NSW GOVERNMENT

Transport Access Program

Doonside Station Upgrade

Review of Environmental Factors

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

November 2021

Doonside Station Upgrade Review of Environmental Factors

Transport Access Program
Ref–6635597

Contents

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Figures

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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
ARI	Average Recurrence Interval
AMB	Asset Management Branch (refer to Definitions)
ASA	Asset Standards Authority
ASS	Acid Sulfate Soils
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
DBH	Diameter Breast Height
DBYD	Dial Before You Dig
DDA	*Disability Discrimination Act 1992* (Cwlth)
DPIE	NSW Department of Planning, Industry and Environment
DSAPT	*Disability Standards for Accessible Public Transport (2002)*
ECM	Environmental Controls Map
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	*Fisheries Management Act 1994* (NSW)
Heritage Act	*Heritage Act 1977* (NSW)
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2000).
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007* (NSW)
IS rating	Infrastructure Sustainability rating under IS Council rating tool (v 1.2)
IS Council	Infrastructure Sustainability Council
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
LV	Low Voltage

Term	Meaning
LVIA	Landscape and Visual Impact Assessment
MCA	Multi-criteria analysis
NCA	Noise catchment area
NES	National Environmental Significance
NML	Noise management level
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	Formerly NSW Office of the Environment and Heritage
OOHW	Out of hours work
PA system	Public Address system
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	*Roads Act 1993* (NSW)
Roads and Maritime	Formerly NSW Roads and Maritime Services
SEPP	State Environmental Planning Policy
SHI	State Heritage Inventory
SHR	State Heritage Register
SoHI	Statement of Heritage Impact
TAHE	Transport Asset Holding Entity
TfNSW	Transport for NSW
TGSI	Tactile Ground Surface Indicators (“tactiles”)
TPZ	Tree Protection Zone
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)
WM Act	*Water Management Act 2000* (NSW)

Definitions

Term	Meaning
Average Recurrence Interval	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.
Asset Management Branch	The Asset Management Branch (formerly Asset Standards Authority - ASA) is a part of Transport for NSW, and responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Within the rail environment, Design Authority functions formerly performed by ASA are now exercised by the Asset Management Branch.
Concept design	The concept design is the preliminary design, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to Transport for NSW acceptance).
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to Transport for NSW acceptance).
Disability Standards for Accessible Public Transport	The Commonwealth *Disability Standards for Accessible Public Transport 2002* ("Transport Standards") (as amended) are a set of legally enforceable standards, authorised under the Commonwealth *Disability Discrimination Act 1992* (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches).
NSW Trains	From 1 July 2013, NSW Trains became the new rail provider of services for regional rail customers.
Opal card	The integrated ticketing smartcard being introduced by Transport for NSW.
Out of hours work	Defined as work *outside* of standard construction hours (i.e. outside of 7am to 6pm Monday to Friday or 8am to 1pm Saturday.

Term	Meaning
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act - in this instance, Transport for NSW.
Rail possession / shutdown	Shutdown is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
Systems Design Review	The Systems Design Review is that stage of the design that this REF is based upon. This stage of the design highlights and provides solutions for key risks to the overall design
Tactiles	Tactile tiles or Tactile Ground Surface Indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.
Transport Asset Holding Entity of New South Wales	The statutory State Owned Corporation and owner of rail property assets, rolling stock and rail infrastructure in the Sydney metropolitan area and limited country locations in New South Wales.
Proposal	The construction and operation of the Doonside Station upgrade project
Vegetation Offset Guide	The Transport for NSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed ‘significant’ for the purposes of section 5.5 of the EP&A Act. The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.

Executive summary

Overview

The NSW Government is improving accessibility at Doonside Station. This project is being delivered as part of the Transport Access Program, a NSW Government Initiative to provide a better experience for public transport customers by delivering accessible, modern secure and integrated transport infrastructure.

As part of this program, the Doonside Station Upgrade (the Proposal) would aim to provide a station precinct that is accessible to those with a disability, limited mobility, parents/carers with prams, and customers with luggage.

The Proposal would include the following key features:

- four new lifts connecting the platforms and station entries to the existing footbridge, with canopies for weather protection at the lift landings
- removal of existing stairs from the footbridge to Platforms 3 and 4 and replacement with new stairs facing the eastern end of the platform
- removal of the platform canopy on Platforms 3 and 4 between the existing stairs and platform building
- changes to the existing footbridge, stairs and ramps including replacement of stair treads and handrails where necessary and installation of a new roof
- continuous canopy coverage on both platforms from the new lifts to the boarding assistance zones
- two new accessible parking spaces on Cross Street
- one new accessible parking space on Doonside Road
- reconfiguration of the existing kiss and ride bay on Cross Street
- changes to the existing station building layout on Platform 1 and 2 for the provision of a new family accessible toilet
- changes to the existing station building layout on Platform 3 and 4 for the provision of a new communications room
- footpath and platform regrading to provide accessible pathways where required throughout the station precinct
- new bicycle hoops near the Doonside Road ramp entrance
- new bicycle hoops near the Cross Street ramp entrance
- improvements to closed circuit TV (CCTV) security, lighting and wayfinding to improve safety and security
- electrical upgrades to accommodate the new infrastructure, including installation of a new padmount transformer.

Transport for NSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Proposal.

This Review of Environmental Factors (REF) has been prepared to assess all matters affecting or likely to affect the environment by reason 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).

Subject to approval, construction is expected to commence in early 2022 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 ES.1-1.

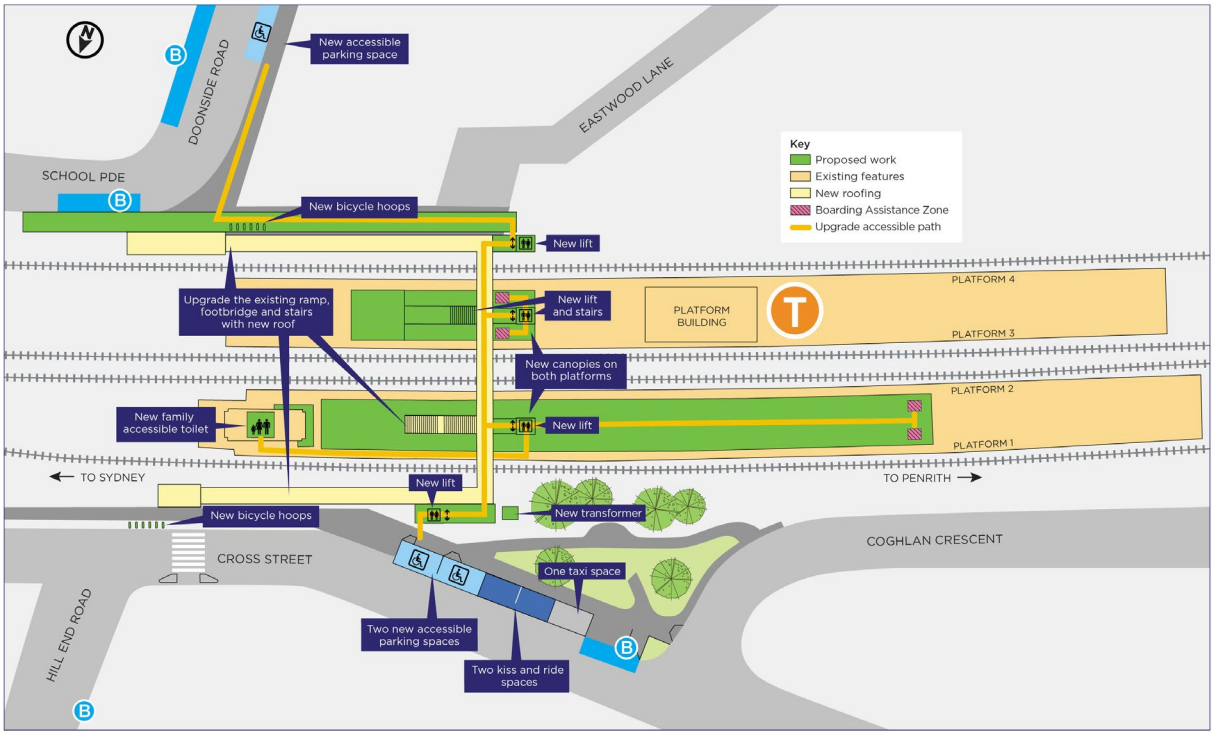


Figure ES.1-1 Key features of the pproposed Doonside Station Upgrade (subject to change during detailed design)

Need for the Proposal

The Proposal would ensure that Doonside Station would meet legislative requirements under the *Disability Discrimination Act 1992* (DDA) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT).

The Proposal is designed to drive a stronger customer experience outcome, to deliver improved travel to and between various means of travel, encourage greater public transport use and better integrate stop and change facilities with the role and function of town centres. The Proposal would also assist in responding to the expected increase in population 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 with the public invited to submit feedback to help Transport for NSW 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 consultation activities is included in Chapter 5 of this REF.

During the display period, a Project Infoline (1800 684 490) and email address (projects@transport.nsw.gov.au) would also be available for members of the public to make enquiries.

In accordance with the requirements of the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), consultation is required with local councils and/or public authorities in certain circumstances, including where council-managed infrastructure is affected. Consultation has been undertaken with Blacktown City Council, Steven Bali MP and the NSW Police Force during the development of design options and the preferred option. Consultation with these stakeholders will continue through the detailed design and construction of the Proposal.

Feedback can be submitted via:

- Project hotline on 1800 684 490
- Email on projects@transport.nsw.gov.au
- Website by visiting transport.nsw.gov.au/doonside
- Mail addressed to: Transport Access Program – Doonside Station Upgrade, Director Environment and Sustainability (Rail Development and Delivery)
    - Address:18 Lee Street, Chippendale NSW 2008
      PO Box K659, Haymarket NSW 1240
- The NSW Have Your Say website on https://www.nsw.gov.au/have-your-say/doonsidestationupgrade

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

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. Figure ES.1-2 shows the planning approval and consultation process for the Proposal.

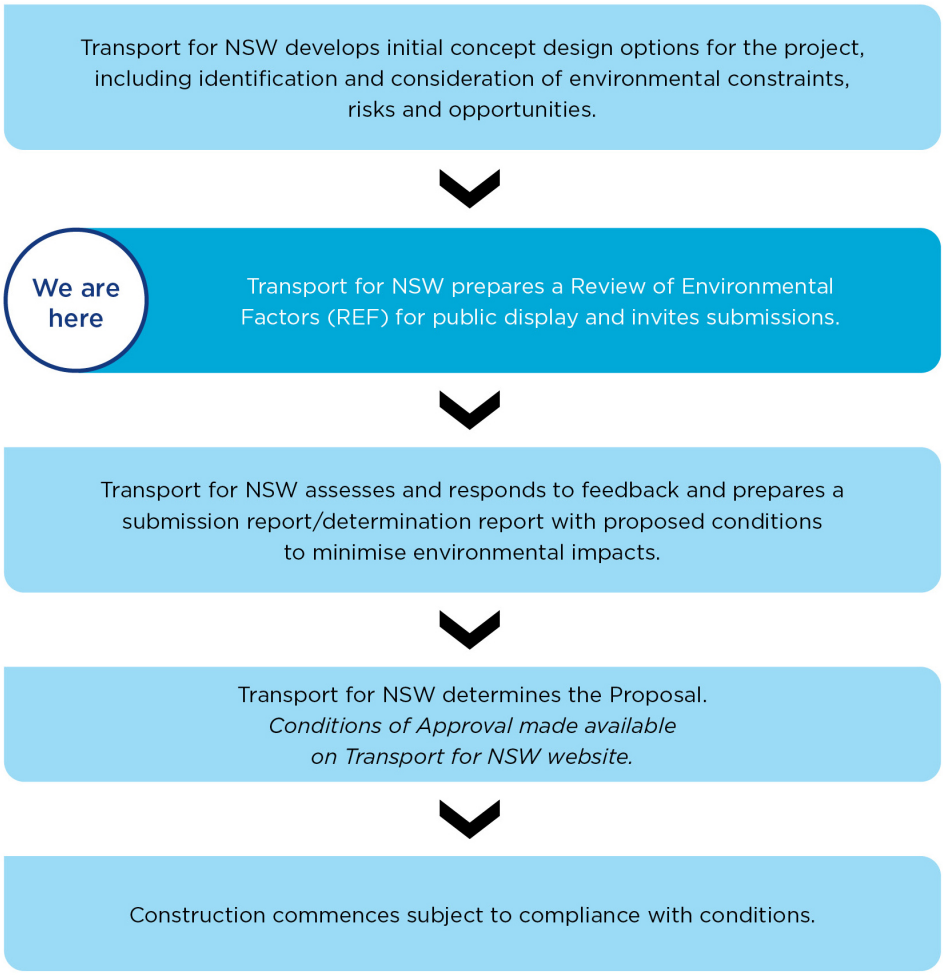


Figure ES.1-2 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

The Proposal would provide the following benefits:

- a station that is accessible to people with a disability, limited mobility, parents/carers with prams and customers with luggage
- buildings and facilities for all means of travel that meet the needs of the local population
- modern stop and change facilities that support an integrated network and allow seamless transfers between all means of travel for customers
- improved safety of the existing platform and surrounds

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

- temporary changes to pedestrian and vehicle movements in and around Doonside Station during construction
- temporary changes to parking nearby Doonside Station

- potential sediment mobilisation and dust generation during construction
- temporary noise and vibration impacts associated with construction activities
- introduction of new built elements to the station setting

Further information regarding these impacts is provided in Chapter 6 of the REF. A photomontage of the Proposal to demonstrate its indicative design is illustrated in Figure ES.1-3.

Conclusion

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

The detailed design of the Proposal would also be designed in accordance with the Infrastructure Sustainability Council (IS Council) Infrastructure Sustainability (IS) Rating Tool (v 1.2) 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 reduce any adverse impacts on the environment.

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

Figure ES.1-3 Photomontage of the Proposal (subject to detailed design)

1 Introduction

Transport for NSW is responsible for strategy, planning, policy, procurement, regulation, funding allocation and other non-service delivery functions for all modes of transport in NSW including road, rail, ferry, light rail, point to point, cycling and walking. Transport for NSW is the proponent for the Doonside Station Upgrade (the 'Proposal').

1.1 Overview of the Proposal

1.1.1 The need for the Proposal

The Proposal would ensure that Doonside Station would meet the legislative requirements under the *Disability Discrimination Act 1992* (DDA) and the *Disability Standards for Accessible Public Transport 2002* (DSAPT).

The Proposal is designed to drive a stronger customer experience outcome, to deliver improved travel to and between various means of travel, encourage greater public transport use and better integrate stop and change facilities with the role and function of town centres. The Proposal would also assist in responding to the expected increase in population 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.

1.1.2 Key features of the Proposal

The key features of the Proposal are summarised as follows:

- four new lifts connecting the platforms and station entries to the existing footbridge, with canopies for weather protection at the lift landings
- removal of existing stairs from the footbridge to Platforms 3 and 4 and replacement with new stairs facing the eastern end of the platform
- removal of the platform canopy on Platforms 3 and 4 between the existing stairs and platform building
- changes to the existing footbridge, stairs and ramps including replacement of stair treads and handrails where necessary and installation of a new roof
- continuous canopy coverage on both platforms from the new lifts to the boarding assistance zone
- two new accessible parking spaces on Cross Street
- one new accessible parking space on Doonside Road
- reconfiguration of the existing kiss and ride bay on Cross Street
- changes to the existing station building layout on Platforms 1 and 2 for the provision of a new family accessible toilet
- changes to the existing station building layout on Platforms 3 and 4 for the provision of a new communications room
- footpath and platform regrading to provide accessible pathways where required throughout the station precinct
- new bicycle hoops near the Doonside Road ramp entrance
- new bicycle hoops near the Cross Street ramp entrance

- improvements to closed circuit TV (CCTV) security, lighting and wayfinding to improve safety and security
- electrical upgrades to accommodate the new infrastructure, including installation of a new padmount transformer.

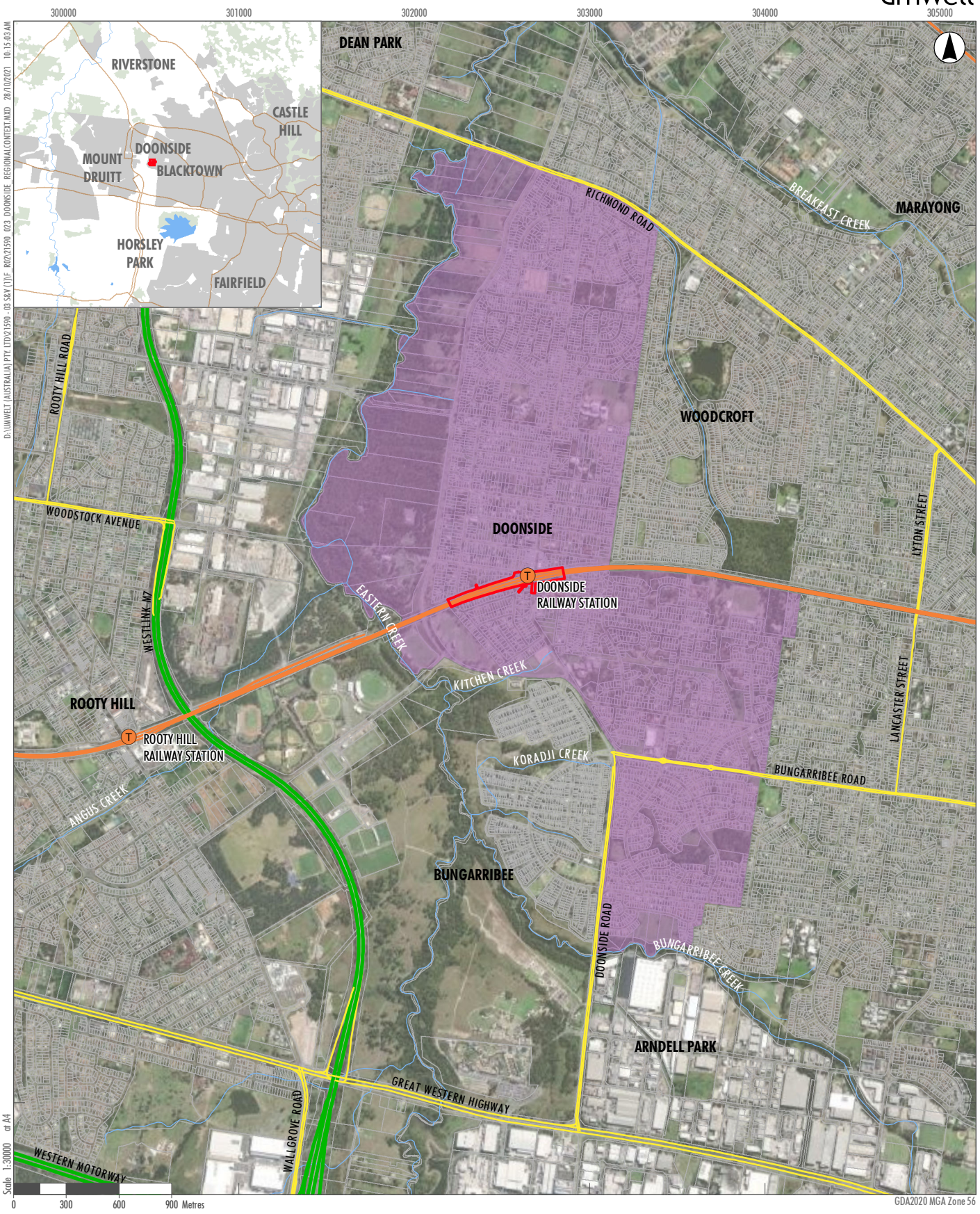
Subject to planning approval, construction is expected to commence in early 2022 and take around 18 months to complete.

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

1.2 Location of the Proposal

The Proposal is in the suburb of Doonside NSW, in the Blacktown Local Government Area (LGA), about 38 kilometres west of Central Station. The location of the Proposal, in its regional context is shown in Figure 1-1.

Doonside Station is located between Cross Street and Doonside Road/School Parade and is serviced by the T1 North Shore and Western Line, between Rooty Hill Station and Blacktown Station. Works would be carried out within the rail corridor, which is land owned by Transport Asset Holding Entity (TAHE) and managed by Sydney Trains, and would also be undertaken on land owned by Blacktown City Council. The Proposal in its local context is shown in Figure 1-2.



Legend

- Proposal Area
- Dooneside Suburb Boundary
- Railway Station
- Railway Line
- Primary/ArterialRoad
- Motorway
- Watercourses

FIGURE 1-1

Regional Context

Image Source: ESRI Basemap Data source: NSW DFSI (2021)

1.3 Existing infrastructure and land uses

Doonside Station comprises two island Platforms (Platforms 1 and 2 on the northern side of the station and Platforms 3 and 4 on the southern side of the station), each with an existing station building.

The station buildings are single-storey, heritage listed brick buildings. The building on Platforms 1 and 2 contains a unisex toilet, cleaner's store and a customer service room/station office. The building on Platforms 3 and 4 is used primarily for storage purposes.

1.3.1 Station access

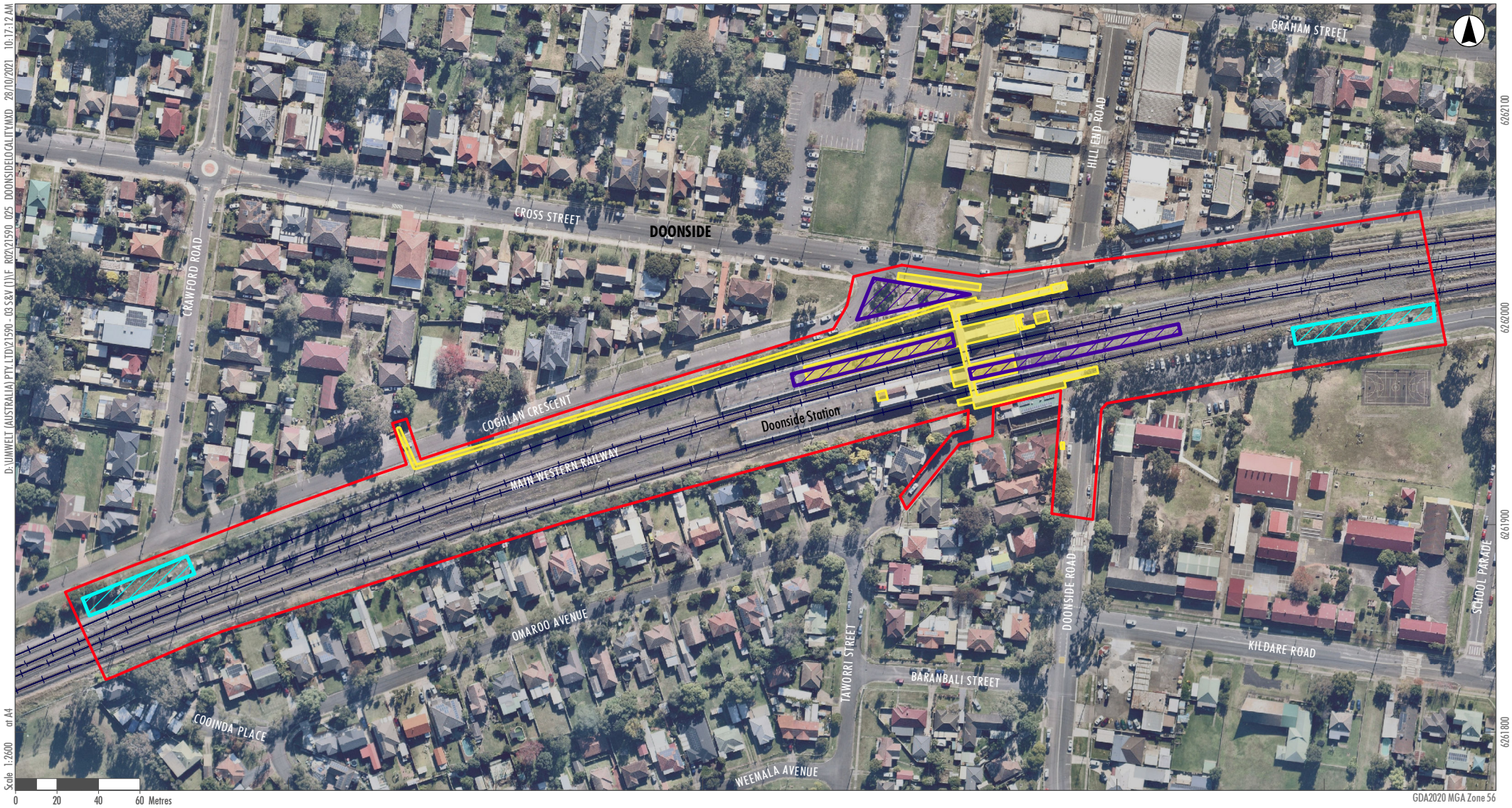
Access to Doonside Station is provided from a ramp located on Doonside Road and a ramp located on Cross Street. Both ramps provide access to a footbridge where customers can access the island platforms via stairs from the footbridge. The footbridge provides public access over the railway corridor to the northern and southern sides of Doonside. The station entrances are shown in Figure 1-3 and Figure 1-4.

1.3.2 Interchange facilities

Public transport and other interchange facilities surrounding the station include:

- two existing bus stops on the southern side of the station on School Parade and Doonside Road
- existing NightRide bus stop on Cross Street
- taxi drop off/kiss and ride zones on Cross Street

  car parking in the form of on street line-marked parallel parking bays, front/rear to kerb line-marked parking bays and a nearby public carpark.



Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- Railway Line

FIGURE 1-2

Site Locality Map

Image Source: Nearmap (Jun 2021) Data source: NSW DFSI (2020)

Figure 1-3 Photo of the station entrance from Cross Street

Figure 1-4 Photo of the station entrance from School Parade

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by Umwelt Australia Pty Ltd on behalf of Transport for NSW to assess the potential impacts of the Doonside Station Upgrade. For the purposes of this work, Transport for NSW is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

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

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

Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to have a significant impact on matters of National Environmental Significance (NES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of Agriculture, Water and the Environment for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.

2 Need for the Proposal

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

2.1 Strategic justification

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport stop and change facilities 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 Doonside Station Upgrade, the subject of this REF, is part of the Transport Access Program. This program is designed to drive a stronger customer experience outcome to deliver seamless travel to and between various means of travel, encourage greater public transport use and better integrate station stop and change facilities with the role and function of town centres within the metropolitan area and developing urban centres in regional areas of NSW.

Table 2-1 Key NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Overview	How the Proposal aligns
Future Transport Strategy 2056 (TfNSW, 2018)	*Future Transport 2056* is an update of NSW's *Long Term Transport Master Plan*. It is a suite of strategies and plans for transport to provide an integrated vision for the state. *Future Transport 2056* identifies 12 customer outcomes to guide transport investment in Greater Sydney. These outcomes include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport.	The Proposal supports the vision of *Future Transport 2056* as it provides accessibility to Doonside Station for people with mobility difficulties. The four new lifts would provide a more physically accessible network along the T1 – North Shore & Western Line, allowing greater choice for people with mobility difficulties to access public transport. Greater accessibility also provides additional connections to places and opportunities for employment, education, business and leisure. The Proposal would assist in meeting the following State-wide outcomes detailed in *Future Transport 2056:* • encouraging active travel (walking and cycling) and using public transport • a fully accessible network that enables barrier-free travel for all.
Disability Inclusion Action Plan (2018-2022) (TfNSW, 2017)	The *Disability Inclusion Action Plan 2018-2022* was developed by Transport for NSW in consultation with the Accessible Transport Advisory Committee, which consists of representatives from peak disability and ageing organisations within NSW.	The Transport Access Program was identified in the *Disability Inclusion Action Plan* as a key action to ensure transport networks in Sydney are accessible for all potential users.

Policy/Strategy	Overview	How the Proposal aligns
	The Disability Plan identifies the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provides a solid and practical foundation for future progress over the next five years.	The Proposal has been developed with consideration of the objectives outlined in this Plan and seeks to improve and provide equitable access to public transport facilities, specifically, Doonside Station.
A Metropolis of Three Cities - Greater Sydney Region Plan (Greater Sydney Commission, 2018a)	The *Greater Sydney Region Plan* 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. The *Greater Sydney Region Plan* includes a number of objectives related to transport networks including: • Services and infrastructure meeting the changing needs of communities • Infrastructure use is optimised	The Proposal would result in the installation of lifts at Doonside Station, providing equitable access for all customers. This would meet the needs of the community, particularly those with mobility difficulties and would optimise the use of Doonside Station.
Central District Plan (Greater Sydney Commission, 2018b)	The *Central City Plan* is a guide for implementing the *Greater Sydney Region Plan* at a district level. It informs local strategic planning statements and local environmental plans, the assessment of planning proposals as well as community strategic plans and policies. Relevantly, the *Central City Plan* recognises the ageing population of the Central River City, and the large volume of persons with a disability. The plan recognises the importance of accessibility for public transport to facilitate people enjoying physically active and socially connected lives.	Through the installation of lifts at Doonside Station, the Proposal is aligned to the *Central District Plan* through the provision of equitably accessible public transport between two strategic centres within the Central River District.
Building Momentum – State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)	The *State Infrastructure Strategy 2018-2038* makes recommendations for each of NSW's key infrastructure sectors including transport. Public transport is deemed to be critical for urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion on roads and supporting urban renewal. The strategy seeks to ensure that the transport system creates opportunities for people and businesses to access the services and support they need.	The Proposal supports investment in existing rail infrastructure, allowing Doonside Station to be accessed by all people.

Policy/Strategy	Overview	How the Proposal aligns
NSW: Premier Priorities *(NSW Government, 2019)* https://www.nsw.gov.au/improving-nsw/premiers-priorities/	In June 2019, 14 new Premier's Priorities were announced that would allow the Government to measure and deliver in areas where NSW can do better. The key policy priorities, include the following: • a strong economy • highest quality education • well-connected communities with quality local environments • putting customer at the centre of everything we do • breaking the cycle of disadvantage	The Proposal is aligned with the priorities focusing on delivering well-connected communities with quality local environments and putting the customer at the centre of everything we do. The Proposal provides an investment in accessible infrastructure to support access to Doonside Station. It improves connectivity to public transport and also provides greater connections between the northern and southern sides of the railway line.
Our Blacktown 2036 – Our Vision, Our Plan (Blacktown City Council, 2017)	*Our Blacktown 2036* provides a roadmap and strategic direction for how Blacktown City Council wants to develop its community now and into the future. It contains six strategic directions which are intended to guide Council in doing what they set out to do. Those are: • a vibrant and inclusive city • a clean, sustainable and healthy environment • a smart and prosperous economy • a growing city supported by accessible infrastructure • a sporting and active city • a leading city	To deliver a growing city supported by accessible infrastructure, Blacktown City Council is focussed on delivering neighbourhoods that are connected to transport and infrastructure that meets the diverse needs of its growing community. The Proposal would ensure equitable access for Doonside Station, meeting the needs of both a diverse and ageing population around Doonside.
Local Strategic Planning Statement 2020 (Blacktown City Council, 2020)	The *Local Strategic Planning Statement* shapes Blacktown's planning decisions, providing a basis for strategic planning within the Blacktown LGA, having regard to economic, social and environmental matters. The statement sets out nine ways that Blacktown City Council will sustainably plan for its current and future population, one of those is providing infrastructure to meet growing demands.	The Proposal involves upgrades to existing infrastructure to provide equitable access to public transport. This will assist in meeting the current and future transport needs of the local community.

Table 2-1 provides an overview of NSW Government policies and strategies relevant to the Proposal.

Table 2-1 Key NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Overview	How the Proposal aligns
Future Transport Strategy 2056 (TfNSW, 2018)	*Future Transport 2056* is an update of NSW's *Long Term Transport Master Plan*. It is a suite of strategies and plans for transport to provide an integrated vision for the state. *Future Transport 2056* identifies 12 customer outcomes to guide transport investment in Greater Sydney. These outcomes include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport.	The Proposal supports the vision of *Future Transport 2056* as it provides accessibility to Doonside Station for people with mobility difficulties. The four new lifts would provide a more physically accessible network along the T1 – North Shore & Western Line, allowing greater choice for people with mobility difficulties to access public transport. Greater accessibility also provides additional connections to places and opportunities for employment, education, business and leisure. The Proposal would assist in meeting the following State-wide outcomes detailed in *Future Transport 2056:* • encouraging active travel (walking and cycling) and using public transport • a fully accessible network that enables barrier-free travel for all.
Disability Inclusion Action Plan (2018-2022) (TfNSW, 2017)	The *Disability Inclusion Action Plan 2018-2022* was developed by Transport for NSW in consultation with the Accessible Transport Advisory Committee, which consists of representatives from peak disability and ageing organisations within NSW. The Disability Plan identifies the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provides a solid and practical foundation for future progress over the next five years.	The Transport Access Program was identified in the *Disability Inclusion Action Plan* as a key action to ensure transport networks in Sydney are accessible for all potential users. The Proposal has been developed with consideration of the objectives outlined in this Plan and seeks to improve and provide equitable access to public transport facilities, specifically, Doonside Station.
A Metropolis of Three Cities - Greater Sydney Region Plan (Greater Sydney Commission, 2018a)	The *Greater Sydney Region Plan* 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. The *Greater Sydney Region Plan* includes a number of objectives related to transport networks including: • Services and infrastructure meeting the changing needs of communities • Infrastructure use is optimised	The Proposal would result in the installation of lifts at Doonside Station, providing equitable access for all customers. This would meet the needs of the community, particularly those with mobility difficulties and would optimise the use of Doonside Station.

Policy/Strategy	Overview	How the Proposal aligns
Central District Plan (Greater Sydney Commission, 2018b)	The *Central City Plan* is a guide for implementing the *Greater Sydney Region Plan* at a district level. It informs local strategic planning statements and local environmental plans, the assessment of planning proposals as well as community strategic plans and policies. Relevantly, the *Central City Plan* recognises the ageing population of the Central River City, and the large volume of persons with a disability. The plan recognises the importance of accessibility for public transport to facilitate people enjoying physically active and socially connected lives.	Through the installation of lifts at Doonside Station, the Proposal is aligned to the *Central District Plan* through the provision of equitably accessible public transport between two strategic centres within the Central River District.
Building Momentum – State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)	The *State Infrastructure Strategy 2018-2038* makes recommendations for each of NSW's key infrastructure sectors including transport. Public transport is deemed to be critical for urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion on roads and supporting urban renewal. The strategy seeks to ensure that the transport system creates opportunities for people and businesses to access the services and support they need.	The Proposal supports investment in existing rail infrastructure, allowing Doonside Station to be accessed by all people.

Policy/Strategy	Overview	How the Proposal aligns
NSW: Premier Priorities *(NSW Government, 2019)* *https://www.nsw.gov.au/improving-nsw/premiers-priorities/*	In June 2019, 14 new Premier's Priorities were announced that would allow the Government to measure and deliver in areas where NSW can do better. The key policy priorities, include the following: • a strong economy • highest quality education • well-connected communities with quality local environments • putting customer at the centre of everything we do • breaking the cycle of disadvantage	The Proposal is aligned with the priorities focusing on delivering well-connected communities with quality local environments and putting the customer at the centre of everything we do. The Proposal provides an investment in accessible infrastructure to support access to Doonside Station. It improves connectivity to public transport and also provides greater connections between the northern and southern sides of the railway line.
Our Blacktown 2036 – Our Vision, Our Plan (Blacktown City Council, 2017)	*Our Blacktown 2036* provides a roadmap and strategic direction for how Blacktown City Council wants to develop its community now and into the future. It contains six strategic directions which are intended to guide Council in doing what they set out to do. Those are: • a vibrant and inclusive city • a clean, sustainable and healthy environment • a smart and prosperous economy • a growing city supported by accessible infrastructure • a sporting and active city • a leading city	To deliver a growing city supported by accessible infrastructure, Blacktown City Council is focussed on delivering neighbourhoods that are connected to transport and infrastructure that meets the diverse needs of its growing community. The Proposal would ensure equitable access for Doonside Station, meeting the needs of both a diverse and ageing population around Doonside.
Local Strategic Planning Statement 2020 (Blacktown City Council, 2020)	The *Local Strategic Planning Statement* shapes Blacktown's planning decisions, providing a basis for strategic planning within the Blacktown LGA, having regard to economic, social and environmental matters. The statement sets out nine ways that Blacktown City Council will sustainably plan for its current and future population, one of those is providing infrastructure to meet growing demands.	The Proposal involves upgrades to existing infrastructure to provide equitable access to public transport. This will assist in meeting the current and future transport needs of the local community.

2.2 Objectives of the Transport Access Program

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

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

2.3 Objectives of the Proposal

The specific objectives of the Doonside Station upgrade are to:

- provide a station that is accessible to those with a disability, the ageing and parents/carers with prams and customers with luggage
- improve customer experience (weather protection on both island platforms and visual appearance, toilet facility upgrades)
- improve integration with the surrounding precinct (better interchange facilities including additional accessible parking spaces, kiss and ride spaces, taxi spaces and a pedestrian crossing)
- improve customer safety (CCTV, lighting, stair and handrail upgrades)
- improve wayfinding in and around the station
- respond to the heritage values of the station
- improve customer amenity.

2.4 Design development

The existing layout of Doonside Station does not meet the DSAPT or DDA requirements and does not allow for equitable access to the station platforms. Stairs provide the only access between the existing footbridge and the island platforms, there are no lifts available and there are no accessible toilets.

Options for upgrades to Doonside Station have been in development since 2011. In 2021 a design report was prepared for the Systems Definition Review (SDR) design stage. The objective of this design stage is to identify key risks associated with the design. As part of this process, three options were considered, with each being reviewed against buildability, staging amenity and life cycle cost. One option was progressed, however since that consideration, amendments have been made to that chosen option.

Each option is discussed below.

2.5 Alternative options considered

The following options (note each option included other upgrades to address DSAPT and DDA non-compliances including station canopies, a family accessible toilet, platform regrading, wayfinding upgrades and interchange upgrades) were considered as part of the SDR design stage:

- **Option 1**: retain the existing footbridge, retain the existing stairs from the footbridge to the platforms, demolish and remove existing ramps to the footbridge, construct new stairs to replace the ramps and construct four new lifts from street/platform level to the existing footbridge (refer Figure 2-1).
- **Option 2**: construct a new footbridge toward the city (eastern) side of the existing footbridge, demolish and remove existing ramps to the footbridge, construct new stairs to replace the ramps and construct four new lifts from street/platform level to the new footbridge (refer Figure 2-2).
- **Option 3**: construct a new footbridge toward the country (western) side of the existing footbridge, demolish and remove existing ramps to the footbridge, construct new stairs to replace the ramps and construct four new lifts from street/platform level to the new footbridge (refer Figure 2-3).
- **Option 4 (preferred option)**: retain the existing footbridge, retain the existing stairs from the footbridge to the platforms, retain the existing ramps to the footbridge, demolish and remove the existing stairs to Platforms 3 and 4, construct new stairs to Platforms 3 and 4 and construct four new lifts from street/platform level to the existing footbridge (refer Figure 2-4).

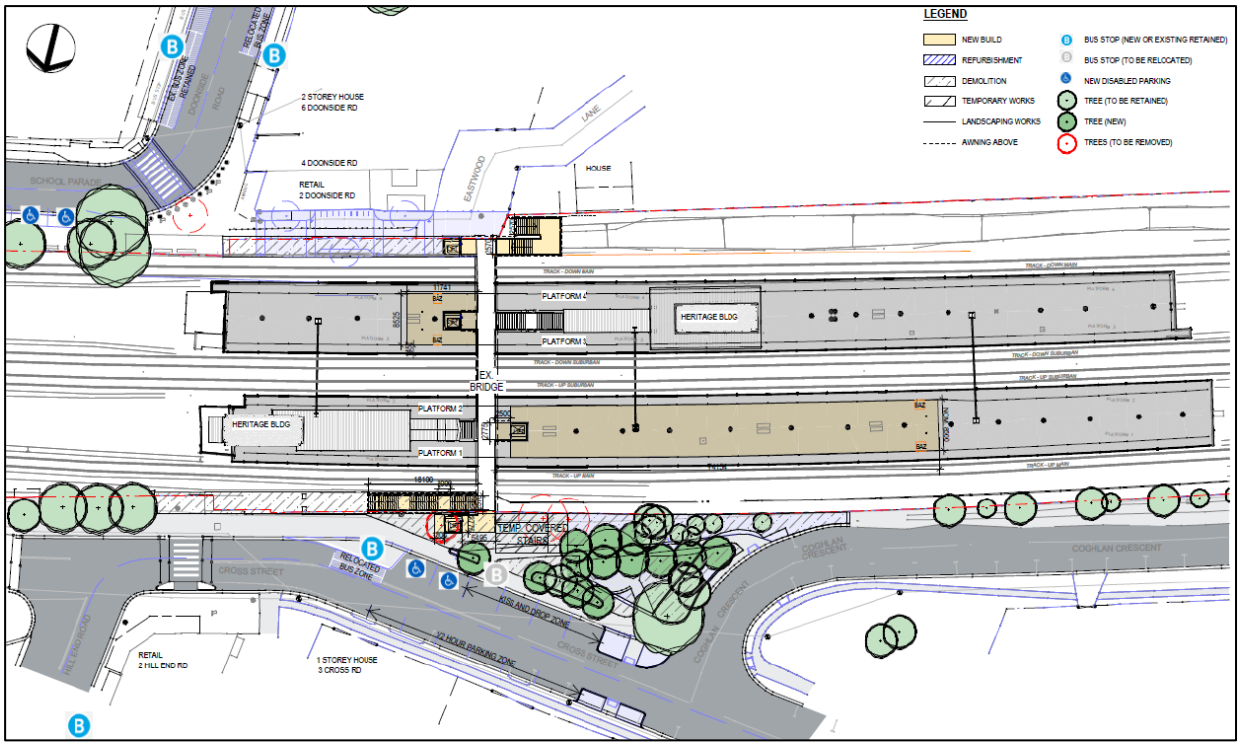


Figure 2-1 Option 1

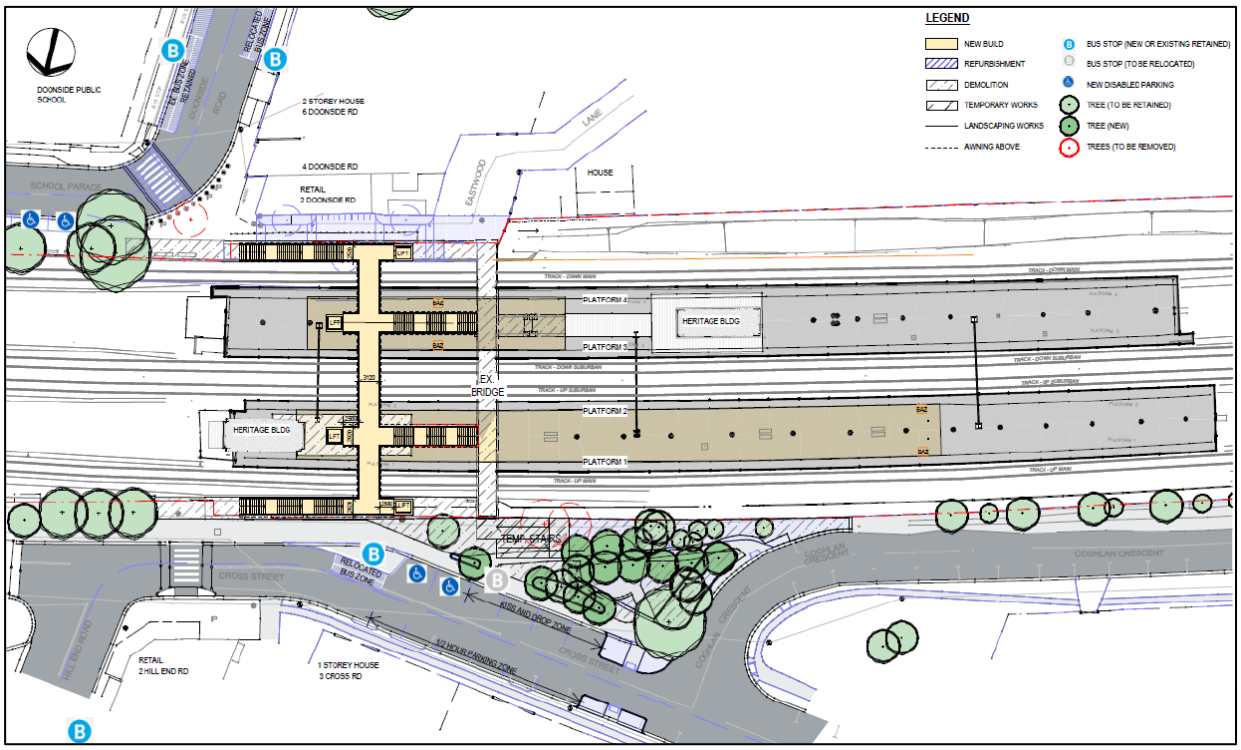


Figure 2-2 Option 2

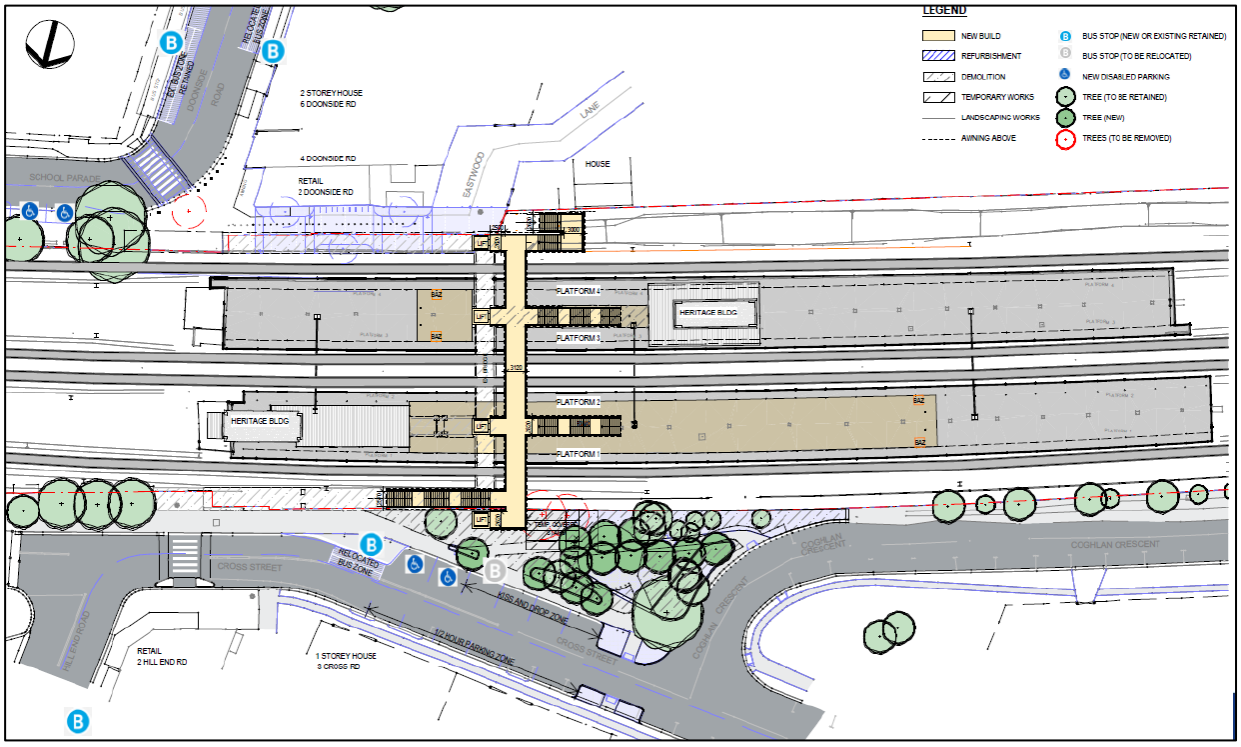


Figure 2-3 Option 3

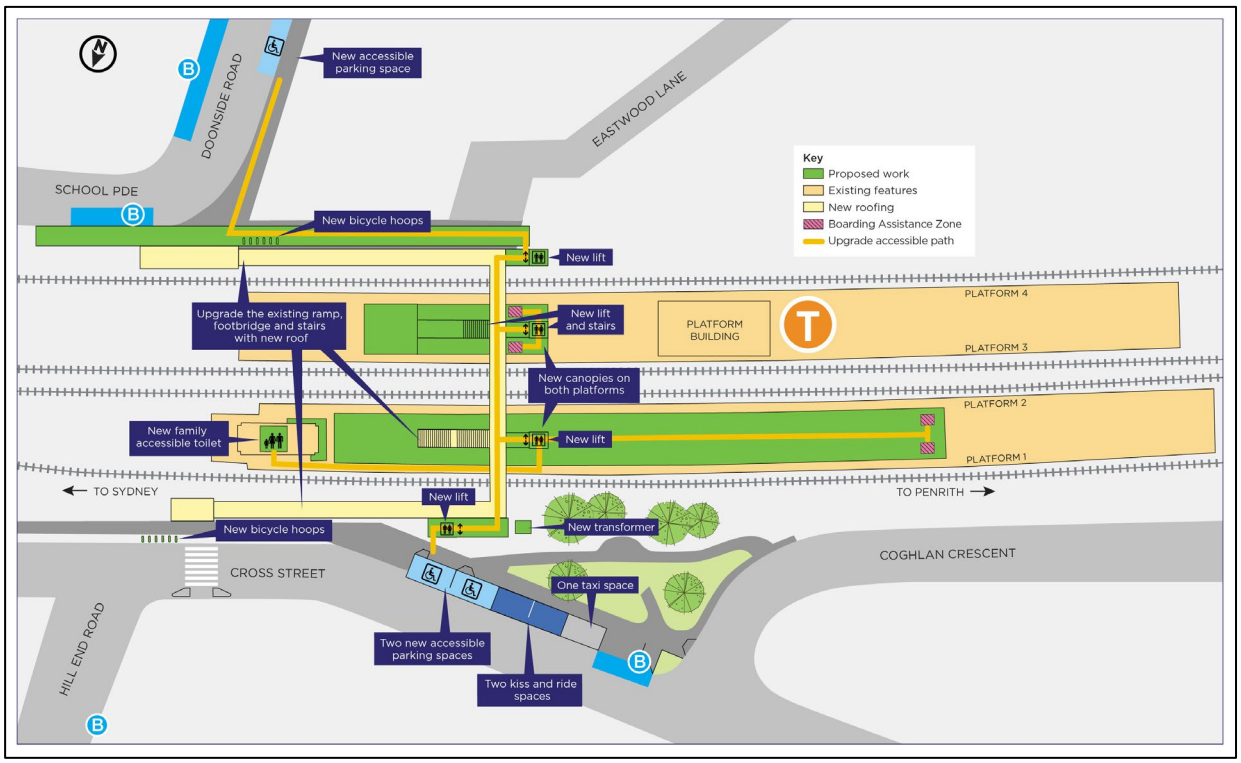


Figure 2-4 Option 4 (preferred option)

2.5.1 The 'do-nothing' option

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

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

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

2.5.2 Assessment of identified options

Options 1 - 3 were assessed in a multi-criteria analysis (MCA) that included consideration of the following criteria:

- design
- heritage
- customer experience
- constructability
- program
- cost
- lifecycle assessment

For each category, the option was scored from 1 – 5 with 1 being the lowest and 5 being the highest. The results of the MCA are presented below in Table 2-2.

Table 2-2 MCA results for options 1 - 3

Criteria	Option 1	Option 2	Option 3
Design	3	4	4
Heritage	4	1	2
Customer experience	4	3	5
Constructability	3	4	1
Program	3	4	1
Cost	5	2	2
Lifecycle assessment	3	4	4
Overall	25	22	20

The MCA indicated that Option 1 was the more feasible option compared to Options 2 and 3 and was therefore progressed further.

2.6 Justification for the preferred option

Following stakeholder consultation and an assessment of the advantages and disadvantages for each of the options identified, it was determined that a modified version of Option 1 would be pursued, that option being Option 4.

Option 4 is considered to be the preferred option as it provides a range of benefits including:

- favourable heritage outcomes through the retention of the existing footbridge and ramps which reduces the extent of heritage fabric that is required to be removed
- Option 4 represents better value for money compared to Options 1 – 3 through the integration of new accessible infrastructure with existing infrastructure
- there is strong community interest in the retention of the existing ramps
- less complex and more timely construction

3 Proposal description

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

3.1 The Proposal

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

The Proposal would include the following key elements:

- four new lifts connecting the platforms and station entries to the existing footbridge, with canopies for weather protection at the lift landings
- removal of existing stairs from the footbridge to Platforms 3 and 4 and replacement with new stairs facing the eastern end of the platform
- changes to the existing footbridge, stairs and ramps including replacement of stair treads and handrails where necessary
- continuous canopy coverage on both platforms from the new lifts to the new boarding assistance zone
- two new accessible parking spaces on Cross Street
- one new accessible parking space on Doonside Road
- reconfiguration of the existing kiss and ride bay on Cross Street to provide an accessible kiss and ride bay
- changes to the existing station building layout on Platforms 1 and 2 for the provision of a new family accessible toilet
- changes to the existing station building layout on Platforms 3 and 4 for the provision of a new communications room
- footpath and platform regrading to provide accessible pathways where required throughout the station precinct
- new bicycle hoops near the Doonside Road ramp entrance
- new bicycle hoops near the Cross Street ramp entrance
- improvements to CCTV, lighting and wayfinding to improve safety and security
- electrical upgrades to accommodate the new infrastructure, including installation of a new padmount transformer.

Figure 3-1 shows the general layout of key elements for the Proposal.

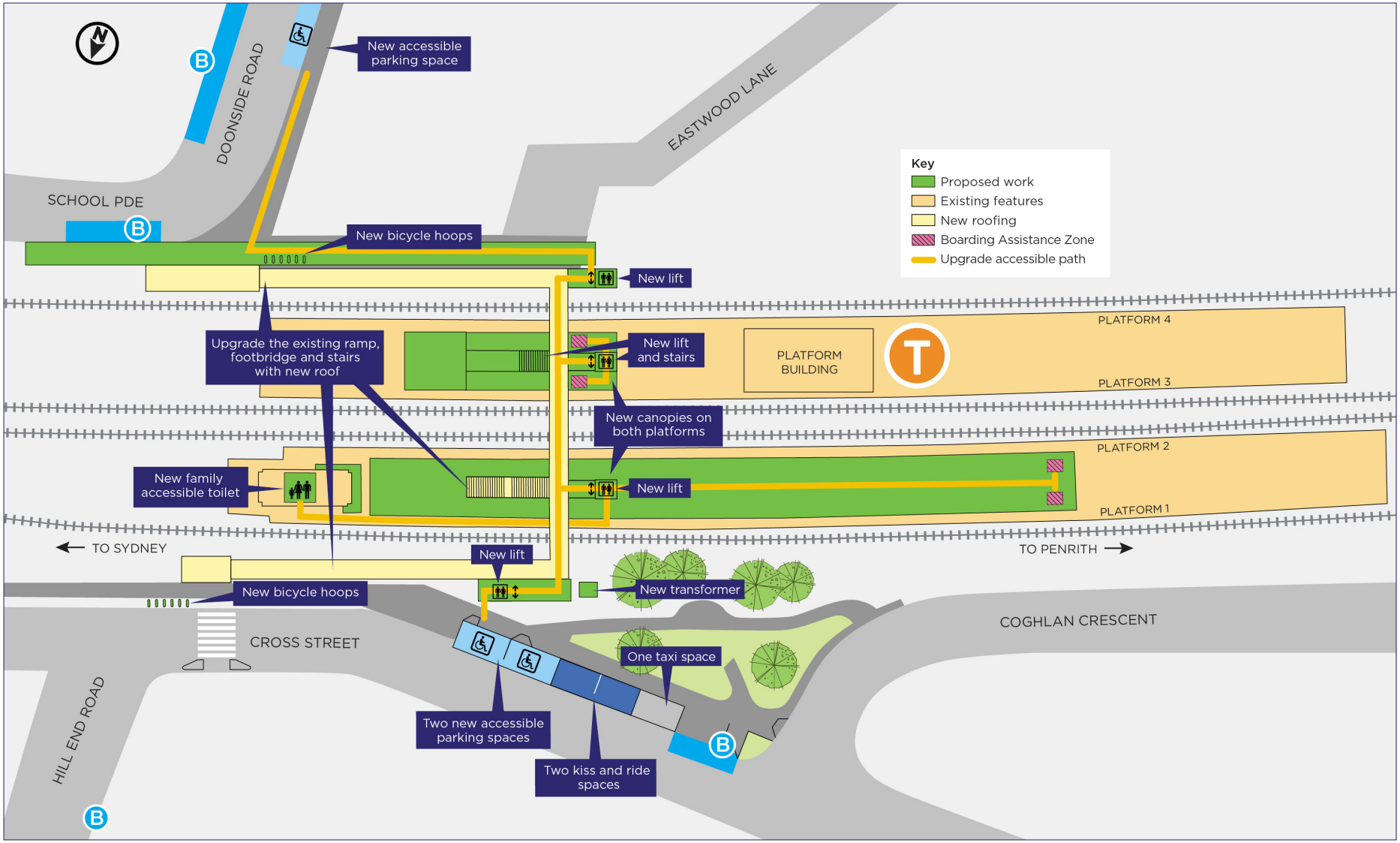


Figure 3-1 Proposed layout of the Doonside Station Upgrade (Indicative only, subject to detailed design)

3.2 Scope of work

3.2.1 Station upgrade

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

- construction and installation of four new passenger lifts and lift landings to provide access to the existing footbridge and island platforms. This would include:
  - installation of a lift from Cross Street to the existing footbridge (Lift 1)
  - installation of a lift from the existing footbridge to Platforms 1 and 2 (Lift 2)
  - installation of a lift from the existing footbridge to Platforms 3 and 4 (Lift 3)
  - installation of a lift from Eastwood Lane to the existing footbridge (Lift 4)
- new roofing to existing ramps, footbridge and stairs to Platforms 1 and 2
- new canopies to all platforms:
  - the new canopy on Platforms 1 and 2 would extend to provide canopy coverage from the existing building to the boarding assistance zones
  - removal of existing stairs and canopy to Platforms 3 and 4 and the provision of new stairs and a new canopy. The new canopy on Platforms 3 and 4 would extend to provide canopy coverage to the boarding assistance zones
- installation of new handrails and anti-throw screens along the existing ramps, footbridge and stairs.

3.2.2 Station building modifications

Details of the proposed work within the existing buildings at Doonside Station to improve accessibility and customer experience are provided below:

- refurbishment of existing toilet within the building on Platforms 1 and 2 to create a new family accessible toilet. These works would include:
  - demolition of existing internal partitions and fittings
  - installation of bathroom fixtures including toilet, sink and a changing table
  - internal fit-out including walls and tiles
  - plumbing
- establishment of a communications room within the existing storage room at the western end of the building on Platforms 3 and 4 including:
  - installation of new cable trays above the existing ceiling
  - installation of a new fire-rated ceiling to the new communications room
  - demolition and make good of the existing cable duct to the existing booking office / communications room
  - installation of a new security system.

3.2.3 Interchange facilities

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

- three accessible parking spaces including:
  - one parking space on the western side of Doonside Road opposite the existing bus zone
  - two parking spaces on the southern side of Cross Street within 10 metres of Lift one
- a kiss and ride bay with capacity for two cars and a taxi rank on the southern side of Cross Street, adjacent to the new accessible parking spaces
- repaving of the pedestrian walkway from Eastwood Lane to the start of the pedestrian ramp to provide a level surface for access to Lift 4
- installation of new bicycle hoops near the Doonside Road ramp entrance and the Cross Street ramp entrance.

3.2.4 Ancillary work

Details of the proposed ancillary work required to take place at and around the station to facilitate accessibility upgrades are provided below:

- regrading and resurfacing of the station platforms to provide compliant paths of travel between the lifts, boarding assistance zones, family accessible toilet and other facilities on the platforms
- resurfacing of other areas within the construction footprint, where impacted by construction activities, including services trenching work
- new stormwater drainage connections from new canopies to the existing stormwater system
- upgrade to the station power supply to cater for the four new lifts, which would include the installation of an underground low voltage (LV) service main to a new padmount transformer that would be installed on the northern side of Doonside Station from the existing padmount transformer 11778
- lighting upgrades
- improvements to station security and communication systems, including CCTV modifications, public address system upgrades, modification to station passenger information systems, new hearing induction loops within the station platforms
- new wayfinding signage in relation to the new lifts and parking spaces
- new TGSIs where required
- relocation and protection of existing underground services including sewer, telecommunications, water, power and gas
- temporary construction compounds and laydown areas for storage of materials and equipment
- temporary work (where required) during construction in order to maintain existing pedestrian ‘level of service’.

3.2.5 Materials and finishes

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

Availability and constructability are also important criteria to ensure that materials are readily available and the structure can be built with ease and efficiently. Materials are also selected for their application based on their suitability for meeting design requirements. Materials selection would also consider sustainability aspects, including consideration of supply chain and sourcing materials locally where possible, prioritising the use of reused and recycled materials where practicable, and investigating use of materials that have environmental labels.

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

- lift shafts – precast concrete and glass with steel roof sheeting
- roofing for existing footbridge, stairs and new canopies – powder coated metal
- platform canopy soffits – prefinished compressed fibre cement panel.

The design would be submitted to Transport for NSW's Design Review Panel for comment before being accepted by Transport for NSW. An Urban Design Plan and Landscape Plan (UDLP) would also be prepared by the Contractor, prior to finalisation of detailed design for review by Transport for NSW.

3.3 Design development

3.3.1 Engineering constraints

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

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

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

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

- gas – under line crossing across the corridor at the eastern end of the island platforms (Jemena)
- telecommunications – located under Eastwood Lane and under the ramp on the southern side of the station (Telstra)
- water – various locations within and outside of the rail corridor including an under line crossing at the eastern end of the island platforms, underside of footbridge and platforms (Sydney Water)
- sewer – various locations within and outside of the rail corridor including an under line crossing at the eastern end of the island platforms and within the island platform servicing Platforms 1 and 2 (Sydney Water)
- power (Endeavour Energy)

Heritage: Doonside Station is listed under the *Blacktown Local Environmental Plan 2015* and on the TAHE section 170 Heritage and Conservation Register. The Doonside Railway Station Group would be directly impacted by the Proposal. The Group is comprised of the two island platforms (c.1955), station building A – Platforms 3 and 4 (c.1955), station building C (c.1955) and signal box (1955, closed 1963) – Platforms 1 and 2 and footbridge (1958, modified 1990).

Construction access: Construction access would require traffic control in the adjacent streets and use of large plant and equipment, particularly piling rigs and cranes which would need to operate around these streets.

Public access: Maintaining pedestrian access to the station, when operational, and to the existing footbridge and ramps during construction.

Vegetation: The Proposal would result in the removal of two street trees on the northern side of the station. .

3.3.2 Design standards

The Proposal would be designed having regard to the following:

- *Disability Standards for Accessible Public Transport 2002* (issued under the Commonwealth *Disability Discrimination Act 1992*)
- Building Code of Australia
- relevant Australian Standards
- Transport for NSW Asset Management Branch standards
- Sydney Trains standards
- Infrastructure Sustainability Council (IS Council) Infrastructure Sustainability Rating Scheme (V1.2)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design (CPTED) principles
- other Transport for NSW policies and guidelines
- applicable standards of Blacktown City Council in relation to pavement and pedestrian crossings.

3.3.3 Sustainability in design

Transport for NSW is committed to minimising the impact on the natural environment and supports the IS Council's Infrastructure Sustainability (IS) rating tool. The IS rating tool was developed and is administered by the IS Council. It is an independently verified and nationally recognised rating system for evaluating sustainability across design, construction and operation of infrastructure.

The Doonside Station Upgrade is one of a number of projects within the Transport Access Program that is using version 1.2 of the IS rating tool and targeting an 'Excellent' rating. The rating scheme provides an independent and consistent methodology for the application and evaluation of sustainability outcomes in infrastructure projects.

The development of the scoping design for the Proposal has been undertaken in accordance with the project targets identified in the program wide TAP 3 Sustainability Strategy.

The Sustainability Strategy sets targets across the following key issues:

- Climate change adaptation and resilience

- Renewable energy
- Waste
- Materials
- Supply chain management
- Community connection
- Social procurement and workforce.

Key design elements and strategies developed during concept design would be used to further develop the design and construction.

3.4 Construction activities

3.4.1 Work methodology

Subject to approval, construction is expected to commence in early 2022 and take approximately 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with Transport for NSW.

The proposed construction activities for the Proposal are identified in Table 3-1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

Table 3-1 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling work	• establish site compounds (i.e. fencing, site offices, amenities and plant/material storage areas) • establish temporary facilities as required (temporary toilets, temporary construction lights etc.) • erect site hoarding as required • service location and relocation • establish tree protection zones (TPZs) if required
Utilities	• confirm location of existing underground utilities • establish protection areas around utilities not required to be relocated • relocate utilities as required • install new padmount transformer on the northern side of Doonside Station • install new underground combined services route including LV service main, connecting from the existing padmount substation 11778 to the new padmount transformer

Stage	Activities
Lift installation	• prepare sites and position cranes and piling rigs for lifts • temporary earthworks and dismantling of fencing and barriers to allow piling rigs to reach desired locations • excavation of lift pits and lift landing footings (including temporary shoring if required) • piling works for lifts and lift landings • waterproof (as required) • install reinforcement, formwork and concrete to form the lift pits and footings • erect glass and steel shaft structures • install structural supports for lift landings • install lift landings • install lifts, including fit-out
Ramps, footbridge and stairs	• demolish existing stairs on Platforms 3 and 4 and install new stairs facing the eastern end of the platform • remove existing rooves on the ramps, footbridge and stairs install structural steel and roofing for ramps, footbridge and stairs • remove existing handrails to the ramps, footbridge and stairs • install new handrails for the ramps, footbridge and stairs • strengthen existing footbridge
Station Building work	• reconfigure existing male and female toilet on Platforms 1 and 2 to allow for a new family accessible toilet • reconfigure existing storage room on Platforms 3 and 4 into a new communications room • excavate pits for canopy structural supports • install formwork and pour concrete pads for canopy structural supports • install canopy structural supports • install canopy and connect drainage to existing stormwater system • regrade existing platform
Interchange	• excavate and establish new kerb on Cross Street • line mark accessible parking spaces and kiss and ride bays on Cross Street • install new parking signs reconfigure the existing roadway (kerb ramps, line marking, etc.) to accommodate accessible car spaces and kiss and-ride spaces • excavate paved area from lift four to the forecourt of School Parade • re-pave area from lift four to the forecourt of School Parade • install new bicycle parking adjacent to the ramps on both sides of the station
Demobilisation	• dismantle construction compounds/hoarding areas and remove of all construction-related plant and equipment from site
Testing and commissioning	• test electrical, communications and signalling components • commissioning of new lifts

3.4.2 Plant and equipment

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

- hand tools
- all terrain forklift
- street sweeper
- 12t crane truck
- hi-rail crane truck
- hi-rail flat bed vehicle
- water cart
- demolition saw
- generator (5kVA – 25 kVA)
- petrol pressure washer
- solar/generator powered light towers
- vacuum truck
- Hanjin DB8 bore rig
- Comacchio Geo205 bore rig
- chainsaw
- 10t smooth drum roller
- rivet buster
- oxy-acetylene burner
- piling rigs
- hi-rail piling rig (25t)
- jackhammer
- air compressor
- 4t excavator
- 2.5t excavator
- 1.5t excavator
- articulated dump truck

3.4.3 Working hours

The majority of 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
- no work on Sundays or public holidays.

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

Out of hours work is required in some cases to lessen disruptions to customers, pedestrians, road users and nearby sensitive receivers; and to make the railway workers and operational assets safe. It is estimated that approximately seven routine rail shutdowns would be required to facilitate the following:

- service relocation works
- electrical works
- piling works for lifts
- lift installation
- works on the station including regrading, construction of canopies and works involving service routes
- works on the footbridge.

Out of hours work may also be scheduled outside rail shutdown periods. Approval from Transport for NSW would be required for any out of hours work and the affected community would be notified as outlined in Transport for NSW's *Construction Noise and Vibration Strategy* (TfNSW, 2019a) (refer to Section 6.3 for further details).

3.4.4 Extended Working Hours during COVID-19

The Minister for Planning and Public Spaces has made a number of Orders under section 10.17 of the EP&A Act in response to the COVID-19 pandemic. This includes the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020* (the 'Order'), which commenced on 24 December 2020, and is applicable to construction activities for projects which have been subject to an assessment under Division 5.1, or approval under Division 5.2 of the EP&A Act. The Order extends the standard construction hours to allow infrastructure construction work on Saturday, Sunday and Public holidays (7am to 6pm), without the need for any approval (excluding high noise generating works such as rock breaking or pile driving and the like).

These extended working hours were due to expire on 25 March 2021. However, on Wednesday 24 March 2021, the NSW Government introduced the COVID-*19 Legislation Amendment (Emergency Measures) Bill 2020*, which was subsequently passed by parliament, and came into effect on 25 March 2021. A section of the Bill enabled the extension of the extended working hours until 31 March 2022.

While no further assessment of the environmental impacts is required for these extended working hours, in the event that Transport for NSW would seek to utilise the extended working hours permitted by the Order, advance notification would be provided to the community.

3.4.5 Earthworks

Excavations and earthworks would generally be required for the following:

- construction of lift foundations and lift pit
- construction of lift landing foundations
- construction of canopy foundations
- establishment of new accessible parking spaces
- establishment of new low voltage cable route
- relocation of underground services.

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

Specific locations for spoil placement would be agreed with Transport for NSW and the Contractor during the delivery phase.

It is estimated that approximately 800 cubic metres of spoil would be generated by the Proposal.

3.4.6 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 IS Council Infrastructure Sustainability Rating Scheme (v1.2). Materials would be sourced from local suppliers where practicable. Reuse of existing materials and sourcing recycled materials would be undertaken where practicable. Investigation of materials that have environmental labels (such as an Environmental Product Declaration) would also be considered as part of the detailed design and procurement processes.

3.4.7 Traffic access and vehicle movements

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

- temporary increase in walking distance for rail customers on the station platform during construction work due to placement of construction hoarding and work sites
- increase in walking distance for pedestrians needing to cross the footbridge during construction works involving the footbridge
- increased safety risks for pedestrians and vehicles near Doonside Station as a result of increased construction vehicle movement
- minor disruptions to pedestrian/cyclist movements in and around the station
- a minor increase in traffic on the local road network.

3.4.8 Ancillary facilities

Two temporary construction compounds and three laydown areas would be required to accommodate a site office, amenities, laydown and storage area for materials. Areas for construction compounds/laydown have been proposed (refer Figure 1-2). The areas nominated are on land owned by Blacktown City Council and TAHE. Impacts associated with utilising these areas have been considered in the environmental impact assessment including requirements for rehabilitation.

3.4.9 Public utility adjustments

The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. It is likely some services may require relocation, including power, water and sewer, but such relocation is unlikely to occur outside of the footprint of the work assessed in this REF. In the event that work would be required outside of this footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

3.5 Property acquisition

Transport for NSW does not propose to acquire any property as part of the Proposal.

3.6 Operation and maintenance

The future operation and maintenance of the new station infrastructure, parking and pavement is subject to further discussions with Sydney Trains, Transport for NSW and Blacktown City Council. Infrastructure constructed under this Proposal would be maintained by Sydney Trains. However it is expected that adjacent landscape areas would continue to be maintained by Blacktown City Council

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The (Commonwealth) EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - defined in the EPBC Act as 'matters of 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 or is not likely to have a significant 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

Other Commonwealth legislation applicable to the Proposal is discussed in Table 4-1.

Table 4-1 Other Commonwealth legislation applicable to the Proposal

Applicable legislation	Considerations
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	There is an obligation on a person who discovers anything which he or she has reasonable grounds to suspect are Aboriginal remains to report that discovery to the Minister, giving particulars of the remains and their location. The Proposal does not include any previously identified Aboriginal sites and/or places (refer Section 6.5); however, considerations for unexpected finds further detailed in mitigation measures and applies to this Act.
Disability Discrimination Act 1992	This 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 be designed having regard to the requirements of this Act. The key objective of the Proposal is to improve the accessibility of Doonside Station which is consistent with the objectives of this Act.
Native Title Act 1983	This Act aims to provide for the recognition and protection of Native Title, how Native Title land is used and establishes a mechanism for determining claims to Native Title. There are no pending or approved Native Title claims over the Proposal area.

4.2 NSW legislation and regulations

4.2.1 Transport Administration Act 1988

The *Transport Administration Act 1988* establishes Transport for NSW as a public authority who is to exercise its functions in a manner 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, among other things, the specific objectives of Transport for NSW under the *Transport Administration Act 1988*, including:

2A Objects of Act

…

a) to provide an efficient and accountable framework for the governance of the delivery of transport services,

b) to promote the integration of the transport system,

c) to enable effective planning and delivery of transport infrastructure and services,

d) to facilitate the mobilisation and prioritisation of key resources across the transport sector,

e) to co-ordinate the activities of those engaged in the delivery of transport services,

f) to maintain independent regulatory arrangements for securing the safety of transport services.

2B Common objectives and service delivery priorities of public transport agencies

…

(a) ***Environmental sustainability***

To promote the delivery of transport services in an environmentally sustainable manner.

(b) ***Social benefits***

To contribute to the delivery of social benefits for customers, including greater inclusiveness, accessibility and quality of life.

4.2.2 Environmental Planning and Assessment Act 1979

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

In accordance with section 5.5 of the EP&A Act, Transport for NSW, 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 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 or is likely to have 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 4-2 provides a list of other relevant legislation applicable to the Proposal.

Table 4-2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
Biodiversity Conservation Act 2016 (BC Act) (NSW)	The site does not contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer Section 6.7).
Biosecurity Act 2015 (NSW)	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 Blacktown LGA are identified (refer to Section 6.7).
Contaminated Land Management Act 1997 (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the Department of Planning, Industry and Environment (DPIE), and potentially investigate and remediate land if contamination is above EPA guideline levels. The site has not been declared under the CLM Act as being significantly contaminated (refer Section 6.8).
Crown Lands Act 1987 (NSW)	The Proposal does not involve work on any Crown land.
Disability Discrimination Act 1992 (DDA Act) (Cwlth)	The Proposal would be designed having regard to the requirements of this Act.
Heritage Act 1977 (Heritage Act) (NSW)	• Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted • Sections 139 and 140 (permit) where relics are likely to be exposed • Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted. The Doonside Railway Station Group would be impacted by the Proposal. The Doonside Railway Station Group is listed on the Transport Asset Holding Entity Section 170 Heritage Register. An assessment of the overall impact has been undertaken through a Statement of Heritage Impact (Umwelt, 2021). The results of this assessment are summarised in Section 6.5.
National Parks and Wildlife Act 1974 (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from NSW Environment, Energy and Science (Division of Department of Planning Industry and Environment) (formerly OEH) for the destruction or damage of Aboriginal objects. The Proposal is unlikely to disturb any Aboriginal objects (refer Section 6.4). However, if unexpected archaeological items or items of Aboriginal heritage significance are discovered during the construction of the Proposal, all work would cease and appropriate advice sought.

Applicable legislation	Considerations
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the PoEO Act, Transport for NSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the Construction Environmental Management Plan (CEMP) to be prepared and implemented by the Contractor.
Roads Act 1993 (Roads Act) (NSW)	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for work on unclassified roads. The following roads would be affected by the Proposal: Doonside Road/School Parade, Eastwood Lane, Cross Street and Coghlan Street. Those roads are not classified roads meaning that consent to carry out work over those roads is not required as part of the Proposal. The impacts to those roads have been assessed in Section 6.1.
Sydney Water Act 1994 (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)	Transport for NSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.
Water Management Act 2000 (NSW)	The Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management work, drainage or flood work, controlled activities or aquifer interference.

4.2.4 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

The 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.

Division 15, Clause 79 of the Infrastructure SEPP allows for certain types of development to be carried out by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act). Specifically, Clause 79(1) of the Infrastructure SEPP states that:

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

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

> *(a) 'railway tracks, associated track structures, cuttings, drainage systems, fences, tunnels, ventilation shafts, emergency accessways, bridges, embankments, level crossings and roads, pedestrian and cycleway facilities.'*
>
> *(d) 'railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms'*
>
> *(e) public amenities for commuters*
>
> *(f) associated public transport facilities for railway stations…'*

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

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other agencies prior to the commencement of certain types of development. Section 5.2 of this REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP.

The Infrastructure SEPP prevails over all other environmental planning instruments except where there is an inconsistency with *State Environmental Planning Policy (State Significant Precincts) 2005* or certain provisions of *State Environmental Planning Policy (Coastal Management) 2018*. The Proposal does not require consideration under these SEPPs and therefore do not require further consideration as part of this REF.

State Environmental Planning Policy 55 – Remediation of Land

State Environmental Planning Policy No.55 — Remediation of Land (SEPP 55) provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. While consent for the Proposal is not required, the provisions of SEPP 55 have still been considered in the preparation of this REF.

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

Impacts of contaminated lands and potential remediation are in Section 6.8.

State Environmental Planning Policy 19 – Bushland in Urban Areas

This instrument requires public authorities to not disturb bushland referred to in clause 6(2) unless it has first considered the aims of this instrument.

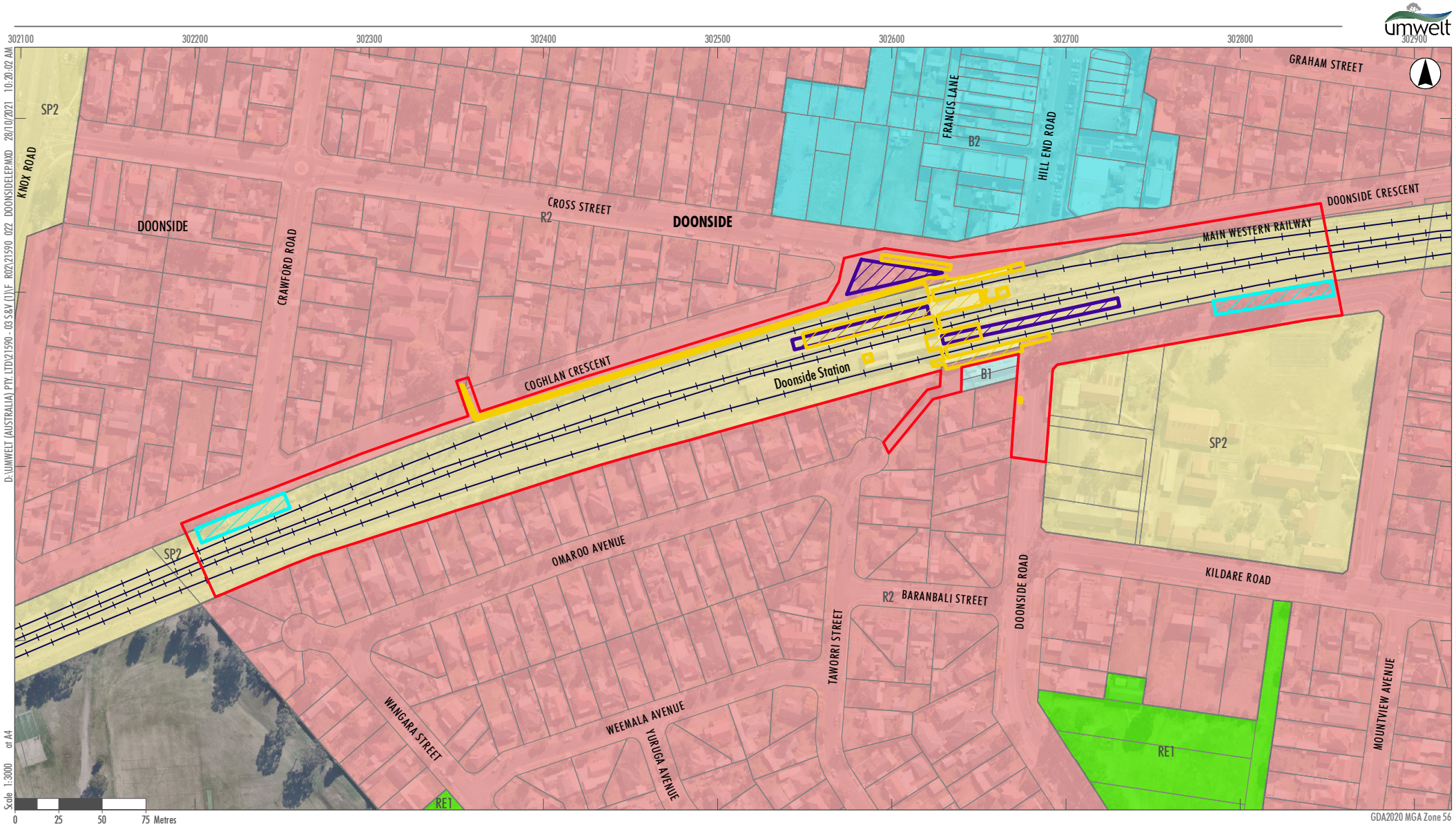
The Blacktown LGA is an LGA that this instrument applies to. The Proposal area is not located within bushland and is not located adjacent to any bushland areas. The REF has considered the general aim of this instrument through an assessment of biodiversity matters relevant to the Proposal.

4.2.5 Blacktown Local Environmental Plan 2015

The Proposal is located within the Blacktown LGA. The Infrastructure SEPP prevails over all other environmental planning instruments (such as LEPs) except where there is an inconsistency with *State Environmental Planning Policy (State Significant Precincts) 2005* or certain provisions of *State Environmental Planning Policy (Coastal Management) 2018.* During the preparation of this REF, the provisions of *Blacktown Local Environmental Plan 2015* were considered (refer Table 4-3).

Table 4-3 Relevant provisions of the Blacktown LEP

Provision description	Relevance to the Proposal
Clause 2.3 – Zone objectives and land use table	The Proposal area is located on land zoned as: • SP2 Infrastructure (Rail) for the works associated with the lifts, station platform and station buildings • R2 Low density residential for the works associated with interchanges, pedestrian crossing, power upgrades external to the station The objectives of the applicable land use zones are as follows: • SP2 Infrastructure (Rail) – provide for infrastructure and related uses, prevent development that is not compatible with or may detract from the provision of infrastructure and not have an adverse impact on the form and scale of the surrounding neighbourhood. • R2 Low density residential – provide for the housing needs of the community within a low density residential environment, enable other land uses that provide facilities or services to meet the day to day needs of residents and enable certain activities to be carried out within this zone that do not adversely affect the amenity of the neighbourhood. The Proposal is consistent with the objectives of the SP2 land zone as it involves the addition of new infrastructure components to existing railway infrastructure in a manner that would not adversely impact the form and scale of the surrounding neighbourhood in the operational phase. The Proposal would ordinarily be a prohibited development within the R2 land zone, if not for the operation of the Infrastructure SEPP. However, the Proposal is generally consistent with the objectives of this zone as it would not be a development that would adversely affect the amenity of the neighbourhood. In addition, the Proposal would provide much needed lifts and other accessibility upgrades to an existing railway station, supporting the diverse access needs of the surrounding community. Refer to Figure 4-1, which shows the Proposal in the context of surrounding land use zones.
Clause 5.10 – Heritage Conservation	Clause 5.10 of the Blacktown LEP provides for the protection of items, conservation areas, archaeological sites, Aboriginal objects and Aboriginal places of heritage significance within the Blacktown LGA. Heritage items listed on the Blacktown LEP as having heritage significance nearby the Proposal include: • Doonside Railway Station (Item I22) – located within the Proposal area. An assessment of impacts to the heritage significance of Doonside Railway Station is located in Section 6.5. The overall impact is considered to be moderate.



Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- Railway Line

Zoning

- B1 Neighbourhood Centre
- B2 Local Centre
- R2 Low Density Residential
- RE1 Public Recreation
- SP2 Infrastructure

FIGURE 4-1

Blacktown LEP Zoning Map

Image Source: Nearmap (Jun 2021) Data source: NSW DFSI (2020)

4.3 Ecologically sustainable development

Transport for NSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of 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 Transport for NSW throughout the development and assessment of the Doonside Station Upgrade. Section 3.3.3 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5 Community and stakeholder consultation

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

5.1 Stakeholder consultation during concept design

Key stakeholders for the Proposal, comprising Transport for NSW, Sydney Trains, NSW Police Force and Blacktown City Council, were engaged in the development of the design to provide input into the station's deficiencies and future development and growth plans. In addition, relevant stakeholders participated in the development and assessment of the station improvement options.

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

- Meeting with Steven Bali MP, Member for Blacktown
- Meeting with Blacktown City Council
- Safety workshop with Sydney Trains and the NSW Police Force.

5.2 Consultation requirements under the Infrastructure SEPP

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

Table 5-1 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Table 5-1 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 | Consultation with Councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility.	The Proposal includes work that would: • require connections or impacts the stormwater system • disrupt pedestrian and vehicle movements • impact on road pavements under Council's care and control • impact on Council-operated footpaths. Consultation with Blacktown City Council has been ongoing throughout the initial development of the Proposal, and would continue throughout the detailed design and construction phases.
Clause 14 | Consultation with Councils – development with impacts on local heritage	Where railway station work: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area.	Doonside Railway Station is listed under the Blacktown LEP as a heritage item. Consultation with Blacktown City Council would be undertaken as part of the planning approvals process. Refer to Section 6.5 for an assessment of impacts on the Doonside Railway Station Group.
Clause 15 | Consultation with Councils – development with impacts on flood liable land	Where railway station work: • impact on land that is susceptible to flooding – reference would be made to *Floodplain Development Manual: the management of flood liable land.*	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.9 for a discussion of impacts to hydrology and water conditions.
Clause 15A Consultation with Councils – development with impacts on certain land within the coastal zone	Where railway station work: impact on land within a coastal vulnerability area and is inconsistent with certified coastal management program that applies to that land	The Proposal is not located on land within the coastal zone. Accordingly, consultation with Council is not required in regard to this aspect.
Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land	Where railway station work: impact on flood liable land -written notice must be given (together with a scope of work) to the State Emergency Services and taken into consideration any response to the notice received from the State Emergency Service within 21 days after the notice is given.	The Proposal is not located flood liable land. Accordingly, consultation with the State Emergency Service is not required in regard to this aspect.

Clause	Clause particulars	Relevance to the Proposal
Clause 16 | Consultation with public authorities other than Councils	For *specified development* which includes consultation with the DPIE for development that is undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974*, and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies Transport for NSW may consult with could include: • Sydney Trains • NSW Train Link • DPIE.	The Proposal is not located adjacent to land reserved under the *National Parks and Wildlife Act 1974*. Accordingly, consultation with the DPIE on this matter is not required. The Proposal is not considered to be specified development under Clause 16 of the Infrastructure SEPP. Consultation with Sydney Trains has occurred throughout the optioneering and scoping design process and would continue during detailed design of the Proposal.

5.3 Consultation strategy

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

The objectives of the consultation strategy are to:

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

5.4 Public display

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

- installation of information signage at the station with QR codes taking customers to the project webpage
- public display of the REF on the project webpage
- distribution of a project update at the station to rail customers, and to local community , outlining the Proposal and inviting feedback on the REF

- advertisement of the REF public display in local newspapers and on the Transport for NSW Facebook page with a link to the Transport for NSW website that includes a summary of the Proposal and information on how to provide feedback
- consultation with Blacktown City Council, Sydney Trains, NSW Trains and other non-community stakeholders.

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

Under normal circumstances Transport for NSW would hold community information sessions at the station. Due to COVID-19 social distancing measures, this is not possible. The REF would be available on the TfNSW website[1]. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email[2].

Feedback can be submitted via:

- Project hotline on 1800 684 490
- Email on projects@transport.nsw.gov.au
- Website by visiting transport.nsw.gov.au/doonside
- Mail addressed to: Transport Access Program – Doonside Station Upgrade, Director Environment and Sustainability (Rail Development and Delivery)
    - Address:18 Lee Street, Chippendale NSW 2008
      PO Box K659, Haymarket NSW 1240
- The NSW Have Your Say website on https://www.nsw.gov.au/have-your-say/doonsidestationupgrade

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

5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around Doonside Station) plus a 200 metre radius, on 10 September 2021. The search did not identify any Aboriginal sites or places.

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

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

5.6 Ongoing consultation

At the conclusion of the public display period for this REF, Transport for NSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by Transport for NSW before determining whether to proceed with the Proposal (refer Figure ES.1-2).

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

Should Transport for NSW determine to proceed with the Proposal, the project team would keep the community, councils and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of 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 undertaken by Turnbull Engineering in September 2021 (Turnbull Engineering, 2021) to support this Proposal. The following sections assess the potential impacts to road and rail users during the construction and operation stages of the Proposal and provide mitigation measures to reduce these impacts.

6.1.1 Existing environment

Site Context

Doonside Station is located in the suburb of Doonside bordered by the suburbs of Blacktown, Bungarribee, Rooty Hill and Quakers Hill. The Proposal area consists of Eastwood Lane, School Parade between Doonside Road and Nyleta Street, and Doonside Road up to the existing bus stop north of Kildare Road on the south side of the rail line. North of the rail line, the Proposal includes Doonside Crescent west of Graham Street, Coghlan Crescent adjacent to the rail line, and Cross Street up to the vacant land on 5-11 Cross Street.

Road Network

Doonside Station is surrounded by local roads including School Parade, Doonside Road, Doonside Crescent, Cross Street and Coghlan Crescent. These roads have a sign-posted speed limit of 50 km/hr, with a 40 km/hr school zone in operation during school periods on School Parade and Doonside Road. The majority of surrounding roads of the station provide a single traffic lane in each direction.

The station is accessible from Cross Street and Doonside Crescent on the north side of the station, or from School Parade and Doonside Road on the south side of the station.

Car Parking

There are two commuter car parks located north and south of Doonside Station:

- Northern car park - off-street parking facility accessible from Cross Street, Francis Lane or Graham Street providing approximately 124 parking spaces, including two accessible parking spaces and seven time-restricted (2 hour (2P)) parking spaces
- Southern car park - provides 90-degree angle parking along the northern side of School Parade, with approximately 30 long-term parking spaces.

A number of short-term (1P and 2P) on-street parking spaces are also available north of the station along Doonside Crescent and Hill End Road and south of the station along Doonside Road and School Parade near the station entrance.

Public Transport

Rail

Doonside Station services the T1 Western Line. Platforms 1 and 2 serve eastbound train services towards Hornsby via Central and Chatswood and Platforms 3 and 4 serve westbound train services towards Penrith or Emu Plains.

Bus

Three bus routes currently operate in the vicinity of Doonside Station and include the following:

- Bus route 753 – Blacktown to Doonside (Loop Service), operated by Busways
- Bus route 726 – Blacktown to Doonside via Monash Road (Loop Service), operated by Busways
- Bus route N70 – Penrith to City Town Hall (Night Service), operated by Hillsbus.

Several bus stops serve Doonside Station and are located on School Parade and Doonside Road to the south of the station, and on Cross Street, Doonside Crescent and Hill End Road to the north of the station.

Bus stops to the south of the station provide seating and shelter for customers, however, seating and shelter are not provided at the bus stops to the north of the station.

Active Transport

Pedestrian Network

The platforms are accessible via stairs which connect to a pedestrian footbridge. The ramps on Cross Street and Doonside Crescent (north side of the station) and School Parade and Doonside Road (south side of the station), connect to the pedestrian footbridge, allowing access from both sides of the station. Footpaths and pedestrian crossings are provided on either side of the station, linking the parking areas to the station entrance ramps.

Paved footpaths are provided on both sides of the road on Cross Street, Hill End Road, Doonside Road and Kildare Road and on one side of the road on Coghlan Crescent, Doonside Crescent and School Parade.

Cycle Network

The cycle network in the vicinity of Doonside Station is limited. It consists of a shared path on the southern side of Cross Street, western side of Knox Road and western side of Doonside Road south of Kareela Street. A bicycle locker that can accommodate two bicycles is available approximately 200 metres east of the station on the northern side of School Parade.

Interchange Facilities

Kiss and Ride Zones

Kiss and ride zones are located on the southern side of Cross Street between the station entrance and Coghlan Crescent and on the southern side of Doonside Crescent near Hill End Road with each zone accommodating three vehicles.

Taxi Zone

A taxi zone is located on the southern side of Cross Street, approximately 15 metres west of the station entrance and adjacent to the kiss and ride zone, with space for up to three vehicles.

6.1.2 Potential impacts

a) Construction phase

Traffic

Up to 25 light vehicles and 15 heavy vehicles per day are anticipated to access the construction compounds during the typical construction period. During scheduled rail shutdowns, the number of construction vehicles may increase slightly. Given that the number of construction vehicles would be low and would fall within the range of daily variation in traffic volumes on the road network when compared to background traffic, impacts on the road network are anticipated to be minor.

Temporary full or partial closure of sections of Cross Street, School Parade and Doonside Road may be required to facilitate works such as crane lifts, modifications to aerials, concrete pours and earthworks. If required, appropriate detour routes and/or other traffic management arrangements would be implemented. Suitable roads that could form part of a detour route include Hill End Road, Graham Street and Kildare Road. Temporary road closures would result in a minor increase in travel time for vehicles travelling on a detour route. Therefore, overall road network impacts are anticipated to be minor given the availability of alternative roads that provide similar connectivity, and the temporary short-term nature of the closures.

Haulage Routes

Potential haulage routes that could be used by construction vehicles travelling to and from the construction compounds and laydown areas are shown in Figure 6-1.

It is recommended that construction vehicles travel via Knox Road, Cross Street and Crawford Road to access the construction compound and laydown areas on the north side of the rail line, and via Eastern Road, Doonside Road and School Parade to access construction compound and laydown areas on the south side of the rail line. School zones are currently in operation on Doonside Road and School Parade. Therefore, to minimise road network and safety impacts, use of the proposed construction compound on School Parade should be limited to hours outside of the school zone hours.

The proposed haulage routes are subject to swept path analyses and the largest vehicle that the construction compound and laydown areas can accommodate. The final construction haulage routes would be determined by the nominated construction contractor during detailed design of the Proposal. A Construction Traffic Management Plan (CTMP) would also be prepared and used to inform truck drivers of the designated haulage routes to and from the construction compound and laydown areas.

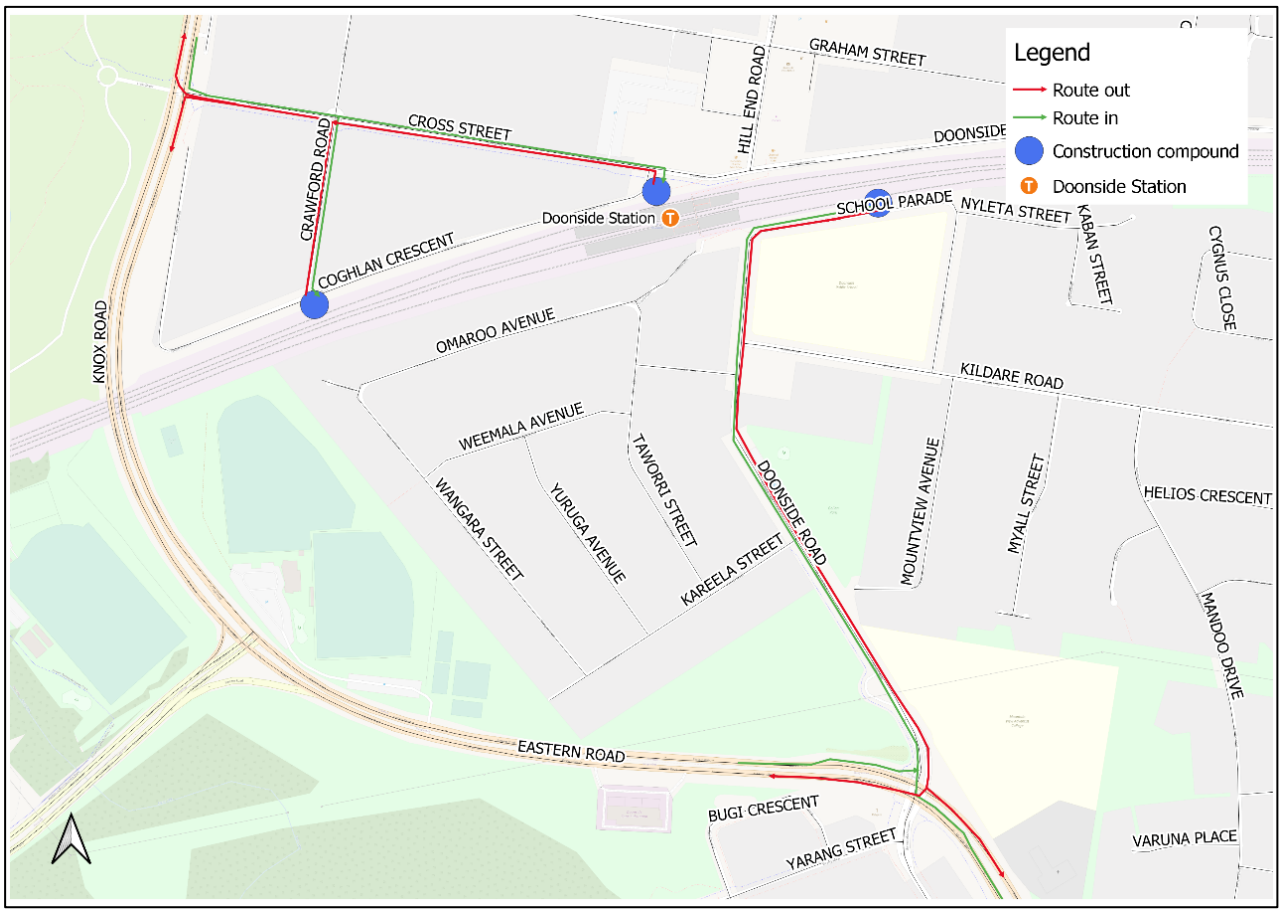


Figure 6-1 Potential Haulage Routes

Emergency vehicle access

Access for emergency vehicles during construction would be maintained in accordance with emergency vehicle requirements. Emergency services would be advised of any planned changes to the road network prior to their implementation. This would include information about upcoming lane closures, traffic disruptions, anticipated delays to traffic, extended times of work and locations of any road possessions.

Parking

Up to 74 car parking spaces may be closed for short durations throughout construction at various times, with the majority consisting of commuter car parking spaces on School Parade to facilitate works such as crane lifts, modification to aerials, concrete pours and earthworks. Alternative parking options for commuters during construction could include:

- parking on local roads where on-street parking is available
- catching public transport from another station
- parking at other car parks including the commuter car park on Cross Street.

Most works that would require the closure of parking spaces at various times would occur during scheduled rail shutdowns where public transport on trains would be unavailable. Demand for parking during those times is expected to be low, therefore the removal of spaces at various times during the construction phases would have a low impact.

Other alternative parking measures and controls to offset the loss of parking during construction of the Proposal would be considered in consultation with Blacktown City Council, prior to construction commencing.

Public Transport

Bus

Up to four bus stops may be temporarily relocated during construction to facilitate works such as crane lifts, modifications to aerials, concrete pours, replacement of roofing and earthworks and include:

- the bus stop on the northern side of Cross Street, west of Coghlan Crescent
- the bus stop on the southern side of Cross Street, east of Coghlan Crescent
- the bus stop on the eastern side of Doonside Road, north of Kildare Road
- the train replacement bus stop on the northern side of School Parade, east of Doonside Road.

If required, these bus stops would be temporarily moved to a location that is in close proximity to their current location. This may result in a minor impact to bus customers due to a potential increase in travel distance.

All bus route and stop changes would be assessed by the Transport for NSW Customer Journey Planning team and made in consultation with the relevant bus operator prior to implementation. Signage would also be in place and communicated to bus customers in advance of any changes.

Active Transport

Pedestrian Network

Access to and from Doonside Station would be maintained throughout construction, except during scheduled routine rail shutdowns when the footbridge may be fully closed to pedestrians at times. Where possible, pedestrian access over the rail line via the footbridge would be provided during rail shutdowns. When this is not possible, an alternate route would be provided which would result in additional travel distance of up to two kilometres (refer Figure 6-2). Given the substantial increase in travel time for these trips, mitigation measures would be required to reduce the anticipated impact.

As a result of the construction laydown area within the open space/seating area at the corner of Cross Street and Coghlan Crescent, the footpath that passes directly through that area would be unavailable during construction. Pedestrians would be required to walk around the open space/seating area via the footpath on Coghlan Crescent and Cross Street. This would result in an increase of approximately 13 metres to walk and would be a less direct route. This is considered to be a minor impact due to the small increase in walking distance.

Eastwood Lane would be temporarily closed during scheduled rail shutdowns while partial closures may also occur throughout the overall construction phase. Access to residents would be maintained at all times during construction, with appropriate traffic and pedestrian control measures in place. Footpaths on Illoura Place, Taworri Street, Baranbali Street and Doonside Road would be maintained to provide access to the station for residents who would ordinarily use Eastwood Lane as a thoroughfare. If further temporary closure of a pedestrian paths are required during the construction, footpaths on the other side of the road would remain open maintaining connectivity. Where there is no footpath present on the opposite side of the road, signage would be in place to direct pedestrians along detour routes.

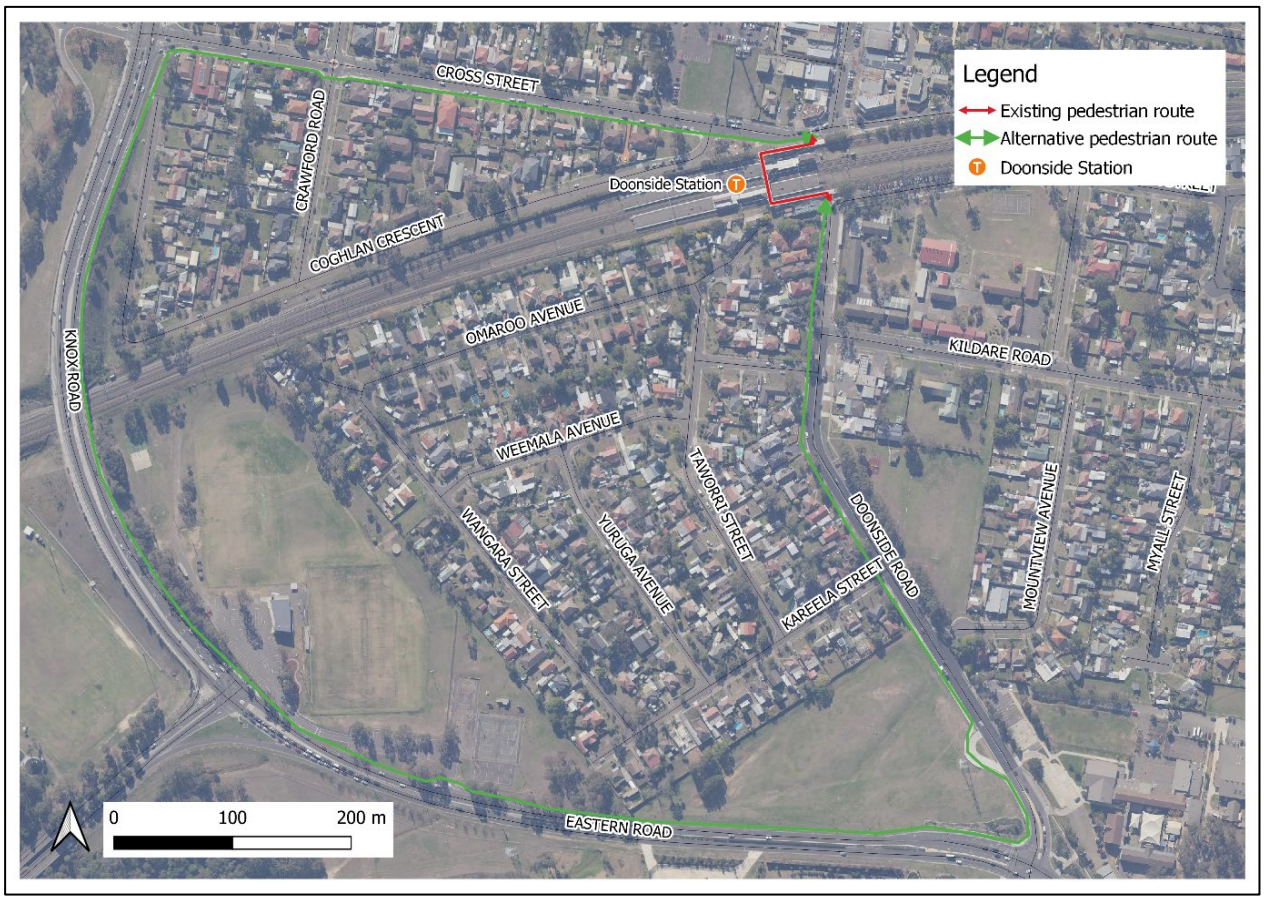


Figure 6-2 Alternative pedestrian route during closures of the footbridge at Doonside Station

Cyclist Network

Impacts on cyclists are anticipated to be minimal and limited to cyclists potentially interacting with a low number of construction vehicles. There would be no closures of existing cycle paths around Doonside Station. The existing bicycle locker would not be affected by the Proposal.

Interchange Facilities

Temporary closure of the taxi zone on the southern side of Cross Street and kiss and ride zones on the southern side of Cross Street and Doonside Crescent may be required during construction. Consultation would be undertaken with the NSW Taxi Council regarding any temporary changes to the taxi zone. Impacts are anticipated to be minor given the temporary nature of the closures and the availability of nearby time-restricted parking spaces.

b) Operational phase

Road Network

The Proposal would provide a higher level of station accessibility and usability attracting more customers using the station. This could lead to a marginal increase in traffic on roads near the station however it is anticipated to have little effect on the surrounding road network.

Parking

No impacts on the commuter car parks are anticipated during operation of the Proposal.

The Proposal would provide two accessible parking spaces on the southern side of Cross Street near the northern station entrance, and one accessible parking space on the western side of Doonside Road near the southern station entrance.

The addition of the accessible parking space on Doonside Road would result in the loss of one 30 minute parking space, while the addition of two accessible parking spaces on Cross Street would result in the loss of one taxi space. The addition of accessible parking spaces would make Doonside Station a more inclusive and accessible railway station and has an overall minor positive impact.

Public Transport

No impacts to the existing bus network and train services are expected during operation of the Proposal.

Active Transport

Pedestrian Network

The Proposal would improve pedestrian accessibility given the addition of facilities such as four new lifts and new canopies for weather protection. Overall station accessibility would improve, particularly for customers with mobility restrictions, parents/carers with prams, and customers with luggage.

The proposed repaving and landscaping of the laneway between Eastwood Lane and Doonside Road would provide an easier connection between the pedestrian network and Doonside Station by eliminating trip hazards and enhancing the public domain.

Cycle Network

New bicycle parking facilities would be provided at the southern station entrance and three new bicycle racks would be provided near the northern station entrance, improving cyclist amenity and accessibility.

Interchange Facilities

The existing kiss and ride and taxi zones located on the southern side of Cross Street between Coghlan Crescent and Hill End Road would be reduced from three to two vehicle spaces for the kiss and ride zone and one space for taxis. Impacts are anticipated to be minor given the low number of spaces lost and the availability of nearby time-restricted parking spaces.

Safety

The Proposal would improve pedestrian safety through the upgrade of existing footpaths and the provision of lifts at each platform. New canopies on both of the platforms would provide additional shelter for customers. Furthermore, the provision of four new accessible parking spaces on Cross Street and School Parade would improve accessibility and safety for people with disabilities and/or less mobility.

6.1.3 Mitigation measures

The following mitigation measures are proposed to manage the potential traffic and transport impacts of the Proposal:

- prior to the commencement of construction, a CTMP would be prepared as part of the CEMP and in accordance with relevant guidelines. The CTMP would outline how construction of the Proposal would avoid, mitigate and manage risks involving construction activities, users of the traffic and transport network and local residents. The CTMP would include at a minimum, procedures for:
    - 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
    - identifying parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
    - identifying routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
    - managing relocation of kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired
    - managing 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.
- 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
- 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 work
- Road Occupancy Licences for temporary road closures would be obtained, where required
- investigation into alternative parking arrangements would be carried out in consultation with Blacktown City Council prior to the commencement of construction
- construction workers would be encouraged to carpool or use other forms of transport to travel to and from the construction compounds, to minimise parking impacts on commuters, residents and the general public
- suitable information would be provided to affected bus customers if bus stops on Cross Street, Doonside Road and School Parade are relocated during construction, and would include advanced notification and appropriate signage to alternative bus stops
- a drive-through assessment or swept path analysis would be carried out to ensure that sufficient manoeuvring space is provided for the largest design vehicle along the proposed haulage routes
- Traffic Guidance Schemes (TGSs) would be developed for construction works that require lane closures such as on Cross Street, Doonside Road or School Parade. TGS implementation would ensure adequate warning and guidance is provided to road users, minimising road related traffic impacts
- access between Doonside Station and the transport network would be maintained during typical construction periods outside of rail shutdown periods
- directional signage and/or linemarking would be used to direct and guide drivers, cyclists and pedestrians past the construction compound and laydown areas and on the surrounding road network
- deliveries to the proposed construction compound on School Parade would be limited to hours outside of the operation of the school zone

- suitable information would be provided to affected pedestrians during scheduled closures of the Doonside Station footbridge including advanced notification and appropriate wayfinding and directional signage along detour routes
- alternative transport options for affected pedestrians due to the closure of the Doonside Station footbridge would be considered in consultation with Blacktown City Council. For example:
    - offering of a shuttle service between the northern and southern sides of Doonside Station
- signage would be provided to redirect impacted users to alternative facilities if existing kiss and ride or taxi zones are temporarily closed.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

A Landscape and Visual Impact Assessment (LVIA) was undertaken for the Proposal (Envisage, 2021). The assessment included a desktop review, site visit (26 August 2021), landscape character assessment, visual impact assessment and preparation of photomontages. The photomontages provide an indication of what the Proposal would look like from key viewpoints upon completion.

The method for the LVIA was developed with reference to Transport for NSW's *Guideline for Landscape Character and Visual Impact Assessment, Environmental Impact Assessment Practice Note EIA-N04, 2020* (the LVIA Guideline).

Two assessments are presented in the LVIA Guideline to improve design outcomes:

- landscape character assessment - the assessment of impact on the aggregate of an area's built, natural and cultural character or sense of place – which helps determine the overall impact of a project on an area's character and sense of place.
- visual impact assessment - the assessment of impact on views - which helps define the day to day visual effects of a project on people's views.

The method used to measure impact is based on the combination of sensitivity of the existing area or view to change, and magnitude of the Proposal on that area or view. These terms are defined in the LVIA Guideline as:

- sensitivity: refer to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to the proposed nature of change
- magnitude: refer to the physical scale of a project, how distant it is and the contrast it presents to the existing condition.

The combination of sensitivity and magnitude provide the rating of the landscape character impact for a project, or visual impact for individual viewpoints (refer Table 6-1).

Table 6-1 Landscape Character and Visual Impact Rating Matric (impact levels in italics)

		Magnitude (of change)			
		High	**Moderate**	**Low**	**Negligible**
Sensitivity (to change)	**High**	*High*	*High-Moderate*	*Moderate*	*Negligible*
	Moderate	*High-Moderate*	*Moderate*	*Moderate-low*	*Negligible*
	Low	*Moderate*	*Moderate-low*	*Low*	*Negligible*
	Negligible	*Negligible*	*Negligible*	*Negligible*	*Negligible*

6.2.1 Existing environment

Landscape character

The landscape character of Doonside Station and its surroundings has an urban form with a local neighbourhood scale, dominated by detached housing, a flat landform and low to moderate tree cover. There are no distinctive landscape cultural elements, or outstanding features of scenic value. The station provides the only visible heritage elements. The large trees near the station contribute to local amenity and character.

Visual context

Doonside Station has a limited viewshed or area of visibility, as it is only visible from the nearest urban area to a maximum distance of about 250 metres. The extent of visibility includes the surrounding residential area, Doonside shopping area, Doonside Public School and local streets on the southern and northern sides.

Four public and private viewpoints (VPs) have been identified within the viewshed as potentially sensitive to visual change. Those viewpoints and their sensitivity to change are identified in Table 6-2.

Table 6-2 Viewpoints

Visual receptor	Description	Sensitivity to change
VP1: School Parade (Figure 6-3)	This viewpoint represents public views available from School Parade in the vicinity of the southern station access	The sensitivity of this viewpoint is rated as moderate as: • this is a public viewpoint with a high number of users, being one of two main access points to Doonside Station which links to the Doonside shopping area, with a local general store nearby, a large bus stop across the street and Doonside Public School just east along School Parade • the viewpoint is, however, within an urban area near Doonside Station, with the station, railway line, footbridge and ramps already dominating this view • the large native trees along the railway side, and the prominent Canary Island Date Palm that visually marks the community hub around the general store, are particularly important landscape elements in the view.
VP2: Cross Street (Figure 6-4)	This viewpoint represents views available from Cross Street and the house at this location (3 Cross Street). The viewpoint location is along the pathway from the nearby commuter car park and across the street from two small public parks. The viewpoint represents public views from the street and parks, and private views from the resident.	The sensitivity of this viewpoint is rated as low as: • the view is available to a relatively small number of public viewers (street users in the vicinity of Doonside Station and west of the shopping area), and from the front of one nearby resident (3 Cross Street) • the viewpoint is within an urban area near Doonside Station, with the railway line, station footbridge and ramps already dominating this view • there are no large trees within the view likely to be affected.

Visual receptor	Description	Sensitivity to change
VP3: Doonside shopping area (Figure 6-5)	This viewpoint represents public views from Doonside shopping area on the northern side of Doonside Station.	The sensitivity of this viewpoint is rated as low as: • there would be public views from street users in the vicinity of Doonside's shopping area and station, which has a relatively high number of viewers • however, the view is not scenic – being dominated by Doonside Station (station buildings, railway line, station footbridge and ramps) and road infrastructure, including overhead utilities and signage • there are no large trees within the view likely to be affected.
VP4: Eastwood Lane (Figure 6-6)	This viewpoint represents private views from a number of houses in the vicinity of Eastwood Lane, including the nearest two residences, both single storey – 3 Eastwood Lane and 4 Eastwood Lane.	The sensitivity of this viewpoint is rated as moderate as: • existing views are from two nearby single storey houses which both have very close and clear views of the station • views are not scenic and are dominated by the existing Doonside Station, with the railway line, station footbridge and ramps occupying a large proportion of the view • station users have a direct view to the two houses whilst on the nearest part of the footbridge and ramp, as well as the nearest platform stairs (Platforms 3 and 4) • the residential and permanent nature of these viewpoints reflects the moderate sensitivity to change rating.

The locations of each viewpoint and area of visibility of the station are shown on Figure 6-7.

Figure 6-3 VP1 – Existing view

Figure 6-4 VP2 – Existing view

Figure 6-5 VP3 – Existing view

Figure 6-6 VP4 – Existing view

Figure 6-7 Approximate visibility and main viewpoints

6.2.2 Potential impacts

a) Construction phase

Landscape character

Sensitivity to change has been assessed as moderate due to:

- the highly urban nature of the area surrounding Doonside Station, and the absence of landscape or cultural elements of note (apart from the station buildings), would generally have a low sensitivity to the type and scale of the proposed visual change
- however, due to a large Canary Island Date Palm and a number of large Eucalypts near the near the southern side of the station, a sensitivity rating of moderate has been given.

During construction, the Proposal would have a temporary, moderate magnitude of change on landscape character as:

- construction activities would affect a relatively large proportion of the station, and the appearance of construction machinery, fencing and periodic use of tall, moving cranes would contrast somewhat with the surrounding area and character
- a number of small construction compounds and laydown areas would be close to the railway corridor along Coghlan Crescent, Cross Street and School Parade, affecting local suburban character.

Visual impact

Visual impacts during construction of the Proposal are detailed below in Table 6-3.

Table 6-3 Visual impacts during construction

Visual receptor	Magnitude of change	Overall impact level
VP1: School Parade	The magnitude of change during the temporary construction period is rated as moderate as: • views of construction activities would be within 50 metres, including construction of the lifts • temporary security fencing would be seen as well as large machinery such as cranes at times • the small construction compound along School Parade would be visible.	**Moderate**
VP2: Cross Street	The magnitude of change during the temporary construction period is rated as moderate as: • views of some of the construction activities would be within 50 metres and construction of some of the lifts would be visible. Temporary security fencing would be seen as well as large machinery such as cranes at times • the small laydown area within the parkland at the corner of Cross Street and Coghlan Crescent (owned by Blacktown City Council) would be clearly seen from this viewpoint yet is small in scale • there may be some nightwork during which lights would be in operation, however, lights would be directed toward the work and away from residents.	**Moderate - low**

Visual receptor	Magnitude of change	Overall impact level
VP3: Doonside shopping area	The magnitude of change during the temporary construction period is rated as moderate as: • views of some of the construction activities would be within 50 metres and construction of some of the lifts would be visible. Temporary security fencing would be seen as well as large machinery such as cranes at times • the small laydown area within the parkland at the corner of Cross Street and Coghlan Crescent would be seen from this viewpoint yet is small in scale.	**Moderate - low**
VP4: Eastwood Lane	The magnitude of change during the temporary construction period is rated as moderate as: • views of some of the construction activities would be within 20 metres, and construction of Lift 4 would be in close view • temporary security fencing would be visible at close proximity, between the viewer and the station • there would be close views of large machinery such as cranes at times • there may be some nightwork during which lights would be in operation, however, lights would be directed toward the work and away from residents.	**Moderate**

b) Operational phase

Landscape character

During operation, the Proposal would have a low magnitude of change as:

- the main visible built changes to the station fabric would be relatively minor and compatible in form and scale, resulting primarily in four new lifts, a new set of stairs on the eastern side of Platform(replacing removed stairs on western side of that platform), some small additional canopies, new roof sheeting on the ramps, footbridge and existing Platforms 1 and 2 stairs.
- the noticeable built changes around the station would be small – on the southern side there would be upgraded paving, and some changes to the parking and kiss and ride facilities. On the northern side a new path would be constructed to service the lift on Cross Street.

Visual impact

Visual impacts during the operational phase of the Proposal are detailed below in Table 6-4. Photomontages showing changes to views at VP1 and VP2 are shown in Figure 6-8 and Figure 6-9.

Table 6-4 Visual impacts during operation

Visual receptor	Magnitude of change	Overall impact level
VP1: School Parade (Figure 6-3)	The magnitude of change at operation is rated as moderate as: • the main new built elements within the view would be the tops of at least three of the new lift shafts which would be visible above the footbridge roof (on the furthest side), upgraded paving in front of, and to the side of the general store, and new roof sheeting on the ramps, and some views of the new stairs and canopies on the nearest platform • overall, the built form of the Proposal would represent a minor change and be generally compatible in form and scale with the existing view.	**Moderate-low**
VP2: Cross Street (Figure 6-4)	The magnitude of change at operation is rated as low as: • the main change to the view would be the addition of the nearest lift on Cross Street and the lift entry at street level. Two small trees would require removal for the lift and landing area • the tops of the remaining three lifts would also be seen in the background • changes on the station platforms and new stairs would be difficult to see due to existing vegetation and fencing • overall, the Proposal would result in a minor change and be generally compatible in form and scale with the existing view.	**Low**
VP3: Doonside shopping area (Figure 6-5)	The magnitude of change at operation is rated as low as: • the main change to the view would be addition of the nearest lift and lift entry on Cross Street and new roof sheeting on the nearest ramp • the top of at least one more lift would also be seen in the background behind the footbridge • changes on the station platforms would be difficult to see due to existing vegetation, station buildings and fencing • overall, the Proposal would represent a minor change and be generally compatible in form and scale with the existing view.	**Low**
VP4: Eastwood Lane (Figure 6-6)	The magnitude of change at operation is rated as moderate-low as: • the main change seen from these viewpoints would be elevated, close views of Lift 4 at the nearest corner of the footbridge and ramp, and removal of the stairs on the western side of the footbridge (on the closest station platform, Platforms 3 and 4 which would reduce some of the direct overlooking of 3 Eastwood Lane that currently occurs when station users descend those stairs)	**Moderate – low**

Visual receptor	Magnitude of change	Overall impact level
	• at ground level the existing security fencing at the western end of Eastwood Lane would be removed to create a pathway from the lift through to School Parade, with the existing section to be upgraded with new paving • overall, the Proposal would improve the view from these two nearest residences.	

Figure 6-8 Likely view of Doonside Station from VP1 once constructed (subject to detailed design)

Figure 6-9 Likely view of Doonside Station from VP2 once constructed (subject to detailed design)

6.2.3 Mitigation measures

The following mitigation measures are proposed to manage the potential landscape character and visual impacts of the Proposal:

- an UDLP for the Proposal shall be prepared and submitted to Transport for NSW for endorsement by the Precincts and Urban Design Team. The UDLP is to address the fundamental design principles as outlined in 'Around the Tracks' – urban design for heavy and light rail (TfNSW, Interim 2016). At a minimum, the UDLP shall:
    - demonstrate a robust understanding of the Project 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 CPTED Principles.
- the UDLP is to include the Public Domain Plan for the chosen option and shall provide analysis of the:
    - 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.

- the following design guidelines are available to assist and inform the UDLP for the Project:
    - *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 Guideline SD-106* (TfNSW, 2017).
- the UDLP shall be:
    - prepared in consultation with councils and relevant stakeholders
    - prepared by a registered architect and/or landscape architect
    - prepared to inform/support the concept design and submitted to TfNSW for review at this design milestone
    - finalised and submitted to TfNSW at the completion of design documentation.
- all permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting*
- the detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles
- worksite compounds and laydown areas would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations
- temporary hoardings, barriers, traffic management and signage would be removed when no longer required
- during construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements
- options to reduce different fence types and 'doubling up' of fences on the footbridge would be investigated
- the use of dark coloured fencing would be investigated during detailed design
- the final colour scheme would be chosen to complement the existing blue balustrading on the ramps and footbridge opportunities to provide additional public seating around the southern access to improve amenity for station users and the general public would be investigated

Refer to Table 7-1 for a list of proposed mitigation measures.

6.3 Noise and vibration

This chapter provides a summary of the *Noise and Vibration Impact Statement – Doonside Station Upgrade* prepared by Umwelt (2021a).

6.3.1 Existing environment

Background Noise Levels

Due to COVID-19 lockdowns and travel restrictions between LGA, noise monitoring fieldwork was not undertaken as part of this assessment and typical ambient and background noise levels representative of 'urban residential' receivers were adopted for the Proposal area.

These values were determined by reviewing the existing land uses and zoning within the vicinity of the Proposal area. Based on this review, noise management levels were derived for the Proposal based on the adoption of typically conservative background noise levels sourced from Table 2.3 of the NSW EPA's *Noise Policy for Industry* (NPfI) (EPA, 2017), representative to that of the 'Urban residential' LEP zoned land-use receiver categories.

'Urban residential' receiver category is an area with an acoustical environment that has any combination of being dominated by:

- 'urban hum' (the aggregate sound of many unidentifiable, mostly road/rail traffic and/or industrial related sound sources)
- industrial source noise
- through-traffic with characteristically heavy and continuous traffic flows during peak periods
- near commercial districts or industrial districts.

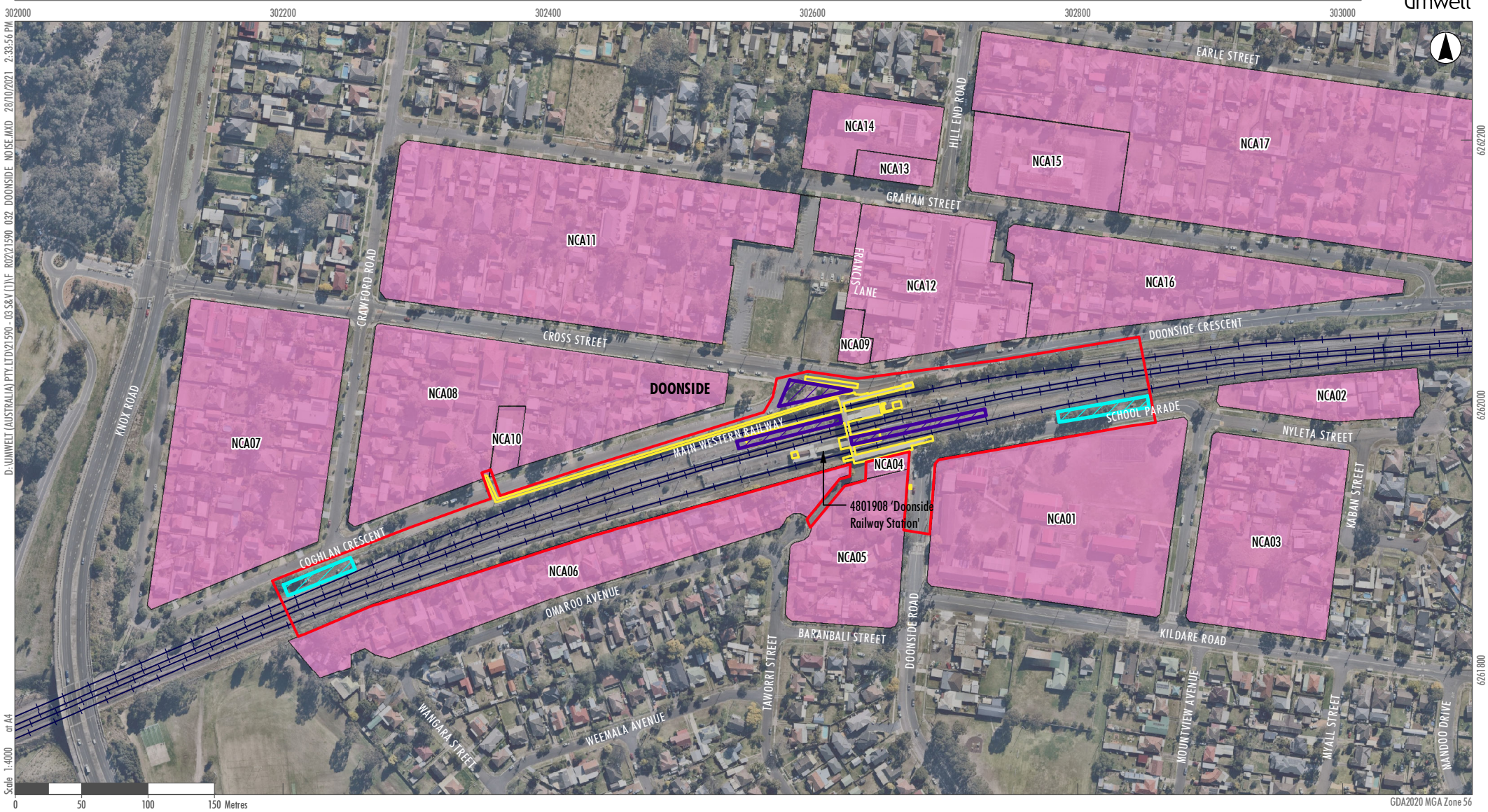
The background noise levels (RBL) for residential receivers in proximity to the site are per Table 6-5.

Table 6-5 Adopted Rating Background Levels [dBA]

Receivers	Time Period	RBL
Potentially affected residential receivers	Day	45
	Evening	40
	Night	35

Receivers

Receivers have been grouped as catchments areas bound by the rail corridor and streets, as shown in Figure 6-10..



Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- Noise Catchment Areas (NCA)
- Railway Line

Image Source: Nearmap (Jun 2021) Data source: NSW DFSI (2020), TfNSW (2021)

FIGURE 6-10

Noise Catchment Area Map

Modelled receiver numbers, type and address details are shown in Table 6-6 below.

Table 6-6 Modelled Noise Catchment Area receiver identification, type and address details

Noise Catchment Area (NCA)	Approximate Separation distance (m)	Receiver Type	Address
NCA01	73	Educational Institution – Primary School	Doonside Public School, 367 Kildare Road, Doonside Buildings are all 1 storey in height.
NCA02	78	Residential Receivers	Residences south of the rail corridor and north of Nyleta Street, 1 to 9 Nyleta Street, Doonside
NCA03	77	Residential Receivers	Residences south of Nyleta Street and east of School Parade, 2 to 10 School Parade, Doonside
NCA04	35	Commercial Receivers	Moshim's Discount House, 2 Doonside Road, Doonside
NCA05	35	Residential Receivers	Residences west of Doonside Road, east of Eastwood Lane, Illoura Place and Taworri Street, Doonside. Residences including: 4 to 12 Doonside Rd; 4 Eastwood Lane; 1 to 2 Illoura Pl, and; 21 and 23 Taworri Street, Doonside.
NCA06	35	Residential Receivers	Residences south of the rail corridor, west of Eastwood Lane, north of Omaroo Avenue, and east of Cooinda Place, Doonside. Residences including: 1 and 2 Cooinda Pl; 1 to 33 Omaroo Ave; 3 Eastwood Ln, and 4 Illoura Pl, Doonside.
NCA07	27	Residential Receivers	Residences west of Crawford Road, north of Coghlan Crescent.
NCA08	102	Residential Receivers	Residences north of Coghlan Crescent, east of Crawford Road and south of Cross Street, Doonside. The eastern boundary adjoins the Commuter Car Park.
NCA09	53	Residential Receivers	3 Cross Street, Doonside.
NCA10	162	Place of Public Worship	Doonside Christadelphian Ecclesia, 15 Coghlan Crescent, Doonside
NCA11	124	Residential Receivers	Residences north of Cross Street, west of Crawford Road and south of Graham Street, Doonside
NCA12	62	Commercial	Doonside Town Centre
NCA13	194	Pre-schools and day care facilities	Doonside Kindergarten Inc., 32 Hill End Road, Doonside

Noise Catchment Area (NCA)	Approximate Separation distance (m)	Receiver Type	Address
NCA14	221	Community centre	Doonside Community Centre, 31 Graham Street, Doonside
NCA15	171	Hotel	Doonside Hotel, 23 Graham Street, Doonside
NCA16	74	Residential Receivers	Residences north of Doonside Crescent, east of Hill End Road and south of Graham Street, Doonside.
NCA17	143	Residential Receivers	Residences north of Graham Street, east of Hill End Road, south of Earle Street and west of Milson Road, Doonside.

Note 1. Heritage items were also considered. Doonside Railway Station is classified as a local Heritage Item. The locally listed heritage items comprise: a) two Station Buildings - Platforms 1 and 2, Platforms 3 and 4, b) signal Box - incorporated in Platforms 1 and 2 building, and c) structures listed in the heritage item Doonside Railway Station Group includes two island platforms and the steel Footbridge.

Assessment criteria

Railway station upgrades are a construction project covered by the *Construction Noise and Vibration Strategy* (CNVS) (TfNSW, 2018). The CNVS outlines the methodology to be undertaken to assess, mitigate and manage construction noise and vibration from *TfNSW Infrastructure and Place Division* (IP) projects.

Guidance and principal requirements regarding the management of noise and vibration from construction in NSW are contained in the:

- *Interim Construction Noise Guideline* (ICNG) (DECC, 2009)
- *Assessing Vibration: A technical guideline* (AVTG) (Department of Environment and Conservation (DEC), 2006)

Construction hours

Time periods are defined in the CNVS for different types of construction activities and for standard construction hours (including the delivery of plant and equipment) and out-of-hours works (OOHW) as shown in Table 6-7. OOHW Periods 1 and 2 are included in the period described by the ICNG as ‘outside the recommended standard hours’.

Table 6-7 Construction Hours as Defined in CNVS

Time Period	Construction hours	Monday – Friday	Saturday	Sunday/Public Holiday
Day	Standard construction hours	7am – 6pm	8am – 1pm	No work
Evening	OOHW Period 1	6pm – 10pm	7am – 8am and 1pm – 10pm	8am – 6pm
Night	OOHW Period 2	10pm – 7am	10pm – 8am	6pm – 7am
Construction Activities with special audible characteristics (high noise impact, impulsive or tonal noise emissions)		8am – 5pm[1]	9am – 1pm[1]	No work

Note 1: Works may be carried out in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block, unless otherwise approved by Transport for NSW

Noise assessment criteria

The applicable criteria for construction noise impacts are given in the ICNG. Table 6-8 presents the ICNG construction Noise Management Level (NML) for representative receivers surrounding the proposal area. The assessment levels are intended to guide the need for, and the selection of, feasible and reasonable work practices to minimise construction noise impacts.

Table 6-8 ICNG Construction Noise Management Levels, dB(A)

Land use	Construction time	Noise Management Level $L_{Aeq,\ 15\ minute}$
Residential	Recommended standard hours	RBL + 10 dBA
	Outside recommended standard hours	RBL + 5 dBA
Classrooms at schools and other educational institutions	Applicable when property is in use	Internal noise level[1] 45 dBA
Hospital wards and operating theatres	Applicable when property is in use	Internal noise level 45 dBA
Places of Worship	Applicable when property is in use	Internal noise level 45 dBA
Community Centres	Applicable when property is in use	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS2107 for specific uses[2]. Internal noise level 40 dBA
Industrial premises	Applicable when property is in use	External[3,4] LAeq (15 minute) 75 dBA
Offices, retail outlets	Applicable when property is in use	External[4] LAeq (15 minute) 70 dBA
Other businesses that may be very sensitive to noise, where the noise level is project specific: Childcare centres	Applicable when property is in use	Internal LAeq[5] (15 minute) ≤ 40 dBA External LAeq[6] (15 minute) ≤ 55 dBA
Active recreation areas	Applicable when property is in use	External LAeq (15 minute) 65 dBA
Passive recreation areas	Applicable when property is in use	External LAeq (15 minute) 60 dBA
Rough Sleepers	Outside recommended standard hours	Project Notifications, Specific Notifications and consideration of well-being.

Note 1. Applies at the centre of the room in use, most exposed to the construction noise, and can include both airborne and ground-borne noise

Note 2. Community Centres generally provide community spaces for life-long learning, social and cultural activities and typically contain a multi-use hall. The assumed conservatively representative design use from AS2107 was for assembly halls and conference rooms within Educational Buildings, resulting in a recommended 'maximum' internal noise level of LAeq (15 minute) 40 dBA.

Note 3. The external noise levels should be assessed at the most-affected occupied point of the premises.

Note 4. The external noise levels should be assessed at the most-affected occupied point of the premises.

Note 5. From the Association of Australian Acoustical Consultants (AAAC) Guideline for Child Care Centre Acoustic Assessment (the GCCCAA), September 2010, any location within the outdoor play or activity area of the Centre during the hours when the Centre is operating.

Note 6. Any location within the indoor play or sleeping areas of the Centre during the hours when the Centre is operating (the GCCCAA)

Where a quantitative noise assessment is to be undertaken, the construction airborne noise objectives are based on the ICNG. The Construction NMLs for the different receivers and different time periods based on the adopted RBLs (refer Table 6-5) are summarised in Table 6-9.

Table 6-9 Proposed Construction Noise Management Levels, dBA

Land Use	Time period	RBL	Noise affected NML1 $L_{Aeq, 15\ minute}$	Highly Noise Affected NML $L_{Aeq, 15\ minute}$	Sleep Disturbance Level (L_{Amax})
All residential receivers	Recommended standard hours[2]	45	55 (45+10)	75	Not applicable[3]
	Outside recommended standard hours (Saturday 1pm - 10pm)	45	50 (45+5)	Not applicable[4]	Not applicable
	Outside recommended standard hours (evening)	40	45 (40+5)	Not applicable	Not applicable
	Outside recommended standard hours (night time)	35	40 (35+5)	Not applicable	65 dBA[5] LAmax
Sensitive land uses (other than residences)	Applicable when property is in use	RBL not applicable to determine noise management level	Refer to Table 6-8 above	Not applicable	Not applicable

Note 1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 metres above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 metres of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Note 2. Recommended standard hours: Monday to Friday 7am – 6pm; Saturday 8am – 1pm.

Note 3. Sleep disturbance only applicable during OOHW2 (Night) period

Note 4. Noise assessment levels for Highly Noise Affected are not defined outside of standard hours

Note 5. On an hourly basis between 10pm - 7 am, determine the number and distribution of L_{Amax} noise levels greater than 65 dBA where L_{Amax}- L_{Aeq} exceeds 15 dB. Where increasing as a result of the project, take account of maximum noise levels when prioritising, selecting and designing noise control measures.

Sleep disturbance

The ICNG recommends that where construction works are planned to extend over two or more consecutive nights, the project should consider maximum noise levels and the extent and frequency of the maximum noise level events exceeding the RBL. The potential for both sleep disturbance and awakenings should be considered in the assessment and is assessed by comparison of the predicted noise levels against the screening levels. The NSW EPA's sleep disturbance screening level for industrial noise is based on the $L_{A1,1minute}$ level (equivalent to the L_{Amax}) of a noise event which should not exceed the ambient L_{A90} noise level by more than 15 dB.

Where sleep disturbance criteria exceedance for more than two consecutive nights cannot be avoided due to reasonable and feasible justification, the delivery partner must consult with the community and consider further mitigation such as duration reduction or alternative accommodation.

Construction vibration - buildings

Criteria for potential damage to structures are given in:

- Australian Standard *AS 2187: Part 2-2006 Explosives - Storage and Use - Part 2: Use of Explosives* (AS2187)
- British Standard *BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings – Part 2* (BS7385)
- German Institute for Standardisation *DIN 4150-3:1999-02 Structural vibration – Effects of vibration on structures* (DIN4150) also has criteria of particular reference for heritage structures

Criteria for vibration effects on building structures recommended in the CNVS are given in BS7385. The criteria in BS7385 are given in terms of peak component (x-, y- or z-axes separately) vibration velocity values from transient (impulsive) vibration events. The criteria for continuous vibration are recommended to be 50% lower than for impulsive vibration. The vibration criteria for the protection of structures and buildings from cosmetic damage (e.g. hairline cracks in drywalls, etc.) are given in Table 6-10**.**

Table 6-10 Vibration criteria for minimal risk of cosmetic damage to structures (peak vibration velocity (ppv) mm/s)

Type of structure	Peak Component Particle Velocity (mm/s)		
	4 Hz - 15 Hz	15 Hz - 40 Hz	40 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 [transient (impulsive) vibration] 25 (continuous vibration)		
Un-reinforced or light framed structures	15 increasing to 20 [transient (impulsive) vibration]	20 increasing to 50 [transient (impulsive) vibration]	50 [transient (impulsive) vibration]
Residential or light commercial type buildings	7.5 increasing to 10 (continuous vibration)	10 increasing to 25 (continuous vibration)	25 (continuous vibration)

Assessment guidelines for vibration damage to heritage-protected structures are commonly referenced from the DIN4150. This standard differentiates between short-term and long-term vibration, where short-term vibration is caused by sources such as drop-hammers, impact piling, etc. All other sources of vibration are considered to be long-term.

The DIN4150 guideline value for heritage-protected structures for long-term vibration is 2.5 mm/s peak particle velocity (PPV) in the horizontal plane at all frequencies. This guideline value is primarily intended for older, sensitive, above-ground structures (typically buildings).

Construction vibration – human perception

Criteria for potential human perception of vibration are given in *Assessing Vibration: A technical guideline* (the 'vibration guideline') (DEC, 2006). The criteria in the vibration guideline are given for continuous vibration, impulsive vibration and for intermittent vibration. For continuous and impulsive vibration, the criteria are given in terms of root-mean-square (rms) vibration acceleration (m/s^2) in the frequency range 1 - 80 Hertz (Hz). For intermittent vibration, the criteria are given in terms of vibration dose value (VDV), which is a parameter used for assessing the combined magnitude and the total duration of vibration impacts.

The criteria given in the vibration guideline for continuous or impulsive vibration relevant to the receivers in the area are given in Table 6-11. The frequency weightings are given in Appendix B3 of the vibration guideline.

Table 6-11 Criteria for continuous and impulsive vibration for human comfort (weighted vibration acceleration m/s^2 at 1-80 Hz)

Location	Assessment period[1]	Preferred values		Maximum values	
		z-axis[2]	x- and y-axes[2]	z-axis	x- and y-axes
Continuous vibration					
Residences	Day	0.010	0.0071	0.020	0.014
	Night	0.007	0.005	0.014	0.010
Offices, schools, educational institutions, or places of worship	Day or Night	0.020	0.014	0.040	0.028
Impulsive vibration					
Residences	Day	0.30	0.21	0.60	0.42
	Night	0.10	0.071	0.20	0.14
Offices, schools, educational institutions, or places of worship	Day or Night	0.64	0.46	1.28	0.92

Note 1. Day time period is 7am - 10pm. Night time period is 10pm - 7am.

Note 2. Typically the x-direction is the horizontal radial direction oriented directly between the source and receiver, the y-direction is the horizontal tangential direction, and the z-direction is the vertical direction.

The criteria for intermittent vibration given in the vibration guideline for the relevant receivers in the area proximate to the site are shown in Table 6-12. The VDV is calculated using the frequency-weighted rms acceleration as described in the vibration guideline.

Table 6-12 Vibration criteria for intermittent vibration (VDV m/s$^{1.75}$)

Location	Day time period[1]		Night time period[1]	
	Preferred value	Maximum value	Preferred value	Maximum value
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions or places of worship	0.40	0.80	0.40	0.80

Note 1. Day time period is 7am - 10pm. Night time period is 10pm - 7am

Construction traffic noise

Noise from construction traffic is assessed against the road traffic noise criteria:

- *NSW Road Noise Policy* (RNP) (Department of Environment, Climate Change and Water (DECCW), 2011)
- *Environmental Noise Management Manual* (ENMM) (Roads and Traffic Authority, 2001)
- *Noise Criteria Guideline* (NCG) (Roads and Maritime, 2015)

6.3.2 Potential impacts

a) Construction phase

Predicted Noise Levels

Noise impacts have been assessed for five construction noise scenarios expected to occur at different stages during construction. All construction scenarios have been assessed against their respective NML. The construction scenarios are:

- site establishment and enabling work
- lift installation, ramps, footbridge and stairs construction
- station building work
- interchange
- demobilisation, testing and commissioning

Standard hours

The results of the assessment of noise levels indicates that construction noise levels are anticipated to exceed the NML during recommended standard hours for each of the construction scenarios at different receiver locations. The assessment of the construction activities undertaken during recommended standard hours triggers the implementation of standard and additional mitigation measures. Predicted construction noise levels during standard hours are presented in Table 6-13 and Table 6-14.

Table 6-13 Predicted construction noise levels – recommended standard hours – residential receivers

NCA	NML dB(A)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA02	55	78	61-65	61-65	61-65	61-65	54-61
NCA03	55	77	63-65	64-66	64-66	64-66	56-62
NCA05	55	35	61-**80**	63-**81**	65-**80**	63-**80**	55-65
NCA06	55	35	63-**79**	63-**80**	64-**80**	64-**80**	57-70
NCA07	55	27	59-74	59-74	59-74	59-74	54-74
NCA08	55	102	58-73	58-74	59-74	59-**75**	51-69
NCA09	55	53	71-**76**	73-**79**	73-**80**	72-**78**	62-70
NCA11	55	124	59-70	60-72	60-72	60-71	50-62
NCA15	55	171	64-65	65-66	65-66	64-65	55-56
NCA16	55	74	60-69	61-70	61-70	60-69	53-63
NCA17	55	143	58-63	59-64	58-64	58-64	50-56

Note – Highly affected residential receivers indicated by **BOLD** text

Table 6-14 Predicted construction noise levels – recommended standard hours – non-residential receivers

NCA	NML dB(A) (when in use)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA01	45	73	65-78	66-79	66-81	66-78	57-64
NCA04	70	35	72-90	75-90	80-90	72-90	57-65
NCA10	45	162	61-63	62-64	61-64	61-64	54-57
NCA12	70	62	68-76	69-77	69-79	68-77	58-65
NCA13	45	194	65-66	66-66	67-67	66-66	56-56
NCA14	40	221	64-64	65-65	64-66	64-65	54-55

Outside standard hours – OOWH Period 1 - Day

The results of the assessment of noise levels indicates that construction noise levels are anticipated to exceed the NML during OOHW1 for each of the construction scenarios at different receiver locations. The assessment of the construction activities undertaken outside of recommended standard hours triggers the implementation of standard and additional mitigation measures. Predicted construction noise levels during OOHW1 are presented in Table 6-15 and Table 6-16.

Table 6-15 Predicted construction noise levels – OOHW1 – residential receivers

NCA	NML dB(A)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA02	50	78	**61-65**	**61-65**	**61-65**	**61-65**	**54-61**
NCA03	50	77	**63-65**	**64-66**	**64-66**	**64-66**	**56-62**
NCA05	50	35	**61-80**	**63-81**	**65-80**	**63-80**	**55-65**
NCA06	50	35	**63-79**	**63-80**	**64-80**	**64-80**	**57-70**
NCA07	50	27	**59-74**	**59-74**	**59-74**	**59-74**	**54-74**
NCA08	50	102	**58-73**	**58-74**	**59-74**	**59-75**	**51-69**
NCA09	50	53	**71-76**	**73-79**	**73-80**	**72-78**	**62-70**
NCA11	50	124	**59-70**	**60-72**	**60-72**	**60-71**	**50-62**
NCA15	50	171	**64-65**	**65-66**	**65-66**	**64-65**	**55-56**
NCA16	50	74	**60-69**	**61-70**	**61-70**	**60-69**	**53-63**
NCA17	50	143	**58-63**	**59-64**	**58-64**	**58-64**	**50-56**

Note – Noise affected residential receivers indicated by **BOLD** text

Table 6-16 Predicted construction noise levels – OOHW1 – non- residential receivers

NCA	NML dB(A) (when in use)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA01	N/A	73	65-78	66-79	66-81	66-78	57-64
NCA04	70	35	**72-90**	**75-90**	**80-90**	**72-90**	57-65
NCA10	45	162	**61-63**	**62-64**	**61-64**	**61-64**	**54-57**
NCA12	70	62	68-**76**	69-**77**	69-**79**	68-**77**	58-65
NCA13	45	194	**65-66**	**66-66**	**67-67**	**66-66**	**56-56**
NCA14	40	221	**64-64**	**65-65**	**64-66**	**64-65**	**54-55**

Note – Noise affected non-residential receivers indicated by **BOLD** text

Outside standard hours – OOWH Period 1 - Day

The results of the assessment of noise levels indicates that construction noise levels are anticipated to exceed the NML during OOHW1 - day for each of the construction scenarios at different receiver locations. The assessment of the construction activities undertaken outside of recommended standard hours triggers the implementation of standard and additional mitigation measures. Predicted construction noise levels during OOHW1- day are presented in Table 6-17 and Table 6-18.

Table 6-17 Predicted construction noise levels – OOHW1 - day – residential receivers

NCA	NML dB(A)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA02	50	78	**61-65**	**61-65**	**61-65**	**61-65**	**54-61**
NCA03	50	77	**63-65**	**64-66**	**64-66**	**64-66**	**56-62**
NCA05	50	35	**61-80**	**63-81**	**65-80**	**63-80**	**55-65**
NCA06	50	35	**63-79**	**63-80**	**64-80**	**64-80**	**57-70**
NCA07	50	27	**59-74**	**59-74**	**59-74**	**59-74**	**54-74**
NCA08	50	102	**58-73**	**58-74**	**59-74**	**59-75**	**51-69**
NCA09	50	53	**71-76**	**73-79**	**73-80**	**72-78**	**62-70**
NCA11	50	124	**59-70**	**60-72**	**60-72**	**60-71**	**50-62**
NCA15	50	171	**64-65**	**65-66**	**65-66**	**64-65**	**55-56**
NCA16	50	74	**60-69**	**61-70**	**61-70**	**60-69**	**53-63**
NCA17	50	143	**58-63**	**59-64**	**58-64**	**58-64**	**50-56**

Note – Noise affected residential receivers indicated by **BOLD** text

Table 6-18 Predicted construction noise levels – OOHW1 – day – non- residential receivers

NCA	NML dB(A) (when in use)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA01	N/A	73	65-78	66-79	66-81	66-78	57-64
NCA04	70	35	**72-90**	**75-90**	**80-90**	**72-90**	57-65
NCA10	45	162	**61-63**	**62-64**	**61-64**	**61-64**	**54-57**
NCA12	70	62	68-**76**	69-**77**	69-**79**	68-**77**	58-65
NCA13	45	194	**65-66**	**66-66**	**67-67**	**66-66**	**56-56**
NCA14	40	221	**64-64**	**65-65**	**64-66**	**64-65**	**54-55**

Note – Noise affected non-residential receivers indicated by **BOLD** text

Outside standard hours – OOWH Period 1 - Evening

The results of the assessment of noise levels indicates that construction noise levels are anticipated to exceed the NML during OOHW1 - evening for each of the construction scenarios at different receiver locations. The assessment of the construction activities undertaken outside of recommended standard hours triggers the implementation of standard and additional mitigation measures. Predicted construction noise levels during OOHW1 – evening are presented in Table 6-19 and Table 6-20.

Table 6-19 Predicted construction noise levels – OOHW1 – evening – residential receivers

NCA	NML dB(A)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA02	45	78	**61-65**	**61-65**	**61-65**	**61-65**	**54-61**
NCA03	45	77	**63-65**	**64-66**	**64-66**	**64-66**	**56-62**
NCA05	45	35	**61-80**	**63-81**	**65-80**	**63-80**	**55-65**
NCA06	45	35	**63-79**	**63-80**	**64-80**	**64-80**	**57-70**
NCA07	45	27	**59-74**	**59-74**	**59-74**	**59-74**	**54-74**
NCA08	45	102	**58-73**	**58-74**	**59-74**	**59-75**	**51-69**
NCA09	45	53	**71-76**	**73-79**	**73-80**	**72-78**	**62-70**
NCA11	45	124	**59-70**	**60-72**	**60-72**	**60-71**	**50-62**
NCA15	45	171	**64-65**	**65-66**	**65-66**	**64-65**	**55-56**
NCA16	45	74	**60-69**	**61-70**	**61-70**	**60-69**	**53-63**
NCA17	45	143	**58-63**	**59-64**	**58-64**	**58-64**	**50-56**

Note – Noise affected residential receivers indicated by **BOLD** text

Table 6-20 Predicted construction noise levels – OOHW1 – evening – non- residential receivers

NCA	NML dB(A) (when in use)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA01	N/A	73	65-78	66-79	66-81	66-78	57-64
NCA04	70	35	**72-90**	**75-90**	**80-90**	**72-90**	57-65
NCA10	45	162	**61-63**	**62-64**	**61-64**	**61-64**	**54-57**
NCA12	70	62	68-**76**	69-**77**	69-**79**	68-**77**	58-65
NCA13	45	194	**65-66**	**66-66**	**67-67**	**66-66**	**56-56**
NCA14	40	221	**64-64**	**65-65**	**64-66**	**64-65**	**54-55**

Note – Noise affected non-residential receivers indicated by **BOLD** text

Outside standard hours – OOWH Period 2 - Night

The results of the assessment of noise levels indicates that construction noise levels are anticipated to exceed the NML during OOHW2 - night for each of the construction scenarios at different receiver locations. The assessment of the construction activities undertaken outside of recommended standard hours triggers the implementation of standard and additional mitigation measures. Predicted construction noise levels during OOHW2 – night are presented in Table 6-21. Non-residential receivers near the Proposal area do not operate 24 hours and have therefore not been included.

Table 6-21 Predicted construction noise levels – OOHW2 – night – residential receivers

NCA	NML dB(A)	Approximate Separation Distance, (m)	Predicted Noise Levels, Leq dB(A) per Construction Scenarios				
			1	2	3	4	5
NCA02	40	78	**61-65**	**61-65**	**61-65**	**61-65**	**54-61**
NCA03	40	77	**63-65**	**64-66**	**64-66**	**64-66**	**56-62**
NCA05	40	35	**61-80**	**63-81**	**65-80**	**63-80**	**55-65**
NCA06	40	35	**63-79**	**63-80**	**64-80**	**64-80**	**57-70**
NCA07	40	27	**59-74**	**59-74**	**59-74**	**59-74**	**54-74**
NCA08	40	102	**58-73**	**58-74**	**59-74**	**59-75**	**51-69**
NCA09	40	53	**71-76**	**73-79**	**73-80**	**72-78**	**62-70**
NCA11	40	124	**59-70**	**60-72**	**60-72**	**60-71**	**50-62**
NCA15	40	171	**64-65**	**65-66**	**65-66**	**64-65**	**55-56**
NCA16	40	74	**60-69**	**61-70**	**61-70**	**60-69**	**53-63**
NCA17	40	143	**58-63**	**59-64**	**58-64**	**58-64**	**50-56**

Note – Noise affected residential receivers indicated by **BOLD** text

Discussion of impacts

Construction noise levels are anticipated to exceed the NML during recommended standard hours, OOHW Period 1 and OOHW Period 2 for each of the construction scenarios at different receiver locations. Accordingly the implementation of standard and additional mitigation measures is triggered.

During construction, the most affected residential receivers are those that are closest to the Proposal within the following NCAs:

- NCA05 - Residences west of Doonside Road, east of Eastwood Lane, Illoura Place and Taworri Street, Doonside. Residences including: 4 to 12 Doonside Rd; 4 Eastwood Lane; 1 to 2 Illoura Pl, and; 21 and 23 Taworri Street, Doonside.
- NCA06 - Residences south of the rail corridor, west of Eastwood Lane, north of Omaroo Avenue, and east of Cooinda Place, Doonside. Residences including: 1 and 2 Cooinda Pl; 1 to 33 Omaroo Ave; 3 Eastwood Ln, and; 4 Illoura Pl, Doonside.
- NCA08 - Residences north of Coghlan Crescent, east of Crawford Road and south of Cross Street, Doonside. The eastern boundary adjoins the Commuter Car Park.
- NCA09 – 3 Cross Street, Doonside

The greatest impacts to those receivers would be experienced during construction scenarios one to four.

It is noted that most of the exceedances are expected to be the result of the worst case scenario over a 15 minute period. Construction work is expected to be undertaken periodically therefore noise exceedances would not occur throughout the full duration of the Proposal. It is predicted noise levels would be much lower during construction due to activities being short term and staged intermittently.

Sleep Disturbance Assessment

Predicted sleep disturbance at representative NCA receiver areas for residential receivers is only applicable during OOHW2 (Night) period.

The predicted sleep disturbance noise levels presented in Table 6-22 show that all the modelled construction scenarios have the potential to result in non-compliance to sleep disturbance criteria at every assessed NCA.

It is understood that the construction works are scheduled to occur within standard work hours (with COVID-19 approved hours on weekends where applicable), however, where sleep disturbance criteria exceedance for more than two consecutive nights cannot be avoided due to reasonable and feasible justification, the delivery partner must consult with the community and consider further mitigation measures such as duration reduction or alternative accommodation.

Table 6-22 Sleep Disturbance Assessment

Receiver/NCA	Night Period RBL, dB(A)	Sleep Disturbance Criteria, LA1,1minute	Construction Scenario				
			1	2	3	4	5
NCA02 1 Nyleta St, Doonside	35	50	**64**	**65**	**65**	**65**	**58**
NCA03 10 School Pde, Doonside	35	50	**65**	**66**	**65**	**65**	**58**
NCA05 4 Eastwood Ln, Doonside	35	50	**80**	**81**	**81**	**80**	**65**
NCA06 3 Illoura Plc, Doonside	35	50	**79**	**80**	**81**	**80**	**69**
NCA07 29 Coghlan Cres, Doonside	35	50	**60**	**61**	**73**	**73**	**73**
NCA08 2A Cross St, Doonside	35	50	**73**	**76**	**76**	**76**	**67**
NCA09 3 Cross St, Doonside	35	50	**77**	**81**	**80**	**79**	**70**
NCA11 13 Cross St, Doonside	35	50	**70**	**77**	**75**	**75**	**67**
NCA15 23 Graham St, Doonside	35	50	**65**	**67**	**66**	**66**	**55**
NCA16 251 Doonside Cres, Doonside	35	50	**69**	**70**	**70**	**70**	**60**
NCA17 21 Graham St, Doonside	35	50	**64**	**65**	**65**	**64**	**53**

Vibration

During construction, vibration would be generated using the following equipment:

- vibratory roller
- small hydraulic hammer
- medium hydraulic hammer
- large hydraulic hammer
- vibratory pile driver
- pile boring
- jackhammer

Recommended minimum working distances for vibration generating equipment from sensitive receivers (i.e. the receiver building or its occupants) are given in Table 20 of the CNVS, reproduced in Table 6-23. The minimum working distances are indicative and will vary depending on the particular item of plant and local geotechnical conditions. They apply to cosmetic damage of typical buildings under typical geotechnical conditions. Vibration monitoring is recommended to confirm the minimum working distances at specific sites.

It is unlikely that construction works would be undertaken within the minimum buffer distances for cosmetic damage, though some works would be carried out within the minimum working distance for human response. Vibration-intensive works may be unavoidable within recommended buffer distances within the heritage-listed station complex.

If vibration intensive works are required within the minimum buffer distances, mitigation measures (including site specific vibration monitoring and dilapidation surveys) would be implemented to ensure no impact to relevant structures.

Table 6-23 Recommended minimum working distances for vibration generating plant sensitive receivers [CNVS Table 20]

Plant Item	Rating/Description	Minimum Working Distance (me)[1]	
		Cosmetic Damage (Residential Building)	Human Response
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5	15 to 20
	< 100 kN (Typically 2-4 tonnes)	6	20
	< 200 kN (Typically 4-6 tonnes)	12	40
	< 300 kN (Typically 7-13 tonnes)	15	100
	> 300 kN (Typically 13-18 tonnes)	20	100
	> 300 kN (> 18 tonnes)	25	100
Small Hydraulic Hammer	(300 kg - 5 to 12 t excavator)	2	7
Medium Hydraulic Hammer	(900 kg - 12 to 18 t excavator)	7	23
Large Hydraulic Hammer	(1600 kg - 18 to 34 t excavator)	22	73
Vibratory Pile Driver	Sheet piles	2 to 20	20
Pile Boring	≤ 800 mm	2 (nominal)	N/A
Jackhammer	Hand held	1 (nominal)	Avoid contact with structure

Note [1] More stringent conditions may apply to heritage or other sensitive structures

Construction Traffic Noise

Up to 25 light vehicles and 15 heavy vehicles per day are anticipated to access the construction compounds during the typical construction period. Construction vehicles are likely to travel via Knox Road, Cross Street and Crawford Road to access the construction compound and laydown areas on the north side of the rail line, and via Eastern Road, Doonside Road and School Parade to access construction compound and laydown areas on the south side of the rail line. It is anticipated that the construction-related traffic movements would be minimal during the day/night-time periods and the traffic noise impacts associated with the construction activities would also be minor. Therefore, a detailed assessment of potential construction traffic noise on local roads near the construction site is not required.

To minimise the construction traffic noise levels and reduce the risk of negative impacts occurring, construction traffic management should be considered as part of a Noise and Vibration Management Plan.

b) Operational phase

The Proposal would not increase noise and/or vibration emissions associated with operational aspects of the station or existing rail network. The Proposal would introduce new infrastructure and assets (e.g. lifts, stairs etc) but these items are not anticipated to generate significant noise and/or vibration emissions. The Proposal would increase accessibility and hence the potential mobility and scale of station usage but any emissions from these sources (e.g. passenger access and usage of the station) would be insignificant when compared to the existing ambient environment.

Accordingly, there is no anticipated change in operational noise and/or vibration impacts associated with the Proposal.

6.3.3 Mitigation measures

The following mitigation measures are proposed to manage the potential noise and vibration impacts of the Proposal:

- prior to commencement of work, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Strategy* (TfNSW, 2019a) and the Noise and Vibration Impact Assessment for the Proposal (Umwelt, 2021a). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable
- the CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:
    - regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise
    - avoiding any unnecessary noise when carrying out manual operations and when operating plant
    - ensuring spoil is placed and not dropped into awaiting trucks
    - avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable
    - switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded
    - avoiding deliveries at night/evenings wherever practicable
    - no idling of delivery trucks
    - keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site
    - minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors

- the CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:
    - maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances
    - using the most suitable equipment necessary for the construction work 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 work
    - use of quieter and less vibration emitting construction methods where feasible and reasonable
- standard noise mitigation and management measures described in section 8.1 of the CNVS (TfNSW, 2019a) be implemented for all construction activities at the site
- additional noise mitigation management measures described in section 8.2 of the CNVS be implemented to the reduce noise impact where feasible and reasonable
- vibration generating construction equipment not be used within the minimum working distances specified in Table 20 ‘Recommended minimum working distances from vibration intensive plant’ of the CNVS.
- the largest size vibratory roller that should be used should have maximum of 300 kN, and weigh less than 18 tonnes
- the largest size hydraulic hammers that would be used would be less than an 18 t excavator
- vibratory pile driving would be avoided less than 20 m from a receiver structure
- 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 Transport for NSW or authorised under the Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020 (whilst the Order is in effect), and the community is notified prior to these work commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the Transport for NSW Environment & Sustainability Manager for any work outside normal hours
- alternative accommodation options may be offered to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels
- out of hours work during evening and night periods would be restricted so that receivers are impacted for no more than three consecutive evenings and no more than two consecutive nights in the same NCA in any one week, except where there is a Duration Respite. A minimum respite period of four evenings/five nights shall be implemented between periods of evening and/or night works
- to avoid structural impacts as a result of vibration or direct contact with structures, the proposed work would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (Umwelt, 2021) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged

- notification within a minimum of seven days prior to the start of works would be provided to local residents and local businesses in particular sensitive receivers to advise of upcoming works and potential disruptions
- verification monitoring of noise and/or vibration levels during construction would be undertaken in the form of routine checks of noise levels or following reasonable complaints, conducted at the affected receiver(s) or a nominated representative location
- respite offers should be considered where there are high noise and vibration generating activities near receivers
- where respite periods are considered counterproductive in reducing impact and where it can be strongly justified on a project-by-project basis, the number of evenings and/or nights worked may be increased through duration reduction so that the project can be completed more quickly
- property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory work including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the work and all heritage listed buildings and other sensitive structures within 150 metres of the work (unless otherwise determined following additional assessment they are not likely to be adversely affected)
- affected pre-schools, schools, universities and other identified sensitive receivers would be consulted in relation to noise mitigation measures to identify any noise sensitive periods, e.g. exam periods. As much as reasonably possible noise intensive construction work in the vicinity of affected educational buildings are to be minimised.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.4 Aboriginal heritage

A desktop assessment was undertaken for the Proposal with consideration of the requirements identified in the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010).

6.4.1 Existing environment

The Proposal area is located upon the scared land of the Darug People.

An AHIMS search with a buffer of 200 metres was undertaken on 10 September 2021. The search did not identify any Aboriginal site or places recorded within or surrounding the Proposal area.

Certain landscape features, such as sand dune systems, ridge lines, cliff faces, waterways, ridge tops and rock caves/shelters, can indicate the likely presence of Aboriginal heritage sites. None of those features are present immediately surrounding Doonside Station, which is located within a disturbed and developed area. Therefore, the Proposal is not considered to be located within a high-risk landscape for Aboriginal heritage potential. The extensive landscape modification and high level of 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.

6.4.2 Potential impacts

a) Construction phase

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

- construction of lifts and lift landing foundations

- construction of canopy foundations
- construction of accessible footpaths establishment of new accessible parking spaces and associated kerb ramps
- installation of a new low voltage cable route

Activities that disturb the ground surface have the potential to impact previously undiscovered Aboriginal heritage items. As no known Aboriginal heritage items or places and high-risk landscape features are located within or nearby the Proposal area, the potential to find previously undiscovered items or places is low. Therefore, the Proposal is unlikely to affect Aboriginal heritage during the construction phase.

b) Operational phase

The Proposal is not expected to pose any risks to Aboriginal heritage during the operational phase.

6.4.3 Mitigation measures

The following mitigation measures are proposed regarding potential Aboriginal heritage impacts:

- 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.
- if unforeseen unidentified Aboriginal objects are uncovered during construction, the procedures contained in the TfNSW *Unexpected Heritage Finds Guideline* (TfNSW, 2019b) would be followed and works nearby the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and TfNSW Senior Environment and Sustainability Officer so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal consultant, Heritage NSW and the Local Aboriginal Land Council.
- if human remains are found, work would cease, the site secured and the NSW Police and Heritage NSW notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.5 Non-Aboriginal heritage

A Statement of Heritage Impact (SoHI) was prepared by Umwelt for the Proposal (Umwelt, 2021b). The SoHI was prepared in order to provide an understanding of the impact of the Proposal to heritage items within the Proposal area, namely the Doonside Railway Station Group.

6.5.1 Existing environment

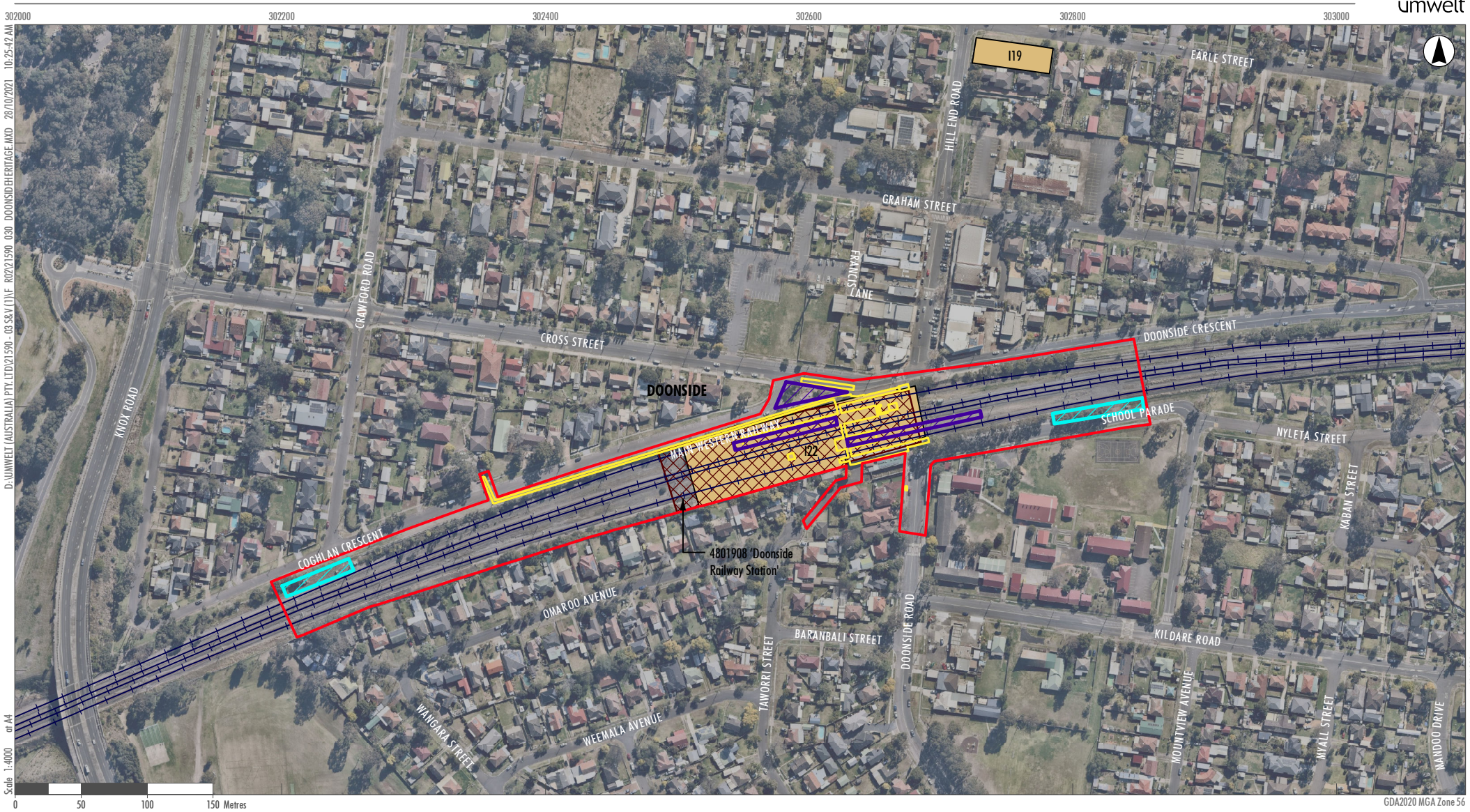
A review of relevant heritage databases was undertaken to determine if non-Aboriginal heritage items are located within or nearby the Proposal area. The heritage databases searched were:

- Blacktown LEP 2015
- Section 170 Heritage and Conservation registers

- NSW State Heritage Inventory (NSW SHI)
- NSW State Heritage Register (NSW SHR)
- Australian Heritage Database (including Commonwealth and National Heritage lists and the Register of the National Estate).

The above searches identified that Doonside Station holds heritage significance and is listed on the on the TAHE S170 Heritage Register (ID: 4801908) and the Blacktown LEP (ID: I22) for its historical, aesthetic and representative heritage values. In addition to Doonside Station, the closest heritage item to the Proposal area is 'House' (ID: I19, Blacktown LEP 2015). This item is located 250 metres north of the Proposal area. The location in relation to the Proposal area is shown in Figure 6-11.

The Proposal area does not fall within the curtilage of any State heritage item. It also does not fall within any local or State listed heritage conservation areas



Legend

- Proposal Area
- Proposed Work Areas
- Laydown Area
- Construction Compound
- LEP Heritage Item - General
- TAHE S170 Curtilage
- Railway Line

FIGURE 6-11

Heritage Context of Proposal area

Image Source: Nearmap (Jun 2021) Data source: NSW DFSI (2020), Bayside LEP (2021)

Historical context

The railway line servicing Doonside was first extended to Blacktown in 1860. It was extended to Rooty Hill in 1861 and Richmond in 1864. The main western line was extended to Penrith in 1867 and into the mountains to Wentworth Falls in 1868.

A platform was opened very early as a siding to the Crawford Farm and was known as 'Crawford's Siding'. This was located in the vicinity of the end of Rosenthal Street (notionally as it would hit the railway) to the east (city side) of the existing Doonside Station, approximately 800 metres east of the Proposal area. Since then, Doonside Station and the railway line have undergone several modifications including:

- opening of the first platform in 1880 at the current location of Doonside Station
- renaming of station to Wolkara on 1 February 1921, renamed again to Doonside on 12 February 1921
- new booking office constructed between 1880 and 1945, during the same time modifications to the level crossing were undertaken
- platforms proposed for extension in 1944 to allow for the quadruplication of the railway line
- existing station layout constructed by 1955 – modification coincided with the electrification of the train line
- pedestrian footbridge was constructed in 1958 – since 1990 every component of the bridge except the steel structure has been replaced
- level crossing was removed in 1980
- quadruplication was completed in 1981
- a station building was demolished before 1998, while the remaining (current) station buildings underwent alterations throughout the 1990s.

Doonside Railway Station Group

Doonside Railway Station Group comprises the two island platforms (c.1955), station building A – Platforms 3 and 4 (c.1955), station building C (c.1955) and signal box (1955, closed 1963) – Platforms 1 and 2 and footbridge (1958, modified 1990). A full description of the Station Group is included in the SoHI.

Significance Criteria

The Doonside Railway Station Group is listed on the TAHE S170 Heritage Register and the Blacktown LEP for its historical, aesthetic and representative heritage values. Table 6-24 contains the significance assessment prepared as part of the TAHE S170 register entry for Doonside Railway Station group on the NSW SHI. Text italicised in the table below indicates where information has been cited directly from the SHI citation.

Table 6-24 TAHE Section 170 Heritage Significance Assessment

Criteria	Application of Criteria
Criterion A – Historical Significance	*Doonside Railway Station is of historical significance as evidence of one of the stations built during the duplication of the line between St Marys to Lidcombe during the Post War period in response to increased development in the area*.
Criterion B – Associative Significance	No associative significance was identified in the TAHE heritage listing, nor the Blacktown LEP listing citation.
Criterion C – Aesthetic or Technical Significance	*Doonside Railway Station has aesthetic significance as an example of a small albeit modified railway Stripped Functionalist station in an urban setting. The buildings are very simply detailed with limited ornamentation representing economic policies of the time.* *The buildings and the setting on the station platform has been modified with the installation of new services and canopies, which have obscured some of the key elements of the Stripped Functionalist style previously evident.*
Criterion D – Social Significance	*The place has the potential to contribute to the local community's sense of place and can provide connection to the local community's past.*
Criterion E – Research Potential	*Doonside Railway Station has research significance as it demonstrates design and construction techniques of the mid-20th century railway structures and the use of Functionalist elements in a railway setting. However, the information gained can be found in better examples of this style on the network.*
Criterion F – Rarity	This station was not assessed as rare in the TAHE heritage listing.
Criterion G – Representativeness	*Doonside Railway Station is a modified example of a small, mid-20th century railway station in an urban context featuring railway Stripped Functionalist style elements. Where original features remain, or have not been obscured by modern additions, it provides a simpler example of the architectural style, with better examples of this represented elsewhere such Pendle Hill, Wentworthville, Toongabbie and Seven Hills railway stations.*

The existing State of Significance reads as follows:

Doonside Railway Station is of local significance as evidence of one of the stations built during the quadruplication of the line between St Marys to Lidcombe during the Post War period in response to increased suburban development in the area. Although reasonably modified, It provides a fair representative example of a small, mid-20th century railway station in an urban context, retaining some visible railway Stripped Functionalist style elements similar to other stations along this section of the Western Line, representing the economic policies of the time between and after the World Wars.

Significance Gradings

Features of the Doonside Railway Station Group were graded in accordance with the Heritage Council of NSW grading criteria, in the following descending order from greatest to lowest (intrusive) contribution to the item's heritage significance:

- exceptional
- high
- moderate
- little
- neutral
- intrusive

Features of the Doonside Railway Station Group have been graded as follows:

- **exceptional**: nil
- **high**: platforms (excluding asphalt surface) and Station Building C (Platforms 1 and 2)
- **moderate**: Station Building A (Platforms 3 and 4) and the footbridge
- **little**: nil
- **neutral**: platform surface, furniture, lights and bins
- **intrusive**: nil

6.5.2 Potential impacts

a) Construction phase

Station upgrades

Passenger lifts

The Proposal includes the construction of four new lifts and their associated landings and canopies at Doonside Station – one to each platform and one each to the north and south end of the footbridge. The new lift structures would generally be aligned on a north south axis to either side of the footbridge, introducing solid vertical structures that join onto the existing footbridge.

The lifts would require excavation through the existing platform surface, which has been replaced with asphalt during general upgrades at the station. These surfaces and fill are not significant elements of the station group. Although the overall form and presentation of the platforms is significant, localised disturbance to facilitate construction of the lifts would not obscure or discernibly impact the overall form of presentation of the platforms. The visual and physical impacts associated with this component of the works is therefore assessed as minor.

Modifications to the existing footbridge, stairs and ramps

Replacement of the roof, stair treads and handrails (where necessary) would be an acceptable alteration as it is generally limited to already modified fabric, and would allow for the continued use of the structure to a contemporary standard.

The demolition of the stairs to Platforms 3 and 4 and construction of the new stairs on the opposite side would require the removal of an area of original fabric. However, some views to the eastern elevation of the platform building would be reinstated, noting that the proposed new lift shaft may obscure some views. This would be a small deviation from the original layout of the footbridge and would have a minor physical impact and a minor visual impact.

The overall original form and remnant elements of the existing structure would remain legible within the station group.

Construction of new canopies to the platform

The proposed canopies on Platforms 3 and 4 would not be fixed to the station buildings. However, the canopy to Platforms 1 and 2 would be fixed to Building C, to ensure that there is continuous coverage between the access points and the family accessible toilet. This would require localised new penetrations into the north elevation of Building C. This would be limited to the upper section of the building, in line with the new canopy and would have a minor adverse physical impact. Installation of the footings for the new canopies would interact with both of the platforms, but this interaction would be localised and would not alter or impact the overall form or presentation of the platforms. The proposed canopies would therefore result in minor physical impacts.

Station building modifications

Refurbishment of existing toilet on Platforms 1 and 2

Works within this space are likely to result in a negligible degree of physical impact to significant fabric, with impacts to an original ceiling being minor physical impacts. The extent of original fabric remaining in this space would need to be confirmed prior to completion of detailed designs however it is acknowledged that the extent of original fabric remaining is likely to be limited.

Modification to the doorframe to provide a compliant width may require minor removal of early or original fabric, limited to the opening for the existing toilet. This would be a minor to negligible physical impact

Relocation of existing communications equipment

Installation the communications equipment in the new location would require removal or partial opening up of the existing ceiling, including the original ceiling in the former booking office and former waiting room, as well as the non-original ceiling in the storeroom. Removal of parts of the original ceiling in Station Building A would have a minor adverse impact.

Installation of a new security system to the proposed communication room is likely to require the replacement of the existing door and installation of a new card reader system to the wall. This would require removal of an early timber door, and penetrations to the brick wall of the building both internally and externally, resulting in minor adverse physical impacts.

Making good works internally would generally not require further intervention to original fabric remaining within the booking office, the works would have a negligible impact on Station Building A.

The booking office currently holds several moveable heritage items associated with the Doonside Railway Station Group. Construction activities associated with the proposed relocation of communications equipment within this space (such as installation of new conduits and relocation of equipment) have the potential to result in accidental removal or damage to these moveable heritage items. Any damage to or loss of moveable heritage items would likely have a minor adverse impact.

Interchange facilities

Proposed construction works to interchange facilities would not result in adverse physical impacts to the Doonside Railway Station Group.

Ancillary works

Regrading and resurfacing station platforms

Regrading of the existing platform surface would remove the current surface and replace with new asphalt to match existing. The platform surface has been extensively altered since the construction of the station and is not considered a significant part of the platform or the station group more broadly. This would not have an adverse physical impact.

Regrading and resurfacing areas impacted by construction activities

Resurfacing areas impacted by construction activities, or 'making good' works would require intervention with the existing asphalt or other ground surfaces, such as ballast, concrete paths or grass, within and adjacent to the station group. This would not require impacts to the significant fabric of the station group. This is unlikely to result in physical impacts.

Stormwater drainage connections

The trenches would require removal of the modern asphalt platform surface and fill, which are not significant elements of the platform This would also not require intervention with the station buildings or the original fabric of the platforms. This would be unlikely to result in adverse physical impacts.

Upgrade to the existing power supply

The underground cable routes would run through the rail corridor as well as below the existing platform surfaces. This may require new penetrations through the platform face at ground (rail) level where under boring of the platform is not achievable. Should this be required, this would result in localised small penetrations to the original brick facing of the platform. This would have a minor adverse physical impact.

Lighting, security and communication system upgrades

Improvements to the station's lighting, security and communications system have the potential to have localised impacts to significant fabric of the station group. This would be in areas where new penetrations to the station building are required, or visible cable routes are introduced into the curtilage of the station. Where services are located within existing cable routes, and would not require removal of significant fabric or require penetrations or fixings to significant fabric, this would not have an adverse heritage impact.

Depending on the extent of work required, new penetrations to the station building or platform face would have a minor to moderate adverse physical impact, to significant fabric.

Wayfinding signage

New signage would be free standing or attached to non- significant elements within the Doonside Railway Station Group. New signage would therefore not result in any adverse physical impacts.

Services relocation and protection works

The relocation of services using non-destructive search methods would not result in any adverse physical or visual impacts as no physical works are required.

Protection works would occur to the services, only if required. Any services exposed for this work would be re-buried (or similar) with associated surfaces made good, to match existing surrounding surfaces. This would have a negligible degree of physical impact.

Construction compounds and laydown areas

Construction compounds and laydown areas for storage would be temporary. Any visual impacts associated with this would be temporary, with the works being fully reversible. The

proposed construction compounds and laydown areas would be located unobtrusively to minimise temporary visual impacts.

The construction compounds and laydown areas would result in negligible temporary impacts, which would be reversible upon completion of the Proposal.

Temporary work

All temporary works are non-permanent and entirely reversible, and would therefore result in a negligible degree of impact on the Doonside Railway Station Group.

b) Operational phase

Station upgrades

Passenger lifts

The lifts are new structures of a relatively large scale in comparison to the other structures in the station group. The scale and bulk of the new lifts along the north-south axis of the station would form part of the focal point in views to the station, particularly of the footbridge, and would be a noticeable departure from the 1950s design of the station. However, they are generally distanced from the station buildings and located near elements of a similar height. This helps to create a sense of visual and physical separation between the new lifts and the most significant elements of the station, being the station buildings. This would allow for a small mitigation of the visual impact of the new lifts on the station buildings and their existing presentation.

Views would be partially impacted along the platforms however the lifts are not located within direct lines of sight to the station buildings from the public domain nor would they obscure the views available across the platforms.

Overall, resulting visual impacts are assessed as moderate**,** however they will form part of the ongoing pattern of upgrades and modifications to the station occurring since its construction

Modifications to the existing footbridge, stairs and ramps

With the exception of the relocation of the Platforms 3 and 4 stairs, changes proposed to the footbridge would not greatly alter the overall appearance of the structure. The demolition of the stairs to Platforms 3 and 4 and construction of new stairs would result in a small deviation from the original layout of the footbridge and would have a minor visual impact. However, the overall original form and remnant elements of the existing structure would remain legible within the station group.

Addition of the anti-throw screens would include installation of mesh panels where the footbridge is currently open. Views are currently available from the footbridge over the platforms to the station buildings and along the rail corridor in both directions. The introduction of the screens would partially restrict these views. However, as the screens are mesh they would be somewhat visually permeable, allowing these views to remain albeit in an altered state. This would have a minor visual impact on existing views.

Overall, the Proposal would likely result in a minor adverse impact on the Doonside Railway Station Group

Construction of new canopies to the platform

The length of the proposed new platform canopy on Platforms 1 and 2 would substantially change the open nature of the station platforms. It would also partially obscure some views to Station Building A from Coghlan Crescent. This would have a moderate degree of visual impact on the overall presentation of the station and on existing views to and from components of the station.

Whilst the visual impacts of this new canopy are acknowledged, it is noted that the intent of the canopy is to improve the user experience of the station and provide a greater level of weather protection than currently exists. The canopy is a relatively visually permeable structure, and would not obscure close views to and from the station buildings at ground level.

The proposed canopy to Platforms 3 and 4 is substantially smaller in scale compared to the canopy on Platforms 1 and 2 and would extend the existing canopy from the west side of the footbridge to the east. This would provide a better understanding of the east elevation and Stripped Functionalist architectural detailing of the building at the platform level noting some views would be limited by the lift shaft. Although this would alter the setting of part of the station, this canopy will not be sited immediately in view lines to the station buildings. The views to Station Building C from Doonside Crescent would be maintained. The visually permeable design would allow for the other views across the station to be largely maintained. It would have a minor to negligible visual impact.

The installation of the two new canopies and resulting changes to the presentation and setting of the station is therefore assessed to have a moderate adverse impact on the Doonside Railway Station Group.

Station building modifications

Refurbishment of existing toilet on Platforms 1 and 2

These works would result in a negligible visual impact, noting that the modification would not be readily discernible within existing views to, from or within the station.

Relocation of existing communications equipment

The proposed communication room works would impact on both non-original and original fabric of Station Building A, generally limited to the original ceiling in the booking office and waiting room. This would be a negligible visual impact.

Interchange facilities

Proposed changes to interchange facilities would not result in adverse visual impacts to the Doonside Railway Station Group.

Ancillary works

Regrading and resurfacing station platforms

The platform surface would be reinstated to match existing upon completion of the works, with the platform TGSI also installed to match the existing where they are required. This would not have an adverse visual impact to the Doonside Railway Station Group.

Regrading and resurfacing areas impacted by construction activities

The works would restore the ground surfacing in the station and generally match the existing and surrounding surfaces. This would not have a visual impact to the Doonside Railway Station Group.

Stormwater drainage connections

Following completion of the works, the drainage system would not be visible to customers or other users of the station, with the area of trenching made good as identified above. These works would not result in an adverse visual impact to the Doonside Railway Station Group.

Upgrade to the existing power supply

The installation of the new padmount transformer would introduce an isolated new element within the station setting. This would form part of the evolving infrastructure added to the station as it has been upgraded over the years and will not obscure views to the station buildings. This would have a minor to negligible visual impact Doonside Railway Station Group.

Lighting, security and communication system upgrades

The introduction of new cable routes to the exterior walls of the station building platform face may result in a minor adverse visual impact and should be avoided.

Wayfinding signage

The new wayfinding signs would match the existing signage present within the Proposal area. New signage would be free standing or attached to non- significant elements within the Doonside Railway Station Group. New signage would therefore not result in any adverse visual or physical impacts.

6.5.3 Mitigation measures

A number of mitigation measures are proposed to minimise the heritage impact of the Proposal on the Doonside Railway Station Group, including:

- a schedule of significant original fabric should be prepared for the station building, particularly internal spaces where the Proposal would remove, alter or require penetrations to existing walls or fixtures and fittings to inform detailed design and endure avoidance of significant fabric wherever possible
- an appropriate materials and colour palette would be selected for the new elements included in the Proposal. This would be done with consideration of the Sydney Trains standard colour schemes for heritage railway stations, noting the applicable colours that Doonside Railway Station would receive when repainted
- the impacts of the proposed new platform canopy would be reduced through refinement of the structural design. This would explore opportunities to reduce the bulk of structural support systems, ensuring all footings are embedded in the platform, as well as selection of lightweight materials which minimise visual impacts of the new canopy. This design development process would be undertaken with design input from a heritage consultant as well as consultation with the Transport for NSW heritage team. Endorsement on the design for the canopies should be sought from the Transport for NSW heritage team at the Critical Design Review (CDR) stage and prior to the development of construction documentation
- where possible opportunities would be explored to reinstate removed original fabric. This would include the use of sympathetic new elements or replicating details such as doors and windows as specified in the original designs
- opportunities would be considered to provide better visibility of the moveable heritage items currently in place at the station. This would be done with consideration of security requirements as well as customer use of the station
- proposed new work would be undertaken with consideration of The Stripped Functionalist architectural style of the station. The proposed elements would be sympathetic to the original building design, and seek to emphasise key details whilst not overwhelming or detracting from this architectural style
- upgrades to any services should seek to use existing cable routes or penetrations through significant elements of the station group. This should be undertaken in accordance with the Sydney Trains Heritage Technical Note*: Installation of New Electrical and Data Services at Heritage Sites*

- details of the temporary enabling works should be confirmed and reviewed to ensure to additional impacts may result from the required works. This should include reviewed visual and physical impacts
- preparation of a heritage interpretation plan in accordance with Sydney Trains Interpretation Guideline. This should be implemented as part of the detailed design and construction documentation for the Proposal
- a photographic archival recording would be prepared for Doonside Railway Station Group prior to the commencement of works, including any temporary works or site investigations. This would capture the areas of the station affected by the Proposal
- review of moveable heritage collection at the station should be undertaken prior to works to confirm their current location. Any identified items should be tagged and protected during the works. Protection methods for the moveable heritage collection should be endorsed by the TfNSW heritage team prior to the commencement of any works on site. No items should be moved without prior agreement from Transport for NSW's heritage team to ensure accurate records of the collection can be maintained
- an audit of the movable heritage collection should be undertaken following completion of works to ensure no damage or loss of objects has occurred
- all project team members, including contractors, would be provided with a heritage induction as part of the general site induction package. The induction would identify why the Doonside Station Group is significant, their obligations under the Heritage Act and environmental management process relating to unexpected finds, design revisions identified during construction and protection methods to be used during construction to prevent accidental damage during construction works
- significant elements of the station group would be adequately protected during the works. This could include physical barriers, exclusion zones or other methods as appropriate to ensure accidental damage would not occur during the works
- regrading of the platform should be completed so that no significant or original features along the platform are impacted. This includes the boot scrapers and the light poles, which are contributory elements to the station group
- adequate drainage and ventilation to the station building would be maintained during platform regrading. Vents to the lower section of walls are to remain free from debris at the end of the regrading works. No asphalt or other materials would be built up directly against the station building
- In accordance with section 170a of the Heritage Act, Sydney Trains should provide notification of the work to Heritage Division 14 days prior to the commencement of the work
- in the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2019b) would be followed, and work within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Senior Manager Environment and Sustainability so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and Heritage NSW. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to work recommencing at the location
- A suitably qualified heritage architect would be engaged from the detailed design phase through to construction to ensure compliance with the relevant heritage approvals, and to further minimise the impact of the Proposal through the use of appropriate form, proportion and materials.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.6 Socio-economic impacts

6.6.1 Existing environment

Overview

The Proposal is located in the suburb of Doonside in the Blacktown LGA. Doonside is located between the suburbs of Blacktown and Rooty Hill. It is approximately 38 kilometres west of Central Station.

Doonside Station is zoned SP2 – Infrastructure (rail), with surrounding land use zones mainly comprised of R2 – Low Density Residential zones. Other nearby land use zones include B2 – Local Centre which incorporates the shops on Hill End Road featuring a range of small-scale retail and food and drink premises, B1 – Neighbourhood Centre and SP2 Infrastructure (educational establishment) (Doonside Public School).

Sensitive receivers that have the potential to be affected by the Proposal include:

- residential receivers, particularly those located adjacent to the railway corridor on Eastwood Lane, Illoura Place, Omaroo Avenue, Doonside Road and Coghlan Crescent
- local businesses surrounding Doonside Station, particularly those located on Hill End Road and the general store located on Doonside Road
- students and staff at Doonside Public School
- commuters including train passengers using Doonside Station.

Demographics

There are 22,530 people living within the 2767 postal code area which is comprised of the suburbs of Doonside, Woodcroft and Bungaribee. The median age of people living in 2767 is 34 with 2,214 people aged over 65 and 1,560 aged 0-4 years (Australian Bureau of Statistics (ABS), 2016). In total, 2,629 people travel to work via public transport services, made up of 1,529 via train, 378 via train and bus and 230 via train and car as a driver (ABS, 2016).

Our Blacktown 2036 – Our Vision, Our Plan

Our Blacktown 2036 is the primary community strategic plan for the Blacktown LGA. It provides a roadmap and strategic direction for how Blacktown City Council wants to develop its community now and into the future. It contains six strategic directions which are intended to guide Council in doing what they set out to do. Those are:

- a vibrant and inclusive city
- a clean, sustainable and healthy environment
- a smart and prosperous economy
- a growing city supported by accessible infrastructure
- a sporting and active city
- a leading city.

The Proposal meets several community outcomes of *Our Blacktown 2036* through the delivery of accessible public transport infrastructure at a railway station located one stop from the Blacktown LGA's main hub of Blacktown. The plan has a strong focus on accessible services including public transport infrastructure. The Proposal is an enabler of those objectives of this community plan.

6.6.2 Potential impacts

a) Construction phase

The construction phase of the Proposal would temporarily impact nearby sensitive receivers, commuters, pedestrians, motorists, businesses and Doonside Public School because of:

- temporary changes to pedestrian movements around Doonside Station and across the railway corridor
- temporary impacts to local traffic movements, particularly as a result of increased heavy vehicle movements in the area
- temporary restrictions on pedestrian movement on the station platforms
- temporary reduction of parking in the area
- temporary closure of Eastwood Lane
- generation of construction noise and dust
- visual impacts during construction.

The above community impacts would be short term and reduced through mitigation measures detailed in Sections 6.1.3, 6.2.3, 6.3.3 and 6.10.3. Because of the short-term nature of the impacts to receiver amenity, the overall impact is considered to be minor.

Station access would be maintained at all times during construction, except during scheduled rail shutdowns. This would include access to the pedestrian footbridge connecting the northern and southern side of the railway corridor. The closure of the footbridge is required to occur during works that present risks to pedestrians that use the bridge. Those works include the replacement of the stairs to Platforms 3 and 4, installation of the lifts and the replacement of the existing footbridge canopy. It is acknowledged that this would require pedestrians to travel up to an additional two kilometres via active transport routes or seek alternate transport arrangements. The impact of this is considered to be moderate, with mitigation measures detailed in Section 6.1.3.

The open space/seating area located at the corner of Coghlan Crescent and Cross Street would not be accessible during construction to facilitate a construction laydown area. This would reduce the ability for members of the community to use this space for recreational or other purposes. This impact would be temporary and is considered to be minor.

As well as the above adverse impacts, the construction phase of the Proposal may have a positive impact to the local economy, particularly the nearby shops on Hill End and Doonside Road. The increase of construction workers may generate demand for goods and services from those shops. This impact is considered to be minor.

b) Operational phase

The operational phase of the Proposal would provide the following impacts to the Doonside and the wider 2767 community:

- improved access to the station via lifts to the footbridge and platforms
- improved amenity of the station
- increased weather protection on both island platforms
- improved safety and security features including CCTV, wayfinding, regraded surfaces and handrails
- improved interchange facilities
- potential economic improvements to surrounding businesses because of increased patronage to the station as a result of increased accessibility.

6.6.3 Mitigation measures

A number of mitigation measures would be implemented to reduce potential adverse impacts on the community. Those measures are focussed on keeping the community informed and include:

- measures to avoid amenity impacts (noise, air quality and visual) as detailed in Section 7.2
- sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal
- feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable
- 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
- contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase
- the community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.7 Biodiversity

This section provides a summary of the Biodiversity Assessment prepared by Umwelt (2021b). The methodologies used to undertake these assessments are provided in section 2 of that assessment. It is noted a site visit could not be undertaken due to COVID-19 restrictions.

6.7.1 Existing environment

The Proposal area is characterised by degraded patches of exotic vegetation or street plantings. A total of 0.17 ha of Urban Exotic/Native vegetation was mapped as occurring within the Proposal area (Figure 6-12). No listed native Plant Community Types (PCTs) were identified occurring within the Proposal area. As no native vegetation communities were identified in the Proposal area, no TECs listed under either the BC Act or EPBC Act occur within the Proposal area. However, a large patch of remnant woodland is located 350 metres to the west of the Proposal.

Flora

Ten threatened flora species have been identified and recorded to occur within ten kilometres of the Proposal area. Each of these species was assessed as having a low likelihood of occurrence due to the absence of potential habitat with only exotic/urban habitat being mapped within the Proposal boundaries.

Fauna

No threatened fauna habitat was identified with the potential for threatened species to utilise within the Proposal area. Hollow-bearing trees were absent, however, threatened microbat species may utilise cracks in concrete and small openings in buildings as roosting sites, but this is unlikely due to the excessive noise created by traffic and trains passing through Doonside Station.

Planted trees located within the Proposal area have the potential to provide some limited foraging opportunities for birds such as the swift parrot. Woodland bird species may also utilise the vegetation located along Coghlan Crescent.

Migratory Species

The Proposal area may provide limited habitat for migratory bird species with the neighbouring Nurragingy Reserve potentially also providing suitable habitat. These bird species may utilise the airspace above the Proposal area as they migrate up and down the coast, stopping to rest or forage at Nurragingy Reserve.

Legend

- Proposal Area
- Development Footprint
- Laydown Area
- Construction Compound
- Urban Exotic / Native Vegetation
- Railway Line

Image Source: Nearmap (Jun 2021) Data source: NSW DFSI (2020)

FIGURE 6-12

Biodiversity identified within proximity of Proposal

6.7.2 Potential impacts

a) Construction phase

Vegetation Impacts

The Proposal would directly impact up to 0.04 hectares of the Urban Exotic/Native vegetation community.

The potential laydown area at the small park on Cross Street and Coghlan Crescent would directly impact the Urban Exotic/Native vegetation community through the removal of two street trees and garden beds (Figure 6-13). Due to COVID-19 lockdown and travel restrictions between LGAs these trees have not been identified on site.

Figure 6-13 Trees proposed to be removed by the Proposal

Flora Impacts

The Proposal area does not contain suitable habitat for any threatened flora species known or predicted to occur within 10 kilometres of the Proposal area. No threatened flora species are expected to be directly impacted by the proposed works.

No vegetation is expected to be cleared for the proposed construction compound/laydown areas. However, the proximity of construction laydown areas and construction compounds would likely require the trimming of vegetation within and adjacent to those areas. The exact extent of trimming would be further refined during the detailed design phase. Trees adjacent to and within construction compound/laydown areas would require protection according to *AS 4970-2009 Protection of Trees on Development Sites*.

Fauna Impacts

It is predicted the removal of street trees would result in the loss of marginal foraging habitat for threatened bird and bat species that may utilise the airspace above the Proposal area. However it is expected the construction of the Proposal would have negligible impact on threatened fauna species due to the absence of suitable habitat.

Indirect Impacts

There is the potential for light, noise and vibrations to have an indirect impact on biodiversity. This could have an impact on the health and behaviour of fauna foraging in vegetation within or near the Proposal area. Given these impacts are already generated by traffic and frequently passing trains, it is unlikely the proposed construction activities will result in additional impacts on biodiversity.

The Proposal is not likely to impact any Priority Weeds listed under the *Biosecurity Act 2015* for the Greater Sydney Region in terms of posing risks to surrounding areas of native vegetation.

b) Operational phase

The operation of the Proposal is not likely to impact biodiversity in the local or wider region.

6.7.3 Mitigation measures

The following mitigation measures are proposed to manage the potential biodiversity impacts of the Proposal:

- construction of the Proposal must be undertaken in accordance with Transport for NSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019c) and Transport for NSW's *Fauna Management Guideline* (TfNSW, 2019d).
- all workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity
- disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Ecological Impact Assessment (Umwelt, 2021b) 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
- Tree Protection Zones (TPZs) would be established around trees adjacent to and within construction laydown/compound areas. Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs
- in the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment and Sustainability Officer to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible
- should the detailed design or onsite work determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval
- for new landscaping work, mulching and watering would be undertaken until plants are established

- weed control measures, consistent with Transport for NSW's *Weed Management and Disposal Guideline* (TfNSW, 2019e), 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 *Biosecurity Act 2015*
- to avoid disturbance to bird and bat species, where possible machinery should be operated during daylight hours when the noise and vibrations caused by construction activities are masked by those generated by passing trains and traffic
- in accordance with the Transport for NSW *Vegetation Offset Guide*, a maximum of eight trees would be planted to offset the clearing of the two trees currently occurring on site which have been precautionarily assessed in the 15 centimetre to 60 centimetre DBH size class
- the trees proposed to be removed would be identified on site by a suitably qualified arborist to confirm the species of the trees and their DBH.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.8 Contamination, landform, geology and soils

A Preliminary Contamination Assessment (Contamination Report) was undertaken during the design phase of the Proposal (SMEC, 2021). The Contamination Report involved a desktop study of the Proposal area, a site walkover survey and opportunistic, limited soil sampling.

6.8.1 Existing environment

Landform, geology and soils

Reference to the New South Wales Department of Finance, Services and Innovation (NSWDFSI) topographic dataset indicates that the Proposal area is relatively flat and mapped at an elevation of approximately 44 metres AHD (SMEC, 2021).

Reference to Department of Finance, Services and Innovation geological mapping indicates that the Site is underlain by Bringelly Shale of the Wianamatta Group, consisting of shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff (SMEC, 2021).

According to eSPADE v2.1 online mapping, the Proposal area is mapped as containing Blacktown Landscape soils. Constraints of soils within this landscape include localised seasonal waterlogging, localised salinity, localised foundation hazards and localised low fertility. Soil testing performed by SMEC (2021) has identified the following soil profiles:

- asphalt pavement to approximately 0.1 metres below ground level
- fill: sandy gravel or clay or clayey sand to 0.8 metres to one metre below ground level
- residual soil/alluvium to maximum of 2.3 metres below ground level
- extremely weathered material and bedrock comprising siltstone and sandstone were present beneath the fill and residual materials.

Acid sulfate soils

Reference to NSWDFSI dataset indicates that the Proposal area is located within an area mapped as 'Extremely Low Probability' of acid sulfate soil occurrence. Acid sulfate soils, if present are mapped as occurring at depths greater than three metres below ground surface (SMEC, 2021).

Contamination

A search of the List of Contaminated Sites Notified to NSW EPA as of 8 September 2021 did not identify any contaminated sites nearby the Proposal area. In addition, no results were identified in the EPA Contaminated Land – Record of Notices for the suburb of Doonside.

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

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

Given the use of the majority of the Proposal area as a rail corridor, there is potential for contaminants to be present within the soils beneath the station. Possible sources of contamination may include:

- use of fill material
- use of pesticides
- asbestos dust from brake pads
- spills of fuels, oils and chemicals.

The Contamination Report identified the following findings at Doonside Station through sampling of the soils within the rail corridor:

- no unusual odours or staining was noted within the sampled material
- evidence of asbestos containing material was not noted on the ground or below the ground
- one exceedance of the NSW 2014 General Solid Waste CT1 criteria was recorded for nickel
- all other analytical results were below the adopted assessment criteria.

6.8.2 Potential impacts

a) Construction phase

The Proposal would require excavation to allow for the installation of foundations and footings for the new lift shafts and lifts, new stairs, new canopies, platform resurfacing, resurfacing of Eastwood Lane, installation of the pedestrian crossing and trenching for the new LV feeder route.

Soil disturbance, erosion and sedimentation

- Excavation and earthworks could result in the following impacts if not appropriately managed:
- erosion of exposed soil
- dust generation from excavation and vehicle movements over exposed soil
- increase to sediments and soils entering stormwater systems and/or local runoff.

Such impacts can affect the amenity of sensitive receivers and lead to adverse impacts on biodiversity, particularly through the introduction of sediment and soils into waterways. Those impacts are anticipated to be minor as the extent of ground disturbance work is limited and can be managed through the implementation of appropriate mitigation measures.

Contamination

Excavation and other earthworks may expose contaminants not previously identified during the field sampling undertaken as part of the Contamination Report. If not appropriately managed, this can pose a health risk to construction works and the community as well as risks to biodiversity values if contaminants enter nearby waterways through stormwater infrastructure.

Although field sampling did not identify sources of contamination, excluding the single exceedance of Nickel, the nature of the majority of the Proposal area as a railway corridor creates potential for contaminated material to be present beneath the surface. Disturbance and mobilisation of contaminated material through excavation and earthworks can result in environmental and human health impacts. Through the use of appropriate mitigation measures and from the findings of the field investigations, the overall impact associated with contamination is considered to be minor.

b) Operational phase

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

6.8.3 Mitigation measures

The following mitigation measures are proposed regarding potential soil and contamination impacts:

- prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction
- erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised
- vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area
- in the event of a pollution incident, works would cease in the immediate vicinity and the Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment & Sustainability Officer. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act
- the CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:
    - identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities
    - detail other onsite management practices such as keeping areas free of rubbish
    - specify controls and containment procedures for hazardous waste and asbestos waste

- outline the reporting regime for collating construction waste data.

- an appropriate unexpected contamination finds protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements
- all spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility
- all spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying Waste* (EPA, 2014) prior to disposal
- any concrete washout would be established and maintained in accordance with the Transport for NSW Concrete Washout Guideline – draft (TfNSW, 2019f) with details included in the CEMP and location marked on the environmental controls map (ECM).

Refer to Table 7-1 for a list of proposed mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water and flooding

The Proposal area is located within the Eastern Creek catchment. The closest waterway is Eastern Creek, which is located approximately 700 metres west of the Proposal area. According to the Blacktown City Council *Waterway health report card 2019 to 2020*, the southern and northern areas of Eastern Creek received a score of C (fair) which means that water quality indicators are within guideline limits 70% of the time. However, those monitoring sites are located a considerable distance from the Proposal area. Relevantly closer monitoring sites for creeks that are tributaries for Eastern Creek include Angus Creek (1000 metres west) and Bungarribee Creek (1300 metres south). Both of those sites received a score of D (poor) meaning that water quality indicators are within guideline limits less than 50% of the time.

Surface water within and nearby the Proposal area is managed by the Council stormwater drainage system, consisting mainly of kerb and gutter drainage connected to an underground pipe network. That network likely feeds into Eastern Creek. Water quality within that network is likely to be consistent with water quality of urbanised catchments which are influenced by pollutants from road use, litter, vegetation waste and household products. This is reinforced through the results of the quality of Bungaribee Creek and Angus Creek, both of which score poor ratings.

A review of the *Eastern Creek Catchment Hydraulic Assessment* (Blacktown City Council, 2014) indicates that the Proposal Area would not be affected by a probable maximum flood event.

Groundwater

SMEC (2021) highlights that according to the Australian Groundwater Explorer website, there are no recorded groundwater bores located within 500 metres of the Proposal area. There is limited publicly available groundwater data for the area nearby the Proposal area, so the depth to groundwater is difficult to estimate. Based on local topography, if groundwater is present, it is likely to flow in a westerly direction.

During fieldworks, no groundwater was observed at depths of up to 8.84 metres below the surface (SMEC, 2021).

6.9.2 Potential impacts

a) Construction phase

Primary impacts to water quality and hydrology would arise from excavation and other earthworks during the construction phase, as well as works that require the use of fuels, oils and other chemicals. Without appropriate mitigation measures in place, pollutants that include sediments and soils, fuels, oils, chemicals and wastewater or any combination of those items have the potential to enter the nearby stormwater network and flow into receiving waterways. The extent of impact would depend on the type of pollutant(s) and the concentration of that pollutant(s) and the existing quality of the receiving waterways. With appropriate mitigation measures in place, pollutant runoff associated with the construction phase of the Proposal would be controlled, causing impacts to be minor should they occur.

While groundwater levels were not determined as part of this assessment, areas of excavation may need to be locally dewatered as a result of groundwater seepage or rainfall runoff into excavated areas. Incorrect dewatering may pose a risk to nearby waterways where run-off travels from site to those areas.

It is not likely that the construction phase would result in impacts to flooding.

b) Operational phase

The Proposal is unlikely to materially alter the hydrology of the surrounding area as the overall impermeable surface area would not change. The existing stormwater system would continue to manage surface water around the station.

6.9.3 Mitigation measures

An Erosion and Sediment Control Plan in accordance with the requirements of the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) would be prepared and implemented for the Proposal to manage risks to water quality. This would include specific controls to protect the stormwater network around Doonside Station, including:

- 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 Transport for NSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019g) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill
- in the event of a pollution incident, works would cease in the immediate vicinity and the Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment & Sustainability Officer. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act
- should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and Transport for NSW's *Water Discharge and Reuse Guideline* (TfNSW, 2019h)
- the DPIE - Water would be consulted and the need for any water licences would be confirmed prior to the commencement of construction by the construction contractor
- the existing drainage systems would remain operational throughout the construction phase
- plant and equipment would be regularly inspected to check for oil leaks
- if refuelling is deemed necessary, refuelling of vehicles or machinery would occur within a hardstand area designed to prevent the escape of spilled substances to the surrounding environment

- any concrete washout would be established and maintained in accordance with Transport for NSW's *Concrete Washout Guideline* (TfNSW, 201f) with details included in the CEMP and location marked on the ECM.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.10 Air quality

6.10.1 Existing environment

Regional air quality

The DPIE manages a network of air quality monitoring stations throughout NSW. The Proposal is positioned between air quality monitoring stations located at Prospect and St Marys, which are considered to be representative of the air quality at the Proposal area.

Between 1 January 2021 and 15 September 2021, the daily site air quality index parameters for the Prospect and St Marys monitoring stations were rated as "Good" to "Fair" on all days except for the following:

- 23 April 2021 – poor visibility at the St Marys monitoring station
- 4 May 2021 – poor visibility, poor PM_{10}, very poor $PM_{2.5}$ at the St Marys monitoring station and poor visibility at the Prospect monitoring station
- 20 August 2021 – poor visibility at the St Marys monitoring station
- 21 August 2021 – poor visibility and poor $PM_{2.5}$ at the Prospect monitoring station.

Air pollutant sources

Based on existing land uses around the Proposal area, the existing air quality environment is considered to be characteristic of a suburban environment. Typical sources of pollutants include motor vehicle emissions, use of plant and machinery and wood-fire burning.

Sensitive receivers

Sensitive receivers near the Proposal include:

- residential receivers, particularly those located adjacent to the railway corridor on Eastwood Lane, Illoura Place, Omaroo Avenue, Doonside Road and Coghlan Crescent
- local businesses surrounding Doonside Station, particularly those located on Hill End Road and the general store located on Doonside Road
- students and staff at Doonside Public School
- commuters including train passengers using Doonside Station.

6.10.2 Potential impacts

a) Construction phase

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

Those emissions are likely to be generated from the following works:

- excavation for the new lifts, stairs and canopies
- trenching for the new LV cable route

- regrading of platform surfaces
- regrading of Eastwood Lane
- stockpiling activities
- creation of the new pedestrian crossing
- dust generated from the loading and transfer of material from trucks
- other general construction works.

The overall anticipated impact on air quality during the construction phase would be minor as the Proposal would not involve extensive excavation or earthworks that would typically generate a large volume of dust.

b) Operational phase

The Proposal would not change the use of Doonside Station as a train station or change the frequency of l train services. Therefore, there would be no impacts to the existing air quality during operation of the Proposal.

As the Proposal would improve the accessibility of Doonside Station, it may result in an overall increase in the use of public transport, and potentially decrease the use of motor vehicles for some members of the local community. Overall, this has the potential to improve air quality.

6.10.3 Mitigation measures

The following mitigation measures are proposed to manage the potential air quality impacts:

- air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's *Air Quality Management Guideline* (TfNSW, 2019i)
- methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks
- plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling
- vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable
- to minimise the generation of dust from construction activities, the following measures would be implemented:
    - apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces)
    - cover stockpiles when not in use
    - appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading
    - prevent mud and dirt being tracked onto sealed road surfaces.

Refer to Table 7-1 for a list of proposed mitigation measures.

6.11 Waste

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

- excavated spoil
- asphalt and concrete

- surplus building materials and building waste
- electrical wiring and conduit waste
- hazardous waste (chemicals and potentially asbestos)
- green waste
- general waste including food scraps.

Waste management would be undertaken in accordance with the WARR Act. A Waste Management Plan would be prepared to identify all potential waste streams associated with the work and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping the area tidy and free of rubbish.

The handling, storage, transport and disposal of asbestos and hazardous waste (including any lead waste) would be in accordance with the requirements of relevant EPA and Safe Work NSW guidelines. Waste management targets in consideration of the Infrastructure Sustainability Rating Scheme – Version 1.2 (IS Council, 2018) would be developed for the Proposal and would include reuse and recycling.

6.12 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 IS Council Infrastructure Sustainability Rating Tool Version 1.2 and the Transport for NSW Environmental Management System (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.3.3 for more information regarding the application of these guidelines.

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

6.13 Climate change

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

Climate change could lead to an increase in the intensity of rainfall events, whereby the rainfall excepted to occur in a 100-year average recurrence interval flood event would occur more frequently. Such changes in weather in the region are unlikely to affect the operation of the Proposal with respect to flooding as the Proposal area is positioned outside of a modelled flood impact area for the probable maximum flood event which represents a more severe flood event compared to the 100-year average recurrence interval flood event. The Proposal itself is not likely to contribute to negative climate change impacts.

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

The detailed design would consider the impacts of climate change on the Proposal through:

- undertaking a hydrological assessment to ensure that the proposed infrastructure would not increase the potential flooding within the Proposal site
- selecting materials for durability in extreme conditions and that minimise heat retention
- incorporating fire resistant/retarding materials wherever practicable

- incorporating engineering and design features to ensure structures are constructed to minimise direct impacts from severe storms and strong winds.

6.14 Greenhouse gas emissions

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

The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW's *Carbon Estimate and Reporting Tool Manual* (TfNSW, 2019j) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction. Greenhouse gas emissions would also be assessed in accordance with the IS Council IS Rating Tool V1.2.

Due to the small scale of the Proposal and the short term temporary nature of the individual construction work, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Table 7-1.

It is anticipated that, once operational, the Proposal may result in an increase in use of public transport and a relative decrease in use of private motor vehicles by commuters to travel to and from Doonside. A modal shift in transport usage may reduce the amount of fuel consumed by private motor vehicles with a corresponding relative reduction in associated greenhouse gas emissions in the local area.

6.15 Cumulative impacts

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

A search of the Department of Planning and Environment's Major Projects Register, Sydney Central City Joint Regional Planning Panel Development and Planning Register, and Blacktown Council Development Application Register on 16 September 2021 identified two developments that may have cumulative impacts with the Proposal.

SPP-21-00005, development of the International Centre for Training Excellence (ICTE) Academy Accommodation at 81 Eastern Road, Rooty Hill has the potential to create cumulative impacts associated with the movement of heavy vehicles. The location of this development has enough separation from the Proposal to not result in cumulative noise, air quality and other amenity issues. It is likely that vehicles would use the same routes along Eastern Road, Doonside Road and Knox Road.

SPP-16-04468, development of a Homicide Victims Support Centre at 38 Doonside Road, Doonside is currently under construction, approximately 400 metres from the Proposal area. The majority of the earthworks for this development have been completed so cumulative dust impacts are likely to be low. The key cumulative impacts between this development and the Proposal would be noise and traffic, particularly for residents on Doonside Road, Kareela Street, Taworri Street, Yaruga Avenue, Wangara Street, Weemala Avenue, Omaroo Avenue, Baranabali Street, Illoura Place and Eastwood Lane.

During construction, the work would be coordinated with any other construction activities in the area, including SPP-16-04468. Consultation and liaison would occur with Blacktown City Council, TAHE/Sydney Trains, and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

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

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

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

7 Environmental management

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

7.1 Environmental management plans

A CEMP for the construction phase of the Proposal would be prepared in accordance with the requirements of Transport for NSW's EMS. The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

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

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in Table 7-1. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 7-1 Proposed mitigation measures

No.	Mitigation measure
General	
1.	A CEMP would be prepared by the Contractor in accordance with the relevant requirements of *Environmental Management Plan Guideline – Guideline for Infrastructure Projects,* NSW Department of Planning, Industry and Environment, 2020) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An ECM would be developed by the Contractor in accordance with Transport for NSW's *Guide to Environmental Controls Map* (TfNSW, 2019k) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
6.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.

No.	Mitigation measure
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by Transport for NSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
Traffic and site access	
8.	Prior to the commencement of construction, a CTMP would be prepared as part of the CEMP and in accordance with relevant guidelines. The CTMP would outline how construction of the Proposal would avoid, mitigate and manage risks involving construction activities, users of the traffic and transport network and local residents. The CTMP would include at a minimum: • ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised • maximising safety and accessibility for pedestrians and cyclists • ensuring adequate sight lines to allow for safe entry and exit from the site • ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off street parking and requirements for any temporary replacement provision • parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP. 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.
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 work.
10.	Road Occupancy Licences for temporary road closures would be obtained, where required.
11.	Investigation into alternative parking arrangements would be carried out in consultation with Blacktown Council prior to the commencement of construction.
12.	Construction workers would be encouraged to carpool or use other forms of transport to travel to and from the constriction compound, to minimise parking impacts on commuters, residents and the general public.
13.	Adequate information would be provided to affected bus customers if bus stops on Cross Street, Doonside Road and School Parade are relocated during construction, and would include advanced notification and appropriate signage to alternative bus stops.
14.	A drive-through assessment or swept path analysis would be carried out to ensure that sufficient manoeuvring space is provided for the largest design vehicle along the proposed haulage routes.

No.	Mitigation measure
15.	TGSs would be developed for construction works that require lane closures such as on Cross Street, Doonside Road or School Parade. TGS implementation would ensure adequate warning and guidance is provided to road users, minimising road related traffic impacts.
16.	Access between Doonside Station and the transport network would be maintained during typical construction periods outside of rail shutdown periods.
17.	Directional signage and/or linemarking would be used to direct and guide drivers, cyclists and pedestrians past construction compounds and on the surrounding road network.
18.	Deliveries to the proposed construction compound on School Parade would be limited to hours outside of the operation of the school zone.
19.	Adequate information would be provided to affected pedestrians during scheduled closures of the Doonside Station footbridge including advanced notification and appropriate wayfinding and directional signage along detour routes.
20.	Alternative transport options for impacted pedestrians due to the closure of the Doonside Station footbridge would be considered in consultation with Blacktown City Council. For example: • offering of a shuttle service between the northern and southern sides of Doonside Station.
21.	Signage would be provided to redirect impacted users to alternative facilities if existing kiss and ride or taxi zones are temporarily closed.
Urban design, landscape and visual amenity	
22.	An UDLP for the Project shall be prepared and submitted to Transport for NSW for endorsement by the Precincts and Urban Design Team. The UDLP is to address the fundamental design principles as outlined in '*Around the Tracks' – urban design for heavy and light rail* (TfNSW, Interim 2016). At a minimum, the UDLP shall: a) demonstrate a robust understanding of the Project site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances b) identify opportunities and challenges c) establish site-specific principles to guide and test design options d) 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. The UDLP is to include the Public Domain Plan for the chosen option and shall provide analysis of the: (i) landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art (ii) materials schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping (iii) an Artist's Impression or Photomontage to communicate the proposed changes to the precinct. The following design guidelines are available to assist and inform the UDLP for the Project: • *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)

No.	Mitigation measure
	• *Water Sensitive Urban Design Guideline SD-106* (TfNSW, 2017). The UDLP shall be : 1. prepared in consultation with councils and relevant stakeholders 2. prepared by a registered architect and/or landscape architect 3. prepared to inform/support the concept design and submitted to Transport for NSW for review at this design milestone 4. finalised and submitted to Transport for NSW at the completion of design documentation.
23.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting.*
24.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
25.	Worksite compounds and laydown areas would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
26.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
27.	During construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements.
28.	Options to reduce different fence types and 'doubling up' of fences on the footbridge would be investigated.
29.	The use of dark coloured fencing would be investigated during detailed design.
30.	The final colour scheme would be chosen to complement the existing blue balustrading on the ramps and footbridge opportunities to provide additional public seating around the southern access to improve amenity for station users and the general public would be investigated.
Noise and vibration	
31.	Prior to commencement of work, a CNVMP would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Strategy* (TfNSW, 2019a) and the Noise and Vibration Impact Assessment for the Proposal (Umwelt, 2021a). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
32.	The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include: • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • avoiding any unnecessary noise when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks • avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable

No.	Mitigation measure
	• switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded • avoiding deliveries at night/evenings wherever practicable • no idling of delivery trucks • keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.
33.	The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include: • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction work 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 work use of quieter and less vibration emitting construction methods where feasible and reasonable.
34.	Standard noise mitigation and management measures described in section 8.1 of the CNVS (TfNSW, 2019a) be implemented for all construction activities at the site.
35.	Additional noise mitigation management measures described in section 8.2 of the CNVS be implemented to the reduce noise impact where feasible and reasonable.
36.	Vibration generating construction equipment not be used within the minimum working distances specified in Table 20 'Recommended minimum working distances from vibration intensive plant', Appendix D, CNVS.
37.	The largest size vibratory roller that should be used should have maximum of 300 kN, and weigh less than typically less than 18 tonnes.
38.	The largest size hydraulic hammers that should be used should be less than an 18 t excavator.
39.	Vibratory pile driving should be avoided less than 20 m from a receiver structure.
40.	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 Transport for NSW or authorised under the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020* (whilst the Order is in effect), and the community is notified prior to these work commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the Transport for NSW Senior Environment & Sustainability Officer for any work outside normal hours.
41.	Alternative accommodation options may be offered to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels.

No.	Mitigation measure
42.	Out of hours work during evening and night periods will be restricted so that receivers are impacted for no more than three consecutive evenings and no more than two consecutive nights in the same NCA in any one week, except where there is a Duration Respite. A minimum respite period of four evenings/five nights shall be implemented between periods of evening and/or night works.
43.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed work would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (Umwelt, 2021) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
44.	Notification within a minimum of seven days prior to the start of works would be provided to local residents and local businesses in particular sensitive receivers to advise of upcoming works and potential disruptions.
45.	Verification monitoring of noise and/or vibration levels during construction would be undertaken in the form of routine checks of noise levels or following reasonable complaints, conducted at the affected receiver(s) or a nominated representative location.
46.	Respite Offers should be considered made where there are high noise and vibration generating activities near receivers.
47.	Where respite periods are considered counterproductive in reducing impact and where it can be strongly justified on a project-by-project basis, the number of evenings and/or nights worked may be increased through duration reduction so that the project can be completed more quickly.
48.	Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory work including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the work and all heritage listed buildings and other sensitive structures within 150 metres of the work (unless otherwise determined following additional assessment they are not likely to be adversely affected).
49.	Affected pre-schools, schools, universities and other identified sensitive receivers would be consulted in relation to noise mitigation measures to identify any noise sensitive periods, e.g. exam periods. As much as reasonably possible noise intensive construction work in the vicinity of affected educational buildings are to be minimised.
Aboriginal heritage	
50.	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.
51.	If unforeseen Aboriginal objects are uncovered during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2019b) would be followed, and work within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment & Sustainability Officer so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, Heritage NSW and the Local Aboriginal Land Council.
52.	If human remains are found, work would cease, the site secured and the NSW Police and Heritage NSW notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to work recommencing at the location.

No.	Mitigation measure
Non-Aboriginal heritage	
53.	A schedule of significant original fabric should be prepared for the station building, particularly internal spaces where the Proposal would remove, alter or require penetrations to existing walls or fixtures and fittings.
54.	An appropriate materials and colour palette would be selected for the new elements included in the Proposal. This would be done in accordance with Sydney Trains standard colour schemes for heritage railway stations.
55.	The impacts of the proposed new platform canopy would be reduced through refinement of the structural design. This would explore opportunities to reduce the bulk of structural support systems, ensuring all footings are embedded in the platform, as well as selection of lightweight materials which minimise visual impacts of the new canopy. This design development process would be undertaken with design input from a heritage consultant as well as consultation with the Transport for NSW heritage team. Endorsement on the design for the canopies should be sought from the Transport for NSW heritage team at the Critical Design Review (CDR) stage and prior to the development of construction documentation.
56.	Where possible opportunities would be explored to reinstate removed original fabric. This would include the use of sympathetic new elements or replicating details such as doors and windows as specified in the original designs.
57.	Opportunities would be considered to provide better visibility of the moveable heritage items currently in place at the station. This would be done with consideration of security requirements as well as customer use of the station.
58.	Proposed new work would be undertaken with consideration of The Stripped Functionalist architectural style of the station. The proposed elements would be sympathetic to the original building design, and seek to emphasise key details whilst not overwhelming or detracting from this architectural style.
59.	Upgrades to any services should seek to use existing cable routes or penetrations through significant elements of the station group. This should be undertaken in accordance with the Sydney Trains Heritage Technical Note*: Installation of New Electrical and Data Services at Heritage Sites.*
60.	Details of the temporary enabling works should be confirmed and reviewed to ensure to additional impacts may result from the required works. This should include reviewed visual and physical impacts.
61.	Preparation of an heritage interpretation plan in accordance with Sydney Trains Interpretation Guideline. This should be implemented as part of the detailed design and construction documentation for the Proposal.
62.	A photographic archival recording would be prepared for Doonside Railway Station Group prior to the commencement of works, including any temporary works or site investigations. This would capture the areas of the station affected by the Proposal.
63.	Review of moveable heritage collection at the station should be undertaken prior to works to confirm their current location. Any identified items should be tagged and protected during the works. Protection methods for the moveable heritage collection should be endorsed by the TfNSW heritage team prior to the commencement of any works on site. No items should be moved without prior agreement from Transport for NSW's heritage team to ensure accurate records of the collection can be maintained.
64.	An audit of the movable heritage collection should be undertaken following completion of works to ensure no damage or loss of objects has occurred.

No.	Mitigation measure
65.	All project team members, including contractors, would be provided with a heritage induction as part of the general site induction package. The induction would identify why the Doonside Station Group is significant, their obligations under the Heritage Act 1977 and environmental management process relating to unexpected finds, design revisions identified during construction and protection methods to be used during construction to prevent accidental damage during construction works.
66.	Significant elements of the station group would be adequately protected during the works. This could include physical barriers, exclusion zones or other methods as appropriate to ensure accidental damage would not occur during the works.
67.	Regrading of the platform should be completed so that no significant or original features along the platform are impacted. This includes the boot scrapers and the light poles, which are contributory elements to the station group.
68.	Adequate drainage and ventilation to the station building would be maintained during platform regrading. Vents to the lower section of walls are to remain free from debris at the end of the regrading works. No asphalt or other materials would be built up directly against the station building.
69.	In accordance with section 170a of the Heritage Act, Sydney Trains should provide notification of the work to Heritage Division 14 days prior to the commencement of the work.
70.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2019b) would be followed, and work within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Senior Environment & Sustainability Officer so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and Heritage NSW. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to work recommencing at the location.
71.	A suitably qualified heritage architect would be engaged from the detailed design phase through to construction to ensure compliance with the relevant heritage approvals, and to further minimise the impact of the Proposal through the use of appropriate form, proportion and materials.
Socio-economic	
72.	Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
73.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
74.	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.
75.	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.
76.	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.

No.	Mitigation measure
Biodiversity	
77.	Construction of the Proposal must be undertaken in accordance with Transport for NSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019c) and Transport for NSW's *Fauna Management Guideline* (TfNSW, 2019d).
78.	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.
79.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Ecological Impact Assessment (Umwelt, 2021c) 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.
80.	Tree Protection Zones (TPZs) would be established around trees adjacent to and within construction laydown/compound areas. Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs.
81.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment and Sustainability Officer to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
82.	Should the detailed design or onsite work determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval.
83.	For new landscaping work, mulching and watering would be undertaken until plants are established.
84.	Weed control measures, consistent with Transport for NSW's *Weed Management and Disposal Guideline* (TfNSW, 2019e), 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 *Biosecurity Act 2015.*
85.	To avoid disturbance to bird and bat species, where possible machinery should be operated during daylight hours when the noise and vibrations caused by construction activities are masked by those generated by passing trains and traffic.
86.	In accordance with the Transport for NSW *Vegetation Offset Guide*. eight trees will need to be planted to offset the clearing of the four trees currently occurring on site.
Soils and water	
87.	Prior to commencement of work, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of work and maintained throughout construction.

No.	Mitigation measure
88.	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 work is complete and areas are stabilised.
89.	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.
90.	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 Transport for NSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019g).
91.	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 Transport for NSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2019g) 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.
92.	In the event of a pollution incident, work would cease in the immediate vicinity and the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Senior Environment & Sustainability Officer. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.
93.	The existing drainage systems would remain operational throughout the construction phase.
94.	Should groundwater be encountered during excavation work, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and Transport for NSW's *Water Discharge and Reuse Guideline* (TfNSW, 2019h).
95.	The DPIE - Water would be consulted and the need for any water licences would be confirmed prior to the commencement of construction by the construction contractor.
96.	The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum: • identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data.
97.	An appropriate unexpected contamination finds protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements.
98.	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.
99.	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying Waste* (EPA, 2014) prior to disposal.

No.	Mitigation measure
100.	Any concrete washout would be established and maintained in accordance with the Transport for NSW Concrete Washout Guideline – draft (TfNSW, 2019f) with details included in the CEMP and location marked on the ECM.
Air quality	
101.	Air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's *Air Quality Management Guideline* (TfNSW, 2019i).
102.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
103.	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.
104.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
105.	To minimise the generation of dust from construction activities, the following measures would be implemented: • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.
Waste and contamination	
106.	The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum: • identify all potential waste streams associated with the work 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.
107.	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.
108.	All excavated spoil suitable for reuse would be reused on site and distributed as agreed with Transport for NSW and the Contractor. The reuse of excavated material would be further reviewed and confirmed during construction.
109.	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.
110.	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (EPA, 2014) prior to disposal.

No.	Mitigation measure
111.	Any concrete washout would be established and maintained in accordance with Transport for NSW's *Concrete Washout Guideline* – draft (TfNSW, 2019f) with details included in the CEMP and location marked on the ECM.
Sustainability, climate change and greenhouse gases	
112.	Detailed design and construction of the Proposal is to be undertaken in accordance with the IS Council Infrastructure Sustainability Rating Scheme (v1.2).
113.	The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW's *Carbon Estimate and Reporting Tool Manual* (Transport for NSW, 2019j) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction.
114.	The detailed design process would undertake a climate change impact assessment with reference to the Climate Change Impacts and Risk Management: A Guide for Business and Government (Department of the Environment and Heritage, 2006) and the IS Council Guidelines for Climate Change Adaptation (AGIC, 2011) to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc. would be considered in the design.
Cumulative impacts	
115.	The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP, and implemented as appropriate.

8 Conclusion

This REF has been prepared in accordance with the provisions of section 5.5 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal would provide the following benefits:

- a station that is accessible to people with a disability, limited mobility, parents/carers with prams and customers with luggage
- buildings and facilities for all means of travel that meet the needs of the local population
- modern stop and change facilities that support an integrated network and allow seamless transfers between all modes for customers
- improved safety of the existing platform and surrounds.

The likely key impacts of the Proposal are as follows:

- temporary changes to pedestrian and vehicle movements in and around Doonside Station during construction
- temporary changes to parking nearby Doonside Station
- potential sediment mobilisation and dust generation during construction
- temporary noise and vibration impacts associated with construction activities
- introduction of new built elements to the station setting

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 and Public Spaces.

The Proposal would also take into account the principles of ESD and sustainability (refer to Sections 3.3.3 and 4.3). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and reduces any adverse impacts on the environment.

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Appendix A Consideration of matters of National Environmental Significance

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

Matters of NES	Impacts
Any impact on a World Heritage property? There are no World Heritage properties nearby the Proposal area	Nil
Any impact on a National Heritage place? There are no National Heritage places nearby the Proposal area	Nil
Any impact on a wetland of international importance? There are no wetlands of international importance nearby the Proposal area	Nil
Any impact on a listed threatened species or communities? The Proposal would not result in impacts to a listed threatened species or community	Nil
Any impacts on listed migratory species? The Proposal would not result in impacts to listed migratory species	Nil
Does the Proposal involve a nuclear action (including uranium mining)? The Proposal would not involve a nuclear action	Nil
Any impact on a Commonwealth marine area? There are no Commonwealth marine areas nearby the Proposal area	Nil
Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Proposal would not involve the development of coal seam gas and/or a large coal mine	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? There are no parcels of Commonwealth land nearby the Proposal area	Nil

Appendix B Consideration of clause 228

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

Factor	Impacts
(a) Any environmental impact on a community? During its construction phase, the Proposal would result in temporary impacts to the community, as a result of increased noise, traffic and dust, impacts to access and visual amenity.	Minor
(b) Any transformation of a locality? The Proposal would introduce new visible elements to the locality of Doonside in the form of four new lifts at Doonside Station, new canopies and readjusted stairs to Platforms 3 and 4. In addition, the Proposal would result in the removal of a small number of trees. The Proposal is likely to have a positive overall contribution to the community as the new built elements integrate with the existing use of Doonside Station as a railway station and would facilitate improved access to the station.	Minor
(c) Any environmental impact on the ecosystem of the locality? The Proposal would require the removal of a small number of trees and other vegetation. As Doonside Station is located within an urbanised environment, the habitat value of the vegetation required to be removed is low. Thus the overall environmental impact upon the ecosystem of the locality is considered to be minor.	Minor
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? The Proposal would temporarily reduce the aesthetic quality around Doonside Station during the construction phase. Appropriate mitigation measures have been proposed in this REF. Overall impacts have been assessed as minor to moderate.	Minor to Moderate
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The Proposal would result in minor adverse impacts through the construction and operational phases to the heritage significance of the Doonside Railway Station Group. However, on balance, the extent of impacts is outweighed by the benefits associated with improved access to the station.	Minor
(f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)? The habitat value of vegetation to be removed by the Proposal is low. Impacts to habitat of protected fauna is therefore considered to be negligible.	Nil
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal would not result in the endangering of any species.	Nil

Factor	Impacts
(h) Any long-term effects on the environment? The Proposal is not likely to have any long-term effects on the environment.	Nil
(i) Any degradation of the quality of the environment? The Proposal is not likely to degrade the quality of the environment within its existing urban setting.	Nil
(j) Any risk to the safety of the environment? The scale of works for the Proposal is not to an extent that would risk the safety of the environment, particularly with appropriate mitigation measures in place.	Nil
(k) Any reduction in the range of beneficial uses of the environment? The Proposal modifies an existing railway station within an urbanised environment. It would not result in the reduction to the range of beneficial uses of the environment.	Nil
(l) Any pollution of the environment? There is a risk that during the construction phase, the Proposal may result in the pollution of waters, particularly through the mobilisation of sediments during heavy rainfall events. With appropriate mitigation measures in place, the risk of that occurring is significantly reduced.	Minor
(m) Any environmental problems associated with the disposal of waste? The Proposal is not likely to cause any environmental problems associated with the disposal of waste.	Nil
(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal is not likely to increase demands on resources that are or are likely to become in short supply.	Nil
(o) Any cumulative environmental effect with other existing or likely future activities? Cumulative effects of the Proposal are described in Section 6.15. Environmental management measures would be co-ordinated with those developments to reduce cumulative construction impacts and construction fatigue in the locality.	Minor
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The Proposal is not located in an area that would result in impacts to coastal processes and hazards.	Nil