slashing along the rail corridor) and landscaping. The area in the north-western corner of the study area contains a planted canopy of brush box (*Lophostemon confertus*) and planted mid-storey of oleander (*Nerium oleander*), with manicured groundcover.

Habitat features and threatened species

No threatened species, endangered populations or migratory species were recorded within the study area during the field survey. Multiple records of downy wattle (*Acacia pubescens*), vulnerable under the BC Act and EPBC Act, occur in the locality and within the rail corridor immediately to the north of the study area. This species is not present within the study area and is not expected to be impacted by the proposed work.

Several threatened fauna species have been recorded in the wider locality and may utilise some of the habitats to be impacted by the proposed work for foraging, however no hollow-bearing trees, burrows or active nests are present in the study area.



Figure 20 Vegetation communities in the study area

6.6.2 Potential impacts

Construction phase

The potential impacts of the proposed work on vegetation within the study area include:

- disturbance of groundcover and midstorey species as a result of vehicle access, landscaping, stockpiling and hardstand construction
- removal of one canopy tree (*Eucalyptus crebra*) at the site of the proposed new footbridge and stairs.

One threatened ecological community listed under the BC Act, *Cumberland Plain Woodland in the Sydney Basin Bioregion* CEEC, was recorded within the study area. The potential impacts on the CEEC have been assessed by way of a Five-Part Test of Significance under the BC Act, which is provided in Umwelt (2019). The Test of Significance indicated that there is not likely to be a significant impact on this CEEC due to the construction of the Proposal.

Under the TfNSW Vegetation Offset Guide (TfNSW 2019), the removal of native vegetation which is deemed unlikely to have a significant effect on threatened biodiversity requires an offset. One canopy tree would be removed as part of the Proposal. Due to the large size of the tree (i.e. diameter at breast height greater than 60 centimetres), TfNSW is required to plant a minimum of eight trees to offset the impact of this removal.

Given the absence of threatened flora and fauna recorded during the field survey, the small extent of habitat within the study area and the minor nature of the proposed work, a Test of Significance under the BC Act and Assessment of Significance under the EPBC Act are not considered to be required for any individual species or population of threatened flora or fauna.

Operation phase

The operation of the Proposal is not anticipated to have impacts on the biodiversity of the site or surrounding area.

6.6.3 Mitigation measures

Mitigation measures are listed in full in Section 7.2. Proposed measures to manage impacts on biodiversity include avoiding and minimising vegetation clearance where possible, establishing tree protection zones, and planting of native flora species. Refer to Table 22 (ID 33-40).

6.7 Socio-economic impacts

6.7.1 Existing environment

Birrong Station is located in an area of medium density residential development with facilities such as schools, parks and shops all located within walking distance. The closest residences are situated adjacent to the station, around 30 metres from the Proposal. Birrong Boys High School is also situated adjacent to the station, around 25 metres from the Proposal.

The wider area includes a considerable number of businesses and employment opportunities, including at the nearby industrial areas of Potts Hill, Chullora and Regents Park.

Data from the 2016 Census (ABS 2016) indicates there were 3,103 people in the suburb of Birrong. The median age of people was 35 years, and people aged 65 years and over made up 13.6 per cent of the population. A total of 1,344 people reported being in the labour force, and the second most common method of travel to work was by train (18.7 per cent).

6.7.2 Potential impacts

Construction phase

The construction phase of the Proposal has the potential to impact station customers, pedestrians, adjacent residents and motorists due to:

- temporary changes to access at the station
- temporary closure of station building toilets
- a minor increase in traffic including truck movements delivering site materials, plant and equipment
- construction noise, vibration, dust and visual impacts.

Traffic and access, visual impacts, noise and vibration, and dust are considered in more detail in Sections 6.1, 6.2, 6.3 and 6.10 respectively.

Operation phase

It is anticipated that the Proposal would provide positive socio-economic benefits at Birrong Station and the wider area including:

- improved accessibility for customers at Birrong Station through the provision of a new footbridge and lift, with an accessible path from the eastern and western station entrances to the platforms
- improved customer amenity and facilities at the station including upgrades to the station building toilets, accessible car parking, kiss and ride, canopies, CCTV, wayfinding and lighting.

6.7.3 Mitigation measures

Mitigation measures are listed in full in Section 7.2. Proposed measures to manage potential impacts on the community include the preparation of a community liaison management plan, keeping the community informed of upcoming construction work and providing contact details for the community to express any feedback or concerns. Refer to Table 22 (ID 41-45).

6.8 Contamination, geology and soils

6.8.1 Existing environment

Geology and soils

Geology mapping (Bryan, 1966) indicates that Birrong Station is situated on Bringelly Shale which is part of the Wianamatta Group and comprises mainly claystone and siltstone with laminite, sandstone, carbonaceous claystone, and rare coal (Herbert, 1979). The station is situated within a cutting that appears to consist of fill with residual clay, and weathered shale towards the base of the cutting (Aurecon, 2018a). Data from historic boreholes located approximately 550 metres to the north west of the site indicate that shale bedrock is present at about two to three metres below ground level (above the rail cutting).

The location of Birrong Station is mapped as the Blacktown soil landscape. This soil landscape is described as comprising red, brown and yellow podzolic soils generally less than one metre deep (Chapman *et al*, 2009). Mapped acid sulfate soils (Naylor *et al*, 1998) are not present at this location. It is anticipated that there is low likelihood of encountering acid sulfate soils at and around the station.

Contamination

A review of the NSW EPA Contaminated Land Register and the PoEO Act Public Register indicates that the Proposal site is not listed as a contaminated site, nor has the site been subject to any regulation under the *Contaminated Land Management Act 1997*.

The site has been an operational railway station since the 1920s and there is a risk of typical rail-related contaminants being present in the vicinity of the station. The Australian Standards (2005) AS4482.1-2005 *Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds* lists the chemicals used by specific industries. The Standard lists the following chemicals that are commonly associated with railway yards:

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

Given the age of the station building, there is also potential for asbestos materials and lead paint to be present.

6.8.2 Potential impacts

Construction phase

Soil disturbance

Excavation and other earthworks form part of the proposal and if such activities are not adequately managed, could result in the following impacts:

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

These impacts are relevant to the Proposal due to the undulating terrain and presence of the railway cutting.

Contamination

Excavation has the potential to expose contaminants that present a health risk to construction workers and the community if not appropriately managed. The exposure of contaminants could also pose an environmental risk if they were to enter nearby waterways through surface water runoff.

The Proposal has the potential to disturb asbestos containing material and other hazardous substances (such as lead paint) from the refurbishment of the station building. There is also potential for construction activities to result in the contamination of soil through accidental fuel or chemical spills from construction plant and equipment.

Operation phase

Operational risks to geology, soils and contamination as a result of the Proposal are considered negligible.

6.8.3 Mitigation measures

Mitigation measures are listed in full in Section 7.2. It is anticipated that erosion risks would be adequately managed through the implementation of standard measures as outlined in the 'Blue Book' - *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004). Proposed measures to manage contamination include incorporating specific management plans into the CEMP, undertaking an environmental risk assessment, and using appropriate measures to manage hazardous substances. Refer to Table 22 (ID 46-53 and 59-63).

6.9 Hydrology and water quality

6.9.1 Existing environment

Birrong Station is located within the upper section of the Duck River catchment which has a total catchment area of around 40 square kilometres. Duck River is located approximately 670 metres west of Birrong Station with water flowing north to its confluence with the Parramatta River, near Silverwater Bridge. Duck River has experienced considerable eutrophication (when a body of water becomes enriched with minerals and nutrients which causes excessive growth of algae) which is largely due to the highly industrialised and urbanised catchments surrounding the river.

Built drainage in the immediate area of Birrong Station is via gutters, stormwater drains and pipes associated with the local road network and the drainage system at the station itself. Surface water runoff is captured by the trunk drainage system managed by City of Canterbury Bankstown.

Based on a flood study undertaken by Bewsher and BMT WBM (2007) the site is affected by flooding from catchment (overland) flow. Mapping shows the flooding extent at the station is limited to the rail corridor, with an estimated flood depth of approximately 0.1 metres to 0.2 metres during peak flows (Aurecon 2018a).

6.9.2 Potential impacts

Construction phase

Without appropriate safeguards, there is potential for pollutants (such as fuel, chemicals or wastewater from accidental spills) to reach nearby stormwater drains that flow into Duck River and its tributaries as a result of incidental spills or inadequate fuel and chemical storage practices.

Activities that would disturb soil during construction work (such as tree removal, excavation for footings and utilities, stockpiling soil on site) have the potential to impact upon local water quality due to erosion and the movement of larger than normal volumes of sediment into nearby waterways.

In an extreme rainfall event, flooding may impact on construction activities. Moderate to heavy wet weather events may cause water flows through the Proposal area which could increase the potential for soil erosion and sedimentation impacts in the cutting and the rail corridor.

Operation phase

The Proposal is unlikely to have an impact on the hydrology in the surrounding area but this would be confirmed during detailed design. The Proposal would generate some increase to the impervious areas at the station and surface runoff from the proposed footbridge and ramps has the potential to cause erosion and sedimentation into the rail corridor. The design would ensure that stormwater flows around new and existing structures are managed appropriately to mitigate these impacts.

6.9.3 Mitigation measures

Mitigation measures are listed in full in Section 7.2. Proposed measures to manage hydrology and water quality include the preparation of an Erosion and Sediment Control Plan as part of the CEMP, regular vehicle and equipment maintenance, and spill response procedures. Flooding is to be taken into consideration in the detailed design phase. It is expected that these measures will adequately manage the potential impacts on hydrology and water quality. Refer to Table 22 (ID 46-53).

6.10 Air quality

6.10.1 Existing environment

Air quality monitoring is undertaken by DPIE for several sites across NSW. The closest monitoring site to the Proposal is at Chullora. Data at this site for the last year indicates exceedances of a number of pollutants including fine particles and ozone (DPIE 2019). A search of the daily regional air quality index for the last year across the Sydney central-east region (which includes the Chullora site) showed that the region generally experienced 'Good' to 'Fair' air quality values with occasional incidents of 'Poor', 'Very Poor' and 'Hazardous'.

A search of the National Pollutant Inventory database (NPI, 2019) using data from 2017-2018 within the Bankstown LGA (now City of Canterbury Bankstown) identified 38 substances emitted from 19 facilities. None of these facilities are located in the suburb of Birrong, with the closest facilities being in Chullora. Emissions are also likely to be attributed to diffuse emitters such as car/truck exhaust and rail emissions.

Existing air quality at Birrong Station is influenced by industrial land uses and transportation activities and is considered to be characteristic of an urban environment. Potential air quality receivers within the vicinity of the site include:

- local residents
- users of the nearby schools, recreational areas and business centres
- pedestrians and commuters within the Birrong Station precinct.

6.10.2 Potential impacts

Construction phase

During construction, air quality impacts that have the potential to occur during construction include minor increases in dust associated with excavation and other disturbance activities, along with emissions of carbon monoxide, sulfur dioxide, nitrous oxides, volatile organic compounds and other substances from the combustion of diesel fuel and petrol from construction plant and equipment. Emissions of particulate matter and dust would be associated with a number of stationary and mobile sources as well as minor potential for wind erosion of areas of exposed soil. Anticipated sources of dust and dust generating activities include:

- loading and transfer of material to and from trucks
- trenching and excavation activities associated with activities construction of the new footbridge, lift, access paths, installation of services
- demolition of the existing stairs
- construction activities associated with the station building toilets and platform regrading.

The total amount of dust generated depends on the type of material being demolished, soil properties (e.g. moisture content), the activities undertaken and weather conditions at the time of construction.

Due to the nature and scale of the Proposal, air quality impacts are anticipated to be minimal. Excavation, demolition and other disturbance would be limited to the station precinct and the likely airborne dust load generated during a typical construction day would be small. Increases in exhaust emissions associated with the operation of plant, machinery and trucks would be minor and short-term, given the relatively small construction footprint, and with the implementation of proposed control measures. It is unlikely the Proposal would result in reduced local air quality at the nearest potentially affected receivers.

Operation phase

Overall impacts on air quality during operation would be negligible. The Proposal would not result in a change in land use or introduce activities or processes that impact upon operational air quality. As the Proposal would increase access to public transport, there may be a corresponding reduction in private vehicle use and hence a small reduction in air quality emissions.

6.10.3 Mitigation measures

Mitigation measures are listed in full in Section 7.2. Proposed measures to manage air quality include training and inductions for construction workers, ensuring stockpiles and loads are covered, and regular vehicle and equipment maintenance. It is expected that these measures will adequately manage the potential impacts on air quality. Refer to Table 22 (ID 54-58).

6.11 Waste

6.11.1 Existing environment

Existing sources of waste at Birrong Station include general waste generated by customers and wastes associated with station operations and maintenance. Sydney Trains manages the day to day operations of Birrong Station and waste management is guided by the requirements of the Government Resource Efficiency Policy (GREP). In accordance with the GREP, initiatives to reduce the use of resources are implemented where possible, such as the use of recycled or part-recycled materials. There are waste bins at the station for use by customers.

6.11.2 Potential impacts

Construction phase

During construction of the Proposal, the following waste materials are likely to be generated in varying quantities:

- excavated soil, asphalt and concrete
- waste associated with new and temporary building materials (including packaging, metals, timber, plastics, fencing etc.) and surplus building materials
- electrical wiring and conduit waste (from electrical connections)
- chemical and liquid wastes
- green waste (from tree and shrub removal)
- demolition waste from the existing bathrooms

- general waste, including food scraps generated by construction workers.

Operation phase

The Proposal would not generate any significant quantities of additional waste and would not result in changes to operational waste management arrangements.

6.11.3 Mitigation measures

Mitigation measures are listed in full in Section 7.2. Proposed measures to manage waste include appropriate planning of construction activities to minimise the volume of surplus materials, preparation of a Waste Management Plan, and developing waste management targets in accordance with the ISCA IS Rating Tool v1.2. Refer to Table 22 (ID 59-63).

6.12 Hazards and Risk

6.12.1 Existing Environment

Investigations suggest that there are a number of existing utilities currently in operation at the station, including electrical services, gas services, rail utilities (including signalling cabling, low voltage electrical and overhead wiring), telecommunication services, stormwater infrastructure and water services.

In terms of natural hazards, the site is affected by flooding from catchment (overland) flow (refer to Section 6.9 for details). Birrong Station and surrounding areas are not mapped as bushfire prone land or landslide risk land.

6.12.2 Potential Impacts

Construction phase

Potential risks associated with utilities and services would be due to accidental direct interaction between construction plant or personnel with services and may include injury or death to workers through electrocution, disruptions to services, and potential for ignition, if services are not appropriately identified and protected or relocated.

Flooding risks are discussed in Section 6.9.

Operation phase

The Proposal is not anticipated to generate a significant increase in hazards and risks. The design of the Proposal would be in accordance with relevant standards and the risk treatments outlined in the Project Specific Safety Risk Register. Further consideration would be given to these matters as the design progresses.

6.12.3 Mitigation Measures

Mitigation measures are listed in full in Section 7.2. Proposed measures to manage hazards and risk include avoiding services in the design where feasible or alternatively considering options for protection or relocation, and consultation with respective utility providers. Refer to Table 22 (ID 64-65).

6.13 Sustainability

The design of the Proposal would be based on the principles of sustainability, including aiming for an excellent rating as a program under the ISCA IS Rating Tool v1.2 and the TfNSW Environmental Management System (EMS). These guidelines require a number of mandatory

and discretionary initiatives to be applied. Refer to Section 3.2.3 for more information regarding the application of these guidelines.

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

6.14 Climate change

Changes in the regional and global climate system indicate a need to focus attention on how to adapt and ensure the risks and adaptation options are understood in planning, delivery and operation of infrastructure. The risk and effects of climate change on rail infrastructure in the Sydney region can be assessed in terms of disruptive weather changes such as increased temperatures, storm intensity, flooding, risk of fire and drought.

Table 21 provides a summary of such climate variables, associated risks, and proposed adaptation measures based on the Climate Risk Assessment prepared for the Proposal (Aurecon 2018b). These matters are to be taken into consideration as the design progresses.

Table 21 Consideration of climate change risks

Climate variable	Risk	Proposed adaptation
Mean annual temperature rise and heatwave	<ul style="list-style-type: none"> Heat stress and health concerns for staff members Increased maintenance costs associated with inoperative heating and cooling systems, quicker deterioration of concrete and paved surfaces etc. 	<ul style="list-style-type: none"> Use natural ventilation where possible and improve passive design e.g. choice of façade materials Include back up power sources for heating and cooling systems and consider using materials with heat resilience properties.
More frequent and intense fire weather	<ul style="list-style-type: none"> Direct loss of property, assets and lives as a result of bushfire. 	<ul style="list-style-type: none"> Fire and smoke control and earthing and lightning protection would be provided in accordance with relevant standards Where feasible, include fire resistant materials in the design.
Increase in extreme rainfall and hail events	<ul style="list-style-type: none"> Localised flooding could cause danger or inconvenience to customers and staff Flooding could cause pollutant spills to natural waterways. Damage to buildings and structures from flooding, hail and wind. 	<ul style="list-style-type: none"> Design drainage and stormwater infrastructure with additional capacity Install detention basins Choose materials which improve resilience Consider monitoring the structural integrity of nearby trees.
Drought	<ul style="list-style-type: none"> Damage to underground infrastructure causing serviceability issues Quicker deterioration of concrete and paved surfaces through cracking. 	<ul style="list-style-type: none"> Consideration should be given to using flexible, pervious materials for ground coverings.

6.15 Greenhouse gas emissions

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

The detailed design process would involve an AS 14064-2 (Greenhouse Gases - project level) compliant carbon footprint calculation in accordance with the *Greenhouse Gas Inventory Guide for Construction Projects* (TfNSW, 2013) and the requirements of the ISCA IS Rating Tool v1.2 where applicable.

The carbon footprint would be used to inform decision making in design and construction, if the estimated greenhouse gas emissions are determined to be greater than the carbon dioxide equivalent value established by the National Greenhouse and Energy Reporting threshold. Due to the small scale of the Proposal and the temporary nature of each stage of construction work, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minor.

Once operational, it is considered that the Proposal may encourage the use of public transport over use of private motor vehicles by people travelling to and from Birrong. A modal shift in transport usage is likely to reduce the amount of fuel used by private motor vehicles and have a corresponding reduction in greenhouse gas emissions in the local area.

6.16 Cumulative impacts

Cumulative impacts occur when two or more projects are carried out at the same time 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 NSW Government's Major Projects Register, Development and Planning Register, and the Sydney and Regional Planning Panels Development Application register for City of Canterbury Bankstown in September 2019 identified that no major development applications are listed for approval at this time in Birrong or adjoining suburbs.

Construction works for the Proposal would be coordinated with any other construction activities in the area as required. This would include any work being undertaken by Sydney Trains (such as maintenance), City of Canterbury Bankstown, utilities providers or developers.

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 negligible impact on the performance of the surrounding road network and would benefit the local pedestrian network.

Based on this assessment, it is anticipated that the cumulative impacts of the Proposal would be negligible assuming that appropriate mitigation measures are implemented (refer to Table 22) including consultation with relevant stakeholders. Potential cumulative impacts would continue to be considered during detailed design as further information regarding the location and timing of potential developments is released. Environmental management measures would continue to be developed and implemented as appropriate.

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.

7.1 Environmental management plans

A Construction Environmental Management Plan (CEMP) for the construction phase of the Proposal would be prepared in accordance with the requirements of the TfNSW 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 but not be limited to the following key sub plans:

- Construction Traffic Management Plan
- Construction Noise and Vibration Management Plan
- Erosion and Sediment Control Plan
- Waste Management Plan

The CEMP would also include at 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.

Other plans to be prepared separately to the CEMP include:

- Urban Design Plan
- Sustainability Management Plan
- Community Liaison Management Plan.

7.2 Mitigation measures

Mitigation measures for the Proposal are listed in Table 22. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 22 Proposed mitigation measures

No.	Mitigation measure
General	
1.	A Construction Environmental Management Plan (CEMP) would be prepared by the Construction Contractor in accordance with the relevant requirements of <i>Guideline for Preparation of Environmental Management Plans</i> (Department of Infrastructure, Planning and Natural Resources, 2004) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Construction Contractor prior to the commencement of construction and documented as part of the CEMP.

No.	Mitigation measure
3.	An Environmental Controls Map (ECM) would be developed by the Construction Contractor in accordance with TfNSW's <i>Guide to Environmental Controls Map</i> (TfNSW, 2017b) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
6.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by TfNSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
Traffic and transport	
8.	<p>Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum:</p> <ul style="list-style-type: none"> • 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 • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus 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 CTMP. <p>Consultation with the relevant roads authorities would be undertaken during preparation of the CTMP. The performance of all project traffic arrangements must be monitored during construction.</p>
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.

No.	Mitigation measure
11.	Consideration should be given to avoiding or limiting construction vehicle activity in the immediate vicinity during School Zone periods.
12.	As the main station access on Avalon Street overbridge is to be removed, this has the potential to impact the usual travel patterns of many residents both east and west of the station. Residents should be notified well in advance of the alternate station accesses with appropriate advanced signage on key pedestrian routes approaching the station.
Landscape and visual amenity	
13.	<p>An Urban Design Plan is to be submitted to TfNSW and endorsed by the Precincts and Urban Design team. The Urban Design Plan is to address the fundamental design principles as outlined in 'Around the Tracks' – urban design for heavy and light rail, TfNSW, Interim 2016. The Urban Design Plan shall:</p> <ul style="list-style-type: none"> • Demonstrate a robust understanding of the site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances • Identify opportunities and challenges • Establish site specific principles to guide and test design options • Demonstrate how the preferred design option responds to the design principles established in 'Around the Tracks', including consideration of Crime Prevention through Environmental Design Principles. <p>The Urban Design Plan is to include the Public Domain Plan for the chosen option and will provide analysis of the:</p> <ul style="list-style-type: none"> • Landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art • Materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping • An Artist's Impression or Photomontage to communicate the proposed changes to the precinct <p>The following design guidelines are available to assist and inform the Urban Design Plan for the Proposal:</p> <ul style="list-style-type: none"> • TAP Urban Design Plan, Guidelines, TfNSW, Draft 2018 • Commuter Car Parks, urban design guidelines, TfNSW, Interim 2017 • Managing Heritage Issues in Rail Projects Guidelines, TfNSW, Interim 2016 • Creativity Guidelines for Transport Systems, TfNSW, Interim 2016 • Water Sensitive Urban Design Guidelines for TfNSW Projects, 2016.
14.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to <i>AS 1158 Road Lighting</i> and <i>AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting</i> .
15.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
16.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
17.	During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.

No.	Mitigation measure
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| 18. | Detailed design should be as visually-sympathetic to the small scale of the station building and to the station's setting as possible. Particular attention should be given to: <ul style="list-style-type: none">ensuring that the design of the new structure is as visually lightweight as possible (including minimising the height of the lift overrun and the overall lift shaft width).considering the use of materials other than acrylic panels on the footbridgeensuring that the treatment of the public spaces on both sides of the footbridge are carefully designed to increase the landscape character on the associated public reserves, particularly the location of ramps, handrails and proposed landscaping and street trees. |
| 19. | The following design measures are also suggested: <ul style="list-style-type: none">where visible to residents or in direct public view, screen the work site and compounds by covering temporary construction zone fencing with shade cloth (or similar material) to minimise visual impacts.ensure a safe pathway, separate from the vehicular access, is provided between the Rodd Street station entrance and Birrong Boys High.consider landscape opportunities to improve the appearance of the existing eastern embankment if feasible.where possible, new tree planting (already proposed) should include canopy trees to filter views to the railway corridor for the closest residents and from surrounding public viewpoints, and provide amenity benefits such as shade and landscape improvement. |

Noise and vibration

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| 20. | Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Construction Noise Strategy</i> (TfNSW, 2018b) and the Noise and Vibration Impact Assessment for the Proposal (author, 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. Where applicable, noise and vibration will be managed and evidenced in accordance with the relevant requirements for the ISCA IS Rating Tool v1.2. |
| 21. | The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include: <ul style="list-style-type: none">regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noiseavoiding any unnecessary noise when carrying out manual operations and when operating plantensuring spoil is placed and not dropped into awaiting trucksavoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicableswitching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloadedavoiding deliveries at night/evenings wherever practicableno idling of delivery truckskeeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the siteminimising 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
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| 22. | <p>The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:</p> <ul style="list-style-type: none">• maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances• using the most suitable equipment necessary for the construction works at any one time• directing noise-emitting plant away from sensitive receivers• regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc• using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works• use of quieter and less vibration emitting construction methods where feasible and reasonable. |
| 23. | <p>Work 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 work outside these hours may be undertaken if approved by TfNSW and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Construction Contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.</p> |
| 24. | <p>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 <i>Construction Noise and Vibration Strategy</i> (TfNSW, 2018b). This would include restricting the hours that very noisy activities can occur.</p> |
| 25. | <p>Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.</p> |
| 26. | <p>Vibration resulting from construction and received at any structure outside of the Proposal area would be managed in accordance with:</p> <ul style="list-style-type: none">• for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 <i>Structural Vibration in Buildings: Effects on Structures</i> and British Standard BS 7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>• for human exposure to vibration the acceptable vibration - values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>. |
| 27. | <p>Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 20 metres from the works and all heritage listed buildings and other sensitive structures within 50 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).</p> |
| 28. | <p>Affected pre-schools, schools, universities and other identified sensitive receivers are to be consulted in relation to noise mitigation measures to identify any noise sensitive periods, e.g. exam periods. As much as reasonably possible noise intensive construction works in the vicinity of affected educational buildings are to be minimised.</p> |

No.	Mitigation measure
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| 29. | Where vibratory rolling is required at a location less than 50 m from the nearest sensitive receiver it is recommended that a small vibratory roller is used where practical. If vibration intensive works such as large vibratory rollers or other equipment are required to be undertaken within the specified minimum working distances outlined in Section 4.3.4, or in close proximity to potentially vibration-sensitive structures, vibration monitoring should be undertaken to ensure acceptable levels of vibration are satisfied. |
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Aboriginal heritage

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| 30. | All construction staff would undergo an induction in the recognition of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to the Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites. |
| 31. | If unforeseen Aboriginal objects are uncovered during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2016a) would be followed, and works within the vicinity of the find would cease immediately. The Construction Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the OEH and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the OEH notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location. |

Non-Aboriginal heritage

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| 32. | In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2016a) would be followed, and works within the vicinity of the find would cease immediately. The Construction Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and OEH. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location. |
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Biodiversity

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| 33. | Construction of the Proposal must be undertaken in accordance with TfNSW's <i>Vegetation Management (Protection and Removal) Guideline</i> (TfNSW, 2018c) and TfNSW's <i>Fauna Management Guideline</i> (TfNSW, 2018d). |
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No.	Mitigation measure
34.	<p>If removal of trees cannot be avoided (subject to detailed design and arborist assessment), they should be offset in accordance with TfNSW's <i>Vegetation Offset Guide</i> (TfNSW 2019). The following principles should be adhered to:</p> <ul style="list-style-type: none"> • planting of offset trees at the ratio specified for the size of the tree to be removed • planting should occur on or near the impacted site or, where this is not possible, at alternative locations identified and agreed with the relevant Council and/or stakeholders • locally native species should be utilised • under no circumstances should noxious weeds (as listed in Council schedules under the <i>Biosecurity Act 2015</i>) or environmental weed species be planted (e.g. camphor laurel (<i>Cinnamomum camphora</i>), privet (<i>Ligustrum</i> spp.), willow (<i>Salix</i> spp.), box elder (<i>Acer negundo</i>), coral trees (<i>Erythrina</i> spp.), honey locust tree (<i>Gleditsia triacanthos</i>) and African olive (<i>Olea europaea</i> subsp. <i>cuspidata</i>) tree species that pose potential health risks should be avoided (e.g. plane tree (<i>Plantanus occidentalis</i>) and rhus tree (<i>Toxicodendron succedaneum</i>))
35.	<p>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.</p>
36.	<p>Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees/vegetation nominated to be removed in the Biodiversity Assessment (Umwelt, 2019) 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.</p>
37.	<p>Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Flora and Fauna Assessment Report (RPS 2018)). Tree protection would be undertaken in line with <i>AS 4970-2009 Protection of Trees on Development Sites</i> and would include exclusion fencing of TPZs.</p>
38.	<p>In the event of any tree to be retained becoming damaged during construction, the Construction Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.</p>
39.	<p>Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Construction Contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval.</p>
40.	<p>Weed control measures, consistent with TfNSW's <i>Weed Management and Disposal Guideline</i> (TfNSW, 2015), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the <i>Biosecurity Act 2015</i>.</p>
Socio-economic	
41.	<p>Sustainability criteria for the Proposal would be established to encourage the Construction Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.</p>
42.	<p>Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.</p>

No.	Mitigation measure
43.	A Community Liaison Management 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.
44.	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.
45.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Management Plan to be developed prior to construction.
Soils and water	
46.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the <i>'Blue Book' Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
47.	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.
48.	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.
49.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and TfNSW's <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2018e).
50.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2018e) 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.
51.	In the event of a pollution incident, works would cease in the immediate vicinity and the Construction Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.
52.	The existing drainage systems would remain operational throughout the construction phase.
53.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the <i>Waste Classification Guidelines</i> (EPA, 2014) and TfNSW's <i>Water Discharge and Reuse Guideline</i> (TfNSW, 2017c).
Air quality	
54.	Air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's <i>Air Quality Management Guideline</i> (TfNSW, 2018f).

No.	Mitigation measure
55.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
56.	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.
57.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
58.	<p>To minimise the generation of dust from construction activities, the following measures would be implemented:</p> <ul style="list-style-type: none"> • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.
Waste and contamination	
59.	<p>A Waste Management Plan is to be prepared as part of the CEMP to address waste management and would at a minimum:</p> <ul style="list-style-type: none"> • identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data • be prepared in accordance with waste management targets associated with the ISCA IS Rating Tool v1.2.
60.	An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements.
61.	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.
62.	All spoil and waste must be classified in accordance with the <i>Waste Classification Guidelines Part 1: Classifying waste</i> (EPA, 2014) prior to disposal.
63.	Any concrete washout would be established and maintained in accordance with TfNSW's <i>Concrete Washout Guideline</i> – (TfNSW, 2018g) with details included in the CEMP and location marked on the ECM.
Hazards and risks	

No.	Mitigation measure
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64.	Further investigations would be undertaken during detailed design to avoid services where feasible, or alternatively consider options for protection or relocation. Relocation or other work that may affect services would be undertaken in consultation with the respective utility providers.
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65.	Appropriate working safely near electricity work practices would be implemented during construction and operation to ensure safety of workers and customers at the station. Electrical supply to the overhead electrical lines would be shut off if works are required to be undertaken within the Safe Approach Distance (SAD) of the overhead electrical lines.
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Sustainability, climate change and greenhouse gases

66.	Detailed design and construction of the Proposal is to be undertaken in accordance with the ISCA IS Rating Tool v1.2.
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67.	The detailed design process would undertake an <i>AS 14064-2</i> (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's <i>Greenhouse Gas Inventory Guide for Construction Projects</i> (TfNSW, 2013). The carbon footprint would be used to inform decision making in design and construction.
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Cumulative

68.	Consult with Sydney Trains, City of Canterbury Bankstown and other stakeholders as relevant, and consider the timing of nearby construction works to minimise potential cumulative impacts.
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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:

- improved and equitable access to Birrong Station for customers through the installation of a lift, new footbridge, accessible ramps, accessible parking and kiss and ride bay.
- improved station amenity and safety for customers at the station by providing upgrades to toilets, new lighting, signage and CCTV.

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

- temporary changes to vehicle and pedestrian movements to, from and around the station during construction
- impacts to the visual environment of Birrong Station due to the removal of vegetation and installation of the footbridge, lift, and access path
- temporary noise and vibration impacts during construction
- removal of around 0.14 hectares of exotic and native vegetation (including one canopy tree) identified as part of a critically endangered ecological community listed under the *Biodiversity Conservation Act 2016, Cumberland Plain Woodland in the Sydney Basin Bioregion*.

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.

It is anticipated that these environmental impacts would be suitably managed by the proposed mitigation measures identified in Chapter 7 of this REF and the Conditions of Approval imposed in the Determination Report (to be prepared). The Proposal has also taken into account the principles of ESD and sustainability (refer to Section 3.2.3, Section 4.3 and Section 6.13). These would be considered further during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximise benefit to the community and minimise 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 and Energy.

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

Appendix B Consideration of clause 228

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

Factor	Impacts
<p>(a) Any environmental impact on a community?</p> <p>There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. Mitigation measures outlined in Section 7.2 would be implemented to manage and minimise adverse impacts.</p>	Minor adverse
<p>(b) Any transformation of a locality?</p> <p>The Proposal would include the introduction of new visible elements into the station precinct (including a new footbridge, lift and station entrances) which would have a visual impact, but which are consistent with a railway facility and would not lead to a major transformation of the locality. In addition a range of design mitigation has been progressed to minimise impacts (refer also to Section 6.2 and Section 6.5).</p>	Minor adverse
<p>(c) Any environmental impact on the ecosystem of the locality?</p> <p>Around 0.14 hectares of exotic and native vegetation (including one canopy tree) identified as part of a critically endangered ecological community listed under the Biodiversity Conservation Act 2016, <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> would require removal. The removal of this vegetation has been assessed as not significant. Local replanting would be undertaken to offset these impacts.</p>	Minor adverse
<p>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>Construction of the Proposal would result in a short-term noise emissions, traffic and access changes and a temporary reduction in visual amenity. The introduction of new elements including the footbridge and lift would modify the visual character of the area. Mitigation measures have been progressed to minimise impacts (refer also to Section 6.2 and Section 6.5).</p>	Minor adverse
<p>(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</p> <p>There are no heritage listed items at the station and the assessment concluded there is negligible risk of encountering archaeological items. The Proposal would contribute to the ongoing use of the station and is considered to have a positive contribution to the locality by creating equitable access to the station.</p>	Minor positive
<p>(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>The Proposal is unlikely to have any impact on the habitat of protected fauna.</p>	Negligible

Factor	Impacts
<p>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The Proposal is unlikely to have any impact on endangering any species of animal, plant or other form of like, whether living on land, in water or in the air. Also see item (c).</p>	Negligible
<p>(h) Any long-term effects on the environment?</p> <p>The Proposal is unlikely to have any long-term effects on the environment.</p>	Negligible
<p>(i) Any degradation of the quality of the environment?</p> <p>The Proposal is unlikely to cause any degradation of the quality of the environment.</p>	Negligible
<p>(j) Any risk to the safety of the environment?</p> <p>The Proposal has the potential to cause an environmental safety risk however this is considered unlikely as long as recommended mitigation measures are implemented (refer to Section 7.2). Specific management measures would be implemented to manage asbestos and other hazardous materials that may be encountered during construction or demolition works.</p>	Minor adverse
<p>(k) Any reduction in the range of beneficial uses of the environment?</p> <p>The Proposal would not result in any reduction in the range of beneficial uses of the environment.</p>	Nil
<p>(l) Any pollution of the environment?</p> <p>The Proposal has the potential to cause pollution however as long as recommended mitigation measures are implemented this risk is considered to be minor.</p>	Minor
<p>(m) Any environmental problems associated with the disposal of waste?</p> <p>The Proposal would generate varying quantities of waste materials however the Proposal is unlikely to cause any environmental problems associated with the disposal of waste. All waste would be managed and disposed of using a site-specific Waste Management Plan prepared as part of the Construction Environmental Management Plan. Measures would be implemented to ensure waste is reduced, reused or recycled where practicable.</p>	Minor
<p>(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p> <p>The Proposal is unlikely to increase demands on resources that are, or are likely to become, in short supply.</p>	Nil
<p>(o) Any cumulative environmental effect with other existing or likely future activities?</p> <p>Cumulative effects of the Proposal are described in Section 6.16. Where feasible, environmental management measures would be co-ordinated to reduce any cumulative construction impacts. The Proposal is unlikely to have any significant adverse long-term impacts.</p>	Negligible

Factor	Impacts
<p>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</p> <p>The Proposal is not mapped as being located in the coastal zone and as such would not affect or be affected by any coastal processes or hazards.</p>	Nil
