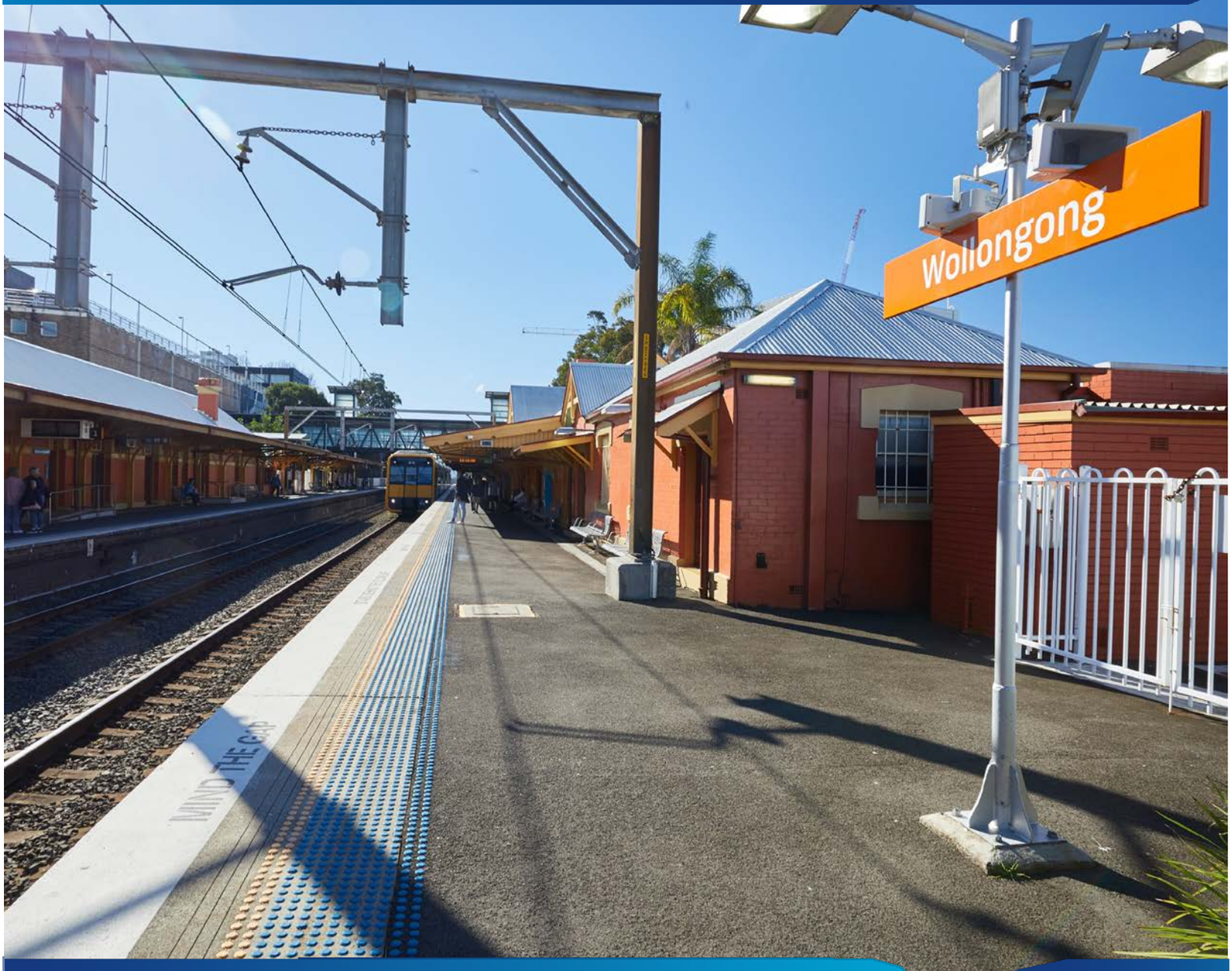
NSW GOVERNMENT

More Trains, More Services

Wollongong Stabling Yard and Platform Extension Project

Review of Environmental Factors



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Abbreviations

Term	Meaning
AHIMS	Aboriginal Heritage Information Management System
ASA	TfNSW Asset Standards Authority
ASS	Acid Sulfate Soils
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CBD	Central Business District
CCTV	Closed-circuit television
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CNVMP	Construction Noise and Vibration Management Plan
CNVS	Construction Noise and Vibration Strategy (TfNSW, 2019c)
DBH	Diameter at Breast Height
DDA	*Disability Discrimination Act 1992* (Commonwealth)
DPC	Department of Premier and Cabinet
DPC Heritage	Department of Premier and Cabinet (Heritage)
DPIE	Department of Planning, Industry and Environment
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	*Fisheries Management Act 1994* (NSW)
Heritage Act	*Heritage Act 1977* (NSW)
ICNG	*Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2000)
Infrastructure SEPP	State Environmental Planning Policy (Infrastructure) 2007 (NSW)
LEP	Local Environmental Plan

Term	Meaning
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NIF	New Intercity Fleet
NML	Noise Management Level
Non-peak	A time when demand is known to be consistently less busy
NPfI	*Noise Policy for Industry* (Environment Protection Authority, 2017)
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	NSW Office of Environment and Heritage (former)
OHW	Overhead wiring
OOHW	Out of Hours Work
PA system	Public address system
Peak period	A time when demand is known to be consistently busy
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RailCorp	Rail Corporation of NSW (former)
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
RING	*Rail Infrastructure Noise Guideline* (EPA, 2013)
Roads Act	*Roads Act 1993* (NSW)
RMS	NSW Roads and Maritime Services (former)
SEPP	State Environmental Planning Policy
SEPP 55	State Environmental Planning Policy No. 55 – Remediation of Land
SoHI	Statement of Heritage Impact
TfNSW	Transport for NSW
TfNSW (former RMS)	Transport for NSW (former Roads and Maritime Services)
TGSI	Tactile Ground Surface Indicators (“tactiles”)
TMP	Traffic Management Plan
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)
Wollongong LEP	Wollongong Local Environmental Plan 2009

Definitions

Term	Meaning
Asset Standards Authority	The ASA is an independent body within TfNSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Design Authority functions formerly performed by RailCorp are now exercised by ASA.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
Construction Contractor	The organisation(s) engaged by TfNSW to undertake the design and construction of the Proposal.
Crossover	A short section of track which creates a path for a train to cross from one line to another.
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).
Down (direction)	The railway direction being away from a major destination i.e. away from Sydney for trains in NSW. Down is also referred to as 'country'.
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.
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 Trainlink	From 1 July 2013, NSW Trainlink became the new rail provider of services for regional rail customers.
Out of hours works	Defined as works *outside* standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act - in this instance, TfNSW.
The Proposal	The construction and operation of the Wollongong Stabling Yard and Platform Extension.

Term	Meaning
Rail possession	Possession is the term used by railway building/maintenance personnel to indicate that they have taken possession of the track (usually a section of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Siding	A short stretch of railway track used to temporarily store trains, to or enable trains on the same line to pass
South Coast Line	The intercity element of the Sydney Trains and NSW Trainlink service connecting Sydney to the Illawarra Region.
Stabling	Areas of a rail network where trains are temporarily stored and cleaned and maintained (unscheduled minor maintenance activities only).
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
T4 Eastern Suburbs and Illawarra Line	An existing commuter rail line on the Sydney Trains Network connecting Bondi Junction to Cronulla and Waterfall.
T8 Airport and South Line	An existing commuter rail line on the Sydney Trains Network connecting the Sydney CBD with the southwestern suburbs.
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.
Tamping	A process of packing track ballast under railway tracks to make the tracks more durable.
Transport for NSW (former Roads and Maritime Services)	The former Roads and Maritime Services was amalgamated into Transport for NSW on 1 July 2019.
Turnout	A short section of rail track which enables the divergence of one rail line into two rail lines, or the convergence of two rail lines into one rail line.
Up (Direction)	The railway direction being towards a major destination i.e. towards Sydney for trains in NSW. Up is also referred to as ‘city’.
Vegetation Offset Guide	The TfNSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed ‘significant’ for the purposes of section 5.7 of the EP&A Act. The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.

Executive summary

Overview

Transport for NSW (TfNSW) proposes to deliver service improvements on Sydney's busiest rail lines including the T4 Illawarra Line, South Coast Line and T8 Airport and South Line. These improvements are part of the More Trains, More Services program (the Program) that over the next ten years will transform the rail network and provide customers with more reliable, high capacity turn up and go services.

The next stage of the program includes the delivery of 17 new Waratah Series 2 trains and 42 additional New Intercity Fleet (NIF) carriages. The Program is about building a modern and up to date rail system that will play its part in making Sydney a more productive and liveable city.

As part of the Program, TfNSW proposes to upgrade Wollongong Stabling Yard and extend the platforms at Wollongong Station (the Proposal) as part of the enabling works for the introduction of the NIF.

TfNSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Proposal. The main features of this Proposal are:

- extension of the southern (Country) ends of Platforms 1 and 2 by about nine metres
- reconfiguration of the railway tracks between the station and the stabling yard
- modifications to overhead wiring (OHW), underground utilities and signal relocation
- reconstruction of a currently unused siding including new OHW infrastructure
- cleaning and tamping of ballast on all other sidings
- installation of walkways for use by train drivers, cleaners and maintenance crews
- new fencing and drainage works
- yard facilities including lighting and closed-circuit television
- operation of the Proposal.

The key features of the proposed works are shown on Figure E1-1 and Figure E1-2.

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

Subject to approval, construction of the Proposal is expected to commence in approximately mid-2020 and be completed in December 2021.

Figure E1-1 Wollongong Stabling Yard – Proposed Works

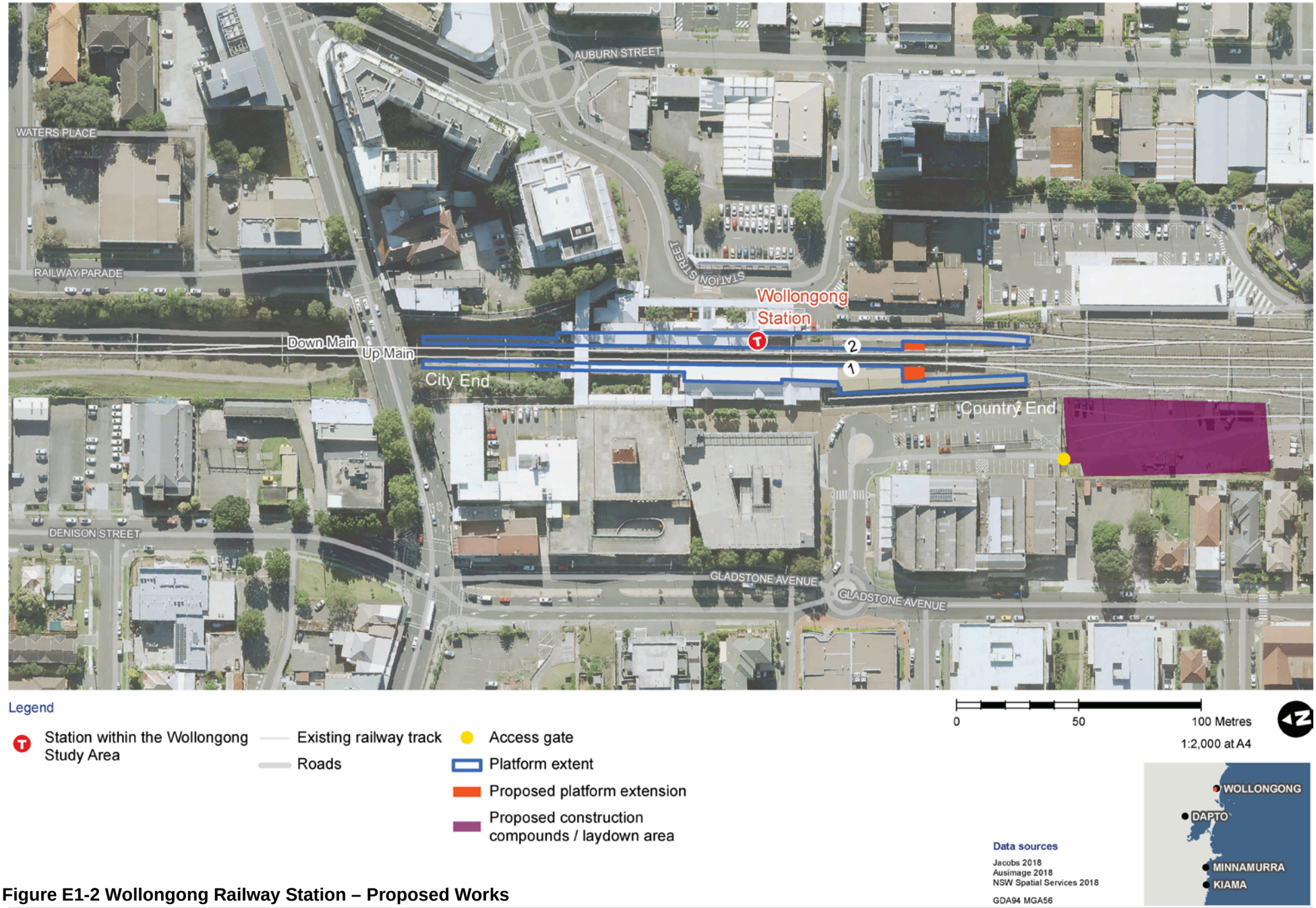


Figure E1-2 Wollongong Railway Station – Proposed Works

Need for the Proposal

Sydney's population is growing and the rail network is one of the busiest in the southern hemisphere, with a record 400 million trips each year. There has been unprecedented customer demand, with rail patronage increasing by 30 per cent over the last five years. Even after the full commencement of Sydney Metro in 2026, the heavy rail network will continue to carry 80 percent of all rail passengers, and around 60 percent of all peak hour transport travel (TfNSW, 2017).

Along with building a new metro train system, the Program will simplify the rail network and create high capacity, turn up and go services for customers. While More Trains, More Services will eventually deliver benefits to the entire network, TfNSW propose to start by targeting improvements on Sydney's busiest lines. The first lines to benefit from the Program will be the T4 Eastern Suburbs and Illawarra Line, the South Coast Line and the T8 Airport and South Line. These are some of the busiest lines on the Sydney Trains network, catering for 410,000 return trips in a typical day, representing around one third of all daily Sydney Trains customers.

As part of the program 17 new Waratah Series 2 trains and an additional 42 New Intercity Fleet carriages will be delivered. The extra NIF carriages, will see eight car trains increased to 10 car trains for peak hour services.

It is proposed to operate 10-car NIF trains on the South Coast Line, which would be longer than the eight-car Oscar trains currently operating on the South Coast Line. The 10-car NIF would provide a better level of service for customers, with more space, improved amenity and accessibility. The proposed upgrade would also provide a service consistent with other intercity lines.

An extension of the platforms at Wollongong Station is required to meet operational requirements and to enable formation and division of 10-car NIF trains.

An upgrade of the capacity of Wollongong Stabling Yard is needed to enable eight 10-car NIF trains to be stabled concurrently.

Community and stakeholder consultation

Community consultation activities for the Proposal would be undertaken during the public display period of this REF and the public invited to submit feedback on this REF to help TfNSW understand what is important to customers and the community. The REF would be displayed for a period of two weeks. Further information about specific consultation activities proposed is included in Section 5.4 of this REF.

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

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

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. Figure E1-3 shows the planning approval and consultation process for the Proposal.

Figure E1-3 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

The Proposal would benefit the community by improving accessibility, enhancing safety and improving comfort for customers on the South Coast Line. The Proposal would accommodate the introduction of the new 10-car NIF trains.

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

- minor temporary increase in traffic volumes as a result of construction vehicles
- low to negligible visual impact associated with the platform extensions
- temporary construction noise impacts
- minor impact on the heritage fabric of Wollongong Railway Station Group
- minor increases in operational noise exceedances compared to the existing noise exceedances currently experienced at the Stabling Yard.

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

Wollongong Station is listed on the State Heritage Register and this REF has identified that the Proposal includes some works for which TfNSW would need approval from the Heritage Council of NSW in accordance with Section 60 of the *Heritage Act 1977*.

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 *Environmental Planning and Assessment Regulation 2000* (EPA Regulation), to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The detailed design of the Proposal would seek to achieve an 'Excellent' rating in accordance with version 1.2 of the Infrastructure Sustainability Council of Australia's Infrastructure Sustainability Rating Scheme by taking into account the principles of ecologically sustainable development.

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 benefits to the community and minimise any adverse impacts on the environment.

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

1 Introduction

Transport for NSW (TfNSW) was established in 2011 as the lead agency for the integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Wollongong Stabling Yard and Platform Extension (the Proposal).

1.1 Overview of the Proposal

1.1.1 The More Trains, More Services Program

Over the next ten years the More Trains, More Services program will simplify and modernise the rail network, creating high capacity and turn up and go services for many customers. Customers will experience more frequent train services, with less wait times, less crowding and more seats on a simpler, more reliable network.

While More Trains, More Services will eventually deliver benefits to the entire network, it will start by targeting improvements on Sydney's busiest lines. The first lines to benefit from the program will be the T4 Eastern Suburbs and Illawarra Line, the South Coast Line and the T8 Airport and South Line.

The More Trains, More Services program is about building a modern and up to date rail system that will play its part in making Sydney a more productive and liveable city.

The NSW Government's *Future Transport Strategy 2056 (TfNSW, 2018a)* identifies More Trains, More Services as a priority initiative and is a commitment to the state's transport and infrastructure needs.

More Trains, More Services is key to enabling Greater Sydney Commission's vision for the Greater Sydney Region Plan*, A Metropolis of Three Cities*, where most residents live within 20 minutes of their jobs, education and health facilities, services and great places.

More Trains, More Services is a program of staged investments that will progressively transform the rail network into a modern and reliable system using world class technology.

The program is already delivering better customer outcomes through timetable enhancements and the integration of the Sydney Metro Northwest with the existing heavy rail network. The current stage of More Trains, More Services will focus on delivering greater capacity, reliability and connectivity for customers on the T4 Eastern Suburbs and Illawarra Line, South Coast Line and T8 Airport and South Line.

These services will be enabled by upgrading and modernising signalling and control systems and using digital technology that, when combined with other infrastructure upgrades, will deliver major increases in the capacity and reliability of the network.

The program will include the delivery of 17 new Waratah Series 2 trains and 42 additional New Intercity Fleet carriages. The new intercity fleet (NIF) will improve accessibility, enhance safety and improve comfort by providing a range of modern features. As part of the Program, TfNSW proposes to upgrade Wollongong Stabling Yard and extend the platforms at Wollongong Station (the Proposal) as part of the enabling works for the introduction of the NIF.

1.1.2 The need for the Proposal

Sydney's population is growing and the rail network is one of the busiest in the southern hemisphere, with a record 400 million trips each year. There has been unprecedented customer demand, with rail patronage increasing by 30 per cent over the last five years. Even after the full commencement of Sydney Metro in 2026, the heavy rail network will continue to carry 80 percent of all rail passengers, and around 60 percent of all peak hour transport travel (TfNSW, 2017).

Along with building a new metro train system, the More Trains, More Services program will simplify the rail network and create high capacity, turn up and go services for customers.

While More Trains, More Services will eventually deliver benefits to the entire network, TfNSW propose to start by targeting improvements on Sydney's busiest lines. The first lines to benefit from the Program will be the T4 Eastern Suburbs and Illawarra Line, the South Coast Line and the T8 Airport and South Line. These are some of the busiest lines on the Sydney Trains network, catering for 410,000 return trips in a typical day, representing around one third of all daily Sydney Trains customers.

In recent years, infrastructure constraints have been a barrier to enhancing services. The delivery of Sydney Metro City & Southwest now creates the opportunity to address future needs on these lines.

Future stages of More Trains, More Services will deliver a 30 per cent increase in peak services on the T4 Illawarra Line, and an 80 per cent increase at stations between Green Square and Wolli Creek, meaning trains at least on average every four minutes instead of every six.

As part of the program 17 new Waratah Series 2 trains and an additional 42 New Intercity Fleet carriages will be delivered. The extra NIF carriages, will see eight car trains increased to 10 car trains for peak hour services.

It is proposed to operate 10-car NIF trains by combining a six-car unit and a four-car unit. A 10-car NIF train would be longer than the eight-car Oscar trains currently operating on the South Coast Line. The existing Wollongong Stabling Yard would have the capacity to stable a maximum of four 10-car NIF trains on the existing Up and Down sidings. TfNSW proposes to upgrade the stabling yard to accommodate up to eight 10-car NIF trains concurrently. It is proposed to upgrade an existing disused siding to increase the yard's stabling capacity.

It is an operational requirement that all doors of a train, including the driver's door, must be able to open to a platform to allow all customers and the driver to egress. Also, amalgamation and division of four and six car units to form and divide a 10-car NIF train is required at Wollongong Station. An extension of the platforms at Wollongong Station is required to meet this operational requirement and to enable formation and division of 10-car NIF trains.

1.1.3 Key features of the Proposal

The key features of the Proposal include:

Wollongong Stabling Yard:

- reconstruction of the No. 2 Up Siding (currently unused) including new overhead wiring (OHW) structures and upgrading the existing manually operated turnout to a mechanised system
- reconditioning of the No. 1 Up Siding
- cleaning and tamping of ballast on all other sidings
- relocation of two signals along the Up Refuge
- relocation of OHW masts and new OHW over No. 2 Up Siding
- installation of eight walkways between tracks including stairway linkages, ranging in length from about 220 metres to about 500 metres and between about 1.2 metres and 2.8 metres in width and demarcation fencing
- installation of bollard lighting
- adjustments to fencing and a combined services route
- installation of new fencing between the main line and yard line
- drainage works along walkways including catch pits and underground drainage pipes

- provision of new and adapted cleaning sinks, occupational health and safety eyewashes and showers using existing water and drainage connections where possible, or otherwise providing new connections
- operation of the Proposal.

Wollongong Station:

- extension of the southern (Country) ends of Platforms 1 and 2 by about nine metres
- installation of lighting including lamp posts and associated cabling and foundations on the platform extensions
- reconfiguration of the railway tracks between the station and the stabling yard because of the extended platforms by providing two crossovers and associated turnouts
- associated modifications/additions to the OHW structures, a combined services route and under line crossing
- signal relocation next to Platform 1
- operation of the Proposal.

Subject to planning approval, construction is expected to commence in approximately mid-2020 and be completed by December 2021.

A detailed description of the Proposal is provided in Chapter 3.

1.1.4 Definitions

For the purposes of this assessment, the following definitions are used:

- the ‘Proposal’ refers to all the activities associated with the Wollongong Stabling Yard and Platform Extension during construction and operation.
- the ‘Proposal site’ refers to the area that would be impacted by the Proposal during construction and operation.
- the ‘study area’ refers to the Proposal site and the wider area that may be indirectly impacted by the Proposal, which may vary slightly between specialist studies. The study area is defined by a 500-metre buffer around the Proposal site.

1.2 Location of the Proposal

The Proposal is located at Wollongong Stabling Yard and Wollongong Station (see Figure 1-1) within the Wollongong local government area (LGA).

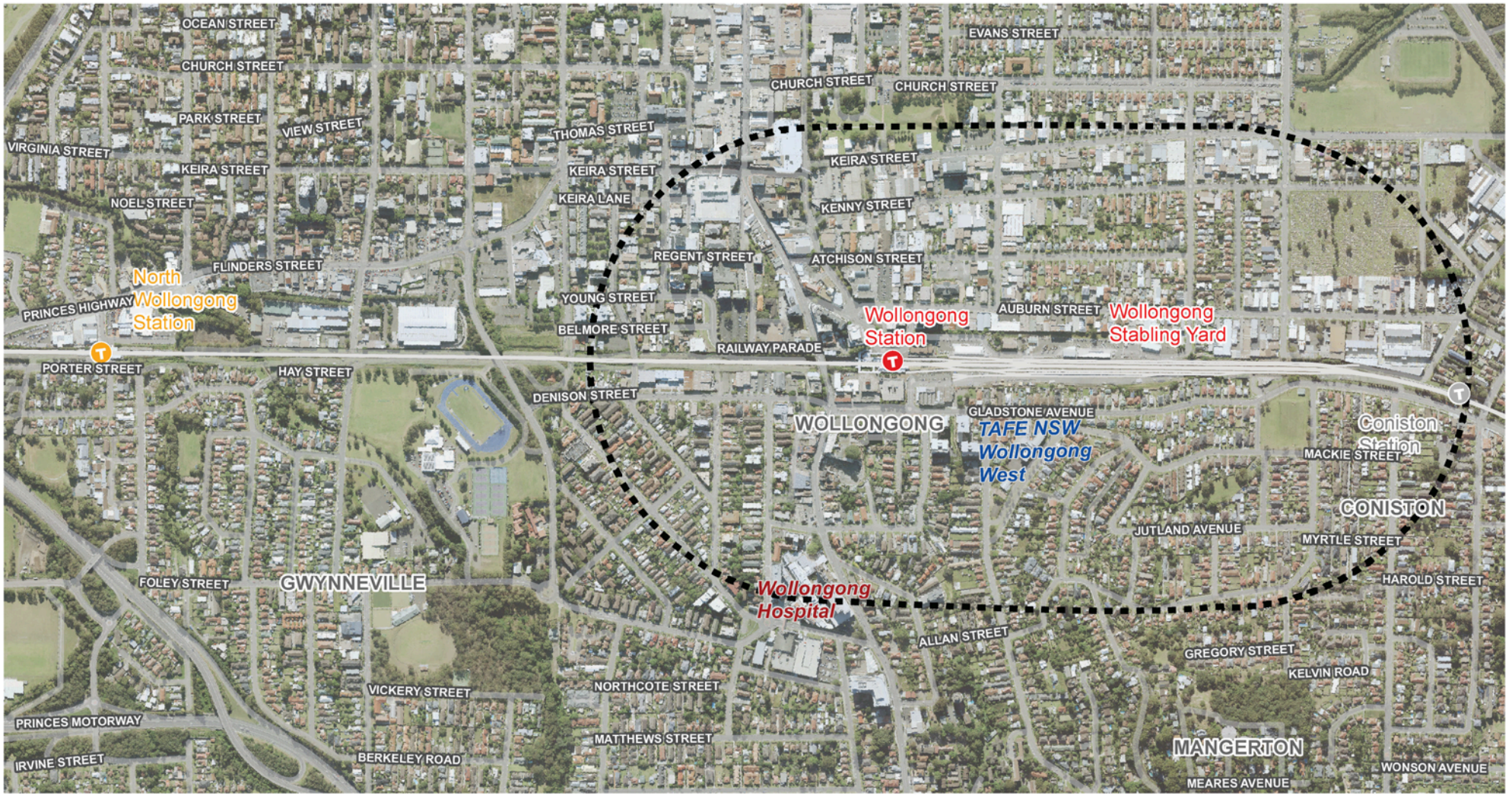


Figure 1-1 Location of the Proposal

1.3 Existing infrastructure and land uses

The Proposal site and study area are shown in Figure 1-2. Photos of the Proposal site are shown in Figure 1-3 to Figure 1-5. Existing infrastructure on the station platforms includes electrical, signalling and communication equipment, canopies, seating, bins, garden beds and billboards.

The Proposal site is zoned SP2 Infrastructure under *Wollongong Local Environmental Plan 2009* (Wollongong LEP).

Land uses surrounding the Proposal site are provided in Table 1-1.

Table 1-1 Surrounding land uses

Station	Surrounding land uses
Wollongong Station	• Wollongong central business district (CBD) is centred on the Princes Highway to the north and east of Wollongong Station Development. Within the CBD near the station includes government office buildings such as the Australian Hydrographic Office and headquarters of the NSW State Emergency Service, South Coast Private Hospital and buildings with ground floor retail and offices beneath up to seven levels of apartments • commercial accommodation, Wollongong TAFE and high-rise apartment buildings with ground floor retail are to the west of the station • a multi-storey commuter car park is also located to the west of the station.
Wollongong Stabling Yard	• east of Wollongong Stabling Yard is a diverse mix of businesses operating from small single or two storey buildings and some detached dwellings. WEA Illawarra, a community college, is also in this area • land use to the south-east comprises miscellaneous light industrial businesses and a few detached dwellings • Wollongong CBD is to the north • land use west of the stabling yard is dominated by detached dwellings.

Existing stabling yard use

Wollongong Stabling Yard is currently used to stable up to nine trains concurrently. Trains enter the stabling yard from both the Coniston and Wollongong ends of the yard. Trains currently being stabled in the yard include Oscar (Outer Suburban) and Tangara (Suburban) trains in four-car and eight-car configurations. Diesel two-car Endeavour trains also stable in the yard.

Under the current timetable, trains generally enter the yard between about 8:00 pm and 3:00 am and depart the yard between about 3:00 am and 9:00 am. The operation of the yard differs across each weekday. On weekends, some trains stand in the yard throughout the daytime.

Figure 1-2 Proposal site and study area

Figure 1-3 Wollongong Stabling Yard, looking north-east towards Wollongong CBD and Wollongong Station

Figure 1-4 Wollongong Stabling Yard, looking east across the Up Yard towards the Down Yard

Figure 1-5 Wollongong Stabling Yard, looking south along the No. 2 Up Siding

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW to assess the potential impacts of the Wollongong Stabling Yard and Platform Extension. For the purposes of these works, TfNSW is the proponent and the determining authority under Division 5.1 of the EP&A Act.

The purpose of this REF is to describe the Proposal, assess the likely impacts of the Proposal having regard to the provisions of Section 5.5 of the EP&A Act, and identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with Clause 228 of the EP&A Regulation.

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Biodiversity Conservation Act 2016* (BC Act), *Fisheries Management Act 1994* (FM Act) and *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 (MNES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of the Environment and Energy for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.

2 Need for the Proposal

Chapter 2 discusses the need and objectives of the Proposal, having regard to the objectives of the 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

2.1.1 Overview

The NSW Government's *Future Transport Strategy 2056* (TfNSW, 2018) identifies More Trains, More Services as a 'priority initiative for investigation' that will provide modern and reliable 'turn up and go' services to customers.

Over the next 40 years, the train network in Sydney will need to handle 28 million trips a day and double the current metropolitan freight capacity. By 2026, it is expected that the heavy rail network will carry around 80 percent of peak hour rail travel and 60 percent of all peak hour transport travel (TfNSW, 2018).

The NSW Government's *Future Transport Strategy 2056* (TfNSW, 2018) identifies More Trains, More Services as a priority initiative and is a commitment to the state's transport and infrastructure needs.

More Trains, More Services is key to enabling Greater Sydney Commission's vision for the Greater Sydney Region Plan*, A Metropolis of Three Cities*, where most residents live within 20 minutes of their jobs, education and health facilities, services and great places.

More Trains, More Services is a program of staged investments that will progressively transform the rail network into a modern and reliable mass transit system using world class technology. The program is already delivering better customer outcomes through timetable enhancements and the integration of the Sydney Metro Northwest with the existing heavy rail network. The current stage of More Trains, More Services will focus on delivering greater capacity, reliability and connectivity for customers on the T4 Eastern Suburbs and Illawarra Line, South Coast Line and T8 Airport and South Line.

These services will be enabled by upgrading and modernising signalling and control systems and using digital technology that, when combined with other infrastructure upgrades, will deliver major increases in the capacity and reliability of the network.

2.1.2 Objectives of the More Trains, More Services program

The objectives of the More Trains, More Services program are to:

- maintain connectivity and support efficient functioning of urban and regional centres
- meet future mass transit demand on the T4 and T8 Lines
- improve travel experience for each customer passenger group
- reduce complexity on the heavy rail network
- meet freight customer needs.

2.1.3 Customer outcomes

Customer outcomes of the More Trains, More Services program are to:

- provide additional train and station capacity for T4 and T8 customers in line with forecast peak demand
- provide dedicated intercity services on the South Coast Line that improve the customer in-vehicle experience and provides a service consistent with other intercity lines
- improve off-peak services on the T4 and South Coast lines to align with customer requirements
- provide regular freight opportunities on the Illawarra corridor which maintains (and where possible enhances) the network capacity for freight services
- reduce network complexity on the T4 and T8 lines through simplified service routes, stopping patterns and asset utilisation
- minimise the impact on other lines that may be affected by service changes on the T4, T8 and South Coast lines.

2.1.4 Objectives of the Proposal

The specific objectives of the Proposal are to:

- accommodate the stabling of the 10-car NIF trains at Wollongong
- extend the station platform such that 10-car NIF trains can terminate alongside the station platform
- minimise cost and maximise benefits of the project requirements
- minimise impacts to current rail operations during implementation
- ensure that safety is maintained throughout the delivery of the Proposal
- ensure that project works are delivered to TfNSW high standards of safety, quality, stakeholder engagement and environmental management.

2.2 Design development

Additional stabling at the Wollongong Stabling Yard is needed to support the introduction of the 10-car NIF trains and future operations of the South Coast Line. The Wollongong Stabling Yard is required to stable up to eight 10-car NIF trains. The current configuration of the Wollongong Stabling Yard would only accommodate four 10-car NIF trains.

As noted in Section 1, 10-car NIF trains are longer that the current eight-car Oscar trains and Platforms 1 and 2 at Wollongong Station need to be extended by about nine metres so that all doors of a 10-car NIF train, including the driver's door, would open to a platform to allow all customers and the driver to egress.

These issues informed the development of the concept design. The design of the Proposal will be further developed during detailed design.

2.3 Alternative options considered

The assessment of design options for the Proposal considered the objectives of the More Trains, More Services program outlined in Section 2.1.2.

Two options were considered during the development of the concept design for the reconfiguration of the Wollongong Stabling Yard:

- option 1: do nothing
- option 2: reconfigure the Wollongong Stabling Yard to accommodate up to eight 10-car NIF trains.

Two options were considered during the development of the concept design for the extension of Platforms 1 and 2 at Wollongong Station:

- option 1: do nothing
- option 2: extend Platforms 1 and 2 by about nine metres.

Under a ‘do-nothing’ option, Wollongong Stabling Yard and the platforms at Wollongong Station would remain the same and there would be no changes to the way the stabling yard and station currently operate.

The NSW Government has identified the need for extensions to the platforms at Wollongong Station and an upgrade of Wollongong Stabling Yard to accommodate the introduction of 10-car NIF trains on the South Coast Line. If the Wollongong Station platforms are not extended and Wollongong Stabling Yard is not upgraded then 10-car NIF trains would not be able to service Wollongong Station and Wollongong Stabling Yard would not be able to provide sufficient stabling to support the efficient operation of 10-car NIF trains on the South Coast Line.

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 or meet the needs of the community.

2.4 Justification for the preferred option

Option 2 consisting of the extension of the platforms at Wollongong Station and upgrading of Wollongong Stabling Yard is the preferred option as it would enable the introduction and efficient operation of 10-car NIF trains on the South Coast Line. Option 2 is consistent with NSW Government objectives to encourage the use of public transport and meet the needs of the community as a result of the expected population growth.

3 Description of the Proposal

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

3.1 The Proposal

As described in Section 1, the Proposal involves upgrades to the existing Wollongong Stabling Yard to accommodate the stabling of the eight 10-car NIF trains, and platform extensions at Wollongong Station as part of the More Trains, More Services program to accommodate the new 10-car NIFs.

The key features of the Proposal at Wollongong Stabling Yard and Wollongong Station are shown in Figure 3-1 and Figure 3-2 respectively and described in the following sections.

Figure 3-1 Wollongong Stabling Yard – Proposal site layout

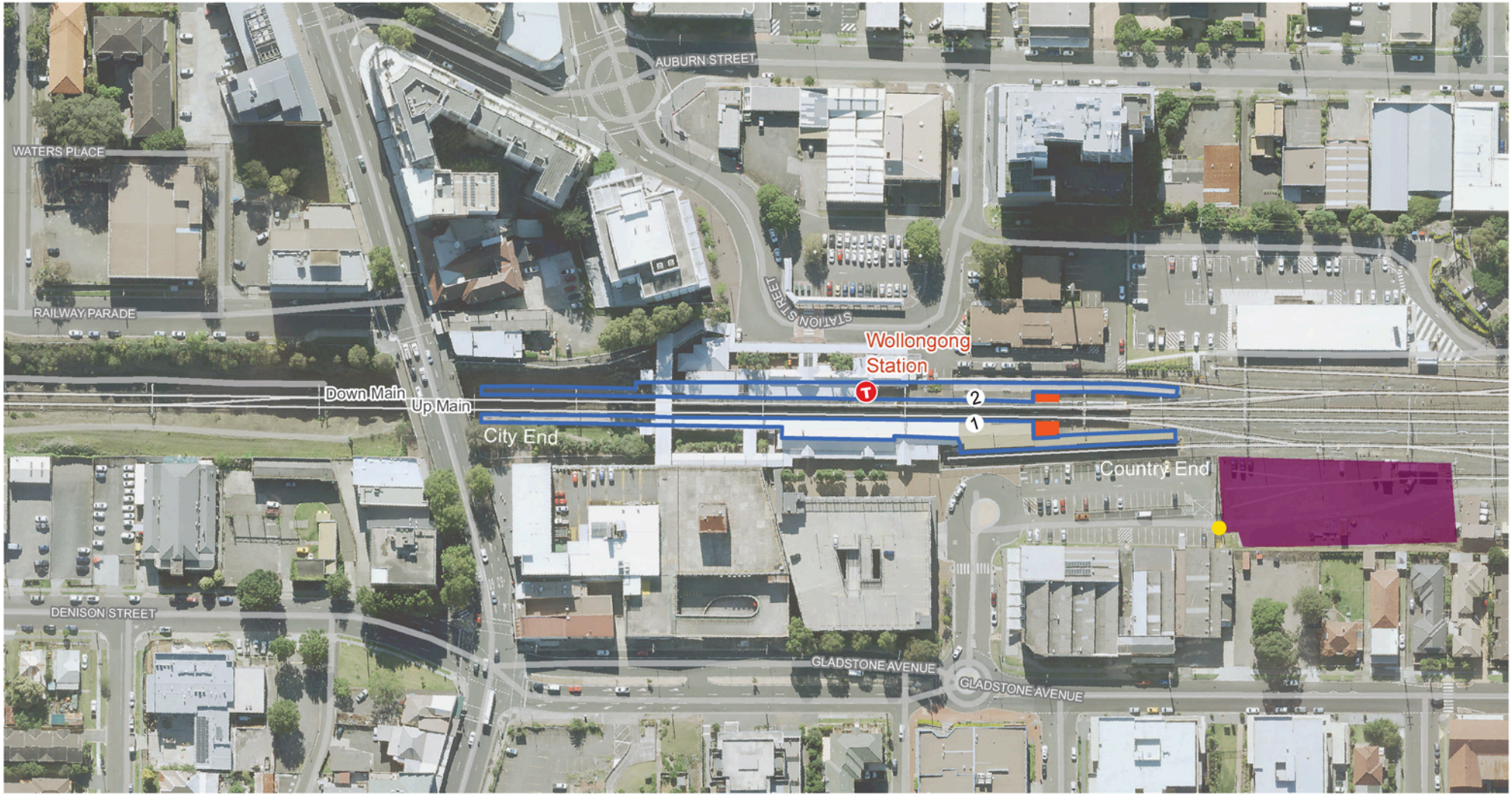


Figure 3-2 Wollongong Station – Proposal site layout

3.1.1 Scope of works

The scope of works of the Proposal includes:

Wollongong Stabling Yard

- reconstruction of the No. 2 Up Siding (currently unused) including new OHW structures and upgrading the existing manually operated turnout to a mechanised system
- reconditioning of the No. 1 Up Siding
- cleaning and tamping of ballast on all other sidings
- relocation of two signals along the Up Refuge
- relocation of OHW masts and new OHW over No. 2 Up Siding
- installation of eight walkways between tracks including stairway linkages, ranging in length from about 220 metres to about 500 metres and between about 1.2 metres and 2.8 metres in width and demarcation fencing
- installation of bollard lighting
- adjustments to fencing and a combined services route
- installation of new fencing between the main line and yard line
- drainage works along walkways including catch pits and underground drainage pipes
- provision of new and adapted cleaning sinks, occupational health and safety eyewashes and showers using existing water and drainage connections where possible, or otherwise providing new connections
- operation of the Proposal.

Wollongong Station:

- extension of the southern (Country) ends of Platforms 1 and 2 by about nine metres
- installation of lighting including lamp posts and associated cabling and foundations on the platform extensions
- reconfiguration of the railway track between the station and the stabling yard because of the extended platforms by providing two crossovers and associated turnouts
- associated modifications/additions to the OHW structures, a combined services route and under line crossing
- signal relocation next to Platform 1
- operation of the Proposal.

Materials and finishes

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

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

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

- stabling yard walkways – concrete

- stabling yard fence – steel
- track – concrete sleepers and ballast
- platform extensions – the platform extensions would comprise a concrete slab deck atop precast concrete culverts. The depth of the concrete slab would match that of the existing platform where they adjoin. The precast concrete culverts would be faced with a brick masonry veneer to match the colour and texture of the existing platforms. The platform extensions would include an 800-millimetre deep refuge space below the top of the platform, in accordance with current platform design standards
- platform ends – the platform ends would be brick masonry veneer to in-situ concrete
- platform access steps – steel.

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

3.1.2 Engineering constraints

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

Existing structures: the placement and integrity of existing structures needed to be considered during the development of the design – these structures included the platforms, station buildings, and associated rail infrastructure within the rail corridor.

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: it is likely some services may require relocation, including electrical, signalling and communication equipment owned by Sydney Trains. The Proposal would not require any major external public utility adjustments.

Other considerations: Wollongong Station is listed as an item of State Significance on the State Heritage Register.

3.1.3 Design standards

The Proposal would be designed having regard to the following:

- Building Code of Australia
- relevant Australian Standards
- Asset Standards Authority standards
- Sydney Trains standards and guidelines
- Crime Prevention Through Environmental Design principles
- other TfNSW policies and guidelines.

3.1.4 Sustainability in design

The development of the concept design for the Proposal has been undertaken in accordance with the project targets identified in the Sustainability Report for the More Trains, More Services Program (Aurecon, 2018) and further developed in the More Trains, More Services Civil Concept with Site Investigations Packages 1 and 2 Sustainability Strategy (April 2019).

TfNSW has an ongoing commitment to sustainability through supporting project solutions that deliver environmental and social benefits whilst reducing lifecycle costs. To reinforce these sustainability goals, TfNSW has developed sustainable design guidelines that detail how it will achieve its goals of minimising impacts to the environment, procuring, delivering and promoting sustainable transport and developing, expanding and managing a transport network that is sustainable and climate resilient.

The *Sustainable Design Guidelines – Version 4.0* (TfNSW, 2017a) align with the Infrastructure Sustainability Council of Australia's Infrastructure Sustainability Rating Scheme. For projects with a capital cost of more than $50 million, TfNSW has an aim to achieve an 'Excellent' rating through the Infrastructure Sustainability Rating Scheme.

To achieve an Infrastructure Sustainability Rating, the More Trains, More Services program will be assessed on the following infrastructure sustainability themes:

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

Within each theme there are multiple categories in which credits may be achieved based on how successfully the infrastructure supports or achieves sustainable guidelines. Credits then contribute to an overall score out of 100, from which the infrastructure is then assigned an Infrastructure Sustainability Rating Level of 'Commended' (score of 25 to less than 50), 'Excellent' (50 to less than 75) or 'Leading' (75 to 100).

As provided in the Sustainability Strategy, TfNSW is proposing to achieve an Infrastructure Sustainability Rating of 'Excellent' for the Program.

3.2 Construction activities

3.2.1 Work methodology

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

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

Table 3-1 Proposed construction activities

Activity	Tasks
Site establishment	• establish site compound • install environmental and safety controls • commence detailed site survey validation • unload materials for hoardings

Activity	Tasks
Platform extension works	
Removal, relocation and installation of services	• relocate signalling infrastructure • modify platform drainage • remove redundant OHW structures • install new OHW structures
Platform extension	• excavate area for the platform extension • install precast concrete culverts • pour concrete to form the platform deck • install platform fencing, gate and steps at the end of the platform extension
Track work	• excavate and modify existing tracks • relocate turnouts • replace crossover
Finishing works	• install platform lighting, closed-circuit television (CCTV), public address (PA) system, tactile paving, yellow and white lines • repaint car markers
Stabling yard upgrade works	
Adjustments to existing infrastructure	• adjust and provide new electrical, signalling and communication infrastructure • install new OHW structures
Walkways	• upgrade existing walkways • remove existing fence • construct new concrete walkway • install new fence • install lighting, CCTV, and drainage on new walkways
Track work	• excavate, modify and remove existing track • construct new track • replace turnouts
Other construction work	• install new facilities for staff (cleaning sinks, occupational health and safety eyewashes and showers)

3.2.2 Plant and equipment

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

- excavator
- franna crane
- truck
- truck (semi-trailer)
- mobile crane
- back hoe/front end loader
- lighting generators
- elevated work platform
- concrete trucks and pumps
- additional trucks and cars for general use
- ballast tamper

- hand-held tools and equipment
- rail saw
- concrete vibrator
- welding equipment

3.2.3 Working hours

Construction of the Proposal would be undertaken during and outside of routine rail possessions. Rail possessions are scheduled closures that would occur regardless of the Proposal when part of the rail network is temporarily closed and trains are not operating.

Construction work would be undertaken during the following periods (these periods are indicative only and subject to change):

- stabling yard: six rail possessions and six non-possession periods
- platform extension: five rail possessions and six non-possession periods.

Rail possessions would be required to facilitate the following:

- adjustments and provisions of electrical, signalling and communication infrastructure
- platform extension and associated track works
- construction of new walkways and associated track work in the stabling yard.

Works that can be undertaken outside of routine rail possessions would be undertaken during standard (NSW) Environment Protection Authority (EPA) construction hours where feasible, which are:

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

Certain works may need to occur outside standard hours and would include night works. Out of hours works are required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers and to ensure the safety of railway workers and operational assets.

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

3.2.4 Earthworks

Excavations and earthworks would generally be required for the following:

- adjustment and provision of new electrical, signalling and communication infrastructure
- upgrade of existing walkways and construction of new walkways
- track work in Wollongong Stabling Yard
- platform extension and associated track works.

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

3.2.5 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal and would consider the requirements of the Infrastructure Sustainability Council of Australia's Infrastructure Sustainability Rating Scheme version 1.2. Materials would be sourced from local suppliers where practicable. Existing materials would be reused and recycled materials sourced in preference to new materials where practicable.

3.2.6 Traffic access and vehicle movements

The potential traffic and transport impacts of the Proposal are assessed in Section 6.1. The potential construction traffic and access impacts of the Proposal include:

- additional vehicle movements on the surrounding road network including up to 10 heavy vehicles and 10 light vehicles used during the works, as well as private vehicles used by up to about 60 site workers to travel to and from the Proposal site
- temporary reduction in parking availability for commuters and local residents.

3.2.7 Ancillary facilities

A temporary construction compound would be required to accommodate a site office, amenities and laydown areas for equipment and materials. A construction compound is proposed on the western side of the rail corridor to the south of the car park on Railway Station Square (refer to Figure 3-1). The proposed construction compound is on land owned by RailCorp. The potential environmental impacts of a temporary construction compound at this location are assessed in this REF.

3.2.8 Public utility adjustments

The Proposal has been designed to avoid the need to relocate services where possible. However, it is likely that some services would require relocation, including electrical, signalling and communication equipment owned by Sydney Trains. These relocations are unlikely to occur outside of the footprint of the works assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

3.3 Property acquisition

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

3.4 Operational management and maintenance

Upon completion of the Proposal, Wollongong Station and Stabling Yard would continue to be operated and maintained by Sydney Trains.

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

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

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

4.1.2 Disability Discrimination Act 1992

The (Commonwealth) *Disability Discrimination Act 1992* (DDA) implements Australia's international human rights obligations under the Convention on the Rights of Persons with Disabilities as well as obligations relating to non-discrimination under other treaties. It protects people with disability against discrimination in many areas of public life including accessing public places. The DDA allows for standards to be made, including but not limited to, Disability Standards for Accessible Public Transport 2002, and Disability (Access to Premises Buildings) Standards 2010.

The Proposal would be designed having regard to the requirements of this Act.

4.2 NSW legislation and regulations

4.2.1 Environmental Planning and Assessment Act 1979

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

In accordance with Section 5.5 of the EP&A Act, TfNSW, as the proponent and determining authority for the Proposal, 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 a significant impact on the environment. Chapter 6 of this REF provides an environmental impact assessment of the Proposal in accordance with Clause 228 and Appendix B specifically responds to the factors for consideration under Clause 228.

4.2.2 Other NSW legislation

Table 4-1 provides a list of other NSW legislation applicable to the Proposal.

Table 4-1 Other NSW legislation applicable to the Proposal

Applicable legislation	Considerations
Biodiversity Conservation Act 2016 (BC Act)	The Proposal site does not contain suitable habitat for any listed threatened species, population or community and the Proposal is unlikely to have a significant impact on any threatened species, population or community (refer to Section 6.7).
Biosecurity Act 2015	Clause 22 requires that 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 of the Proposal if declared priority weeds in the Wollongong LGA are identified at the Proposal site (refer to Section 6.7).
Contaminated Land Management Act 1997 (CLM Act)	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 Proposal site has not been declared under the CLM Act as being significantly contaminated (refer to Section 6.8).
Crown Lands Act 1987	The Proposal would not involve works on any Crown land.
Heritage Act 1977 (Heritage Act)	• 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 Wollongong Railway Station Group is listed on the NSW State Heritage Register and the RailCorp Section 170 Heritage and Conservation Register as an item of state heritage significance. A Statement of Heritage Impact (SoHI) has been prepared for Wollongong Station and is provided in Appendix C and summarised in Section 6.5.
National Parks and Wildlife Act 1974 (NPW Act)	Sections 86, 87 and 90 of the NPW Act require consent from DPIE for the destruction or damage of Aboriginal objects. The Proposal is unlikely to disturb any Aboriginal objects (refer to Section 6.4). However, if unexpected archaeological items or items of Aboriginal heritage significance are discovered during the construction of the Proposal, all works would cease and appropriate advice sought.
Protection of the Environment Operations Act 1997 (POEO Act)	The Proposal does not involve any 'scheduled activities' under Schedule 1 of the POEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the POEO Act, TfNSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the Construction Environmental Management Plan (CEMP) to be prepared and implemented by the Contractor.

Applicable legislation	Considerations
Roads Act 1993 (Roads Act)	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) of Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads. It is not expected that any roads would be affected by the Proposal and a Road Occupancy Licence would not be required.
Sydney Water Act 1994	The Proposal would not involve discharge of wastewater to the sewer.
Waste Avoidance and Resource Recovery Act 2001 (WARR Act)	TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.
Water Management Act 2000	The Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the water supply network), water management works, drainage or flood works, controlled activities or aquifer interference.

4.3 State environmental planning policies

4.3.1 State Environmental Planning Policy (Infrastructure) 2007

The *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) is the key environmental planning instrument which determines the permissibility of the Proposal and the part of the EP&A Act under which an activity or development may be assessed.

Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act).

Clause 78 defines 'rail infrastructure facilities' as including elements such as 'railway stations', 'station platforms and areas in a station complex that commuters use to get access to the platforms', 'railway tracks', 'facilities for the assembly, maintenance and stabling of rolling stock', 'communication and security systems', 'power supply systems', 'railway workers facilities', 'public amenities for commuters' and 'associated public transport facilities for railway stations'.

Consequently, development consent is not required for the Proposal, which is classified as a rail infrastructure facility, and the potential environmental impacts of the Proposal may be 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 of this REF discusses the consultation undertaken in accordance with the requirements of the Infrastructure SEPP.

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

4.3.2 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) provides a Statewide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. While consent for the Proposal is

not required, the provisions of SEPP 55 have still been considered in the preparation of this REF.

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

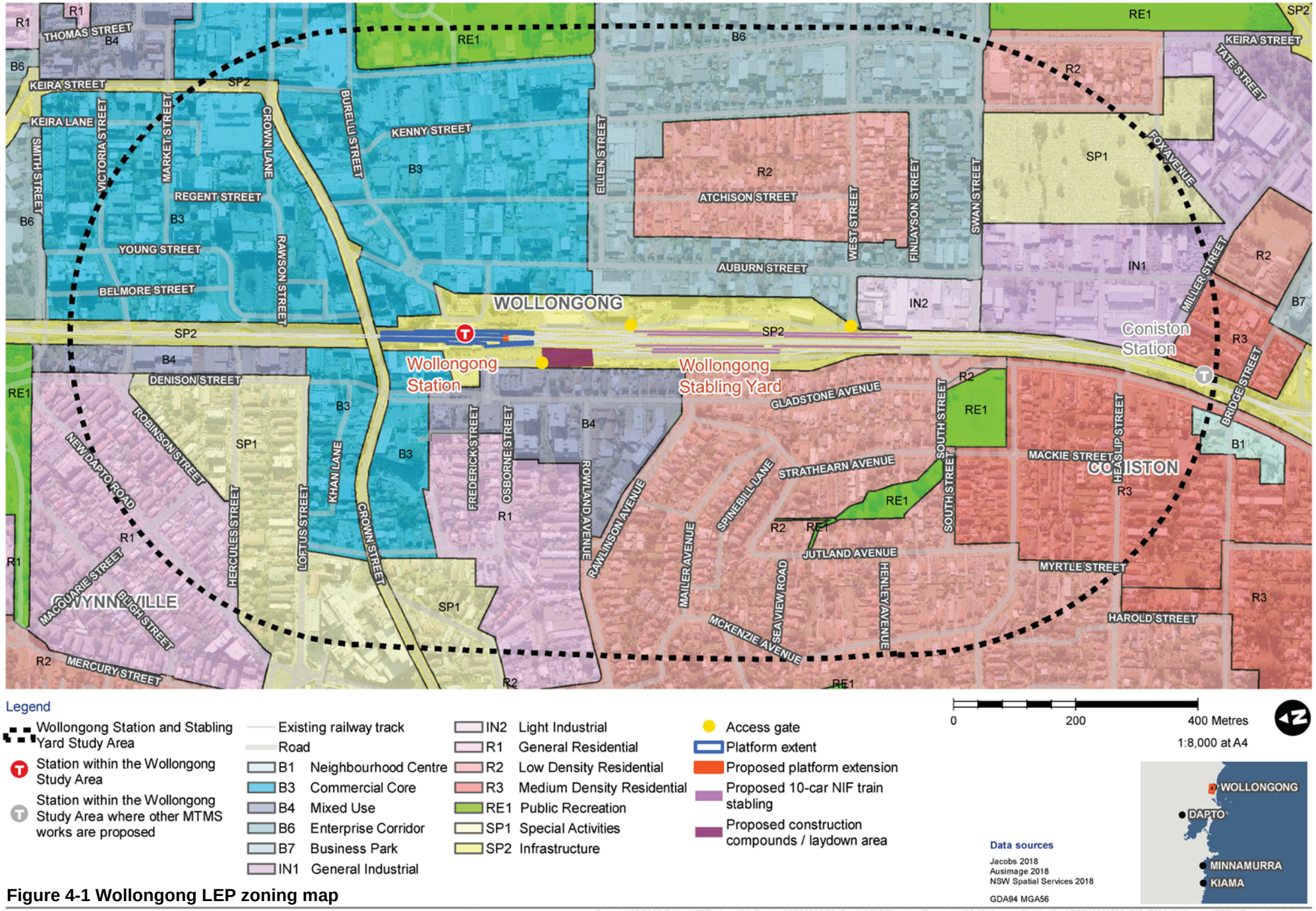
4.4 Wollongong Local Environmental Plan 2009

The provisions of the Infrastructure SEPP mean that local environmental plans (LEPs), prepared by councils for an LGA, do not apply to the Proposal. Nevertheless, during the preparation of this REF, the provisions of the Wollongong LEP were considered.

The Wollongong LEP is the governing plan for the Wollongong LGA. Table 4-2 identifies and summarises the provisions of the Wollongong LEP that are relevant to the Proposal. Figure 4-1 shows the land use zonings prescribed in the Wollongong LEP for land within the study area for the Proposal.

Table 4-2 Relevant provisions of the Wollongong LEP

Provision description	Relevance to the Proposal
Clause 2.3 - Zone objectives and Land Use Table	Under the Wollongong LEP, Wollongong Station and Wollongong Stabling Yard including the proposed construction compound are zoned as SP2 Rail Infrastructure Facility. The proposed platform extensions and stabling yard upgrade are consistent with the objectives of this zone.
Clause 5.10 – Heritage conservation	Clause 5.10 of the Wollongong LEP aims to conserve the environmental heritage of Wollongong, the heritage significance of heritage items and heritage conservation areas, archaeological sites and Aboriginal objects and places. Wollongong Railway Station Group is listed on the NSW State Heritage Register, the RailCorp Section 170 Heritage and Conservation Register and in Schedule 5 of Wollongong LEP as an item of state heritage significance. A SoHI has been prepared for the Wollongong Railway Station Group and is provided in Appendix C and summarised in Section 6.5.
Clause 7.2 – Natural resource sensitive – biodiversity	Clause 7.2 of the Wollongong LEP aims to protect native fauna and flora, ecological processes and encourage the recovery of native fauna and flora and their habitats. The Proposal does not include any vegetation removal. Potential impacts on biodiversity are discussed in Section 6.7.
Clause 7.3 – Flood planning	Clause 7.3 of the Wollongong LEP aims to minimise the flood risk to life and property and flood impacts on the environment. The Proposal is not located within a flood planning area. Potential impacts on flooding are discussed in Section 6.9.
Clause 7.6 – Earthworks	Clause 7.6 of the Wollongong LEP aims to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. The potential impacts of the Proposal as a result of earthworks are discussed in Section 6.8.



Legend

- Wollongong Station and Stabling Yard Study Area
- Station within the Wollongong Study Area
- Station within the Wollongong Study Area where other MTMS works are proposed
- Existing railway track
- Road
- B1 Neighbourhood Centre
- B3 Commercial Core
- B4 Mixed Use
- B6 Enterprise Corridor
- B7 Business Park
- IN1 General Industrial
- IN2 Light Industrial
- R1 General Residential
- R2 Low Density Residential
- R3 Medium Density Residential
- RE1 Public Recreation
- SP1 Special Activities
- SP2 Infrastructure
- Access gate
- Platform extent
- Proposed platform extension
- Proposed 10-car NIF train stabling
- Proposed construction compounds / laydown area

0 200 400 Metres

1:8,000 at A4

Data sources

Jacobs 2018
Ausimage 2018
NSW Spatial Services 2018

GDA94 MGA56

Figure 4-1 Wollongong LEP zoning map

4.5 NSW Government policies and strategies

Table 4-3 provides an overview of NSW Government policies and strategies relevant to the Proposal.

Table 4-3 NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Commitment	Comment
The NSW State Priorities: Making it Happen (NSW Government, 2015)	The *NSW State Priorities: Making it Happen* replaces *NSW 2021: A plan to make NSW Number One*. It set out 12 Premier's priorities and 18 state priorities. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services. One of the 12 priorities relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.	The Proposal assists in meeting the priorities by improving amenity, safety and comfort for customers and encouraging greater use of public transport.
Future Transport Strategy 2056 (TfNSW, 2018a)	*Future Transport 2056* is an update of NSW's *Long Term Transport Master Plan*. It is a suite of strategies and plans for transport to provide an integrated vision for the state. The strategy places the customer at the centre of works undertaken by TfNSW. It includes issue specific and place based supporting plans that seek to integrate transport modes. The strategy outlines six state-wide outcomes: • customer focused • successful places • a strong economy • safety and performance • accessible services • sustainability.	The Proposal would deliver on the customer focus, safety and performance outcomes. The More Trains, More Services program is specifically referenced in the strategy as an example of major infrastructure upgrades that are underway.
Building Momentum State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)	*The State Infrastructure Strategy 2018-2038* is a strategy to plan and fund the infrastructure that the NSW Government delivers over the next 20 years. Public transport is viewed as critical to productivity, expanding employment opportunities by connecting people to jobs, and reducing congestion.	The Proposal invests in public transport by improving amenity, safety and comfort for customers which may encourage greater use of public transport.
Illawarra Shoalhaven Regional Plan (Department of Planning and Environment, 2015)	The *Illawarra–Shoalhaven Regional Plan 2036* is the NSW Government's strategy for guiding land use planning decisions for the Illawarra–Shoalhaven Region for the next 20 years. Improving public transport to better link centres, corridors and growth areas is identified as a priority in the plan as a result of expected urban growth.	The Proposal invests in public transport by facilitating the introduction of the NIF via the provision of stabling facilities and lengthening the platforms at Wollongong Station.

Policy/Strategy	Commitment	Comment
Illawarra Regional Transport Plan (TfNSW, 2016a)	The *Illawarra Regional Transport Plan* (TfNSW, 2016) provides a blueprint for the future and a strategic direction for the delivery of major transportation infrastructure over the next 20 years. The plan looks at population changes in the Illawarra region, considers the impact of urban growth in suburbs such as West Dapto, Nowra and Shellharbour, and accommodates anticipated employment growth and an increasing tourism market.	The Proposal invests in public transport, which is key to supporting employment opportunities, connecting people to jobs, and reducing congestion.

4.6 Ecologically sustainable development

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

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

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the Proposal. Section 3.1.4 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.12 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction 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

During development of the concept design of the Proposal, consultation was undertaken with Sydney Trains Heritage and the former Heritage Division (now Department of Premier and Cabinet Heritage) during September to December 2018 to discuss the design of the proposed platform extensions at Wollongong Station and any heritage requirements and considerations. Feedback received from these agencies on the concept design has been considered and incorporated during development of the Proposal.

The Proposal would involve the relocation of services, including electrical, signalling and communication equipment owned by Sydney Trains. Any affected utility providers would be consulted during the detailed design phase.

A Stakeholder and Community Consultation Plan has also been developed to provide a framework for effective communication and engagement with stakeholders and the community during the environmental assessment of the Proposal.

5.2 Consultation requirements under the Infrastructure SEPP

Part 2, Division 1 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Clauses 13, 14, 15, 15A, 15AA 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 use of the construction compound may result in temporary disruptions to pedestrian and vehicle movement. The use of the construction compound would be managed in accordance with a Traffic Management Plan (TMP) and any disruptions are expected to be minor. The Proposal would including the installation of stormwater drainage for the new stabling road walkways however the additional capture would be minimal and would not have a substantial impact on stormwater management services. TfNSW will consult with Wollongong City Council about these potential traffic and stormwater impacts of the

Clause	Clause particulars	Relevance to the Proposal
		Proposal in accordance with Clause 13 of the Infrastructure SEPP.
Clause 14 - Consultation with Councils – development with impacts on local heritage	Where railway station works: • substantially impact on local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area.	The Proposal would impact the Wollongong Railway Station Group, which is identified as local heritage in the Wollongong LEP. However, as this item is also listed on the State Heritage Register, consultation with Wollongong City Council under Clause 14 of the Infrastructure SEPP is not required.
Clause 15 - Consultation with Councils – development with impacts on flood liable land	Where railway station works: • impact on land that is susceptible to flooding – reference would be made to *Floodplain Development Manual: the management of flood liable land.*	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Wollongong City Council is not required in regard to this aspect. Refer to Section 6.9.
Clause 15A - Consultation with councils – development with impacts on certain land within the coastal zone	A public authority must not carry out development on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program that applies to that land.	There are currently no coastal vulnerability maps in force. The Proposal is not located in any currently mapped coastal areas under the Coastal Management SEPP. Accordingly, consultation with Wollongong City Council is not required in regard to this aspect. Refer to Section 6.9.
Clause 15AA - Consultation with State Emergency Service – development with impacts on flood liable land	A public authority must not carry out development on flood liable land unless the authority has given written notice of the intention to carry out the development to the State Emergency Service.	The Proposal is not located on flood liable land. Accordingly, consultation with the State Emergency Service is not required in regard to this aspect. Refer to Section 6.9.
Clause 16 - Consultation with public authorities other than Councils	For *specified development* which includes consultation with DPIE for development that is undertaken adjacent to land reserved under the NPW Act, and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult with could include: • TfNSW (former RMS) • Sydney Trains • DPC Heritage.	The Proposal is not located adjacent to land reserved under the NPW Act. Accordingly, consultation with DPIE is not required under Clause 16 of the Infrastructure SEPP. Consultation with DPC Heritage has been undertaken during development 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

TfNSW. 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 the local community and stakeholders are informed of the proposed upgrade work at the station and encourage direct communication/identification of issues, concerns or suggestions
- engage with directly affected community members near the Proposal area to understand opportunities to minimise impacts on their amenity
- 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
- listen and record community and stakeholder feedback and ensure it is considered during the development of the Proposal and responded to in the Determination Report
- work collaboratively with statutory regulators/authorities to facilitate the environmental approval process
- build positive relations with identified community stakeholders
- ensure a comprehensive and transparent approach
- identify and resolve issues in a timely manner.

5.4 Public display

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

- public display of the REF at various locations
- distribution of a project update at the station, and to local community and rail customers, outlining the Proposal and inviting feedback on the REF
- advertisement of the REF public display in local newspapers with a link to the TfNSW website that includes a summary of the Proposal and information on how to provide feedback
- consultation with Wollongong City Council, Sydney Trains and other non-community stakeholders
- a community information session held at the station (Wednesday 11 September 4 - 6pm).

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 two weeks from 4 - 18 September 2019.

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

1. Wollongong Library, 41 Burelli Street, Wollongong
2. Transport for NSW, 241 O'Riordan Street, The Gateway, Mascot.

The REF would also be available on the TfNSW website[1] and Have Your Say Website[2]. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email[3]. During this time feedback is invited. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the Proposal site on 31 July 2019. The AHIMS search identified no Aboriginal sites within 200 metres of the Proposal site.

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

5.6 Ongoing consultation

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

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

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

[1] www.transport.nsw.gov.au/projects/mtms
[2] www.nsw.gov.au/improving-nsw/have-your-say/
[3] projects@transport.nsw.gov.au

6 Environmental impact assessment

Chapter 6 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

Potential impacts on traffic and transport are presented in this section, together with mitigation measures to manage any negative impacts.

6.1.1 Existing environment

Road network

The Princes Highway (Crown Street) is located to the north of the Proposal site and is a major road running north-south between Sydney and the Victorian border. The Princes Highway near the Proposal site is generally two lanes in each direction with a posted speed limit of 60 kilometres per hour.

Local roads near the Proposal site include Station Street, Auburn Street and West Street to the east of the rail corridor and Gladstone Avenue to the west of the rail corridor.

Parking

There are dedicated commuter car park facilities at Wollongong Station. A multi-storey car park is located on the western side of the rail corridor. At grade car parking facilities are located on the eastern and western sides of the station. Secure Sydney Trains worker parking is provided south of the at grade parking on the western side as well as on the eastern side of the rail corridor.

Train services

Wollongong Station is located on the South Coast Line. The station is serviced by up to nine trains per hour during morning peak periods and up to six trains per hour during afternoon peak periods.

Bus services

Bus services operate to Wollongong Station at an interchange on Station Street, on the eastern side of the station. Bus routes that service Wollongong Station include:

- Bus services operated by NSW Trainlink to Moss Vale and Goulburn
- Routes 51 and 53, Wollongong to Shellharbour
- Route 57, a loop service around Lake Illawarra including Warrawong, Oak Flats, Albion Park Rail, Dapto and Unanderra
- Route 65, a loop service between North Wollongong and Port Kembla
- Route 855, Wollongong to Canberra
- Route 887, Wollongong to Campbelltown.

Pedestrian facilities

There a number of pedestrian footpaths and crossing opportunities on either side of the station.

Cyclist facilities

No dedicated cyclist lanes are located near the Proposal site. Bike racks are provided on the western side of Wollongong Station, on the ground floor of the multi-storey car park. Three secure bike lockers are also provided on the eastern side of the station.

6.1.2 Potential impacts

Construction phase

Access to the construction compound would be via the car park off Railway Station Square. Access to the rail corridor would be via existing access gates off Station Street and West Street. The access points are shown in Figure 3-1 and Figure 3-2.

During construction it is anticipated the Proposal would require the use of up to 10 heavy vehicles and 10 light vehicles. These vehicles would use the local road network to access the Proposal site when works are in progress. There would also be private vehicle traffic from up to about 60 site personnel engaged in the works travelling to and from the Proposal site. The majority of construction traffic would occur during the rail possession periods, as described in Section 3.2.3, which would occur outside of peak commuting times. However, this would coincide with increased vehicle traffic associated with rail replacement buses. As a result, there may be a slight increase in traffic at the beginning and end of each work shift during these weekend periods, these increases are not anticipated to affect the local road network operation, as local traffic is typically low on weekends.

The area around Railway Station Square and the at grade parking area is a low speed zone due to the shared use nature of the interaction between vehicles, pedestrians and cyclists. Traffic controls would be in place to ensure the safety of pedestrians, cyclists and road users.

Where possible, delivery of plant and materials would take place outside of standard construction hours to minimise the potential for impacts to the surrounding road network.

Parking

The secure area used for Sydney Trains staff parking on the western side of the station would be utilised for a construction compound and laydown area. The small number of staff that currently use this area would utilise the larger staff parking area on the eastern side of the station for the duration of construction. Construction workers on site outside of possession periods may use a combination of the construction compound and laydown area and staff parking area on the eastern side of the station.

During possession periods, offsite overflow parking in addition to the construction compound and laydown area and eastern staff car park would potentially be required for construction workers. This could potentially reduce parking available to commuters and other users of the car parks on the western side of the station unless management measures are implemented.

Operational phase

Overall the Proposal would contribute to the efficient introduction of the Long NIF on the South Coast Line. These new 10-car services would improve accessibility, enhance safety and improve comfort by providing a range of modern features for customers. The platform extensions would allow drivers to safely enter and exit trains at Platforms 1 and 2. The establishment of a suitable stabling yard for the Long NIF would enable trains to be safely stabled when not required for services, and for drivers to safely enter and exit trains at the beginning and end of shifts.

It is not expected that there would be any impact of local road traffic or parking as a consequence of the operation of the Proposal. The existing Sydney Trains worker car park has sufficient capacity to accommodate additional staff parking if required.

6.1.3 Mitigation measures

The following mitigation measures are proposed to manage the potential impacts of the Proposal on traffic and transport (refer to Table 7-1 for a full list of proposed mitigation measures):

- prior to the commencement of construction, a TMP would be prepared as part of the CEMP and would include at a minimum:
  - adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to avoid road accidents and minimise disruption to surrounding land uses
  - measures to maintain safety and accessibility for pedestrians and cyclists
  - adequate sight lines to allow for safe entry and exit from the site
  - unobstructed access to Wollongong Station, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made)
  - measures to manage impacts and changes to on and off street parking and requirements for any temporary replacement provision
  - parking locations for construction workers away from Wollongong Station and busy residential areas and details of how this would be monitored for compliance
  - routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
  - details for relocating kiss and ride bays, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired
  - measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP
- consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction
- communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.

6.2 Urban design, landscape and visual amenity

The potential impacts of the Proposal on urban design, landscape and visual amenity are assessed in the *More Trains, More Services, Wollongong Stabling Yard and Platform Extension, Visual Impact Assessment* (Jacobs, 2019a) provided in Appendix D. A summary of the assessment is presented in this section.

6.2.1 Existing environment

Land use near the Proposal site is described in Section 1.3.

The rail corridor at the Proposal site has very little road frontage, which means there are few publicly accessible locations with views of the Proposal. Publicly accessible views of Wollongong Station from outside of the rail corridor are only available from the bus interchange on Station Street on the eastern side of the rail corridor and from Railway Station Square and the commuter car park on the western side of the rail corridor. At these locations, the rail corridor is at the same level as land either side of the rail corridor.

At Wollongong Stabling Yard, the rail corridor is in a wide cutting at the northern end of the stabling yard. This cutting transitions to a low embankment near West Street. Existing residential receivers on the eastern side of Gladstone Avenue have views over the stabling yard from the rear of their properties.

6.2.2 Potential impacts

The visual impact of the Proposal has been assessed by considering the following criteria:

- visibility of the development
- the distance of the viewer from the development
- the nature of the surrounding landscape
- the number of viewers able to see the development.

The assessment considered the visual impact of the Proposal from six publicly accessible locations around Wollongong Station and also from residential dwellings on Gladstone Avenue, on the western side of Wollongong Stabling Yard. At each location, the visual impact of the Proposal was considered against the above criteria and the impact described according to the following scale:

- negligible adverse effect – minute level of effect that is barely discernible over ordinary day to day effects
- low adverse effect – adverse effects that are noticeable but that will not cause any significant adverse impacts
- medium adverse effect – significant effects that may be able to be mitigated/remedied
- high or unacceptable adverse effect – extensive adverse effects that cannot be avoided, remedied or mitigated.

The assessment found that the change in views that would result from the proposed platform extensions would not be discernible or noticeable from publicly accessible locations external to the rail corridor due in part to the limited locations where the proposed works would be visible and screening of these views by existing rail infrastructure, perimeter fencing and vegetation.

Within the rail corridor, the proposed platform extensions would be visible from the southern ends of the platforms and would appear consistent with the existing platforms. Figure 6-1 provides a comparison of an existing view and an indicative future view of Platform 1 from Platform 2.

Figure 6-1 Existing and indicative future views of Platform 1 from Platform 2

Wollongong Stabling Yard is visible from Wollongong Station. However, the proposed stabling yard upgrade would not be a noticeable element from Wollongong Station due to the existing view including several OHW structures, station infrastructure and vertical elements which mesh together. If visible, it would appear consistent with other infrastructure in the view.

The visual impact of the Proposal was assessed as a 'Low' to 'Negligible' adverse effect from the southern end of the platforms of Wollongong Station and 'Negligible' from the Wollongong Station concourse.

At Wollongong Stabling Yard, the change in views from privately accessible locations would be entirely consistent with current views. The only noticeable change may be in night-time views, where new lighting may cause spill or glare.

6.2.3 Mitigation measures

The following mitigation measures are proposed to manage the potential visual impacts of the Proposal (refer to Table 7-1 for a full list of proposed mitigation measures):

- all permanent lighting should be designed and installed in accordance with the requirements of *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting*. An appropriate lighting management plan should be prepared to minimise the impact of lighting within the stabling yard to include downward direct lights, baffling and shielding
- light spill from the construction area into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution
- materials should be selected to be consistent with existing elements at Wollongong Station and Wollongong Stabling Yard

- black fencing should be considered as a mitigation measure where fencing is proposed adjacent to visually sensitive areas
- during construction, worksite compounds should be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations
- temporary construction hoardings, barriers, traffic management and signage should be removed when no longer required.

6.3 Noise and vibration

The potential noise and vibration impact of the Proposal is assessed in the *More Trains, More Services, Noise and Vibration Impact Assessment, Wollongong Stabling Yard and Platform Extension* (Renzo Tonin, 2019) provided in Appendix E. A summary of the assessment is presented in this section.

6.3.1 Existing environment

The noise and vibration assessment has taken into consideration all nearby noise sensitive receivers. Representative locations have been selected to provide an indication of predicted noise levels around the stabling yard. The selected representative noise sensitive receivers within the study area are shown in Figure 6-2. The nearest residential locations to the Proposal site include:

- residential receivers along Gladstone Avenue, Wollongong to the west of the Proposal site
- residential receivers along Auburn Street, Wollongong to the east of the Proposal site.

The nearest non-residential sensitive receiver locations to the Proposal site are identified in Table 6-1.

Table 6-1 Nearest non-residential sensitive receiver locations to the Proposal site

Receiver type	Description	Address	Approximate distance to the Proposal site (metres)
Childcare	City Cottage Kindergarten	32 Atchison Street, Wollongong	250
Education	TAFE NSW – Wollongong West	1 Rowland Avenue, Wollongong	100
	Computer training school	50-52 Auburn Street, Wollongong	60
Medical	Doctors' surgery	76 Auburn Street, Wollongong	60
Recreation (active)	Coniston Junior Soccer Club	92 Gladstone Avenue, Coniston	100
Recreation (passive)	South Street Park	South Street, Wollongong	230
Place of worship	Serbian Orthodox Church	82 Kenny Street, Wollongong	290
	St Elias Church	86 Kenny Street, Wollongong	290

Noise monitoring was undertaken during preparation of this REF to measure ambient and background noise levels at the Proposal site. Unattended noise monitoring was conducted for

a continuous period between 6 and 13 May 2019 at three locations described in Table 6-2 and shown in Figure 6-3.

Table 6-2 Unattended noise monitoring locations

Noise logger no.	Location	Observed noise environment
M1	39 Gladstone Street, Wollongong	Day: General urban hum with distant traffic audible. Railway was the dominant source when trains were passing. No mechanical plant from industrial areas could be identified from the general urban hum. Night: Background controlled by industrial and distant traffic hum from the south, with local traffic and train noise (when present or passing by) contributing to ambient noise levels.
M2	81 Gladstone Street, Wollongong	Day: General urban hum with traffic on Gladstone Avenue audible. Railway was the dominant source when trains were passing. Distant mechanical plant was audible from the direction of the industrial area east of the railway. Night: Background controlled by industrial and distant traffic hum from the south, with local traffic and train noise (when present or passing by) contributing to ambient noise levels.
M3	80 Auburn Street, Wollongong	Day: General urban hum with traffic on Auburn Street audible. Distant mechanical plant could be heard from an industrial unit to the north. No noise heard from railway except for passing trains. Night: Background controlled by industrial and distant traffic hum from the south, with local traffic contributing to ambient noise levels.

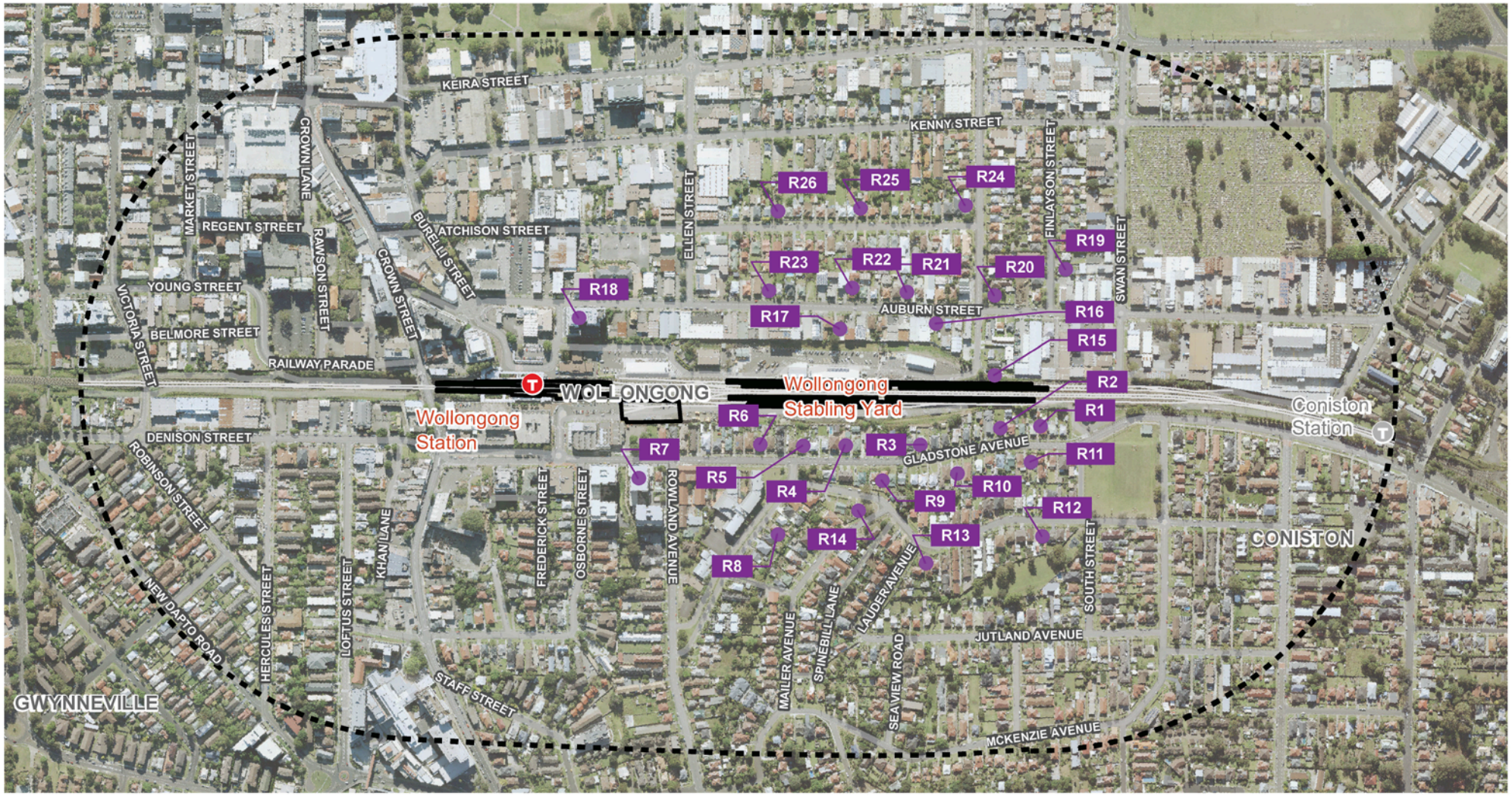
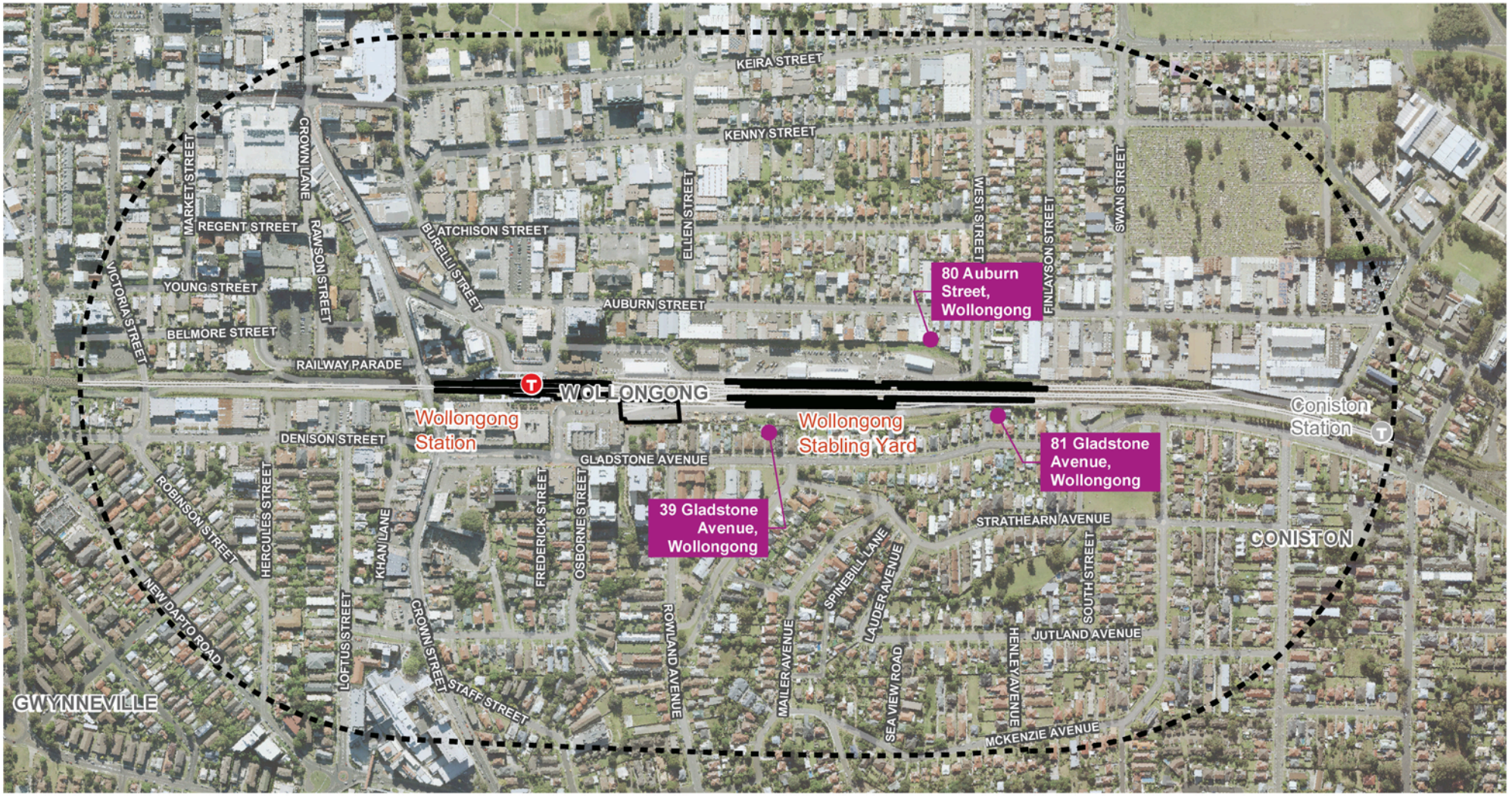


Figure 6-2 Noise sensitive receivers in the study area



Legend

- Wollongong Station and Stabling Yard Study Area
- Unattended noise monitoring locations
- Station where works are proposed
- Station where other MTMS works are proposed
- Existing railway
- Local roads
- Footprint of the Proposal

0 250 500 Metres

1:8,000 at A4

Data sources

Jacobs 2018
Ausimage 2018
NSW Spatial Services 2018

GDA94 MGA56

Figure 6-3 Unattended noise monitoring locations

The unattended noise monitoring data was used to determine background noise levels for each day, evening and night period monitored. These periods are defined in the *NSW Noise Policy for Industry* (NPfI) (EPA, 2017) as:

- day – 7:00 am to 6:00 pm Monday to Saturday and 8:00 am to 6:00 pm Sundays and public holidays
- evening – 6:00 pm to 10:00 pm, Monday to Sunday and public holidays
- night – 10:00 pm to 7:00 am Monday to Saturday and 10:00 pm to 8:00 am Sundays and public holidays.

Rating background levels (RBLs) for each period were then determined based on the median background noise levels for these periods and are presented in Table 6-3.

Table 6-3 Measured existing ambient and background noise levels, dB(A)

Location	Rating background level ($L_{A90, 15\ minute}$)			Ambient noise levels ($L_{Aeq, 15\ minute}$)		
	Day	Evening	Night	Day	Evening	Night
39 Gladstone Street, Wollongong	41	41	41	54	53	53
81 Gladstone Street, Wollongong	40	39	37	49	52	49
80 Auburn Street, Wollongong	39	38	37	49	47	55

Attended noise monitoring was undertaken of the ambient noise environment at several receivers near to the stabling yard to determine the contribution from existing stabling activities and the noise sources that make up the existing noise environment. Attended and unattended noise monitoring was also undertaken at the stabling yard to quantify the noise of trains in various conditions during arrival, idling while stabled, train preparation and train departure. This data was used to develop noise modelling scenarios for the existing stabling situation, which were then used to determine the future noise impacts of the Proposal.

The noise modelling of the operation of Wollongong Stabling Yard identified that existing noise emissions from stabling operations exceed the project-specific noise level by more than 20 dB(A) and the awakening reaction level by up to 30 dB(A) at some receivers. The maximum modelled exceedance of the project-specific noise level for representative receivers west of the Stabling Yard on Gladstone Avenue were 22 dB(A), and east of the Stabling Yard on West Street were 26 dB(A). Train horn testing and preparation procedure testing events are key contributors to these exceedances.

When these events are not taking place and trains are standing idle, the maximum exceedance of the project-specific noise level is 12 dB(A) and the maximum exceedance of the awakening reaction level is 5 dB(A) to the west of the Stabling Yard, and 7 dB(A) to the east of the Stabling Yard. This is attributable to the cyclical release of air from the train air compressor.

6.3.2 Potential impacts

Construction phase

The *Interim Noise Construction Guideline* (ICNG) (Department of Environment and Climate Change, 2009) provides guidance for assessing noise generated during the construction

phase of developments. Noise management levels (NMLs) identified in the ICNG for residential receivers are presented in Table 6-4.

Table 6-4 Construction noise management levels in the ICNG for residential receivers

Time of day	Noise management level $L_{Aeq\ (15min)}$
Recommended standard hours: Monday to Friday 7am to 6 pm Saturday 8am to 1pm No work on Sundays or public holidays	Noise affected: RBL + 10dB
	Highly noise affected: 75 dB(A)
Outside recommended standard hours	Noise affected: RBL + 5 dB

The likelihood of sleep disturbance was assessed by adopting a sleep disturbance assessment level that is the higher of $L_{A90(15min)}$ + 15 dB(A) or 55 dB(A).

The construction NMLs for the Proposal are presented in Table 6-5.

Table 6-5 Construction noise management levels at residential receivers near the Proposal

Noise monitoring location	Receiver area surrounding station	Noise management level ($L_{Aeq,\ 15\ minute}$)				Sleep disturbance ($L_{A1(1min)}$)
		Day (Standard)	Day (OOH)	Evening (OOH)	Night (OOH)	Night (OOH)
M2	Stabling yard (western side)	50	45	44	42	55
M3	Stabling Yard (eastern side)	49	44	43	42	55

While the two monitoring locations on the western side of the railway (M1 and M2 in Table 6-2) show similar background noise levels, the monitoring results at M2 are marginally lower than at M1. As a conservative measure, NMLs for receivers on the western side of the railway have been adopted from noise monitor M2.

Construction noise emissions were predicted by modelling the noise sources, receiver locations and construction activities and comparing the results to the NMLs in Table 6-4. The modelling indicates that construction noise would exceed the NMLs and be clearly audible at the receivers closest to the stabling yard and station. The modelling also indicates that there would be four highly noise affected receivers on the western side of the Proposal site on Gladstone Street and none to the east of the Proposal site, for works undertaken during standard construction hours. One would be affected during site establishment works, and four during track works. There would be no highly noise affected receivers during other construction works.

For works undertaken outside of the standard construction hours, construction noise would be clearly audible at the receivers closest to the Proposal site and may at times be highly intrusive. The highest noise impacts are expected to occur during track works, primarily due to rail saw usage. Residences adjacent to the rail corridor on Gladstone Avenue, from Rawlinson Street to South Street, may experience highly intrusive construction noise. Receivers as far as Staff Street (north west), McKenzie Avenue (west), Bridge Street (south), Kenny Street (east and south east) and Crown Street (north) are predicted to receive noise above the night NML.

It is noted that the majority of construction would occur during rail possession periods, including the track works, and consequently the most disruptive work would be distributed across six weekends over the entire construction phase.

Construction vibration criteria were defined for the Proposal and are detailed in Appendix E. There are no buildings within the recommended minimum working distance for vibration intensive plant identified in the *Construction Noise and Vibration Strategy* (TfNSW, 2019c). A review of the Proposal site and nearby sensitive buildings identified that there is low to negligible risk of vibration impact as a result of the construction of the Proposal. The vibration impact on the station buildings was assessed as low as the nearest works would be more than 20 metres from the station buildings. The vibration impact on the station buildings would be confirmed during detailed design.

Operational phase

Platform extensions

The *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013) provides guidance in relation to the prediction and assessment of railway noise. The RING includes 'noise trigger levels' which, if exceeded, require the preparation of a detailed study to evaluate predicted noise and vibration levels and determine feasible and reasonable mitigation measures.

The RING includes a noise trigger level for residential receivers near projects that involve the redevelopment of an existing rail facility, such as the Proposal. The trigger is development that increases existing $L_{Aeq(period)}$ rail noise levels by 2 dB or more, or existing L_{Amax} rail noise levels by 3 dB or more and predicted rail noise levels exceed:

- day (7:00 am to 10:00 pm) – 65 dB(A) $L_{Aeq(15\ hour)}$ or 85 L_{AFmax}
- night (10:00 pm to 7:00 am) – 60 dB(A) $L_{Aeq(15\ hour)}$ or 85 L_{AFmax}.

The operation of the proposed Wollongong Station platform extensions is predicted to result in a less than 1 dB(A) change to operational noise emissions at the nearest residential receivers, as a consequence of relocated signals. This difference would not be perceptible to the majority of people. This is within the redeveloped rail line noise trigger levels.

Wollongong Stabling Yard

It should be noted that the RING does not apply to noise involving maintenance facilities for rolling stock (including stabling yards and shunting operations), which is assessed in accordance with the NSW *Noise Policy for Industry* (NPfI) (EPA, 2017).

The NPfI provides a procedure for the assessment of operational noise from industrial sources including rail operations. In accordance with the policy, operational noise impact should be assessed against a project noise trigger level that is the lower of two components:

- controlling intrusive noise impacts for residences
- maintaining noise level amenity for residences and other land uses.

For existing industry that has been in operation for more than 10 years and has noise emissions that exceed the recommended amenity noise level, the NPfI specifies that the project amenity noise level may be adopted as the project noise trigger level to assess both existing and proposed site operations. As the Wollongong Stabling Yard and other nearby industrial facilities have been in operation for more than 10 years, this approach is relevant to the Proposal.

Project noise trigger levels of 58 dB(A), 48 dB(A) and 43 dB(A) for the day, evening and night periods (respectively) have therefore been adopted for residential receivers to assess the existing and proposed stabling operations. A sleep disturbance screening level for the project of 52 dB(A) (L_{AFmax}) was also used to assess the potential for sleep disturbance from maximum noise level events.

The noise modelling of the future stabling operations showed similar results, with small differences from the modelling of the existing operations due to changes in the location of driver cabs, which are the location of the key noise sources during preparation activities. The maximum predicted exceedance level for representative receivers west of the Stabling Yard on Gladstone Avenue were 23 dB(A), and east of the Stabling Yard on West Street were 21 dB(A).

The key noise sources that generate the exceedances during the preparation process are:

- horn testing
- train compressed air system testing/releases.

A range of scenarios were modelled, adopting several different reasonable worst-case 15 minute noise emission scenarios for typical early morning train preparation activities. These were compared against the existing noise emissions to understand where the changes or exceedance may occur. It is to be noted that these are assumed scenarios modelled at the selected representative receivers. A summary of the range of exceedances at each of the representative receivers for night operations at the stabling yard, existing and future, is provided in Table 6-6, providing the range of predicted noise levels across the modelled scenarios. Full modelling details are provided in Section 6.4.1 of the *Noise and Vibration Assessment* in Appendix E.

Table 6-6 Summary of changes to exceedances at representative receivers – night operations

Representative receiver	Exceedance range dB(A) existing operations (night)	Exceedance range dB(A) future operations (night)
R1	8-22	9-21
R2	8-20	9-20
R3	7-19	9-21
R4	10-21	12-23
R5	7-19	6-18
R6	4-18	7-18
R7	6-8	1-9
R8	1-2	0-6
R9	3-12	4-11
R10	5-7	3-7
R11	1-8	1-7
R12	1	0
R13	0	0
R14	6	1-8
R15	12-26	7-21
R16	2-9	4-14
R17	2-12	2-12
R18	4-6	5-6
R19	1-2	2
R20	4-9	3-9
R21	3-6	2-6
R22	4-8	6
R23	1	0
R24	2-3	1
R25	0	0
R26	0	0

This shows that there were increases at some locations and changes or decreases at other representative locations, as a consequence of the changed configuration of operations within the stabling yard.

The modelling also considered the changes in sleep disturbance impacts, specifically looking at the maximum noise levels (L_{AFmax}). Table 6-7 provides a summary of the changes in sleep disturbance and awakening reaction predicted noise levels for night operations at the stabling yard, existing and future, providing the range of predicted noise levels across the modelled scenarios. Full modelling details are provided in Section 6.4.2 of the *Noise and Vibration Assessment* in Appendix E.

Table 6-7 Summary of changes to exceedances at representative receivers – sleep disturbance

Representative receiver	Exceedance range dB(A) existing operations (night)		Exceedance range dB(A) future operations (night)	
	Screening level	Awakening level	Screening level	Awakening level
R1	18-41	5-28	18-40	5-27
R2	16-35	3-22	19-33	6-20
R3	10-26	13-22	15-38	6-25
R4	18-37	5-24	19-41	6-28
R5	14-36	1-23	9-35	19-22
R6	11-36	10-23	18-29	5-16
R7	18-26	5-13	19-25	6-12
R8	5-20	0-7	5-20	0-7
R9	3-23	9-10	7-24	8-11
R10	5-24	5-11	2-22	4-9
R11	6-25	4-12	6-24	11
R12	3-19	0-6	3-14	0-1
R13	3-13	0	3-12	0
R14	1-20	3-7	1-21	4-8
R15	20-43	7-30	18-38	5-25
R16	6-26	10-13	11-31	8-18
R17	6-29	14-16	5-31	14-18
R18	15-23	2-10	17-22	4-9
R19	16-18	3-5	15-18	2-5
R20	22-25	6-12	5-26	3-13
R21	20	0-7	3-22	1-9
R22	22	9	2-24	7-11
R23	15-16	2-3	14-17	1-4
R24	12-19	0-6	10-15	0-2
R25	8-11	0	8-14	0-1
R26	2-4	0	1-3	0

6.3.3 Mitigation measures

This section presents mitigation measures proposed to manage the potential noise and vibration impacts of the Proposal (refer to Table 7-1 for a full list of proposed mitigation measures).

Mitigation and management measures should be considered in a hierarchical approach as follows:

- controlling noise at the source
- once the controls at the source exhausted, controlling the transmission of noise
- once source and transmission controls are exhausted, considering mitigation measures at the noise-sensitive receivers.

Mitigation and management measures should be considered in parallel with effective community engagement, so that community preferences and expectations can be considered when assessing if mitigation and management measures are feasible and reasonable.

Construction

- communication with the community and stakeholders regarding construction noise and vibration would be detailed in a Community Liaison Management Plan for the construction of the Proposal and would include a 24 hour hotline and complaints management process
- high noise impact construction activities would only be carried out between 8:00 am and 6:00 pm on Monday to Friday and 8:00 am to 1:00pm on Saturday
- high noise impact construction activities would be carried out in continuous blocks of up to three hours. Respite from high noise impact activities would be provided between each block for at least one hour. No high noise impact activities would be carried out during this one hour respite period
- high noise generating construction plant and equipment would not be used during the night period
- undertake a condition survey of the heritage buildings within the heritage curtilage of Wollongong Railway Station Group prior to the commencement of construction work
- prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Strategy* (TfNSW, 2019c) and the *Noise and Vibration Impact Assessment* (Renzo Tonin, 2019). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.

Operation

- review at-source mitigation and management controls including:
  - management practices to require complete shut down of trains when stabled and not in use
  - modifications to equipment and procedures for existing and future rolling stock for key noise generating sources
- investigate alternative methods for elements of operations within the Stabling Yard
- consideration of noise controls at noise sensitive receivers following the implementation of all other feasible and reasonable mitigation measures

- develop a noise reduction program, in accordance with Section 6.2 of the NPfI, to investigate and identify feasible and reasonable noise mitigation and management measures that can be adopted at Wollongong Stabling Yard to provide noise reduction benefits for nearby noise sensitive receivers. The program may include:
  - identification of noise levels and targets for the site
  - time frame for implementation of measures
  - an upper limit for new equipment
  - an upper limit for partial upgrades of the site
  - plans to eliminate or reduce problematic characteristics that have been identified, such as tonal, low-frequency noise and intermittent noise
  - operating practices to reduce noise emissions
  - training and awareness initiatives
  - a noise monitoring procedure and timeframe to verify the effectiveness of noise mitigation and management measures. Verification of new rolling stock noise levels should be undertaken within 6 months of the commencement of their use within the Stabling Yard
  - an ongoing monitoring program to evaluate noise-emission levels over time
  - communicating with the affected community using tools such as a complaint handling process, liaison group or newsletters.

6.4 Aboriginal heritage

Potential impacts on Aboriginal heritage are presented in this section, together with mitigation measures to manage any negative impacts.

6.4.1 Existing environment

A search of the AHIMS database was undertaken for the Proposal site on 31 July 2019 (refer to Appendix F). The AHIMS search identified no Aboriginal sites or places within 200 metres of the Proposal site.

The extensive landscape modification that has occurred across the Proposal site including the site of the proposed construction compound suggests that intact evidence of Aboriginal land use is unlikely to occur within the Proposal site. Similarly, the high level of disturbance suggests that the archaeological potential of the area is low.

6.4.2 Potential impacts

Construction phase

The Proposal site has been subject to previous disturbance from construction of rail infrastructure and surrounding development. Due to the disturbed nature of the Proposal site, it is considered unlikely that any unknown Aboriginal heritage items would be encountered during construction.

Operational phase

There would be no impact to Aboriginal heritage during operation of the Proposal.

6.4.3 Mitigation measures

The following mitigation measures are proposed to manage the potential impacts of the Proposal on Aboriginal heritage (refer to Table 7-1 for a full list of proposed mitigation measures):

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

6.5 Non-Aboriginal heritage

The potential impacts of the Proposal on non-Aboriginal heritage are assessed in the *More Trains, More Services Wollongong Stabling Yard and Platform Extension, Statement of Heritage Impact* (Jacobs, 2019b), provided in Appendix C. A summary of the report is presented in this section, together with safeguards and management measures to minimise any adverse impacts.

6.5.1 Methodology

The non-Aboriginal heritage assessment comprised:

- background historical research, including a review of previous heritage assessments to identify the potential for archaeological and heritage items to be present within the Proposal site
- a search of all available heritage registers on 18 March 2019. This included the State Heritage Register, State Heritage Inventory, Wollongong LEP, RailCorp Section 170 Heritage and Conservation Register, Commonwealth Heritage List, National Heritage List and World Heritage List to identify previously recorded non-Aboriginal heritage items within or near to the Proposal site, and related legislative obligations
- a site visit to publicly accessible areas of Wollongong Station on 16 April 2019
- identification and assessment of potential impacts of the Proposal on non-Aboriginal heritage items, conservation areas and archaeology
- the development of measures to manage the Proposal's potential impact on non-Aboriginal heritage items and archaeology through the application of the 'avoid, minimise and mitigate' hierarchy.

6.5.2 Existing environment

Historical context

The land comprising the city now known as Wollongong was sighted by Captain James Cook in April 1770. An attempt was made to land at Woonona, about 10 kilometres north-east of Wollongong Station, however owing to rough seas the Endeavour pushed further north to Botany Bay, where Cook's first landing on Australian soil was made. At Woonona, Cook and Sir Joseph Banks noted the presence of a group of Aboriginal men. Cook also noted:

> *… hauld up on the beach 3 or 4 small Canoes which to us appear'd not much unlike the small ones of New Zeland (sic), in the woods were several trees of the Palm kind and no under wood and this was all we were able to observe… from the boat" (Cook 1770).*

Following colonisation, the area was not visited by Europeans until 1796, when George Bass and Matthew Flinders landed at Towradgi Point (McDonald, 1975).

One of the first land grants near Wollongong Station was to Joseph Thompson, who was granted 640 acres in 1824. In 1831, Royal Navy surgeon Dr John Osborne applied for the land to be transferred to him, which he named "Glen Glosh". In 1836, Osborne added a further 300 acres and renamed his estate "Garden Hill". He built his home there, which was also named "Garden Hill", but is better known now as "Hospital Hill", which is now the location of the current Wollongong Hospital. Osborne died at Garden Hill in 1850.

Wollongong Station was opened on 21 June 1887 with a single platform. A goods yard, carriage shed and turntable were added in 1911 and a second platform was added when the line was duplicated in 1921 (Brian Macdonald & Associates Pty Ltd, 2000:3).

Listed heritage items

A search of heritage registers identified three items listed on the State Heritage Register, one item listed on the RailCorp Section 170 Heritage and Conservation Register and 19 local heritage listed sites within the study area (refer to Table 6-8). The closest heritage item is the Wollongong Railway Station Group which is within the Proposal site and includes the platforms of Wollongong Station.

Table 6-8 Listed heritage items within 500 metres of the Proposal site

Heritage item name	Register(s) listed	Listing Number	Significance	Distance from the Proposal site
Wollongong Railway Station Group	State Heritage Register RailCorp Section 170 Heritage and Conservation Register Wollongong LEP	01289 6382	State	Within the Proposal site
Regent Theatre, 197 Keira Street, Wollongong	State Heritage Register Wollongong LEP	01735 5937	State	390 metres north-west
Wollongong Hospital Nurses' Home Darling Street, Wollongong	State Heritage Register Wollongong LEP	00836 5939	State	480 metres north-east

Heritage item name	Register(s) listed	Listing Number	Significance	Distance from the Proposal site
Group of fig trees	Wollongong LEP	5939 (5955 on LEP map)	Local	385 metres north-west
Moreton Bay fig tree	Wollongong LEP	6290	Local	175 metres west
Row of Canary Island date palms	Wollongong LEP	6287	Local	470 metres south-west
House	Wollongong LEP	6222	Local	260 metres south-east
House	Wollongong LEP	6223	Local	270 metres south-east
“Carthona”	Wollongong LEP	6224	Local	280 metres south-east
House	Wollongong LEP	6225	Local	290 metres south-east
“Regentville”	Wollongong LEP	6361	Local	300 metres south-east
Hotel	Wollongong LEP	6242	Local	20 metres east
City Pacific International (former Crown Hotel)	Wollongong LEP	6241	Local	150 metres east
Row of shops	Wollongong LEP	6240	Local	225 metres east
Former Marcus Clark Building	Wollongong LEP	6474	Local	235 metres east
Row of Canary Island date palms	Wollongong LEP	6276	Local	385 metres north-west
Row of California Bungalows	Wollongong LEP	6514	Local	380 metres north-west
Row of workers’ cottages	Wollongong LEP	6391	Local	345 metres north-west

Wollongong Railway Station Group

The Wollongong Station buildings are of brick construction with corrugated steel gabled roofs. The Platform 2 station building is the older of the two buildings (c.1887), while the Platform 1 station building was constructed c.1923. The newer c.1923 building is essentially a mirror of the c.1887 building. The heritage curtilage (refer Figure 6-4) extends five metres past the platforms to the south and does not include the Stabling Yard.

Platform 2 station building (1887)

The Platform 2 station building is a single storey building in English bond painted brick with a rendered base to the walls, timber valance to cantilevered awning, timber framed double-hung windows, steel trusses and curved brackets to awning. The building features timber panelled doors with fanlights and sidelights and a gabled section over the main entry. The main entry has modern timber panelled double doors, each with glazed panels to the upper halves, and

modern tiled floor. There are rendered surrounds to each window, and projecting string courses above window height. There is a modern awning to the station entry. The building has two painted brick chimneys with brick strap work. One bay south of the entry, on the street side of the building, has a parapet.

Platform 1 station building (1923)

The Platform 1 station building is a single storey platform building with English bond painted brick walls with a projecting brick base, and a corrugated steel gabled roof with roughcast stuccoed imitation half-timbered gable ends. The gable ends also feature rectangular timber louvred vents. The roof has two painted brick chimneys with rendered caps and flat concrete hoods. The platform awning has a skillion corrugated steel roof and curved steel brackets. Windows are timber framed double hung with sandstone reveals.

Archaeological potential

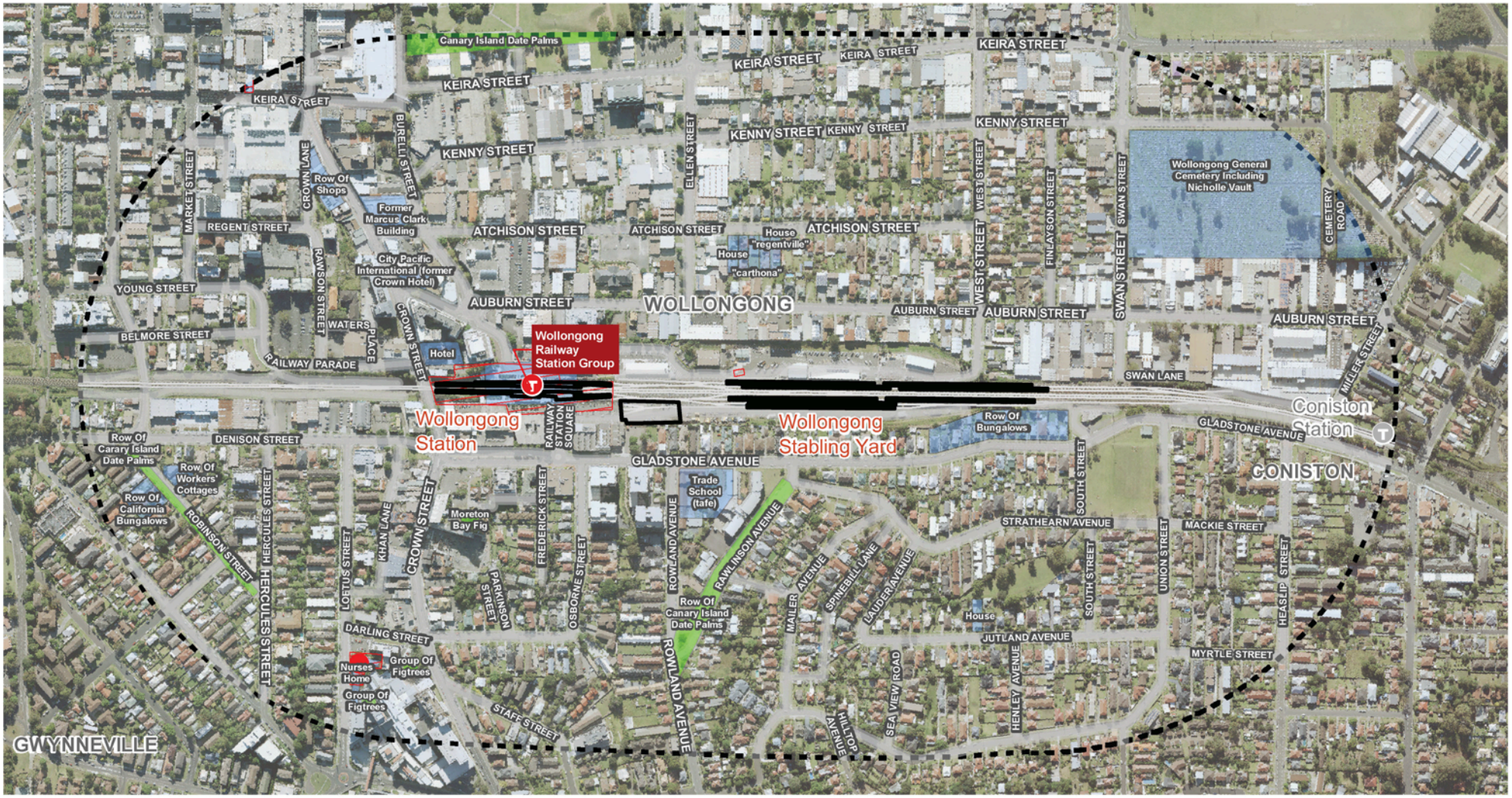
Wollongong Stabling Yard

The remains of the locomotive turntable that was constructed in 1888 for the purpose of turning locomotives when required are buried beneath the hardstand surface at the northern end of the stabling yard. Little remains of the original turntable, with the rail, pivot and other machinery removed in 2009 and donated to the Eskbank Rail Heritage Museum. In 2014, the remainder of the turntable was buried beneath the current hardstand surface and the area is now a car park and staging area. This area is proposed to be used for a temporary construction compound.

Given the presence of these remains below the current surface, the archaeological potential of this area of the stabling yard is high, however this area is outside of the area of proposed works and will not be disturbed.

Platform extensions

There are no known previous structures near the proposed platform extensions. It is considered that there is little to no potential for archaeological relics near the proposed platform extensions due to the extent of previous works associated with earlier extensions of Platforms 1 and 2.



Legend

- Station where works are proposed
- Station where other MTMS works are proposed
- Existing railway
- Local roads
- State Heritage Register (Centroid)
- State Heritage Register (Curtilage)

Local heritage item

- Item - General
- Item - Landscape
- Footprint of the Proposal

0 250 500 Metres

1:8,000 at A4

Data sources

Jacobs 2018
Ausimage 2018
NSW Spatial Services 2018

GDA94 MGA56

Date: 2/08/2019 Path: J:\IE\Projects\04_Eastern\IA209500\22_Spatial\GIS\Directory\Templates\B2_WollongongStablingYard\REF\IA209500_GIS_E005_WollongongPESY_HeritageA4_r1v1.mxd

Figure 6-4 Location of non-Aboriginal heritage items near the Proposal site

6.5.3 Potential impacts

Construction phase

Platform extensions

The primary heritage values of Wollongong Railway Station Group relate to the historic authenticity, the aesthetic value, social value, the rarity of the station buildings, refreshment rooms and weighbridge, and its representativeness as a major rural railway station. While the historical and social values or representativeness would not be impacted by the proposed works, the platform extensions have the potential to cause impact to the historic fabric of the platforms during construction and to the aesthetic values of the station.

The proposed platform extension of Platform 1 is located about 25 metres south of that platform's building, while on Platform 2 the extension is about 60 metres south of that platform's building. Given that the platform extensions are short in length, it is assessed that there is little potential for the platform extensions to impact on the aesthetic heritage value of the station buildings.

The construction of the proposed platform extensions would have a minor impact on the fabric of the historic brick platforms, and a negligible impact on the heritage significance of the item overall.

Given the disturbed nature of the ground near the platform extensions, it is unlikely that any archaeological material would be disturbed by the Proposal.

Wollongong Stabling Yard

As noted above, a former turntable is located at the northern end of Wollongong Stabling Yard, now buried underneath a hardstand carpark. The archaeological potential in that area of the stabling yard is assessed as high. That area is proposed to be used as a construction compound. No ground disturbance works are proposed near the turntable.

There may still be the remains of infrastructure relating to the servicing of locomotives or maintenance and/or operation of the turntable that extend into the areas of the stabling yard where upgrade works are proposed. These would need to be treated as unexpected finds should they be uncovered by any ground disturbance works.

Operational phase

The operation of the Proposal would not impact non-Aboriginal heritage items.

6.5.4 Mitigation measures

The following mitigation measures are proposed to manage the potential non-Aboriginal heritage impacts of the Proposal (refer to Table 7-1 for a full list of proposed mitigation measures):

- as some of the proposed works do not fall within either the RailCorp agency-specific exemptions or the standard exemptions pursuant to Section 57(2) of the *Heritage Act 1977*, an application for a permit under Section 60 of the Heritage Act is required to be obtained from DPC Heritage prior to commencement of works
- the heritage fabric of the platforms should be protected against accidental damage during construction by installing hoarding or other such material
- a heritage induction giving information regarding the location of heritage and archaeological items within and near the Proposal site should be given to all staff, contractors and subcontractors involved with the construction of the Proposal. The induction should cover the heritage constraints associated with the Proposal and relevant

obligations under the *Heritage Act 1977*. This induction could be included as part of a general induction

- in the event that any unanticipated archaeological deposits are identified within the Proposal site during construction, the procedures contained in the *Unexpected Heritage Finds Guideline* (TfNSW, 2019a) would be followed, and works near the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and DPC Heritage. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.

6.6 Socio-economic

Potential socio-economic impacts are presented in this section, together with mitigation measures to manage any negative impacts.

6.6.1 Existing environment

The study area is located within Wollongong LGA, which covers an area of about 72,100 hectares (including waterways). Wollongong LGA is bordered by the Tasman Sea (to the east), the Illawarra Escarpment (to the west), the Royal National Park (to the north) and the entrance to Lake Illawarra and the Macquarie Rivulet (to the south).

Land use

Surrounding land uses and social infrastructure in the study area includes:

- surrounding residential receivers
- surrounding businesses and commercial receivers including Piccadilly Centre and the Australian Hydrographic Office
- Wollongong Fire Station
- Lighthouse Church
- Australian College of Commerce and Management
- Cyprian Community Club
- Wollongong West TAFE
- Neville McKinnon Park.

Population, demography and economy

Wollongong LGA is estimated to have a resident population of 213,132 and a population density of 3.12 persons per hectare (Wollongong City Council, 2017). Key demographic and economic statistics for the Wollongong LGA (as reported in Wollongong City Council's (2018) *Wollongong City Community Profile*) are summarised in Table 6-9.

Employment in the Illawarra region has since diversified from a recent history focussed on steel manufacturing, with tourism, information technology, hospitality and health services now forming key areas of growth within the area (Wollongong City Council, 2014).

Between 2006 and 2017, the Wollongong LGA's estimated residential population has increased by about 11.6 per cent (Wollongong City Council, 2018). This trend in population growth is predicted to continue within Wollongong LGA, with the total residential population forecast to increase by 36,224 persons (or 16.57 per cent) between 2019 and 2036 (Wollongong City Council, 2018). Over 25,000 people living within Wollongong LGA regularly

commute out of the region each day for work, with the majority of these commuting to Sydney and its surrounding suburbs (Wollongong City Council, 2018).

Table 6-9 Key demographic and economic statistics for the Wollongong LGA

Statistic	Reported data		
	Wollongong LGA	NSW	Australia
Median age	39	38	38
Median weekly household income ($)	1,335	1,481	1,431
Couples with children (%)	30	32	30
Older couples without children (%)	11	10	10
Non-English speaking backgrounds (%)	17	25	21
Highest qualification achieved – Bachelor or Higher Degree (%)	20	23	22
Unemployment (%)	7.1	6.3	6.9

Source: *Wollongong City Community Profile* (Wollongong City Council, 2018)

Population growth

Wollongong has been identified by the *Future Transport Strategy 2056* (TfNSW, 2018) as an emerging Satellite City of Greater Sydney, driven by population and economic growth, requiring fast transit connections to Greater Sydney. Currently about 18 percent of all journey to work trips from Wollongong are to Greater Sydney.

Maintaining and enhancing connectivity to jobs, services and other amenities to and from these growth centres, will be fundamental to supporting NSW Government aspirations for liveability, productivity and sustainability.

6.6.2 Potential impacts

Construction phase

If unmanaged, the local amenity of the study area may be impacted by increased noise, traffic, dust and vibration from construction activities. Impacts of the Proposal on traffic and transport, noise and vibration, and air quality are discussed in Section 6.1, Section 6.3, and Section 6.10, respectively.

No direct impacts to social infrastructure are anticipated as works will be undertaken inside the rail corridor.

Operational phase

During operation, the Proposal is expected to have a positive impact on the community by improving accessibility, enhancing safety and improving comfort for customers on the South Coast Line.

6.6.3 Mitigation measures

The following mitigation measures are proposed to manage the potential socio-economic impacts of the Proposal (refer to Table 7-1 for a full list of proposed mitigation measures):

- 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 Management Plan to be developed prior to construction.

6.7 Biodiversity

Potential impacts on biodiversity are presented in this section, together with mitigation measures to manage any negative impacts.

6.7.1 Existing environment

Vegetation communities

A search of the Protected Matters Search Tool was undertaken on 7 June 2019 for the study area and is provided in Appendix G.

Three threatened ecological communities listed under the EPBC Act were identified within one kilometre of the Proposal Site:

- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community
- Illawarra and south coast lowland forest and woodland ecological community
- Subtropical and Temperate Coastal Saltmarsh ecological community.

The Proposal site is located within a disturbed area as a result of previous development and current rail operations. Vegetation within the Proposal site is generally restricted to urban exotic or native vegetation in the form of planted street trees and shrubs along the edges of the rail corridor and on station platforms in garden beds.

Threatened flora and fauna

A search of the DPIE Bionet Atlas of NSW Wildlife database was undertaken on 12 June 2019 for the study areas and did not identify any records of threatened species listed under the BC Act within the study areas.

The Protected Matters Search Tool identified 12 threated flora, 26 threatened fauna and 18 migratory species that may occur within one kilometre of the Proposal site.

Fauna habitat

The Proposal site contains minimal fauna habitat as it is an operational rail corridor. There are fragmented patches of foraging and shelter habitat for fauna in the urban exotic or native tree plantings and shrubs near the Proposal site.

6.7.2 Potential impacts

Construction phase

The Proposal site is on disturbed cleared areas within the rail corridor. Vegetation removal is not required to construct the Proposal.

Operational phase

There would be no impacts on biodiversity during operation of the Proposal.

6.7.3 Mitigation measures

The following mitigation measures are proposed to manage the potential impacts of the Proposal on biodiversity (refer to Table 7-1 for a full list of proposed mitigation measures):

- construction of the Proposal must be undertaken in accordance with the *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2018c) and *Fauna Management Guideline* (TfNSW, 2019e)
- if a tree is inadvertently damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible
- should the detailed design or onsite works determine the need to remove or trim any trees, the Contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval
- weed control measures, consistent with the *Weed Management and Disposal Guideline* (TfNSW, 2019f), 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 2016.*

6.8 Contamination, landform, geology and soils

Potential impacts on contamination, landform, geology and soils are presented in this section, together with mitigation measures to manage any negative impacts.

6.8.1 Existing environment

Geology

The *Soil Landscape of the Sydney 1:100,000 Map* indicates Wollongong Station is underlain by Gwynneville soil landscape.

The soils in the rail corridor are highly disturbed and common characteristics include unconsolidated low wet strength, impermeable soils, poor drainage, localised very low fertility and toxic materials.

Acid sulfate soils

Acid sulfate soils are soils and sediments containing iron sulfides that, when exposed to oxygen, generate sulfuric acid and potentially toxic quantities of aluminium and other heavy metals. The sulfuric acid and heavy metals are produced in forms that can be readily released and absorbed into the environment, with potential adverse effects on the natural and built environment and human health.

The acid sulfate soils risk maps prepared by DPIE do not identify any acid sulfate soil risks at the Proposal site.

Contamination

A search of the NSW EPA contaminated land records of notices and NSW contaminated sites notified to the EPA in June 2019 did not identify any contaminated sites in the study area.

Railway corridors have the potential to contain various contaminated materials from historical and operational sources. Such sources relate to the long-term operation of the railway and the history of nearby contaminating activities. Possible sources of contamination may include fill materials, hazardous materials from structures, leaks and spills of fuels, historical use of pesticides, and asbestos dust from train brake pads. The *Guide to the investigation and sampling of sites with potentially contaminated soil - Part 1: Non-volatile and semi-volatile compounds* (Standards Australia, 2005) states that common non-volatiles and semi-volatiles in railway yards include hydrocarbons, arsenic, phenolics (creosote), heavy metals, nitrates and ammonia.

6.8.2 Potential impacts

Construction phase

Excavation works would be limited for the proposal. Any excavation works would be minor and contained within the existing station platforms and stabling yard and would therefore reduce the risk of soil disturbance.

There is the potential for erosion and sedimentation and sediment may leave the Proposal sites through vehicle tracking if not managed correctly. There is the potential for unexpected finds which would require management if contaminated soils are encountered.

There is the potential risk of accidental spills at the construction compounds from the storage of fuels, oils and other potentially harmful substances. The impact of accidental spills or leaks of these substances is anticipated to be low as the Proposal would not involve the storage of large quantities of fuels, oils or other potentially harmful substances on site.

Operational phase

The operation of the Proposal is not expected to result in impacts on contamination, landform, geology and soils .

6.8.3 Mitigation measures

The following mitigation measures are proposed to manage the potential impacts of the Proposal on contamination, landform, geology and soils (refer to Table 7-1 for a full list of proposed mitigation measures):

- 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 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
- an appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. The protocol would include 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 waste would be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (EPA, 2014) prior to disposal.

6.9 Hydrology and water quality

Potential impacts on hydrology and water quality are presented in this section, together with mitigation measures to manage any negative impacts.

6.9.1 Existing environment

There are no waterways within the Wollongong Station and stabling yard study area.

The study area is not located within flood a planning area in the Wollongong LEP.

6.9.2 Potential impacts

Construction phase

The Proposal involves minor ground disturbance and therefore the potential for sediment-laden runoff to enter nearby watercourses and receiving catchments is low. There is potential for water quality to be impacted through pollution of stormwater runoff with fuels or other hazardous materials stored on site. These impacts would be adequately managed with standard environmental management measures. These measures would be consistent with the principles and practices detailed in the 'Blue Book' *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004).

Operational phase

The operation of the Proposal would not result in a substantial impact on local hydrology or water quality.

6.9.3 Mitigation measures

The following mitigation measures are proposed to manage the potential impacts of the Proposal on hydrology and water quality (refer to Table 7-1 for a full list of proposed mitigation measures):

- all fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and TfNSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018b)
- adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018b) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill
- in the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act
- the existing drainage systems would remain operational throughout the construction phase.

6.10 Air quality

Potential impacts on air quality are presented in this section, together with mitigation measures to manage any negative impacts.

6.10.1 Existing environment

Sensitive receivers in the immediate vicinity of the Proposal site are identified in Table 1-1. Air quality in the study area is representative of an urban area and is mainly dominated by vehicle emissions.

A search of the National Pollutant Inventory maintained by the Department of Environment and Energy was conducted for the study area on 29 May 2019. The search did not identify any pollutant emitting facilities within one kilometre of the proposal.

No air quality monitoring was carried out specifically for the Proposal. DPIE operates a nearby ambient air quality monitoring station at Wollongong about one kilometre north of the proposal. The Wollongong air quality monitoring station records nitrogen dioxide (NO_2), ozone (O_3), PM_{10}, $PM_{2.5}$ and visibility (NEPH). Data collected for the period 2018-2019 showed that the 24-hour average criterion for PM_{10} was exceeded once in March 2018, once in July 2018, once in November 2018 and once in December 2018. The 24-hour average criterion for $PM_{2.5}$ was exceeded once in May 2018, twice in July 2018, once in August 2018 and once in July 2019.

6.10.2 Potential impacts

Construction phase

During construction, air quality impacts could result from dust generated during excavation of the station platforms, stockpiling of excavated material and the movement of construction vehicles, plant and equipment along unsealed surfaces. Vehicles emissions would also be generated from the use of construction vehicles, plant and equipment.

Given that the Proposal is not likely to expose large areas of soil and that air quality impacts can be managed through the implementation of standard management measures, impacts on air quality are expected to be temporary and minor.

Operational phase

There would be no impacts on air quality during operation of the Proposal.

6.10.3 Mitigation measures

The following mitigation measures are proposed to manage the potential impacts of the Proposal on air quality (refer to Table 7-1 for a full list of proposed mitigation measures):

- air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's *Air Quality Management Guideline* (TfNSW, 2019d)
- 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.

6.11 Cumulative impacts

Cumulative impacts occur when two or more projects are carried out concurrently and near 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.

The More Trains, More Services program comprises several projects between Sydney Terminal and Kiama. Construction of these projects would be undertaken at the same time as the Proposal. One of the projects is near the proposal, being the 10-car NIF enabling works at Coniston Station.

A search of DPIE's Major Projects Register, Southern Joint Regional Planning Panel Development and Planning Register, and Wollongong City Council Development Application Register on 12 June 2019 identified Development Applications within the study area that relate mainly to residential and retail modifications and a number of multi-story developments. Many of the developments would have similar construction timeframes to the Proposal.

The construction works for the Proposal would be coordinated with any other construction activities occurring in the area. Consultation and liaison would occur with Wollongong City Council, Sydney Trains and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

Traffic associated with the construction of the Proposal would have a minor impact on the surrounding road network. The operation of the Proposal would result in a negligible change to local traffic conditions and the performance of the local road network.

Based on this assessment, it is anticipated that the cumulative impacts would be minor/negligible, provided that consultation with relevant stakeholders and the mitigation measures identified 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.

6.12 Climate change and sustainability

Potential impacts on climate change and sustainability are presented in this section, together with mitigation measures to manage any negative impacts.

6.12.1 Greenhouse gas emissions

Construction of the proposal would generate greenhouse gas emissions, primarily carbon dioxide, due to exhaust emissions from construction machinery and vehicles transporting materials and personnel to and from site. These emissions would be minimal due to the small scale of the Proposal and the short-term nature of the construction works. Furthermore,

greenhouse gas emissions generated during construction would be minimised through the implementation of the mitigation measures detailed in Table 7-1.

It is anticipated that, once operational, the wider More Trains, More Services program may result in an increase in use of public transport and a relative decrease in use of private motor vehicles by commuters travelling along the T4 Illawarra, T8 Airport and South Coast Lines. A modal shift in transport usage may reduce the amount of fuel consumed by private motor vehicles with a corresponding relative reduction in associated greenhouse gas emissions in the local area.

6.12.2 Climate change

The effects of climate on the Wollongong region can be assessed in terms of weather changes including the frequency and severity of storms, flooding and bush fire. The assessment of climate change impacts includes consideration of the capacity of a proposal to adapt to changes in climate and the limitations of adaptation.

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. Climate change could also lead to an increase in the frequency and severity of bush fires.

The Proposal is not situated on flood prone land nor on land mapped as bush fire prone but would be designed with appropriate drainage and fire protection measures.

6.12.3 Sustainability

The detailed design of the Proposal would seek to achieve an ‘Excellent’ rating in accordance with version 1.2 of the Infrastructure Sustainability Council of Australia’s Infrastructure Sustainability Rating Scheme by taking into account the principles of ecologically sustainable development.

6.12.4 Waste

Solid and liquid wastes would be generated during construction of the Proposal and would include:

- concrete waste
- oil, grease and other liquid wastes from the maintenance of construction plant and equipment
- packaging materials from items delivered to the Proposal site, such as pallets, crates, cartons, plastics and wrapping materials
- waste from the construction compound and staff amenities, including putrescibles, paper, cardboard, plastics and glass.

The quantity of waste generated by the Proposal would be comparable to similar infrastructure projects and would be adequately managed with standard waste management measures, to be developed as part of the CEMP.

Operation of the Proposal would not increase the amount or change the type of waste generated within the Proposal site.

7 Environmental management

Chapter 7 identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures. Section 7.2 contains a complete list of the measures that would be implemented to mitigate the potential environmental impacts of the Proposal.

7.1 Environmental management plans

A CEMP for the construction phase of the Proposal would be prepared in accordance with the requirements of TfNSW's environmental management system. 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 in Section 7.2, any conditions from licences or approvals required by legislation and a process for demonstrating compliance with such mitigation measures and conditions.

7.2 Mitigation measures

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

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 *Guideline for Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and Natural Resources, 2004) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An Environmental Control Map would be developed by the Contractor in accordance with TfNSW's *Guide to Environmental Control Map* (TfNSW, 2018h) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
6.	Service relocation would be undertaken in consultation with the relevant authority if required. Contractors would mark existing services on the Environmental Control Map to avoid direct impacts during construction.
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by TfNSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.

No.	Mitigation measure
	Traffic and site access
8.	Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum: • adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to avoid road accidents and minimise disruption to surrounding land uses • measures to maintain safety and accessibility for pedestrians and cyclists • adequate sight lines to allow for safe entry and exit from the site • unobstructed access to Wollongong Station, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • measures to manage impacts and changes to on and off street parking and requirements for any temporary replacement provision • parking locations for construction workers away from Wollongong Station and busy residential areas and details of how this would be monitored for compliance • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride bays, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP. Consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.
9.	Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
10.	Road Occupancy Licences for temporary road closures would be obtained, where required.
	Urban design, landscape and visual amenity
11.	An Urban Design Plan would be prepared by the Contractor, in consultation with Wollongong City Council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The Urban Design Plan, at a minimum, would address the following: • the appropriateness of the proposed design with respect to the existing surrounding landscape, built form, behaviours and use-patterns including consideration of Crime Prevention Through Environmental Design principles • design detail that is sensitive to the amenity and character of heritage items located within or adjacent to the Proposal site.

No.	Mitigation measure
12.	A Public Domain Plan would be prepared by the Contractor, in consultation with the relevant council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The Public Domain Plan, at a minimum, would address the following: • materials, finishes, colour schemes and maintenance procedures including graffiti control for new fences • location and design of lighting equipment • total water management principles to be integrated into the design where considered appropriate • design measures included to meet an Infrastructure Sustainability Rating of 'Excellent' under version 1.2 of the Infrastructure Sustainability Council of Australia's Infrastructure Sustainability Rating Scheme.
13.	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.* An appropriate lighting management plan should be prepared to minimise the impact of lighting within the stabling yard to include downward direct lights, baffling and shielding.
14.	Light spill from the construction area into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
15.	Materials would be selected to be consistent with existing elements at Wollongong Station and Wollongong Stabling Yard.
16.	Black fencing would be considered as a mitigation measure where fencing is proposed adjacent to visually sensitive areas.
17.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
18.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
19.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
20.	During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.
	Noise and vibration
21.	Communication with the community and stakeholders regarding construction noise and vibration would be detailed in a Community Liaison Management Plan for the construction of the Proposal and would include a 24 hour hotline and complaints management process.
22.	High noise impact activities would only be carried out between 8:00 am and 6:00 pm on Monday to Friday and 8:00 am to 1:00pm on Saturday.
23.	High noise impact construction activities would be carried out in continuous blocks of up to three hours. Respite from high noise impact activities would be provided between each block for at least one hour. No high noise impact activities would be carried out during this one hour respite period.

No.	Mitigation measure
24.	High noise generating construction plant and equipment would not be used during the night period.
25.	Complete a condition survey of the heritage buildings within the heritage curtilage of Wollongong Railway Station Group prior to the commencement of construction work.
26.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Strategy* (TfNSW, 2019c) and the *Noise and Vibration Impact Assessment* (Renzo Tonin, 2019). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
27.	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 waiting 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.
28.	The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include: • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction works at any one time • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc • using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works • use of quieter and less vibration emitting construction methods where feasible and reasonable.

No.	Mitigation measure
29.	Works would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any works outside these hours may be undertaken if approved by TfNSW and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the TfNSW Environment and Planning Manager for any works outside normal hours.
30.	Where the $L_{Aeq\ (15minute)}$ construction noise levels are predicted to exceed 75 dBA and/or 30 dBA above the Rating Background Level at nearby affected sensitive receivers, respite periods would be observed, where practicable, and in accordance with the *Construction Noise and Vibration Strategy* (TfNSW, 2019c). This would include restricting the hours that very noisy activities can occur.
31.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the *Noise and Vibration Assessment* (refer to Appendix E) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
32.	Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with: • for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 *Structural Vibration in Buildings: Effects on Structures* and British Standard *BS 7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)* • for human exposure to vibration the acceptable vibration - values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) which includes British Standard BS *7385-2:1993 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).*
33.	Property condition surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the works and all heritage listed buildings and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).
34.	Review at-source mitigation and management controls including: • management practices to require complete shut down of trains when stabled and not in use • modifications to equipment and procedures for existing and future rolling stock for key noise generating sources.
35.	Investigate alternative methods for elements of operations within the Stabling Yard.
36.	Investigate additional measures to control the transmission of noise, including: • prioritising the stabling of trains that will prepare and depart the stabling facility during periods when nearby receivers are most noise sensitive (e.g. 2am to 5am) to consider both maximising the distance to the receiver and local acoustic shielding, e.g. from adjacent trains.
37.	Consideration of noise controls at noise sensitive receivers following the implementation of all other feasible and reasonable mitigation measures.

No.	Mitigation measure
38.	Develop a noise reduction program, in accordance with Section 6.2 of the *Noise Policy for Industry*, to investigate and identify feasible and reasonable noise mitigation and management measures that can be adopted at Wollongong Stabling Yard to provide noise reduction benefits for nearby noise sensitive receivers, taking into consideration community preferences and expectations. The program may include: o identification of noise levels and targets for the site o time frame for implementation of measures o an upper limit for new equipment o an upper limit for partial upgrades of the site o plans to eliminate problematic characteristics that have been identified, such as tonal, low-frequency noise and intermittent noise o operating practices to reduce noise emissions o training and awareness initiatives o a noise monitoring procedure and timeframe to verify the effectiveness of noise mitigation and management measures. Verification of new rolling stock noise levels should be undertaken within 6 months of the commencement of their use within the Stabling Yard o an ongoing monitoring program to evaluate noise-emission levels over time o communicating with the affected community using tools such as a complaint handling process, liaison group or newsletters.
	Aboriginal heritage
39.	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.
40.	If unforeseen Aboriginal objects are uncovered during construction, the procedures contained in the *Unexpected Heritage Finds Guideline* (TfNSW, 2019a) would be followed, and works near the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, DPIE and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the DPIE notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.
	Non-Aboriginal heritage
41.	As some of the proposed works do not fall within either the RailCorp agency-specific exemptions or the standard exemptions pursuant to Section 57(2) of the *Heritage Act 1977*, an application for a permit under Section 60 of the Heritage Act is required to be obtained from DPC Heritage prior to commencement of the works.
42.	The heritage fabric of the platforms should be protected against accidental damage during construction by installing hoarding or other such material.

No.	Mitigation measure
43.	A heritage induction giving information regarding the location of heritage and archaeological items within and near the Proposal site should be given to all staff, contractors and subcontractors involved with the construction of the Proposal. The induction should cover the heritage constraints associated with the Proposal and relevant obligations under the *Heritage Act 1977*. This induction could be included as part of a general induction.
44.	In the event that any unanticipated archaeological deposits are identified within the Proposal site during construction, the procedures contained in the *Unexpected Heritage Finds Guideline* (TfNSW, 2019a) would be followed, and works near the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and DPC Heritage. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
45.	On completion of works, an update would be prepared for the State Heritage Register/ Section 170 Heritage and Conservation Register, with required details.
	Socio-economic
46.	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.
47.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
48.	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.
49.	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.
50.	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.
	Biodiversity
51.	Construction of the Proposal must be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019g) and TfNSW's *Fauna Management Guideline* (TfNSW, 2019e).
52.	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.
53.	In the event of any tree to be retained becoming inadvertently damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.

No.	Mitigation measure
54.	Should the detailed design or onsite works determine the need to remove or trim any trees, the Contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval.
55.	Weed control measures, consistent with TfNSW's *Weed Management and Disposal Guideline* (TfNSW, 2019f), 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.*
	Soils and water
56.	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.
57.	Erosion and sediment control measures would be established prior to 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.
58.	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.
59.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and TfNSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018b).
60.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018b) 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.
61.	In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.
62.	The existing drainage systems would remain operational throughout the construction phase.
	Air quality
63.	Air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's *Air Quality Management Guideline* (TfNSW, 2019d).
64.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
65.	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.

No.	Mitigation measure
66.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
67.	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
68.	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.
69.	An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. The protocol would include 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.
70.	Any 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.
71.	All waste would be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste (*EPA, 2014) prior to disposal.
72.	Any concrete washout would be established and maintained in accordance with TfNSW's *Concrete Washout Guideline* – (TfNSW, 2019) with details included in the CEMP and location marked on the Environmental Control Map.
	Climate change and sustainability
73.	TfNSW is seeking an Infrastructure Sustainability Rating of 'Excellent' under version 1.2 of the Infrastructure Sustainability Council of Australia's Infrastructure Sustainability Rating Scheme.
74.	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 *ISCA Guidelines for Climate Change Adaptation* (AGIC, 2011) to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc. would be considered in the design.

No.	Mitigation measure
	Cumulative impacts
75.	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 benefit the community by improving accessibility, enhancing safety and improving comfort for customers on the South Coast Line. The proposal would accommodate the introduction of the new 10-car NIF trains.

The likely key impacts of the Proposal are as follows:

- minor temporary increase in traffic volumes as a result of construction vehicles
- low to negligible visual impact associated with the platform extensions
- temporary construction noise impacts
- minor impact on the heritage fabric of Wollongong Railway Station Group
- minor increases in operational noise exceedances compared to the existing noise exceedances currently experienced at the Stabling Yard.

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

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

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