



Transport Access Program

Unanderra Station Upgrade

Review of Environmental Factors



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



Unanderra Station Upgrade – Review of Environmental Factors

**Transport Access Program
Ref – 6450098**

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Abbreviations

Term	Meaning
ABS	Australian Bureau of Statistics
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AMM	Additional Mitigation Measures
AS	Australian Standard
ASA	Asset Standards Authority (refer to Definitions)
ASS	Acid Sulfate Soils
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BS	British Standard
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CCTV	Closed circuit TV
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
DBH	Diameter Breast Height
DBYD	Dial Before You Dig
DDA	<i>Disability Discrimination Act 1992 (Cwlth)</i>
DAWE	Commonwealth Department of the Agriculture, Water and the Environment
DPIE	NSW Department of Planning, Industry and Environment
DSAPT	<i>Disability Standards for Accessible Public Transport (2002)</i>
ECM	Environmental Controls Map
EES	Environment, Energy and Science Group in the Department of Planning, Industry and Environment (formerly known as Office of Environment and Heritage)
EMS	Environmental Management System

Term	Meaning
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development (refer to Definitions)
FIP	Fire Indicator Panels
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
GHG	Green House Gas
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
IACA	Institute of Australian Consulting Arborists
ICNG	<i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009).
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>
IS rating	Infrastructure Sustainability rating under ISCA rating tool (v 2.0)
ISCA	Infrastructure Sustainability Council of Australia
LEP	Local Environmental Plan
LGA	Local Government Area
MCA	Multi-criteria analysis
NARClim	NSW and ACT Regional Climate Modelling
NES	National Environmental Significance (refers to matters of National Environmental Significance under the EPBC Act)
NML	Noise Management Levels
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
OEH	Formerly NSW Office of the Environment and Heritage
OHH	Out of Hours

Term	Meaning
PA	Public Address
PDP	Public Domain Plan
PoEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	<i>Roads Act 1993 (NSW)</i>
SEED	Sharing and Enabling Environmental Data
SEPP	State Environmental Planning Policy
SES	State Emergency Service
SHI	State Heritage Inventory
SHR	State Heritage Register
SREP	Sydney Regional Environmental Plan
SRZ	Structural Root Zone
SSER	Station Services Equipment Room
Transport for NSW	Transport for NSW
TPZ	Tree Protection Zone
UDP	Urban Design Plan
VP	Viewpoints
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i>
WCC	Wollongong City Council
WM Act	<i>Water Management Act 2000 (NSW)</i>
WMP	Waste Management Plan

Definitions

Term	Meaning
Asset Standards Authority	The ASA is an independent body within Transport for NSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets.
Annual Exceedance Probability	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Construction Contractor (should the Proposal proceed) to a design suitable for construction (subject to Transport for NSW acceptance).
Design and Construct Contract	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Construction Contractor. The Construction Contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to Transport for NSW acceptance). The Construction Contractor is therefore responsible for all work on the project, both design and construction.
Determining Authority	A Minister or public authority on whose behalf an activity is to be carried out or public authority whose approval is required to carry out an activity (under the EP&A Act).
Disability Standards for Accessible Public Transport	The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> (as amended) are a set of legally enforceable standards, authorised under the Commonwealth <i>Disability Discrimination Act 1992</i> (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Out of hours works	Defined as works <i>outside</i> standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act.

Term	Meaning
Rail shutdown	Rail shutdown is the term used by railway building/maintenance personnel to indicate that they have taken possession of the track (usually a section of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
The Proposal	The construction and operation of the Unanderra Station Upgrade.
Vegetation Offset Guide (Transport for NSW, 2019a)	<p>The Transport for NSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.5 of the EP&A Act.</p> <p>The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.</p>

Executive summary

Overview

Transport for New South Wales (NSW) is proposing to undertake upgrades at Unanderra Station to improve accessibility at this station. Transport for NSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Unanderra Station Upgrade (the 'Proposal').

The Proposal forms part of the Transport Access Program, a NSW Government Initiative to provide a better experience for public transport customers by delivering accessible, modern secure and integrated transport infrastructure.

The Proposal would aim to provide a station precinct that is accessible to those with a disability, limited mobility, parents/carers with prams, and customers with luggage.

The Proposal would provide:

- three new lifts connecting to the existing footbridge, with canopies for weather protection at the lift landings
- modifications to the existing footbridge, including regrading of the deck and replacement of stair treads and handrails
- platform modifications, including minor platform regrading and line marking of boarding assistance zones on Platform 1 and 2
- modification of the existing station building layout for the provision of a new family accessible toilet
- provision of an accessible kiss and ride bay on Berkeley Road (east), with a new access path to the station entrance including new kerb ramps
- provision of an accessible kiss and ride bay on Berkeley Road (west), including a widened footpath and a kerb ramp
- conversion of the existing non-compliant DDA parking spaces on Berkeley Road (west) into three accessible parking spaces with shared zones
- provision of accessible footpaths on Berkeley Road (west) between the station entrance, kiss and ride, bus zone and accessible parking spaces.

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 is expected to commence in mid-2021 and take around 18 months to complete. A detailed description of the Proposal is provided in Chapter 3 of this REF. An overview of the Proposal is shown in Figure 1 Proposed Unanderra Station Upgrade (indicative only, subject to detailed design) below.

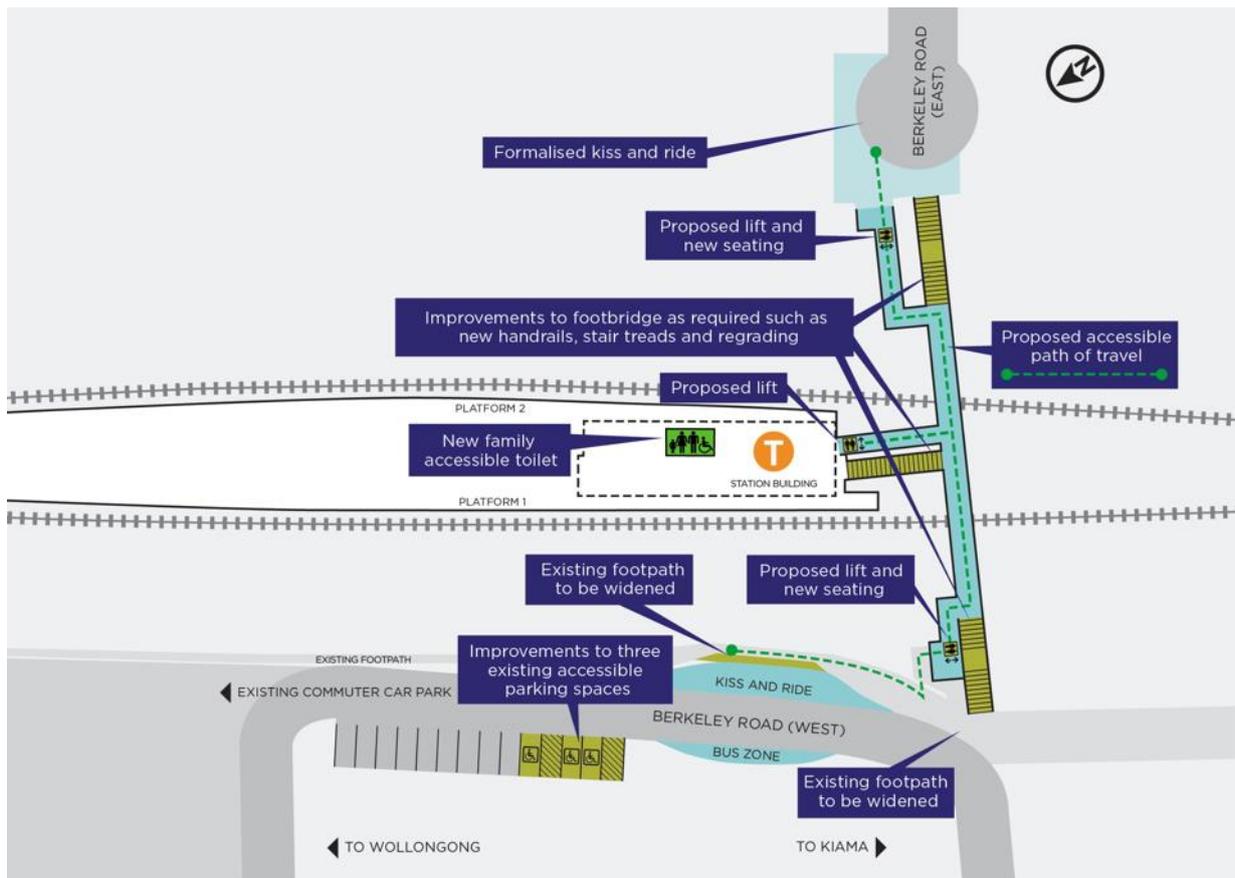


Figure 1 Proposed Unanderra Station Upgrade (indicative only, subject to detailed design)

Need for the Proposal

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

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

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

Community and stakeholder consultation

Initial community consultation was undertaken from 31 March – 24 April 2020. A mix of locally letterbox dropped notifications, paid advertisements (in the Illawarra Mercury), station posters and community engagement support helped promote the engagement period and encourage the community to provide their feedback on the concept designs. Face to face engagement in the form of information sessions held at the station were not conducted due to social distancing requirements associated with COVID-19. A total of 118 pieces of feedback were received during the engagement period. Key themes of community feedback included:

- general support for the Proposal

- consideration of canopies on the footbridge
- queries around additional parking
- consideration of CCTV and lighting
- consideration of additional Opal card readers
- feedback on the location, size and necessity of the proposed lifts.

Feedback on the concept design was considered by the project team and used to help inform the design development and planning documentation, including this Review of Environmental Factors (REF).

Community engagement for the Proposal would also be undertaken during the public display period of this REF and the public invited to submit feedback to help Transport for NSW understand what is important to customers and the community. The REF would be displayed for a period of two weeks.

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

In accordance with the requirements of the Statement Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP), consultation is required with local councils and/or public authorities in certain circumstances, including where council managed infrastructure is affected. Consultation with Wollongong Council and the NSW State Emergency Service (SES) is required under the Infrastructure SEPP and would continue through the detailed design and construction of the Proposal.

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

Feedback can be sent to:

- projects@transport.nsw.gov.au

Or submitted:

- via the feedback box on the project webpage
<https://www.transport.nsw.gov.au/projects/current-projects/unanderra-station-upgrade>
- via www.nsw.gov.au/improving-nsw/have-your-say/unanderra-station-upgrade

Further information about specific REF engagement activities, and the initial community consultation is included in Section 5 of this REF.

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

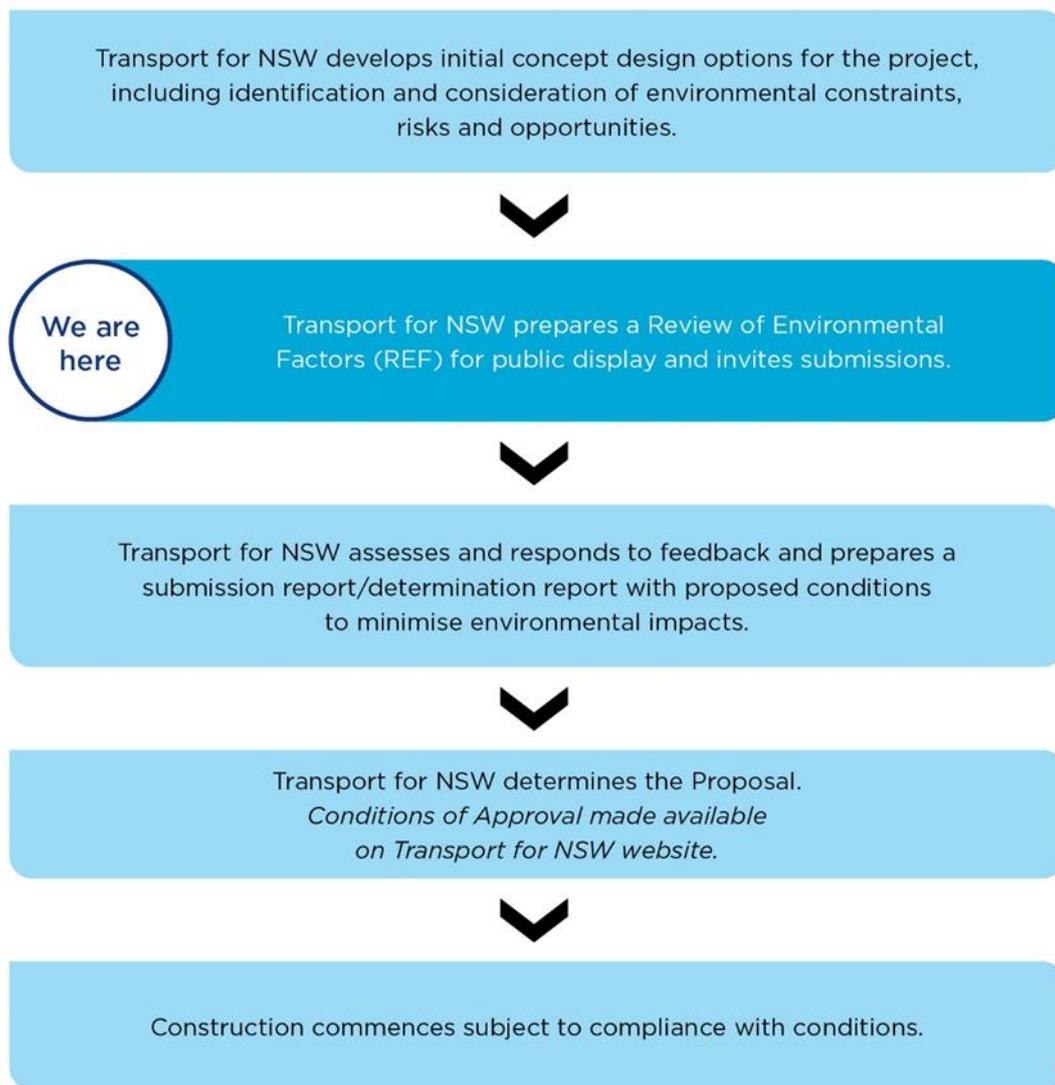


Figure 2 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

The Proposal would provide the following benefits:

- improved and equitable access to Unanderra Station for customers resulting from the installation of lifts, accessible parking and kiss and ride areas
- improved station amenity and safety for customers at the station by providing one family accessible toilet, staff unisex ambulant toilet, new wheelchair waiting areas and upgrades to CCTV.
- The following key impacts have been identified should the Proposal proceed:
- temporary visual, noise and vibration impacts during construction

- temporary traffic and pedestrian impacts during construction
- loss of two trees which would be offset in accordance with the Vegetation Offset Guide (Transport for NSW, 2019a)
- permanent loss of one car parking space to provide three new DDA compliant parking spaces and the formalisation of the kiss and ride west of the station would result in permanent loss of three car parking spaces
- introduction of new built elements such as lifts to the visual environment.

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

Conclusion

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

The detailed design of the Proposal would also be designed in accordance with the Infrastructure Sustainability Council of Australia (ISCA), Infrastructure Sustainability Rating Scheme (v1.2) taking into account the principles of ecologically sustainable development (ESD).

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

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



Figure 3 Artists' Impression of the Proposal from the western side of the station (indicative only, subject to detailed design)

1 Introduction

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

1.1 Overview of the Proposal

1.1.1 Need for the Proposal

The Unanderra Station Upgrade, the subject of this REF, forms part of the Transport Access Program. This Program is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

Unanderra Station has been identified for an accessibility upgrade as it does not currently meet key requirements of the *Disability Standards for Accessible Public Transport 2002* (DSAPT) or the Commonwealth *Disability Discrimination Act 1992* (DDA). The non-compliant pathways, car parking and stairs to the footbridge do not facilitate access for people with reduced mobility, parents or carers with prams, or customers with luggage.

The Proposal would provide safe and equitable access to the platforms and car park, and to the bus network on the western side of the station.

The Proposal would improve accessibility of the station in line with the requirements of the DDA and the DSAPT. The upgrades would provide an improved customer experience for existing and future users of the station.

The needs and objectives of the Proposal are further discussed in Chapter 2 of this REF.

1.1.2 Key features

The key features of the Proposal are shown in Figure 1 and summarised as follows:

- installation of three new lifts connecting to the existing footbridge, with canopies for weather protection at the lift landings
- modifications to the existing footbridge, including regrading of the deck and replacement of stair treads and handrails
- construction of elevated walkways between the new lifts and the footbridge
- platform modifications, including minor platform regrading and line marking of boarding assistance zones on Platform 1 and 2 and relocation of two benches
- modification of the existing station building layout for the provision of a new family accessible toilet and a new staff unisex ambulant toilet, a Station Services Equipment Room (SSER) and store room
- provision of an accessible kiss and ride bay on Berkeley Road (east), with a new access path to the station entrance including new kerb ramps
- provision of an accessible kiss and ride bay on Berkeley Road (west), including a widened footpath and a kerb ramp
- conversion of the existing non-compliant DDA parking spaces on Berkeley Road (west) into three accessible parking spaces with shared zones

- provision of accessible footpaths on Berkeley Road (west) between the station entrance, kiss and ride, bus zone and accessible parking spaces.

Subject to planning approval, construction is expected to commence in mid-2021 and take around 18 months to complete.

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

1.2 Location

The Proposal is located in the Wollongong Local Government Area (LGA) in the suburb of Unanderra. The station is about 5.2 kilometres south west of the Wollongong Central Business District (CBD) and 73 kilometres south west of the Sydney CBD. The location of the Proposal in the regional context is shown in Figure 4 Regional context.

Unanderra is serviced by the South Coast Line providing connections to the intercity and metropolitan train networks. Platform 1 on the western side of the station provides train services to Kiama. On the eastern side, Platform 2 provides train station services to Sydney Central and Bondi Junction.



Figure 4 Regional context

1.3 Surrounding land uses

Unanderra Station is located on eastern side of the Princes Highway. The area to the east of the station is a large industrial area occupied by many businesses. To the west of the station the area is predominately small businesses and low to medium density residential areas.

The Proposal includes upgrades to Unanderra Station on land owned by RailCorp and managed by Sydney Trains within the station precinct and Berkeley Road car park. Some works are also proposed along adjacent footpaths which are under the control of Wollongong City Council. The Proposal site and surrounding land uses are shown in Figure 5.

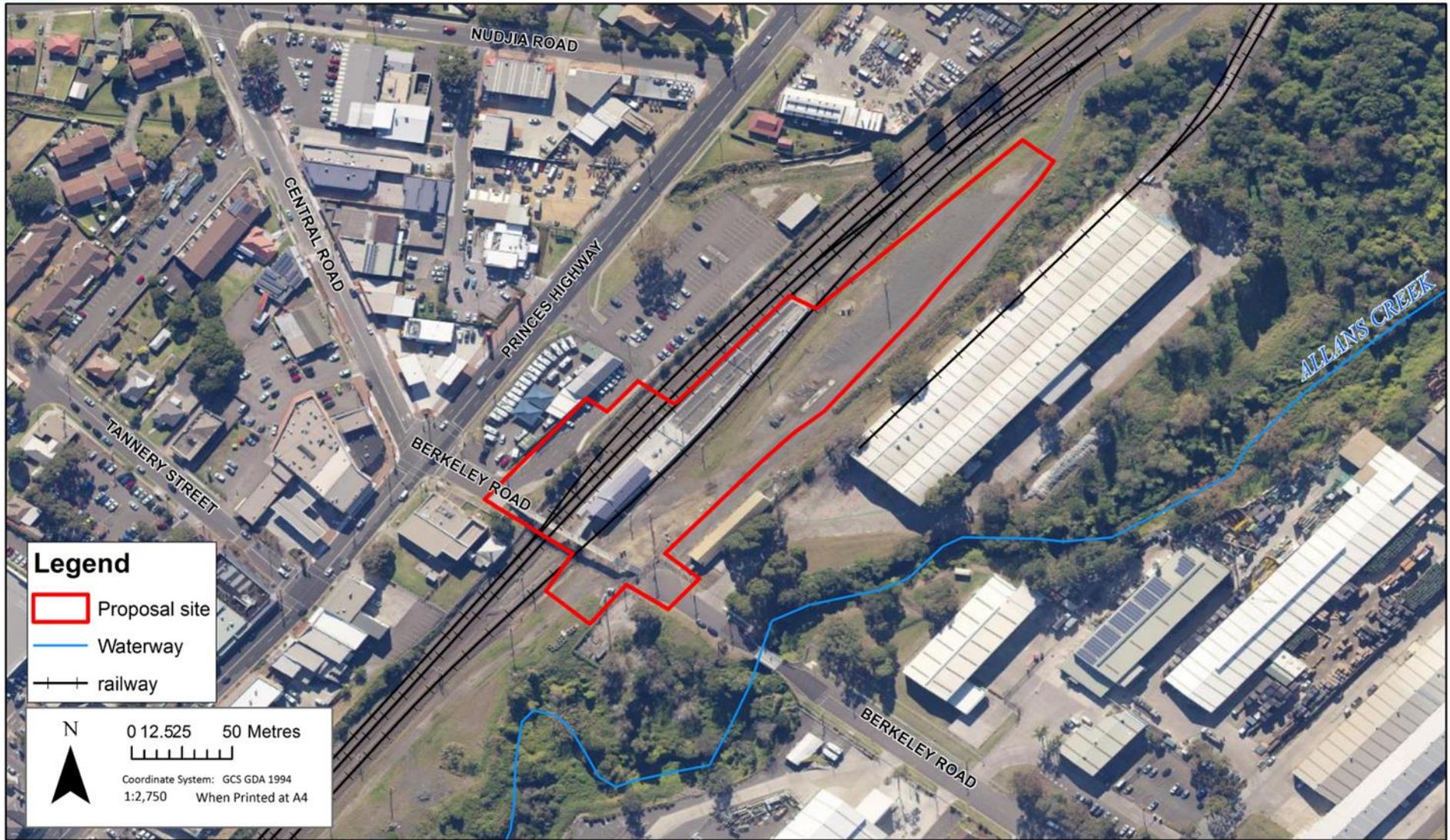


Figure 5 Site locality map

1.4 Existing infrastructure

1.4.1 Platforms

Unanderra Station consists of an island platform located centrally between the existing rail tracks. Platform 1 is located on the western side of the island platform and services trains towards Kiama. Platform 2 is located on the eastern side and services trains to Sydney Central and Bondi Junction.

Figure 6 and Figure 7 show Unanderra Station platforms with shelter and seating. The station building is located between the platforms.



Figure 6 Platform 1 shelter and seating



Figure 7 Platform 2 shelter and seating

1.4.2 Station entrance

Access to the station is via Berkeley Road cul-de-sac to the east of the station, and from Berkeley Road off the Princes Highway on the western side of the station. Station entrances to both platforms are via the Unanderra Station footbridge between Berkeley Road (east) and Berkley Road (west) (Figure 8). Footpath access to the footbridge is available at Berkeley Road (west). No footpath access is available on Berkeley Road (east) after the single-lane bridge.



Figure 8 Unanderra Station footbridge, entrance to platforms

1.4.3 Parking and intermodal facilities

A commuter car park west of Unanderra Station provides 127 spaces, plus three non-compliant accessible spaces. On the eastern side of the station, on-street parallel parking is available on Berkeley Road (east).

The following intermodal facilities are available near Unanderra Station:

- bus stops on the Princes Highway and Berkeley Road (west)
- an informal kiss and ride area west of station
- four bicycle locker storage spaces near the commuter car park west of station.

1.5 Purpose of this Review of Environmental Factors

This REF has been prepared by pitt&sherry on behalf of Transport for NSW to assess the potential impacts of the Unanderra Station Upgrade. For the purposes of these works, Transport for NSW is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

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

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

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

2 Need and options considered

Chapter 2 discusses the need and strategic justification for the Proposal, with consideration of the objectives of the Transport Access Program as well as the specific objectives of the Proposal. This chapter also provides a summary of the options that have been considered during development of the Proposal and a justification for the preferred option.

2.1 Strategic justification

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

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

In 2019, the NSW Government announced a series of State Priorities intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget (NSW Government, 2019). These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services. The government's key policy priorities are:

- a strong economy
- highest quality education
- well-connected communities with quality local environments
- putting customer at the centre of everything we do
- breaking the cycle of disadvantage.

The Proposal particularly supports the priority of creating well-connected communities. The Proposal assists in meeting the priority by improving accessibility to public transport and encouraging greater use of public transport.

The NSW Government has developed *Future Transport Strategy 2056* (Transport for NSW 2018a). This plan provides a comprehensive strategy for all modes of transport across NSW over the next 40 years, while also delivering on current commitments.

Data forecasts indicate that there would be a growth in patronage at Unanderra Station. The Proposal accommodates the forecast Sydney Trains patronage growth (an increase of 13 per cent to 2036) and changing travel patterns.

The *Disability Inclusion Action Plan 2018-2022* (Transport for NSW, 2017) was developed by Transport for NSW in parallel with the development of *Future Transport Strategy 2056*. The plan builds on the objectives of *Future Transport Strategy 2056* in relation to accessibility to transport. The Transport Access Program has been identified in this plan as a key action of ensuring transport networks in Sydney are accessible for all potential users.

Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal.

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

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

Policy / Strategy	Overview	How the Proposal aligns
<p><i>Future Transport Strategy 2056</i> (Transport for NSW, 2018a)</p>	<p><i>Future Transport 2056</i> is an update of NSW's <i>Long Term Transport Master Plan</i>. It is a suite of strategies and plans for transport to provide an integrated vision for the state.</p> <p><i>Future Transport 2056</i> identifies 12 customer outcomes to guide transport investment in Greater Sydney. These outcomes include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport and the provision of accessible transport services.</p>	<p>The Proposal would deliver on the customer focus and accessible services outcomes. The Proposal would assist in meeting the following State-wide outcomes detailed in <i>Future Transport 2056</i>:</p> <ul style="list-style-type: none"> • encouraging active travel (walking and cycling) and using public transport • a fully accessible network that enables barrier-free travel for all • public and active travel lower environmental impacts reducing Green House Gas (GHG) emissions and congestion.
<p><i>Building Momentum – State Infrastructure Strategy 2018-2038</i> (Infrastructure NSW, 2018)</p>	<p>The <i>State Infrastructure Strategy 2018-2038</i> makes recommendations for each of NSW's key infrastructure sectors including transport.</p> <p>The strategy sets out the Government's priorities for the next 20 years, and combined with the <i>Future Transport Strategy 2056</i>, the Greater Sydney Region Plan and the Regional Development Framework, brings together infrastructure investment and land-use planning for our cities and regions.</p>	<p>The Proposal particularly supports Direction 6 of the Plan, which is to create 'a well-connected city' by ensuring services and infrastructure meet communities' changing needs. The Proposal would be consistent with this direction by providing improved accessibility to Unanderra Station.</p>
<p><i>Disability Inclusion Action Plan 2018-2022</i> (Transport for NSW, 2017)</p>	<p>The <i>Disability Inclusion Action Plan 2018-2022</i> was developed by Transport for NSW in parallel with the development of <i>Future Transport 2056</i>. The Plan builds on the objectives of <i>Future Transport 2056</i> in relation to accessibility to transport.</p>	<p>The Proposal has been developed with consideration of the objectives outlined in this Plan and seeks to improve and provide equitable access to public transport facilities. The Transport Access Program, of which the Proposal forms part is identified in the plan as a key action of ensuring the transport networks in Sydney are accessible for all potential users.</p>
<p><i>Illawarra Shoalhaven Regional Plan 2015</i> (Department of Planning and Environment, 2015)</p>	<p>The <i>Illawarra Shoalhaven Regional Plan 2015</i> provides the strategic planning and decision-making framework to guide sustainable growth in the region for the next 20 years beyond 2015. The vision is for a sustainable future and a resilient community, capable of adapting to</p>	<p>Goal 3 of the Plan is for a region with communities that are strong, healthy and well-connected, which includes improving public transport service levels. The Proposal would support this goal by improving the accessibility of Unanderra Station.</p>

Policy / Strategy	Overview	How the Proposal aligns
<p>Wollongong 2028 Community Strategic Plan (Wollongong Council, 2018)</p>	<p>changing economic, social and environmental circumstances.</p> <p><i>The Wollongong 2028 Community Strategic Plan</i> is a long term plan which provides direction for the delivery of key projects and services which will help meet the needs of the community. The overarching community vision is to protect the natural environment and be leaders in building an educated, creative and connected community.</p>	<p>One of the goals of the plan is to provide sustainable, affordable and accessible transport. The Proposal supports this goal by providing accessibility upgrades to Unanderra Station. Another key goal to be a healthy community in a liveable city, which would be supported by providing an accessible infrastructure developed with consideration for safety and security.</p>

2.2 Objectives of the Transport Access Program

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

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

2.3 Objectives of the Proposal

The specific objectives of the Unanderra Station Upgrade are to:

- provide a station that is accessible for people with a disability, limited mobility, parents/carers with prams and customers with luggage
- improve customer experience and amenity (including better interchange facilities such as formal kiss and ride spaces and improved footpaths around the station)
- improve integration with the surrounding precinct by providing an accessible path of travel from the station to the new accessible car spaces, bus zone on Berkeley Road (west), and the kiss and ride spaces
- improve customer safety (including additional CCTV cameras and lighting as required).

2.4 Options considered

Transport for NSW commissioned the development of a scoping design for the Unanderra Station Upgrade that would improve accessibility in and around the station and meet key architectural, engineering and urban design objectives (SMEC, 2018).

To develop a preferred option for the station upgrade that addresses the Proposal objectives, a multi-criteria analysis was undertaken on two options in consultation with relevant stakeholders.

The two options developed are summarised as follows:

- Option 1: Construction of a new footbridge with three lifts and stair access positioned centrally along the platform (including demolition of the existing footbridge)
- Option 2: Modification to the existing footbridge with three new lifts, with extensions at both ends of the existing footbridge to accommodate the lift landings.

Both options included upgrades to facilities such as staff amenities, passenger services and other systems (e.g. electrical and communication systems), and interchange and accessible parking upgrades.

The two options were assessed with consideration of factors such as customer experience, accessibility, engineering constraints, modal integration and cost. Stakeholders from Transport for NSW and Sydney Trains were also consulted regarding the various options in order to determine the final configurations.

The following constraints were identified for Option 1:

- constructability and access limitations for large cranes to construct a new footbridge
- redundant infrastructure would need to be removed, increasing environmental impacts
- relocation of existing high voltage power lines would be required
- larger project costs associated with new footbridge.

Option 2 was confirmed as the preferred option as it provided the best customer experience and reduced environmental impacts compared with Option 1.

2.4.1 The 'do-nothing' option

Under a 'do-nothing' option, existing access to the platform would remain non-compliant with DDA and DSAPT and there would be no changes to the way the station currently operates.

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

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

2.5 Justification for the preferred option

Option 2 was identified as the preferred option due to:

- better customer experience including shortest more direct travel paths and cross corridor connection (retaining the existing footbridge)
- utilising the existing canopy on station platform

- lower security risks due to shorter connections to open public areas with passive surveillance
- retains existing station operational layout and associated facilities
- minimal impact to existing car parking and transport interchange arrangements
- reducing construction environmental impacts and less infrastructure to build and remove, improving the project's sustainability rating
- reduced project costs by utilising existing footbridge structure.

3 Proposal description

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

3.1 Scope of works

The Proposal involves an upgrade of Unanderra Station as part of the Transport Access Program which would improve accessibility and amenities for customers. The Proposal would include the following key elements:

- installation of three new lifts connecting the platforms and station entries to the existing footbridge, with canopies for weather protection at the lift landings
- modifications to the existing footbridge, including regrading of the deck and replacement of stair treads and handrails where necessary
- construction of elevated walkways between the new lifts and the footbridge
- platform modifications including minor platform regrading and line marking of boarding assistance zones on Platforms 1 and 2, and relocation of two benches
- modification of the existing station building layout for the provision of a new family accessible toilet and a new staff unisex ambulant toilet, a SSER and store room
- provision of an accessible kiss and ride bay on Berkeley Road (east) with a new access path to the station entrance including new kerb ramps
- provision of an accessible kiss and ride bay on Berkeley Road (west) including a widened footpath and a kerb ramp
- conversion of the existing non-compliant DDA parking spaces on Berkeley Road (west) into three accessible parking spaces with a shared zone
- provision of accessible footpaths on Berkeley Road (west) between the station entrance, kiss and ride, bus zone and accessible parking spaces.

The general layout of the proposed works is shown in Figure 9 and indicative elevations of the proposed modifications to the existing footbridge are shown in Figure 10.

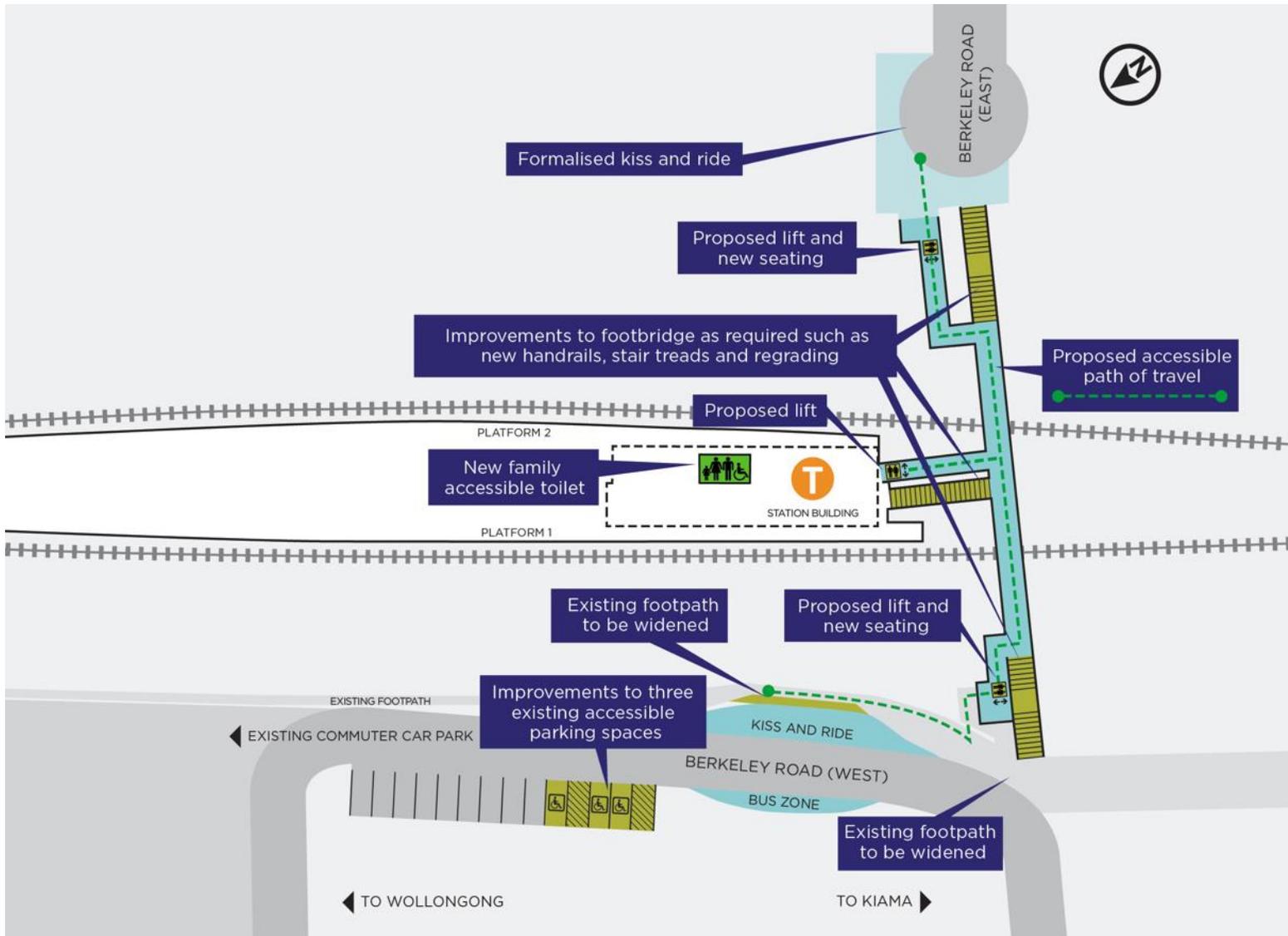


Figure 9 General layout of the proposed works (indicative only, subject to detailed design)

3.1.1 Station upgrade

Proposed works to take place at the station to facilitate improved accessibility are as follows:

- installation of three new lifts connecting station platforms and entrances (east and west) to the existing footbridge, which would include:
 - covered lift landings, extensions to the footbridge, new anti-throw screens and handrails
- refurbishment and other work to the existing footbridge including:
 - replacement of stair treads and handrails where required
 - regrading of the footbridge flooring
- works to the existing station building including:
 - construction of a new family accessible toilet
 - construction of new staff ambulant toilet.
- ancillary works including adjustments to lighting, handrails, minor drainage works, existing non-operational ticket counter to be fitted with opaque glass, landscaping, wayfinding signage, improvements to station communications systems including CCTV cameras, hearing loops, emergency help points and installation of tactile ground surface indicators (TGSIs).

3.1.2 Interchange facilities

A number of adjustments to the interchange areas around the station are proposed to improve accessibility and the customer experience. These include:

- conversion of three existing non-compliant accessible parking spaces into three compliant accessible parking spaces with shared zones on the west side of the station, and compliant footpath and kerb ramps to access these spaces
- formalisation of a kiss and ride bay on the west side of the station and establishment of a kiss and ride bay on the east side of the station including widening of footpaths and the addition of kerb ramps
- addition of a kerb ramp at the bus stop west of the station
- modification of rail corridor fencing to accommodate kiss and ride zones.

3.1.3 Materials and finishes

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

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

Different materials are used for each architectural element for the construction of the upgraded or new facilities. Subject to detailed design, the Proposal would include the following:

- lift shafts – precast concrete with anti-graffiti coating, aluminium louvres, prefinished metal roof sheeting, aluminium window frames and glass
- lift waiting area canopies – steel frames and prefinished metal roof sheeting.

The design would be submitted to Transport for NSW's Design Review Panel and Sydney Trains at various stages for comment before being accepted by Transport for NSW. An Urban Design Plan (UDP) including a Public Domain Plan (PDP) would also be prepared by the Construction Contractor prior to finalisation of detailed design for endorsement by Transport for NSW. An Artists' Impression of the Proposal is shown in Figure 11.



Figure 11 Artists' Impression of the Proposal, perspective from west of the station (indicative only, subject to detailed design).

3.2 Design development

3.2.1 Engineering and environmental constraints

A number of constraints have influenced the design development of the Proposal.

Existing structures: the accessibility, placement and integrity of existing structures has been considered during the development of the design – these structures include the existing platforms, footbridge, footpaths, stairs and station building.

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. Existing access points to the rail corridor and associated infrastructure would be maintained.

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

- Endeavour Energy – Electricity
- Jemena Gas South – Gas and Petroleum
- NBN Co, NSWACT – Communications
- Nextgen, NCC, NSW – Communications
- Optus and/or Uecomm, NSW – Communications
- PIPE Networks, NSW – Communications
- Transport for NSW – Electricity
- Sydney Water – Water
- Telstra NSW, Central – Communications.

While the Proposal has been designed to minimise relocation of services, further investigation will be required. It is likely additional services will require relocation and/or the final location of proposed works require adjustment. Such works are unlikely to occur outside the footprint of works assessed in this REF.

Heritage: Unanderra Railway Station is not listed on any statutory or non-statutory heritage registers and is not considered an item of listed heritage importance. Unanderra Station Masters Residence is located 10 metres southwest of the Proposal site and is listed on the following registers as an item of local significance:

- 'Unanderra Station Master's Residence', RailCorp Section 170 Heritage and Conservation Register, SHI# 4801939
- 'Unanderra Station Master's Residence', Wollongong LEP 2009, item no. 6428.

The proposed works would not be conducted within the curtilage of the Unanderra Station Masters Residence. Heritage impacts associated with the Proposal are assessed in Section 6.5 of this REF.

Construction access: construction access would require traffic control in the adjacent streets. Use of a large mobile crane would be required to lift construction materials and equipment to the station from these roadways and/or the commuter car park on specified days. The construction compound is proposed to be located east of station (refer to Figure 12).

Public access: pedestrian access to the station and across the rail corridor would be maintained during construction.

3.2.2 Design standards

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

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

3.2.3 Sustainability in design

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

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

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

The Sustainability Strategy sets targets across the following key issues:

climate change adaptation and resilience

- renewable energy
- waste
- materials
- supply chain management
- community connection
- social procurement and workforce.

Key design elements and strategies developed during scoping design will be used to further develop the design and construction.

3.3 Construction activities

3.3.1 Work methodology

Subject to approval, construction is expected to commence in mid-2021 and take around 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Construction Contractor in consultation with Transport for NSW.

The proposed construction activities for the Proposal are identified in Table 3-1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised.

Table 3-1 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling works	<ul style="list-style-type: none"> establishment of construction site area including compound, stockpile site and associate utilities (i.e. erect fencing, tree protection zones, site offices, amenities and plant/material storage area) establishment of temporary access points from both sides of the station identify detailed locations of all services in the area for relocation and or adjustment of detail design relocate station services which are to be impacted by the works services diversion/relocation works including on platforms (if required) installation of power where required trim and/or remove vegetation as required.
Station entrance	<ul style="list-style-type: none"> new paving and fencing to the new station entry points widen footpaths on both sides of the station.
Lift installation	<ul style="list-style-type: none"> construct lift pits/foundations/lift bases install lift shafts and upper lift landings install lift structures including landing, roof and louvres install lift shaft services, lift cars and fit-out lift cars.
Platform works	<ul style="list-style-type: none"> demolish and remove existing unisex toilet and SSER wall demolish and remove staff toilet and store walls and doors relocation of two platform benches installation of new walls, family accessible toilet and staff ambulant toilet install new lighting and CCTV.
Footbridge and stairs	<ul style="list-style-type: none"> regrade existing footbridge to achieve compliant cross fall remove footbridge balustrade at lift locations construct new elevated walkways from lifts to existing footbridge installation of protection screens to walkways and waiting areas.

Stage	Activities
Interchange works	<ul style="list-style-type: none"> • modification of footpaths on both sides of the rail corridor including widening and installation of kerb ramps • line marking in car park west of the station for the accessible car spaces • signage for new bus stop, accessible parking and kiss and ride areas • new lighting along accessible paths and lift areas.
Finalisation	<ul style="list-style-type: none"> • install wayfinding signage • fencing adjustments and installation of bollards.
Testing and commissioning	<ul style="list-style-type: none"> • test and commission power supply, lifts, lighting, new/modifications to station services, communication and security systems.

3.3.2 Plant and equipment

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

- trucks
- skip trucks
- suction truck
- jack hammer
- chainsaw
- piling rig/drill rig
- franna/mobile cranes
- crane
- bobcat
- excavator
- elevated work platform
- demolition saw
- hydraulic saw/rock saw/concrete saw/tile cutter
- concrete pump, grinder and truck
- lighting tower
- coring machine
- water cart
- hi-rail plant including elevated work platform, flatbed and hiab
- forklift
- pallet jack
- vibrating roller/compacting plate
- hand tools
- benders
- bar bender
- road rail excavator
- power tools (e.g. drill, hammer drill, core drill, saw, torque, impact wrenches and grinders)

3.3.3 Working hours

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

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

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

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

- installation of lift structures
- delivery of lift equipment
- resurfacing/regrading of the existing footbridge and station platform.

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

The Minister for Planning and Public Spaces has recently made a number of Orders under Section 10.17 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in response to the COVID-19 pandemic. This includes the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days) Order 2020* (the ‘Order’), which applies to construction activities for projects which have been subject to a completed assessment under Division 5.1, or approval under Division 5.2 of the EP&A Act.

The Order extends the standard construction hours to allow infrastructure construction work on Saturday, Sunday and Public holidays (7am to 6pm) for projects approved prior to the 9th April 2020 (when the Order commenced).

As such, Transport for NSW will consider its position with regard to extending standard construction hours consistent with the intention of the Order through the Determination process. In the event that Transport for NSW would seek to extend the standard construction hours, the potential environmental impacts of doing so would be further assessed as part of the Determination Process.

3.3.4 Earthworks

Excavations and earthworks would generally be required for the following:

- services relocation including construction of new combined services route and electrical cabling
- construction of lift shaft and footings for walkway supports
- upgrade works to kiss and ride area and bus stop

- other minor civil works including footings and foundations for structures, drainage/stormwater works, and trenching activities for service adjustments and relocations and drainage upgrade works.

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

3.3.5 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal and would consider the requirements of the ISCA Infrastructure Sustainability Rating Scheme (v1.2). Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

3.3.6 Traffic access and vehicle movements

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

- temporary impacts to pedestrians, motorists, rail customers and cyclists including:
 - impact to pedestrian, motorist and cyclist movements on both sides of the station due to the movement of construction material, traffic diversions and the location of crane/s during construction
 - temporary diversions around construction zones for rail customers accessing the station
 - temporary pedestrian access
 - increased vehicle movements that may reduce safety
- temporary impacts to accessible parking at commuter car parking west of the station to convert three existing non-compliant accessible parking into three compliant accessible parking spaces with a shared zone.

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

3.3.7 Temporary construction compound

A temporary construction compound would be required to accommodate a site office, amenities, laydown and storage area for materials. An area for a construction compound is proposed on the east side of the station footbridge (refer to Figure 12). The compound location would extend under the footbridge. The area nominated for the compound is on land owned by RailCorp. A laydown and storage area is proposed next to the site compound in the rail corridor, owned by RailCorp.

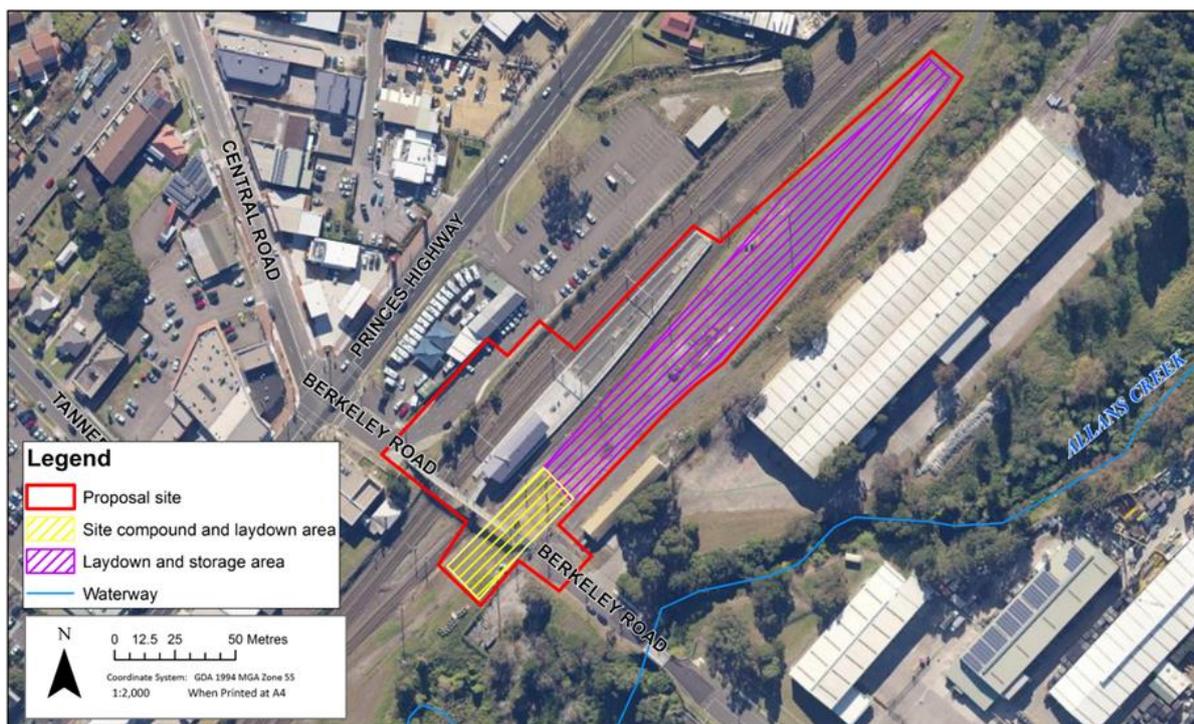


Figure 12 Proposed site compound location (extends under footbridge), laydown and storage areas.

3.3.8 Service relocation and adjustments

Where possible, the Proposal has been designed to minimise relocation of services, however further investigation would be required to confirm the presence and location of all services. It is likely more services would require relocation and/or the final location of proposed works may require adjustment. Such works are unlikely to occur outside the footprint of works assessed in this REF. In the event that works would be required outside the footprint, further assessment would be undertaken. The appropriate utility providers would be consulted during the detailed design phase.

3.4 Property acquisition

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

3.5 Operation and maintenance

The future operation and maintenance of the new station/interchange is subject to further discussions with Sydney Trains, Transport for NSW and Wollongong City Council. However, the Proposal is not anticipated to significantly alter the current operating arrangements.

The infrastructure that is constructed as part of this Proposal would be maintained by Sydney Trains. The accessible parking, kiss and ride area and bus stop would be maintained by Wollongong City Council.

4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - defined in the EPBC Act as 'matters of National Environmental Significance (NES)'. The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix A.

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

4.1.2 Other Commonwealth legislation

Table 4-1 Other Commonwealth legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	There is an obligation on a person who discovers anything which he or she has reasonable grounds to suspect are Aboriginal remains to report that discovery to the Minister, giving particulars of the remains and their location.
<i>Disability Discrimination Act 1992 (DDA Act)</i>	This Act aims to eliminate as far as possible, discrimination against persons on the ground of disability in areas including access to premises and the provision of facilities, services and land. The accessibility of the station would be improved by providing lifts to the platforms and three accessible parking spaces as part of the Proposal.

4.2 NSW legislation and regulations

4.2.1 Transport Administration Act 1988

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

This REF has been prepared having regard to, among other things, the specific objectives of Transport for NSW under the *Transport Administration Act 1988*:

- to provide an efficient and accountable framework for the governance of the delivery of transport services,
- to promote the integration of the transport system,
- to enable effective planning and delivery of transport infrastructure and services,

- to facilitate the mobilisation and prioritisation of key resources across the transport sector,
- to co-ordinate the activities of those engaged in the delivery of transport services,
- to maintain independent regulatory arrangements for securing the safety of transport services.

4.2.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as Transport for NSW, which do not require development consent under Part 4 of the Act.

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

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

4.2.3 Other NSW legislation and regulations

Table 4-2 provides a list of other relevant legislation applicable to the Proposal.

Table 4-2 Other NSW legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Biodiversity Conservation Act 2016</i> (BC Act)	<p>The BC Act establishes a framework for assessing and protecting environmental and public interests.</p> <p>The Proposal site is unlikely to contain suitable habitat for any listed threatened species or community and the Proposal is unlikely to have a significant impact on any threatened species or community (refer Section 6.7).</p>
<i>Biosecurity Act 2015</i>	<p>Clause 22 requires any person who deals with a biosecurity matter has a duty to ensure that in so far as is reasonably practicable, the potential biosecurity risk is prevented, eliminated or minimised. Appropriate management methods would be implemented during construction if declared noxious weeds in the Wollongong LGA are identified (refer to Section 6.6).</p>
<i>Contaminated Land Management Act 1997</i> (CLM Act)	<p>Section 60 of the CLM Act imposes a duty on landowners to notify the EPA and potentially investigate and remediate land if contamination is above EPA guideline levels.</p> <p>The Proposal site has not been notified under the CLM Act as being contaminated (refer to Section 6.8).</p>
<i>Heritage Act 1977</i> (Heritage Act)	<ul style="list-style-type: none"> • Sections 57 (exemption) 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. <p>The Unanderra Station Masters Residence is located about 10 metres from the Proposal site. The Proposal is unlikely to have significant impact on the heritage item (refer to Section 6.5).</p>
<i>National Parks and Wildlife Act 1974</i> (NPW Act)	<p>Sections 86, 87 and 90 of the NPW Act require consent from DPIE to have an impact upon items of Aboriginal cultural heritages.</p> <p>Sections 151–153D of the Act specify the uses for which leases, licences or easements can be granted for areas within declared National Parks. Section 153 relates to approval for easements within National Parks which can be granted by the Minister for the construction of pipelines, or for the erection of standards, posts, wires and appliances for the conveyance or transmission of electricity, or for any other purpose deemed necessary.</p> <p>The Proposal is unlikely to disturb any Aboriginal objects (refer Section 6.4). However, if unexpected archaeological items or items of Aboriginal heritage significance are discovered during construction of the Proposal, all works would cease, and appropriate advice sought.</p> <p>The Proposal would not require any works within, or have an effect on declared National Park areas</p>
<i>Protection of the Environment Operations Act 1997</i> (PoEO Act)	<p>The Proposal does not involve a ‘scheduled activity’ under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal.</p> <p>However, in accordance with Part 5.7 of the PoEO Act, Transport for NSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the CEMP to be prepared and implemented by the Construction Contractor.</p>

Applicable legislation	Considerations
<i>Roads Act 1993</i> (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) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads. The Proposal would not require works within or over a public road.
<i>Sydney Water Act 1994</i>	The Proposal would not involve discharge of wastewater to the sewer.
<i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act)	Transport for NSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.
<i>Water Management Act 2000</i> (WM Act)	Approval under the WM Act is required for certain types of developments and activities that are carried out in or near a river, lake or estuary. Under section 91E of the WM Act, it is an offence to carry out a controlled activity in, on or under waterfront land unless a controlled activity approval has been issued. The Proposal would not involve any water use (directly from a natural source such as an aquifer, river), water management works, drainage or flood work, controlled activities or aquifer interference.

4.2.4 Key State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

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

The Infrastructure SEPP prevails over all other environmental planning instruments except where there is an inconsistency with *State Environmental Planning Policy (State Significant Precincts) 2005* or certain provisions of *State Environmental Planning Policy (Coastal Management) 2018*.

Clause 79 in Division 15 of the Infrastructure SEPP permits the development of 'rail infrastructure facilities' on any land on behalf of a public authority without consent. The definition of 'rail infrastructure facilities' under Clause 78 includes:

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

The Proposal is classified as 'rail infrastructure facilities' and therefore does not require development consent. However, the environmental impacts of the Proposal have been assessed in accordance with Part 5, Division 5.1 of the EP&A Act.

Division 1 of the Infrastructure SEPP prescribes the consultation to be undertaken with the Local Council and the relevant public authorities with regards to certain development. Section 5.2 of this REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP.

State Environmental Planning Policy 55 – Remediation of Land

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

The potential for contaminated land and the potential impacts of the Proposal are assessed in Section 6.7 of this REF. It is unlikely that any large-scale remediation (Category 1) work would be required as part of the Proposal.

4.2.5 Wollongong Local Environmental Plan 2009

The Wollongong LEP is the governing plan for the Wollongong LGA, including Unanderra. Table 4-3 summarises the relevant aspects of the Wollongong LEP applicable to the Proposal. Figure 13 shows the land zoning of the Proposal site and the surrounding areas under the Wollongong LEP. While the Infrastructure SEPP prevails over Local Environmental Plans, the provisions of the Wollongong LEP have been considered with respect to the Proposal as detailed below.

Table 4-3 Relevant provisions of the Wollongong LEP

Provision description	Relevance to the Proposal
<p>Land Use Zones – Zone SP2 Infrastructure (railway) Zone B6 Enterprise Corridor Zone IN3 Heavy Industrial</p>	<p>The Proposal site is located in land zoned SP2 Infrastructure (Railway), B6 Enterprise Corridor and IN3 Heavy Industrial. The objectives of the SP2 zone are:</p> <ul style="list-style-type: none"> • to provide for infrastructure and related uses • to prevent development that is not compatible with or that may detract from the provision of infrastructure • to provide for key transport corridors. <p>The Proposal is consistent with the objectives of the SP2 zone as the works are to improve access to Unanderra Station.</p> <p>The objectives of the B6 zone are:</p> <ul style="list-style-type: none"> • to promote businesses along main roads and to encourage a mix of compatible uses • to provide a range of employment uses (including business, office, retail and light industrial uses) • to maintain the economic strength of centres by limiting retail activity • to encourage activities which will contribute to the economic and employment of Wollongong • to allow some diversity of activities that will not – <ul style="list-style-type: none"> ○ significantly detract from the operation of existing or proposed development, or ○ significantly detract from the amenity of nearby residents, or ○ have an adverse impact upon the efficient operation of the surrounding road system. <p>The objectives of the IN3 zone are:</p> <ul style="list-style-type: none"> • to provide suitable areas for those industries that need to be separate from other land uses • to encourage employment opportunities • to minimise any adverse effect of heavy industry on other land uses • to support and protect industrial land for industrial uses • to facilitate the ongoing sustainability of steel making and steel product manufacturing that will contribute to the economic and employment growth of Wollongong. <p>The Proposal involves upgrading footpaths and upgrading of three parking spaces within the B6 zone, upgrading of footpaths and installation of a kiss and ride zone in land zoned IN3, with the remaining works being undertaken within the rail corridor (SP2 zone).</p>

Provision description	Relevance to the Proposal
Clause 7.5 - Acid Sulfate Soils	<p>The Proposal is located on land mapped as Class 5 Acid Sulfate Soils (ASS). The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.</p> <p>Acid Sulfate Soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent Class 1,2,3 or 4 land that is below five metres Australian Height Datum (AHD) and by which the water table is likely to be lowered below one metre AHD on adjacent Class 1, 2, 3 or 4 land.</p> <p>The Proposal includes minor excavation which is highly unlikely to adversely affect groundwater tables within the area.</p>
Clause 7.6 - Earthworks	<p>The applicable objective of this clause is to ensure that any earthworks will not have a detrimental impact on environmental functions and processes, neighbouring uses or heritage items and features surrounding land. The proposed earthworks as part of the Proposal would be unlikely to detrimentally impact environmental function or surrounding land uses.</p>

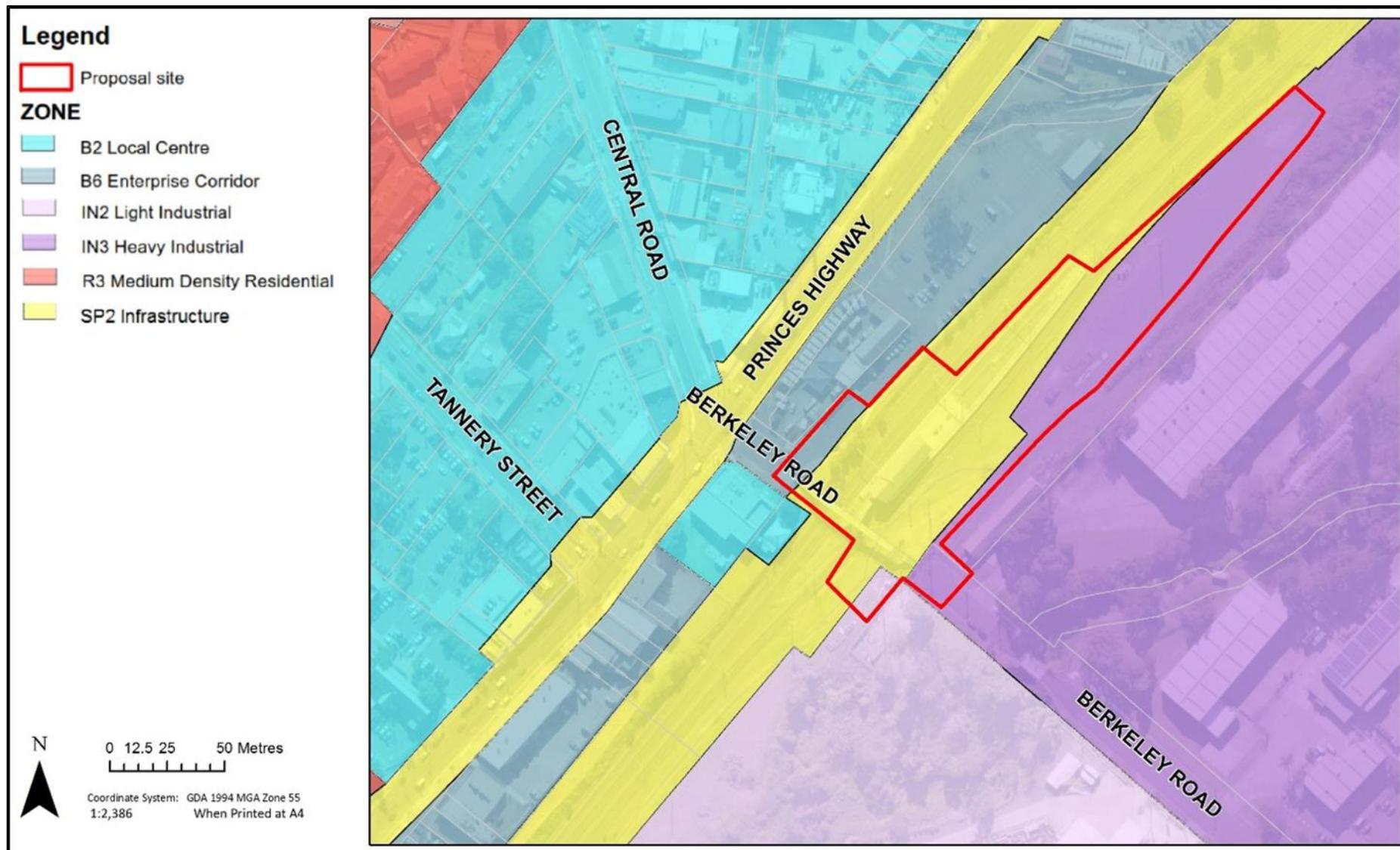


Figure 13 Wollongong LEP land use zoning

4.3 Ecologically sustainable development

Transport for NSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of 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 Transport for NSW throughout the development and assessment of the Unanderra Station Upgrade. Section 4.3 summarises how ESD has been incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5 Community and stakeholder consultation

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

5.1 Stakeholder consultation during scoping design

Key stakeholders for Unanderra Station, comprising of Sydney Trains and Transport for NSW, were engaged during development of the concept design plan to provide insights into the scope of work for the Proposal, and to also participate in the development and assessment of the station improvement options.

Early community engagement was undertaken between 31 March and 24 April 2020 to provide the community an opportunity to have their say on the early concept designs. Transport for NSW advertised this early engagement period via:

- advertisements in the local paper
- notifications distributed to the suburb of Unanderra
- signage installed at the station, with flyers made available to customers
- a dedicated project web page with information on the project, with a feedback form to collect feedback from the community.

Community sentiment was supportive of the proposed concept design. The project received 118 submissions during the concept design engagement period. The feedback received from the community was provided to the project team for consideration and to help inform the planning process and documentation.

5.1.1 Community consultation during coronavirus

In response to the evolving Coronavirus situation, Transport for NSW is following NSW Health advice and changing the way it approaches community consultation for important transport infrastructure projects.

It is important for the community to have their say on all transport infrastructure projects and while this isn't business as usual, Transport for NSW will ensure all appropriate community consultation is carried out.

This means consultation will be carried out in different ways, including via the website, social media and video conferencing, to ensure the community can practice social distancing and limit the spread of Coronavirus.

Transport for NSW will continue to deliver projects across NSW, while ensuring the safety of all staff and the community.

5.2 Consultation requirements under the Infrastructure SEPP

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

Table 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
<p>Clause 13 Consultation with Councils – development with impacts on council related infrastructure and services</p>	<p>Consultation is required where the Proposal would result in:</p> <ul style="list-style-type: none"> substantial impact on stormwater management services generating traffic that would place a local road system under strain involve connection to or impact on a council owned sewerage system involve connection to and substantial use of council owned water supply significantly disrupt pedestrian or vehicle movement involve significant excavation to a road surface or footpath for which Council has responsibility. 	<p>The Proposal includes work that would:</p> <ul style="list-style-type: none"> require connections or impacts upon the stormwater system disrupt pedestrian and vehicle movements impact on road pavements under Council’s care and control impact on Council-operated footpaths. <p>Consultation with Wollongong City Council has been undertaken and would continue throughout the detailed design and construction phases.</p>
<p>Clause 14 Consultation with Councils – development with impacts on local heritage</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> substantially impact on local heritage item (if not also a State heritage item) substantially impact on a heritage conservation area. 	<p>There is no proposed impact to local heritage items. Therefore, consultation with Council is not required. Refer to Section 6.5.</p>
<p>Clause 15 Consultation with Councils – development with impacts on flood liable land</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual: the management of flood liable land</i>. 	<p>The Proposal site is not located in an area mapped as flood prone land under the Wollongong LEP. However, an updated flood study of Allans Creek catchment was completed by Wollongong City Council which identified that Unanderra Station would be impacted by 20 per cent Annual Exceedance Probability (AEP) events and heavier rainfall events. Consultation with Council would be conducted during detailed design and construction phase.</p>
<p>Clause 15A Consultation with Councils – development with impacts on certain land within the coastal zone</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on land within a coastal vulnerability area and is inconsistent with certified coastal management program that applies to that land. 	<p>The Proposal is not located within a coastal vulnerability area. Accordingly, consultation with Council is not required in regard to this aspect.</p>
<p>Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on flood liable land – written notice must be given (together with a scope of works) to the State Emergency Service. Any response to the notice received from the State Emergency Service 	<p>The Proposal site is not located in an area mapped as flood prone land under the Wollongong LEP. However, an updated flood study of Allans Creek catchment was completed by Wollongong City Council which identified that Unanderra Station would be impacted by 20 per cent</p>

Clause	Clause particulars	Relevance to the Proposal
	within 21 days after the notice is given must be taken into consideration.	Annual Exceedance Probability (AEP) events and heavier rainfall events. Consultation with State Emergency Service would be undertaken during detailed design and construction phase.
Clause 16 Consultation with public authorities other than Councils	<p>For <i>specified development</i> which includes consultation with the EES for development that is undertaken adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i>, and other agencies specified by the Infrastructure SEPP where relevant.</p> <p>Although not a specific Infrastructure SEPP requirement, other agencies Transport for NSW may consult with could include:</p> <ul style="list-style-type: none"> • Transport for NSW • Sydney Trains • NSW TrainLink • Department of Planning, Industry and Environment (EES Group). 	The Proposal is not located adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> . Accordingly, consultation with the EES Group in the Department of Planning, Industry and Environment on this matter is not required.
Clause 104 Consultation with relevant roads authority	<p>For <i>traffic-generating development</i> specified in Column 1 of the Table to Schedule 3 that involves new premises of the relevant size or capacity, or an enlargement or extension of existing premises, being an alteration or addition of the relevant size or capacity – written notice of the intention to carry out the development must be given to relevant roads authority in relation to the development. Any response to the notice that is received from Transport for NSW within 21 days after the notice is given must be taken into consideration.</p>	The Proposal is not deemed a traffic-generating development. Accordingly, consultation with the relevant division of Transport for NSW is not required in regard to this aspect. Refer to Section 6.1.

5.3 Consultation strategy

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

The objectives of the consultation strategy are to:

- provide accurate and timely information about the Proposal and REF process to relevant stakeholders
- raise awareness of the various components of the Proposal and the specialist environmental investigations

- ensure that the directly impacted community is aware of the REF and consulted where appropriate
- provide opportunities for stakeholders and the community to express their view about the Proposal
- understand and access valuable local knowledge from the community and stakeholders
- record the details and input from community engagement activities
- build positive relations with identified community stakeholders
- ensure a comprehensive and transparent approach.

5.3.1 Public display

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

- distribution of a project newsletter to local community and rail customers, outlining the Proposal and inviting feedback on the REF
- advertisement of the REF public display in the local newspaper with a link to the Transport for NSW website that includes a summary of the Proposal, links to the REF and supporting documents and information on how to provide feedback
- a geo-targeted social media campaign during the public display period (Facebook)
- consultation with council, Sydney Trains, NSW Trains and other non-community stakeholders
- phone calls and emails to members of the community who have registered to the project contact list
- online feedback forms on the project website
- posters at the station advising customers where to view the REF and how to make a submission.

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.

The REF would be placed on public display on the Transport for NSW website: transport.nsw.gov.au/projects/current-projects/unanderra-station-upgrade

The NSW Government Have Your Say website: nsw.gov.au/improving-nsw/haveyour-say/unanderra-station-upgrade

Further information on the Proposal may be requested by contacting the Project Infoline on 1800 684 490 or by email at projects@transport.nsw.gov.au.

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

- Email: projects@transport.nsw.gov.au
- Transport for NSW website: transport.nsw.gov.au/projects/current-projects/unanderra-station-upgrade

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

5.4 Ongoing consultation

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

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

Should Transport for NSW determine to proceed with the Proposal, the project team would keep the community, 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.

6 Environmental impact assessment

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

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

6.1 Traffic and transport

A Traffic Impact Assessment was completed for the Proposal by Bitzios Consulting in May 2020 with results summarised below.

6.1.1 Existing environment

Road network

Berkeley Road West

Berkeley Road (west) is a two-way two-lane local road that runs perpendicular to but does not cross the South Coast Line. The western section runs from the Princes Highway intersection to the entrance of the station. An unnamed road runs from the entrance of the station to the car park and loops back to the Princes Highway. There is no sign posted speed limit, and there are no traffic calming devices on the road.

Berkeley Road East

The eastern side of Berkeley Road is an undivided no-through road that leads through the industrial zone on the eastern side of the railway. There is a narrow bridge crossing the river about 50 metres from the station entrance. The bridge is wide enough for one car.

Princes Highway

The Princes Highway at Unanderra is a two-way four-lane road running parallel to the South Coast Railway leading from Wollongong to Dapto. This section of the Princes highway is classified as a Regional Road by Transport for NSW. The sign posted speed limit is 60 kilometres/hour.

Public Transport

Unanderra Station

Unanderra Station is serviced by the South Coast Line. Trains stopping here run between Kiama or Dapto and Sydney via Wollongong. Journeys between Unanderra and Central Stations typically take 100 minutes for limited stop services during peak periods, and 120 minutes for all stop services. Journeys between Unanderra and Wollongong take approximately eight to 10 minutes.

Bus services

Bus stops near the station are located on the Princes Highway and on Berkeley Road on the western side of the station. The buses that service the area are Routes 31, 33, 34, 35, 36, 37, 41 and 855. The bus stops and routes near the station are presented in Figure 14.

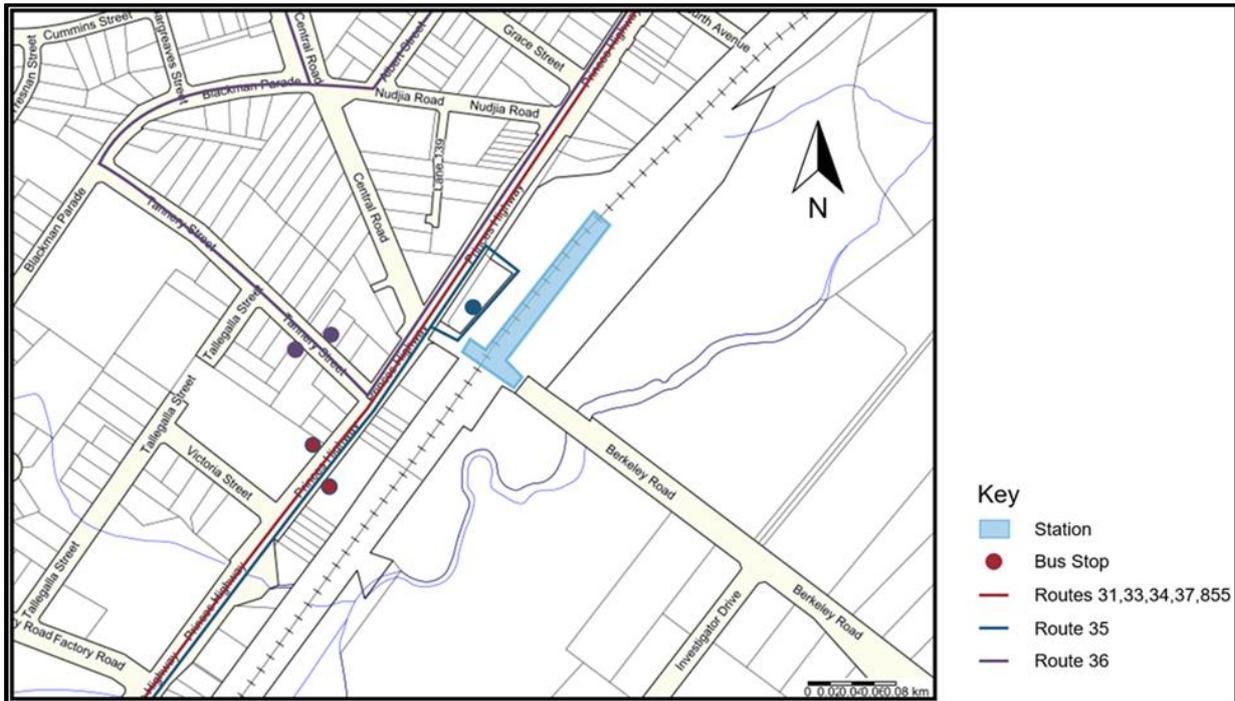


Figure 14 Bus stops and bus routes near Unanderra Station

Pedestrian infrastructure

The station platform at Unanderra is accessible via the existing footbridge from both sides of the station. There are currently no lifts for the footbridge. Existing footpaths connect the station with other transport facilities such as the commuter car park and bus stops and a pedestrian crossing for the Princes Highway is located just outside the station. The footpaths along Berkeley Road on the eastern side of the station are not connected, and pedestrians must walk on the road for some sections, most notably at the bridge where the road narrows.

Unanderra Station is the closest train station to Nan Tien Temple, and visitors to the Temple often travel by train to and from Unanderra station.

Cycling infrastructure

Bicycle lockers for hire are provided by Transport for NSW next to the commuter car park, with capacity for four bicycles, but there are no bicycle racks or stands for short stay bicycle parking.

Wollongong City Council recognises Berkeley Road east of the station as an unmarked on-road cycling path, and there is a shared path located to the west of the Princes Highway along the side streets.

Parking and kiss and ride

A commuter car park is provided on the western side of the station with spaces for 127 cars plus three non-compliant accessible spaces (Figure 15). Due to COVID-19 measures, parking demand has been estimated using satellite imagery from a number of weekdays from 2019 to 2020 (Table 6-1). The demand for parking has a large variance (including weekdays), and has been observed to be at or above capacity.

On the western side of the station, an informal kiss and ride is located on Berkeley Road. On occasion, cars have been observed to park here.

On the eastern side of the station, on-street parallel parking is available on Berkeley Road. The 24 on-street parking spaces closest to the station have been considered for the analysis

although this parking may also be used by people working in the industrial zone (Figure 15). The cul-de-sac at Berkeley Road (east) has a no parking and no stopping sign to prevent cars parking in front of gates.

Short-stay parking is available on Central Road, Tannery Street, Tallegalla Street and Victoria Street on other side of the Princes Highway. These streets were not considered in the traffic analysis because it is mostly used by people visiting the town centre and not by train commuters.

Table 6-1 Unanderra Station Typical Parking Demand

Parking Area	Type	Supply (Spaces)	Demand (Spaces)	Demand (%)
Commuter Car Park	Accessible*	3	1	33
Commuter Car Park	Unrestricted	127	117	92
Berkeley Road (east)	Unrestricted	24	22	88

Note – numbers potentially atypical as investigations were undertaken during COVID-19 social isolation. Therefore figures are likely not an accurate representation.

*non-compliant accessible space



Figure 15 Existing transport facilities (Basemap Source: SixMaps, NSW Department of Finance and Services)

6.1.2 Potential impacts

Construction phase

Traffic

The construction of the proposed upgrades would add extra vehicles to the local roads, including heavy vehicles for material and equipment delivery and removal, and light work vehicles for construction workers and subcontractors.

Construction traffic is not expected to exceed 20 light vehicles and 10 heavy vehicles per day during peak construction periods (including scheduled Sydney Trains rail shutdowns) and would be less when work is undertaken during standard construction hours.

It is expected that a range of trucks would need access to the site, including medium and large rigid vehicles, articulated vehicles, and concrete trucks. The timing of construction vehicles would be planned to reduce traffic impact. However it is unlikely that the proposed works would cause significant congestion issues.

The proposed construction would encroach on Berkeley Road of the western side of the station. If this section of road is closed, then the only entrance into the station car park would be from the southbound lanes of the Prince Highway. Cars travelling northbound on the Princes Highway would have to make a detour through Central Road and Nudjia Road to be able to enter the station car park.

Public transport

Construction work on the western side of the station, such as the footpath widening and accessible space upgrades, would affect the bus stop next to the station. Bus Route 35 would not be able to access the bus stop and use it as a turnaround area. An alternative route would be via Tannery Street, Blackman Parade and Central Road. Bus passengers would be directed to the existing bus stops on the Princes Highway. Access to the buses on Berkeley Road (west) and the commuter car park would be considered in the Construction Traffic Management Plan (CTMP). The bus routes on the Princes Highway and access to those bus stops would not be affected.

Pedestrian and cyclists

The Proposal is expected to cause temporary disruptions to the existing pedestrian facilities surrounding the station, when construction works for the lift, surrounding footpaths, upgrades to the TGSI's and the regrading of the footbridge and station are being undertaken. This has the potential for increased safety risks for pedestrians, due to potential interactions with construction plant and vehicles.

Access to the commuter car park may be affected by the footpath widening on the western side of the station which would cause temporary minor disruption to pedestrians and increased safety risks for pedestrians, due to potential interactions with construction plant and vehicles.

Appropriate signage and/or traffic controllers would be positioned to notify pedestrians of the temporary arrangements. Any interaction between construction vehicles and pedestrians would be managed and controlled by traffic controllers. Impacts to pedestrians during construction would be managed through the development of a CTMP. Wherever possible, the community would be notified in advance of any planned works which would impact pedestrian movements through regular project notifications.

Parking

Parking demand is high at Unanderra Station, so measures would be taken to minimise potential impacts on parking access for vehicles and pedestrians during construction. Construction workers would be encouraged to take public transport or use car parks further away from the site to maintain the capacity of the commuter car park.

The construction work on the eastern side of the station would result in parking spaces being temporarily unavailable. The reduction in the number of parking spaces available on Berkeley Road (east) next to the station would be minor compared to the available supply.

Construction access

The construction of the new kiss and ride area on Berkeley Road (east) would temporarily prevent vehicle access through an existing gate to the rail corridor, however the gate opposite

the station stairs is to be maintained. To be able to access the same area, vehicles must pass underneath the station footbridge. The construction may also temporarily affect the turning area at the end of Berkeley Road (east) for larger vehicles. The extent of any turning circle reductions would be further investigated as part of the detailed design process, and appropriate controls implemented during construction to minimise any impacts.

Access to neighbouring properties during construction are not expected to be impacted, but would be considered in construction planning .

Haulage routes

Construction vehicles are able to access the western side of the station from the Five Islands Road exit off the Princes motorway via the Princes Highway. Both these roads are multiple-lane arterial roads. Five Islands Road has a sign posted speed limit of 80 kilometres/hour and the Princes Highway is 60 kilometres/hour. The intersection of Berkeley Road (west) and the Princes Highway has room for larger vehicles to turn to enter the site, however egress from the site through the car park access route may not be restricted. Access and egress to the site and manoeuvring for larger vehicles would be further considered when planning construction.

The eastern side of the station is accessible via Glastonbury Avenue and Berkeley Road. These roads are significant access roads for the industrial area east of Unanderra Station, and are often used by trucks. The sign posted speed limit is 60 kilometres/hour for both roads. There is a single lane bridge on Berkeley Road (east) just before the station, and the turning area at the end of the road may be limited by the construction of the new kiss and ride area.

There is no direct vehicle route between the different sides of the station, with the closest railway crossing route via Nolan Street about one kilometre to the south of the station. Construction vehicle routes are shown in Figure 16.

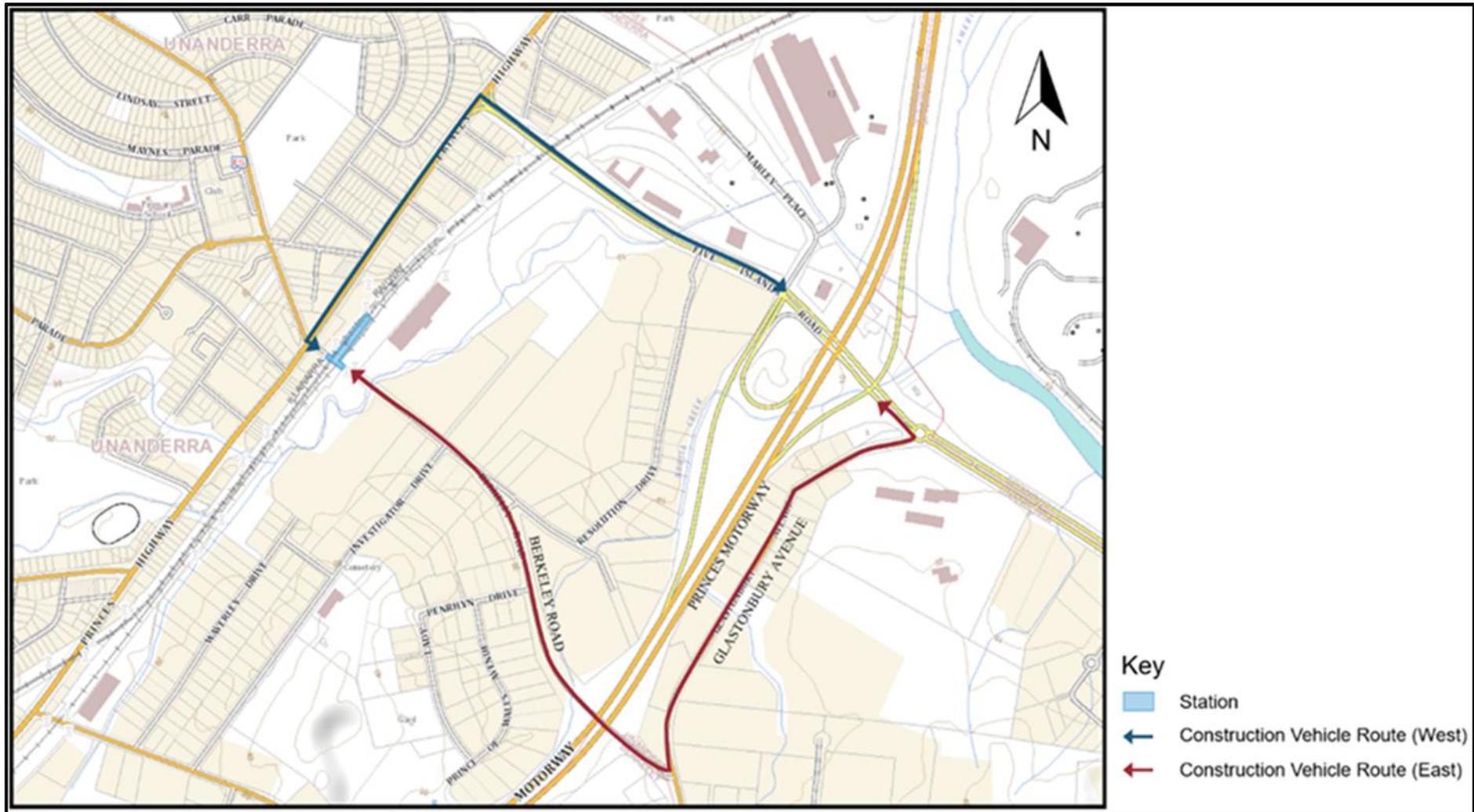


Figure 16 Proposed construction vehicle routes (Bitzios, 2020)

Operation phase

Public transport

The Proposal does not include changes to bus/rail services, and would not impact on the operation (service operation or timetabling) of public transport in the vicinity of Unanderra Station. The Proposal includes improved interchange facilities and improved commuter access to Unanderra Station, which may result in a minor increase in rail patronage.

Pedestrian

The Proposal includes a number of pedestrian facilities that would improve access and safety such as new lifts and footbridge modifications.

Access to the commuter car park would be improved by the widening of the footpath next to the kiss and ride area. A pedestrian crossing on Berkeley Road (west) would also provide safer access between the station and the bus stop.

Pedestrian access on the eastern side of the station would also be improved by the construction of a footpath next to the kiss and ride. However, pedestrians may still need to cross an unpaved section after the single-lane bridge to reach the existing footpath.

It is unlikely that pedestrian capacity on the footbridge, lifts and stairs would impact the operation of the station as the patronage numbers for Unanderra Station are relatively low.

Kiss and ride

The existing kiss and ride area on Berkeley Road (west) would be formalised, and a new kiss and ride would be provided on the east side of the station. The new kiss and ride would take up part of the existing turning area, and therefore may reduce manoeuvrability due to an increase in vehicle activity at this location.

Traffic generation and parking demand

The formalisation of the kiss and ride area on Berkeley Road (west) would remove three car parking spaces. One car parking space will be removed in order to convert existing non-compliant DDA parking spaces into three accessible parking spaces with a shared zone.

Parking demand at Unanderra Railway Station is high with the commuter car park observed to be near or at capacity. A small increase in commuters may result in more commuters parking in the nearby shopping areas or local roads.

The construction of the new kiss and ride area on the eastern side of Berkeley Road may generate a small amount of additional traffic on that road. This may raise safety issues if there is an increase in traffic across the single lane bridge that provides access to the station. However as the increase in traffic is anticipated to be low on the east side of the station, existing operations of the road are unlikely to be significantly impacted.

Traffic on the western side of the station exits directly onto the Princes Highway which is a major arterial road. It is therefore unlikely that additional traffic generated on the western side of the station would have a significant impact on the greater road network.

6.1.3 Mitigation measures

Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared as part of the CEMP and would include at a minimum:

- ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised

- maximising safety and accessibility for pedestrians and cyclists
- ensuring adequate sight lines to allow for safe entry and exit from the site
- ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made)
- managing impacts and changes to on and off-street parking and requirements for any temporary replacement provision
- parking locations for construction workers away from stations and busy residential areas and details of how this would be monitored for compliance
- routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
- details for relocation of rail replacement bus stops (if required), including appropriate signage to direct patrons, in consultation with the relevant bus operators. Particular provisions would also be considered for the accessibility impaired
- measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP.

During detailed design the following should be investigated to improve safety:

- a pedestrian crossing on Berkeley Road (west) to improve pedestrian safety between the accessible parking spaces, bus stop and the station
- a footpath next to the accessible parking spaces on Berkeley Road (west)
- alternative pedestrian footpaths or traffic management from commuter carpark to station
- speed humps, connected footpaths, pedestrian crossings and speed limits within the commuter carpark
- investigate the need for additional signage and line marking on the single lane bridge on Berkeley Road (east) to clarify right of way and mitigate congestion
- relocation of the proposed kiss and ride area on the eastern side of the station due to decreased manoeuvrability.

Consultation with the relevant roads authorities would be undertaken during preparation of the CEMP. The performance of all project traffic arrangements must be monitored during construction. Refer to Section 7.2 for the full list of the proposed mitigation measures for the Proposal.

6.2 Landscape and visual amenity

A Landscape Character and Visual Impact Assessment was prepared for the Proposal to assess the landscape character and visual impact of the Proposal (EnVisage, 2020). This includes landscape and visual effects of both construction and operational stages of the Proposal. The findings of the assessment are summarised in this section.

6.2.1 Existing environment

Key features that contribute to local landscape character include: the flat local terrain around the station and railway corridor; warehousing-style industrial land uses east of the station;

commercial precinct west of the station; low-density residential housing on elevated, distinct small hills west of the station; and the backdrop of the Illawarra Escarpment.

Character within the railway corridor is more 'infrastructure based' and features lighting, stanchions, fencing, small buildings, open grassed areas and material stockpiles, and is bordered by the rear of commercial and industrial premises.

The existing landscape character is rated as having low sensitivity due to:

- the wider landscape setting of the station is distinctive and dramatic with the proximity of Mount Kembla and the Illawarra Escarpment in the background
- the railway corridor, including the footbridge, stairs and station infrastructure, are not visually appealing elements within the landscape
- the contribution of the railway corridor to local scenic qualities would be unlikely to be damaged by the type of change proposed
- character adjacent the railway corridor – featuring warehousing, sheds, brick walls, fencing and extensive areas of bitumen for parking - is also less appealing within the positive, wider, natural landscape setting.

Views of Unanderra Station are possible from adjacent roads, the local shopping precinct, and elevated residential areas within approximately three kilometres of the station. An approximate visual catchment is shown in Figure 17.



Figure 17 Viewpoints identified for Proposal site

6.2.2 Potential impacts

6.2.3 Construction phase

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

- tall, moving construction equipment and machinery would be visible, although compatible with the character of the railway corridor character
- the extent of the landscape that would be affected by construction activity would be relatively small
- the two trees to be potentially removed do not contribute significantly to landscape character
- the construction period is temporary.

Due to the low sensitivity of the landscape character, the overall impact is anticipated to be low. Unanderra shopping precinct (VP1) would be most visually impacted by the construction phase. The impacts from construction would be temporary and minimised where possible. Worksite compounds would be screened with a shade cloth (or similar, where necessary) to minimise visual impacts from key viewing locations. The level of impact during construction on each viewpoint is summarised in Table 6-2.

Table 6-2 Viewpoints level of impact during construction

Viewpoint	Level of impact
VP1 - Unanderra shopping precinct (Central Road)	The low sensitivity ranking combined with the moderate magnitude of change, leads to an overall moderate-low level of impact
VP2 – Princes Highway	The low sensitivity ranking combined with the low magnitude of changes lead to an overall low level of impact
VP3 – Berkeley Road (east)	The low sensitivity ranking, combined with the low magnitude of change, leads to an overall low level of impact
VP4 – Elevated residential areas west	The low sensitivity ranking, combined with the low magnitude of change, leads to an overall low level of impact

Operation phase

Upon completion of the proposed construction works, all disturbed areas would be rehabilitated. Demobilisation works include removal of the construction compound/s, temporary fencing and storage areas; and covering or vegetating exposed surfaces.

The main elements of the Proposal that would be visible would be:

- three new lift shafts: one either end of the footbridge, and one on the platform. The top of the lift shafts would be approximately 11 metres above existing ground level, and approximately five metres above the height of the footbridge
- extensions to the footbridge connecting to each lift
- widened pathways at station entries, connecting the lifts, stairs and kiss and ride facilities

- new/formalised kiss and ride bays at each station entry
- new handrails and signage.

Upgrades to the station building (such as the refit of the bathrooms) are largely internal and the building would not look significantly different when viewed from the outside. Regrading of the platform would not be visible when viewed from outside the station.

Following construction, the Proposal would have a low (positive) magnitude of change on landscape character:

- the Proposal would be a recognisable new element within the overall scene, one that enhances local scenic quality by improving the station entrances and upgrading railway infrastructure
- the scale of the Proposal would be compatible with the character of the immediately surrounding railway corridor, industrial and commercial uses, and railway infrastructure would still be confined to a relatively small proportion of the wider scene
- the height of the new elements would not adversely affect the wider setting and would not detract from the presence of the Illawarra Escarpment in the background.

Overall, the Proposal would result in a low impact to the landscape character and surrounding viewpoints. The Proposal would represent a visual improvement to the station and its scale would be compatible with the character of the railway corridor and immediate surroundings, remaining relatively inconspicuous and not visually prominent within the landscape.

Four viewpoints (VPs) have been identified for assessment, including viewpoints from private residences within one kilometre of the Proposal, and public viewpoints. More-distant residential viewpoints were not included for assessment as the extent of the Proposal site within view is negligible. Each viewpoint identified in Figure 17 has been assessed and outlined in Table 6-3 below. The lift shafts would be the most visible new features of the Proposal, however they would be generally lower in height than industrial sheds and vegetation in the background and would relate with the surrounding built structures in scale and character. Further, the upgrades proposed at station entrances would improve the visual appeal of the station. Accordingly, the assessed impact to all viewpoints is low.

Table 6-3 View point impact assessment

Viewpoint	Description	Visual sensitivity	Magnitude of change	Visual impact of the Proposal	Overall impact
VP1 – Unanderra shopping precinct (Central road)	View from local shopping precinct about 60 metres west of the station, at the same elevation, and includes small retail shops and larger commercial premises.	Low	Low	<ul style="list-style-type: none"> three proposed lift shafts would be prominent new elements in view new refurbished features would be visible and recognisable, yet relatively compatible with the surround character. 	Low
VP2 – Princes Highway	View is about 40 metres from the station at its closest but has limited viewing opportunity. At approximately 160 metres to the north of the station, wider, clearer views of the station are possible from the highway across the commuter car park.	Low	Low	<ul style="list-style-type: none"> modifications to station building on platform would be visually indistinct closest new major feature would be central proposed lift shaft at southern end of station, which would be taller than the existing station building. Eastern lift shaft may also be visible new features would integrate with the surrounding built objects in scale and character. 	Low
VP3 – Berkeley Road (east)	Berkeley Road (east) runs perpendicular to the railway corridor and terminates approximately 2.5 metres from the base of the station stairs.	Low	Low	<ul style="list-style-type: none"> three proposed lift shafts would be in view lift shafts would be lower than the ridgeline, however, unless they 	Low

	Views are possible up to approximately 380 metres from the station.			are similar dark tones as the footbridge, they may stand out against background.	
VP4 – Elevated residential areas west	There are two small hills within one kilometre of the station providing elevated vantage points (approximately 60 metres above the level of the station) for residents of low-density, detached dwellings. Streets where views would be possible include some residences along Lindsay Street and Beverley Avenue.	Low	Low	<ul style="list-style-type: none"> • three proposed lift shafts would be in view • lift shafts would be lower than vegetation that appears near station, and lower than large bulky shed in background • Proposal would be compatible with its surrounding character. 	Low

6.2.4 Mitigation measures

The following mitigation measures are recommended to minimise visual impacts during the design development and construction phases:

- investigate incorporating one or several feature trees at the Berkeley Road (west) entrance to enhance the view of the entry and provide amenity and shade for station customers
- select colours for the proposed lift shafts and footbridge to be as recessive as possible, so the station continues to be unobtrusive
- choose colours with low reflectivity and high grey content
- take all practical measures to ensure construction equipment, stockpiles, and other visible elements are located away from key views. Should such equipment or stockpiles be located in a visually prominent location for any reasonable period of time, incorporate screening measures and practices to ensure sites are kept tidy
- ensure construction activities, equipment and storage areas are, where possible, located away from existing vegetation, the dripline of canopy trees, and other natural landscape features.

Refer to Section 7.2 for a full list of the proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.3 Noise and vibration

A Noise and Vibration Impact Assessment (NVIA) report by Muller Acoustic Consulting was prepared in April 2020, with results summarised below.

6.3.1 Existing environment

The existing noise environment in the vicinity of Unanderra Station is described as urban/industrial interface with light industrial premises located to the east of the Proposal site and commercial and residential areas located to the west. The dominant noise sources in the locality include road traffic noise from the Princes Highway, rail noise from the passage of freight and passenger trains on the South Coast Line, industrial noise and general urban hum.

Sensitive receivers

The nearest sensitive receivers are the residents located within approximately 650 metres of the Proposal site. The sensitive receivers are identified in Table 6-4 and Figure 18.

Table 6-4 Sensitive receivers' distance from Unanderra Station

Receivers	Distance from the Proposal site
Residential receivers	within approximately 10 to 650 metres
Commercial premises	within 20 to 120 metres
Light industrial	within 75 to 135 metres
Unanderra Park	350 metres
St Pius Primary School	450 metres
Medical and Dental Centre	60 metres
Unanderra Family Doctors	160 metres
The Immaculate Conception Church	210 metres



Figure 18 Sensitive receivers around the Proposal site

Background noise levels

During preparation of the NVIA, social isolation requirements were in place as a result of the COVID-19 pandemic, which caused changes in typical work, commuter and traffic patterns. Due to these changes any results of noise monitoring taken at this time were determined to be unlikely to represent business as usual noise levels for the area.

Historic background noise monitoring data has therefore been used to quantify the existing noise environment in the locality of the Proposal site. The data was sourced from the Environmental Noise Assessment (publicly available) for a service station at 41-43 Princes Highway, Unanderra, NSW (Marshall Day Acoustics, 2014). The historic monitoring was completed in August to September 2014 at 20 Hurt Parade, Unanderra, NSW adjacent to the Princes Highway. This location is considered representative of the background noise levels for receivers in the vicinity of the Proposal site being of similar offset to the railway and the Princes Highway.

The results of the historic unattended noise monitoring are presented in Table 6-5. The measured noise levels were used to determine the Rating Background Level (RBL) for the assessment during the day, evening and night periods in accordance with the *Noise Policy for Industry* (2017).

Table 6-5 Adopted RBLs for the Proposal

Background noise level	Day ¹	Evening ²	Night ³
Rating Background Level, dB LA90(period)	54	52	38
Ambient Level, dB LAeq(period)	58	57	52

¹Day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays;

²Evening – period from 6 pm to 10 pm;

³Night – the remaining periods.

6.3.2 Potential impacts

Construction phase

Construction noise

The assessment includes identification of potentially affected assessment locations, description of activities involved in the Proposal, derivation of the construction noise criteria for standard and Out of Hours (OOH) periods and quantification of potential noise impacts at receivers.

The assessment and management of noise from construction works is completed using the *NSW Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change, 2009). The ICNG is specifically aimed at managing noise from construction works regulated by DPIE and is used to assist in setting statutory conditions in licences or other regulatory instruments.

The ICNG provides a framework to consider the impacts of construction noise on residences and other sensitive land uses and the Noise Management Levels (NML) provide noise criteria for construction. The application of the ICNG criteria to residential receivers is outlined in Table 6-6. Non-residential receivers have set NMLs depending on the type of receiver.

Table 6-6 ICNG residential NMLs

Provision description	NML ($L_{Aeq,15}$ minutes)	Application
Recommended standard hours: Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm No work on Sunday or Public Holidays	Noise affected RBL + 10dBA	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq,15min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm No work on Sunday or Public Holidays	Highly noise affected 75dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that would be provided.
Outside recommended standard hours	Noise affected RBL + 5dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community.

NMLs for construction activities have been developed for receivers during standard hours and OOH periods are summarised in Table 6-7. OOH periods are divided into two categories:

Period 1 (evening/low risk period):

- Monday to Friday – 6.00pm to 10.00pm,
- Saturdays – 1.00pm to 6.00pm
- Sundays and Public Holidays – 8.00am to 6.00pm

Period 2 (night/medium to high risk period):

- Monday to Friday – 10.00pm to 7.00am
- Saturdays, Sundays and Public Holidays – 6.00pm to 7.00am (8.00am on Sunday mornings and Public Holidays).

Table 6-7 NMLs at surrounding receivers

Location	Assessment Period	RBL, dBA	NML dB LAeq15min)
Residential receivers	Day (Standard Hours)	54	64 (RBL+10dBA)
Residential receivers	Evening (OOH Period 1)	52	57 (RBL+5dBA)
Residential receivers	Night (OOH Period 2)	38	43 (RBL+5dBA)
Commercial receivers	When in use	-	70 (external)
Industrial receivers	When in use	-	75 (external)
School classrooms	When in use	-	45 (internal)
Medical facilities	When in use	-	45 (internal)
Places of worship	When in use	-	40 (internal)
Active recreation areas	When in use	-	65 (external)

A computer model was developed to predict and quantify project noise emissions to neighbouring receivers for typical construction activities and operations.

Works during OOH periods are expected during rail shutdowns to complete installation works for the footbridge and work on the station platform. Works during the rail shutdowns have been assessed for all modelled scenarios during the day, evening and night-time assessment periods. The rail shutdowns would be required to limit the effect on normal rail operations and to improve worker safety.

Noise emissions at residential receiver locations are predicted not to exceed the NMLs by more than 10dB (standard hours) and 5dB (OOH1) for all construction activities.

Predicted noise levels during OOH2 are anticipated to exceed the trigger level for the implementation of standard mitigation measures for residential receivers during each construction scenario. Therefore, feasible and reasonable standard mitigation measures are recommended for works undertaken during the OOH2 work period. It is noted that construction noise levels would not exceed the highly noise affected NML of 75dBA at any residential receiver locations.

The construction noise emissions are predicted to exceed the relevant NMLs for commercial receivers, medical facilities and places of worships during the proposed construction scenarios. Construction noise levels are predicted to satisfy the relevant NMLs for industrial receivers, educational facilities and active recreation areas during all construction scenarios.

The results of the assessment indicate that during the station entrance upgrade, lift installation, and pedestrian bridge upgrades, commercial receivers at nearest receiver anticipated NML of 70dB LAeq(15 mins) was exceeded by 7dB. At Centre Heath Unanderra, noise levels are expected to exceed the NML of 45dB LAeq(15 mins) by 14dB during station entrance upgrades, 2dB during lift installation and 3dB during pedestrian bridge upgrades. At the Immaculate Conception Church predicted noise levels are anticipated to exceed the NML 45dB LAeq(15 mins) by up to 3dB during platform regarding works.

Construction noise management zones have been mapped to identify the receivers where residual noise levels are anticipated to exceed the Additional Mitigation Measures (AMM) trigger levels. The noise management zones are provided for lift installation works, considered to be the activity likely to impact the greatest number of receivers, for OOH2 (Figure 19). It is noted that the predicted noise levels during standard construction hours and OOH1

construction periods are below the AMM trigger levels at all receiver locations, hence, it is expected that following the implementation of standard mitigation measures, the AMM trigger levels would be met for all construction scenarios.



Figure 19 Noise management zones OOH2

Sleep disturbance

OOH construction activities occurring during the night time have the potential to generate noise emissions that may cause sleep disturbance at receivers in proximity to the construction work.

Noise modelling quantified the levels from maximum night time events from the near point of each construction activity to each assessed receiver. Modelling adopted a sound power level of 115dB L_{Amax} to represent emissions from transient sources such as metallic impacts from equipment.

Modelling identified that maximum emissions have the potential to exceed to maximum noise trigger level at the nearest assessed receivers on Central Road and Tannery Street. Therefore, it is recommended that the Proposal proactively manages night time noise emissions and implement reasonable and feasible noise control strategies to minimise and where possible, eliminate the occurrence of sleep disturbance within the surrounding locality.

Construction road traffic

The NSW EPA's *Road Noise Policy* (2017) recommends that any increase in the total traffic noise level should be limited to 2dB above that of the corresponding 'without construction' scenario. Construction of the Proposal would generate heavy vehicle movements through the transport of construction equipment and materials to the site, and light vehicle movements associated with workers and smaller deliveries. Access to the Proposal site would typically be via:

Princes Highway – arterial road

Five Islands Road, Glastonbury Avenue, Berkeley Road – collector roads.

It is noted that the access route from Five Islands Road along Glastonbury Avenue and Berkeley Road is principally used for industrial traffic, with no residential receivers located along the route. Therefore, no construction road traffic noise impacts are likely to occur.

Construction vibration

The assessment and management of noise from construction work is completed with reference to the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019). This strategy recommends safe working buffer distances for standard structure depending on the plant and equipment being used. The nearest receiver to the location of the lift shafts is approximately 20 metres to the south west, Unanderra Station Master's Residence. Accordingly, the use of large hydraulic hammers and vibratory rollers would be avoided, where possible. Where highly vibration intensive plant is used for the formation of the lift shafts, the vibration mitigation measures provided in Section 7.2 should be implemented. The *Construction Noise and Vibration Strategy* (Transport for NSW, 2019) provides guidance of minimum working distances from sensitive receivers for typical items of vibration intensive plant. Table 6-8 demonstrates the minimum working distances for vibratory plant.

Where construction is required within the safe working buffer distance alternative work methods are required, such as smaller equipment. If no alternative work method is feasible or reasonable, then compliance vibration monitoring should be undertaken where works are required within the safe working buffer distance.

Table 6-8 Minimum working distances for vibratory plant (metres)

Plant item	Rating/Description	Minimum working distance	
		Cosmetic damage (BS 7385)	Human response (OH&E Vibration guideline)
Vibratory roller	< 50 kN (typically 1-2 tonnes)	5 metres	15 to 20 metres
	< 100 kN (typically 2-4 tonnes)	6 metres	20 metres
	< 200 kN (typically 4-6 tonnes)	12 metres	40 metres
	< 300 kN (typically 7-13 tonnes)	15 metres	100 metres
	> 300 kN (typically 13-18 tonnes)	20 metres	100 metres
	> 300 kN (> 18 tonnes)	25 metres	100 metres
Small Hydraulic Hammer	300 kilograms – 5 to 12 tonne excavator	2 metres	7 metres
Medium Hydraulic Hammer	900 kilograms – 12 to 18 tonne excavator	7 metres	23 metres
Large Hydraulic Hammer	1600 kilograms – 18 to 34 tonne excavator	22 metres	73 metres
Vibratory Pile Driver	Sheet piles	2 to 20 metres	20 metres
Pile Boring	≤ 800 mm	2 metres (nominal)	N/A
Piling Rig – Hammer	12 tonnes down force	15 metres	50 metres
Jackhammer	Hand held	1 metres (nominal)	Avoid contact with structure

Note: Source *Construction Noise and Vibration Strategy* (Transport for NSW, 2019)

Note: More stringent conditions may apply to heritage or other sensitive structures.

Heritage building impacts

The CNVS specifies a safe working buffer distance of 25 metres for standard structures. The Unanderra Station Master’s Residence is within 10 metres of the Proposal site and about 20 metres from the location of the proposed lift shafts. The item is shown in Figure 20.

Heritage buildings are considered on a case by case basis. Where a historic building is deemed to be sensitive to damage from vibration (following inspection), it is recommended to reduce the vibration criteria accordingly in line with the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019). The use of large hydraulic hammers and vibratory rollers would be avoided, where possible. Where highly vibration intensive plant is used for the formation of the lift shafts, the vibration mitigation measures provided in Section 7.2 should be implemented.

Operation phase

Noise levels associated with the operation of railway stations are assessed in accordance with the provisions of the NSW EPA's *Noise Policy for Industry* (2017).

The proposed station upgrades would not result in an increase in rail operations on the South Coast Line and would not affect operational noise levels. It is anticipated that station upgrades to the public address (PA) system would have a net beneficial effect, with noise levels at nearby residential receivers anticipated to be lower than present. It is understood that the current PA system uses few speakers in a central location at a high level, while the new system would employ a greater number of directional speakers at a lower level to target particular areas on the platform.

Operational noise associated with the lift motor and air conditioning are expected to be minor in nature. As final equipment has not yet been selected, the operational noise levels cannot be predicted. However from other station upgrades, it is predicted that sound and vibrations of such equipment will be low.

Therefore, it is expected that operational noise levels would be the same or lower than current levels.

6.3.3 Mitigation measures

Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the INCG, *Construction Noise and Vibration Strategy* (Transport for NSW, 2019) and the Noise and Vibration Impact Assessment for the Proposal (Muller Acoustic Consulting, 2020). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.

Refer to Section 7.2 for a full list of the proposed mitigation measures.

Additional noise mitigation measures

Where construction noise levels are still predicted to exceed the NMLs after the application of the standard mitigation measures, further mitigation measures as outlined in Table 6-9 should be implemented where reasonable.

Table 6-9 Proposed additional mitigation

Time period	Receiver Perception	dB above RBL	dB above NML	AMMs
Standard	Noticeable	5 – 10	0	--
	Clearly Audible	>10 – 20	<10	--
	Moderately Intrusive	>20 – 30	>10 – 20	PN, V
	Highly Intrusive	>30	>20	PN, V
	> 75dBA HNA	n/a	n/a	PN, V, SN
OOH Period 1	Noticeable	5 – 10	<5	
	Clearly Audible	>10 – 20	5 - 15	PN
	Moderately Intrusive	>20 – 30	>15 – 25	PN, V, SN, RO
	Highly Intrusive	>30	>25	PN, V, SN, RO, RP#, DR#
OOH Period 2	Noticeable	5 – 10	<5	PN
	Clearly Audible	>10 – 20	5 - 15	PN, V
	Moderately Intrusive	>20 – 30	>15 – 25	PN, V, SN, RO, RP, DR
	Highly Intrusive	>30	>25	PN, V, SN, AA, RP, DR

Notes: PN = Project Notification; SN = Specific Notification, individual briefings, or phone call; V = Verification monitoring; DR = Duration Reduction; RP = Respite Period; RO = Project specific Respite Offer; AA = Alternative Accommodation.

6.4 Aboriginal heritage

6.4.1 Existing environment

A search of Aboriginal Heritage Information Management System (AHIMS) was undertaken on 18 March 2020. The AHIMS search with a 200 metre buffer did not identify any Aboriginal sites in proximity to the Proposal site and no Aboriginal places have been declared. Furthermore, the Proposal site is located in an area that has been highly modified. Previous construction of the railway corridor and station has resulted in significant disturbance to the Proposal site.

The Proposal site has low archaeological potential and it is considered unlikely that any Aboriginal heritage items would be located in the vicinity of the Proposal due to the history of disturbance.

6.4.2 Potential impacts

Construction phase

The construction of the Proposal would involve minor excavation and other ground disturbing activities for the lift shafts and foundations. Ground disturbing activities have the potential to impact Aboriginal sites, if present.

As no known Aboriginal heritage items are located in the vicinity of the Proposal site and no high risk landscape features are located at or near the Proposal site, the potential for unknown

items to be present is considered to be low. As such, the Proposal is unlikely to affect Aboriginal heritage during construction.

Operation phase

No impacts to Aboriginal heritage items in the vicinity of the Proposal are anticipated during operation of the Proposal.

6.4.3 Mitigation measures

Mitigation of Aboriginal heritage impacts is not expected to be required as no known Aboriginal heritage items or high risk landscape features have been identified near the Proposal site. Mitigation would therefore be limited to management of any unknown impacts to Aboriginal heritage through worker inductions and protocols for unexpected finds.

If unforeseen Aboriginal heritage were to be uncovered during the proposed work, work would cease in the vicinity of the find and Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager are to be notified immediately to assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, EES and the Local Aboriginal Land Council. If human remains are found, works would cease and the site secured with NSW Police and EES notified.

Refer to Section 7.2 for a full list of the proposed mitigation measures.

6.5 Non-Aboriginal heritage

6.5.1 Existing environment

A desktop search of the following historic heritage registers was undertaken on 18 March 2020 for the area around Unanderra Station:

- World Heritage List
- National Heritage List
- Commonwealth Heritage List
- Register of the National Estate (non-statutory archive)
- Section 170 Heritage and Conversation Registers
- NSW State Heritage Register (SHR)
- Wollongong LEP.

The results are displayed below in Table 6-10. A map showing the curtilage of relevant heritage items is provided in Figure 20.

Table 6-10 Register search results for Unanderra Station

Item	Address	Significance	Listing	Place ID (Item No.)	Distance from Proposal site
Unanderra Station Master's Residence	Princes Highway, Unanderra, NSW, 2526	Local	Wollongong LEP	LEP Item No. 6428	10 metres
Unanderra Station Master's Residence	111 Prince Highway	Local	RailCorps170	SHI Listing No. 4801939	10 metres

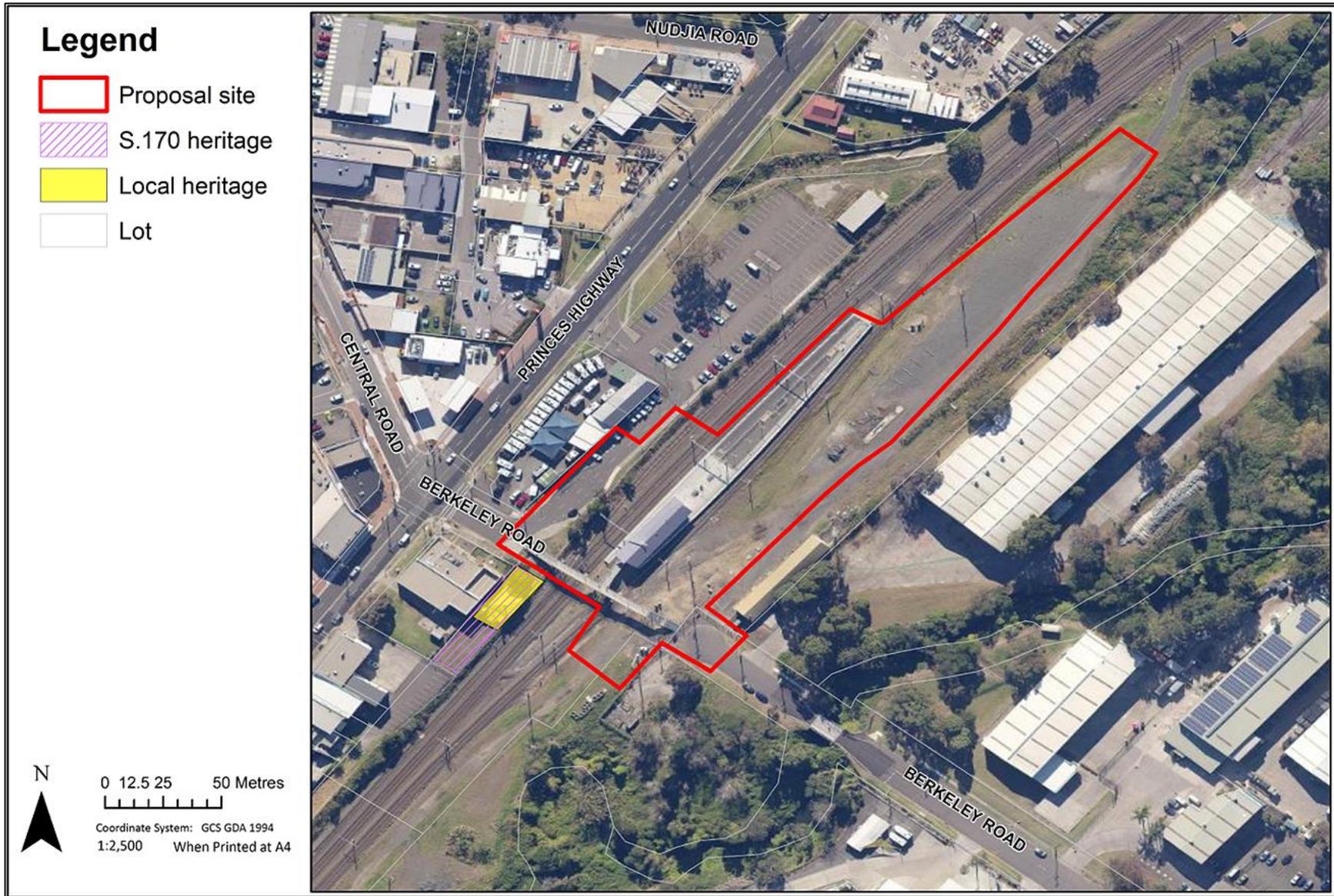


Figure 20 Location of heritage listed items

6.5.2 Potential impacts

Construction phase

No works are proposed within the curtilage of the Unanderra Station Masters Residence and it is unlikely that the Proposal would result in any direct or indirect (i.e. vibration, temporary construction compounds) impacts on this heritage item.

Operation phase

The elevated walkways and lift structures are located on the northern side of the existing footbridge, within the modern station precinct. The works are visually and physically separated from the heritage item by the width of the existing footbridge and physical separation from the footbridge to the heritage item. The addition of the elevated walkways and lift structures would add to the visual bulk of the station precinct.

Specifically, the link structure and western lift would be within 20 metres of the Unanderra Station Master's Residence, but separated by the existing stairway entrance at Berkeley Road (west). Due to the existing footbridge and stairway, adjacent development on Berkeley Road (west) and existing vegetation, there are restricted views of the Station Master's Residence from street level. The introduction of the link structure and lift would impact some minor views of the Station Master's Residence from street level through the existing stairway structure, however this is not considered a significant view of the item. The primary views of the Residence from the footbridge level and Berkeley Road (east) across the rail corridor would remain largely unchanged (refer to Section 6.2).

The proposed lift and link structure are likely to be constructed using precast concrete and would be 11 metres in elevation. This material choice is in keeping with the material palette of the existing footbridge and station precinct, which was substantially upgraded in 2009.

The Unanderra Station Master's Residence is locally significant in part due to its aesthetic significance, including the vertical central chimney. The proposed western lift and link structure would add to the visual bulk of the station precinct, however the physical separation afforded by the existing footbridge and stairway limits the visual impact of the new work on the Station Master's Residence.

The Proposal would likely result in a minor indirect visual impact to the heritage significance of the Unanderra Station Master's Residence.

6.5.3 Mitigation measures

Potential impacts to non-Aboriginal heritage during construction would be managed through the implementation of the CEMP. The CEMP would prescribe management measures to ensure the nearby local heritage item, Unanderra Station Masters Residence, is not inadvertently damaged or impacted by the Proposal and to ensure that any unexpected archaeological finds are managed appropriately.

It is recommended that during detailed design, further consideration be given to refining the Proposal to further reduce the minor indirect visual impact on the Station Masters Residence, including:

- alignment of the western lift and link structure columns and structural supports to the existing footbridge arrangements to avoid unnecessary visual clutter of structural elements and maintain maximum views through from Berkley Road (west) to the Station Master's Residence
- investigate all opportunities to reduce the overall height of the lift structures

- a recessive material palette that is consistent with the station precinct should be adopted
- opportunities for forecourt and landscaping works to better integrate the Station Masters Residence in to the new western station entry to facilitate possible future activation of this Residence by others.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.6 Biodiversity

6.6.1 Existing environment

Flora

An Arboricultural Impact Assessment, which assessed the impacts to the trees within the Proposal site was completed by Eco Logical Australia based on an inspection of the site on 9 April 2020.

The Proposal is located in a highly modified, urban environment comprising of one platform located in the middle of existing tracks, access stairs across tracks connecting Berkeley Road and a commuter car park. Unanderra Station has four trees and one large bush located along the pedestrian path west of the station (Figure 21). The surrounding area contains exotic maintained grass species.

The four trees west of the station were identified as (in order) China Doll (*Radermachera sinica*), Scribbly Gum (*Eucalyptus haemastoma*), Sydney Golden Wattle (*Acacia longifolia*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*). The Proposal site does not contain any threatened ecological communities or habitat for threatened flora.



Figure 21 Trees and bush located west of the station

These trees were assessed in accordance with the Institute of Australian Consulting Arborists (IACA) *Significance of a Tree Assessment Rating System* (IACA, 2010) using the following ratings:

- high - priority for retention. These trees are considered important and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by Australian Standard AS 4970–2009 Protection of trees on development sites.
- medium - consider for retention. These trees are moderately important for retention. Their removal should only be considered if adversely affected by the proposed works and all other alternatives have been considered and exhausted.
- low - consider for removal. These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
- priority for removal. Tree not considered important for retention, nor requiring special works or design modification to be implemented for their retention.

Fauna

A desktop review of existing information was conducted on 18 March 2020. Government databases were reviewed to identify potential threatened species, populations and communities in the study area. The databases included:

- the NSW NPWS Wildlife Atlas database (10 kilometres)(DPIE, 2020)
- the EPBC Act Protected Matters Search Tool (10 kilometres)(DAWE, 2020).

The Protected Matters database identified six Threatened Ecological Communities, 65 fauna species and 72 migratory species that may occur within the search radius of the Proposal site. The search included marine species. No habitat appropriate for marine or migratory species was identified within the Proposal site therefore no further assessment of marine and migratory fauna species is required.

The Wildlife Atlas returned a total of 621 records of 56 species. Species listed under the BC Act and/or the EPBC Act likely to occur in the vicinity of the Proposal site include endangered bird species such as Square-tailed Kite (*Lophoictinia isura*), the Swift Parrot (*Lathamus discolor*) and Powerful Owl (*Ninox strenua*) and bat species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*).

The Proposal site has relatively low habitat connectivity, but could be used as a stopping point for mobile fauna between the riparian corridors located within 80 metres south and east-south of the site. Although the Wollongong LGA is included in Koala Habitat Protection SEPP, the Proposal site is unlikely to provide habitat for koalas due to the low habitat connectivity and absence of suitable tree species. No further fauna surveys or assessment were completed due to the minimal vegetation identified within the Proposal site.

6.6.2 Potential impacts

Construction phase

Trees may be impacted from the Proposal by physical damage to the structural root zone (SRZ) or above ground tree sections from activities such as site grading, soil compaction, excavation, stock piling within tree protection zone (TPZ), as well as changes in site hydrology, changes in soil level and site contamination.

Two trees, tree 2 (Scribbly Gum) and tree 3 (Sydney Golden Wattle) would require removal for the Proposal. The two trees have been assessed as having low retention value. The arboricultural impact assessment results are shown in Figure 22. The removal of two trees from the western side of the station would have a negligible impact on native flora and fauna within the locality.

Arboricultural Impact Assessment



Legend

Proposed Works

Tree Protection Zone

Impact

● High Impact: >20%

● Low Impact: <10%

● No Impact: 0%

Structural Root Zone

0 5 10

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

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logical
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A TETRA TECH COMPANY

Prepared by: SC Date: 14/04/2020

Figure 22 Impacts to trees from the Proposal

Offset for tree removal and landscaping would be undertaken in accordance with Transport for NSW's *Vegetation Offset Guide* (Transport for NSW, 2019a) and in consultation with Wollongong Council, and/or the owner of the land upon which the vegetation is to be planted. The two trees identified for removal would be offset with a minimum of eight trees (Table 6-11).

Table 6-11 Potential offset requirements

Size of tree (Diameter at Breast Height)	Offset plantings per tree	Potential trees to be removed	Offsets plantings required
Large tree (DBH>60cm)	8 trees	-	-
Medium tree (DBH 15-60cm)	4 trees	2	8
Small young tree (DBH<5cm)	2 trees	-	-
Total		2	8

Operation phase

There is no potential for operational impacts to biodiversity as a result of the Proposal.

6.6.3 Mitigation measures

Construction of the Proposal must be undertaken in accordance with *Transport for NSW's Vegetation Management (Protection and Removal) Guideline* (Transport for NSW, 2018c) and *Transport for NSW's Fauna Management Guideline* (Transport for NSW, 2018d).

All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.

Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed in the Unanderra Station Arboricultural Impact Assessment (Eco Logical, 2020) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal.

A project arborist would supervise works within TPZs and provide advice regarding tree protection and monitor compliance. Final inspection of trees would be undertaken by the project arborist after all major construction has ceased and following the removal of tree protection measures.

During detailed design, investigate the position of the kerb ramps and path widening on Berkeley Street (west) to possibly avoid removal of vegetation, where possible.

Refer to Section 7.2 for a full list of the proposed mitigation measures.

6.7 Socio-economic impacts

6.7.1 Existing environment

Unanderra is a suburb of Wollongong, located about 10 kilometres south west of the Wollongong CBD. Unanderra is both a residential, mostly west of the Princes Highway and industrial suburb to the east.

A review of the 2016 Australian Bureau of Statistics (ABS) Census data was undertaken for the suburb of Unanderra. Unanderra had a population of 5,434 people with a relatively even

age distribution. People aged 65 years and over made up 24.1 per cent of the population which is higher than the Australia average at 15.7 per cent.

As a result of disability, 10.1 per cent of the residents within Unanderra reported the need for assistance which is higher than the wider Wollongong LGA of which 6.5 per cent of the population require assistance.

The population of Unanderra is heavily dependent on private vehicles for the primary mode of travel to work with 75.4 per cent of the population being the driver or passenger. Public Transport was utilised by 5.8 per cent of the population to travel to work, with 2.4 per cent (of the total population) utilising trains. The use of cars for travel to work is higher in Unanderra compared to the NSW and Australian average and above the Wollongong LGA percentage of 73.6 per cent.

Unanderra falls under the *Wollongong 2028 Community Strategic Plan (2018)* which outlines the community's main priorities and aspirations for the future. To achieve the vision of "from the mountains to the sea, we value and protect our natural environment and we will be leaders in building an educated, creative and connected community" the plan focuses on six community goals, including:

1. We value and protect our environment
2. We have an innovative and sustainable economy
3. We have creative, vibrant city
4. We are connected and engaged community
5. We have a healthy community in a liveable city
6. We have affordable and accessible transport.

The Proposal site also falls under the *Unanderra Town Centre Masterplan Implementation Plan (WCC, 2013)*, which aims to ensure that there is an appropriate allocation of resources and budget and that community expectations are managed effectively. To do these eight principals were identified:

1. A Unique Identity
2. Street Vibrancy
3. Urban Composition
4. A Community Heart
5. Accessible and Well Connected
6. A Balanced Environment
7. Policy and Governance
8. Community Ownership.

6.7.2 Potential impacts

Construction phase

The Proposal has the potential to temporarily impact customers, pedestrians and the surrounding community as a result of:

- temporary changes to pedestrian access to, through and movements around the station (i.e. including along platforms)
- temporary impacts to local traffic movements and car park access

- increased truck movements delivering materials and equipment and transporting waste
- construction amenity impacts such as noise, vibration, dust and visual impacts.

The above impacts on the community are expected to be relatively short term in nature. Impacts would be further reduced as many of the proposed works would likely occur during possession periods when movements in the vicinity of the station would be lower as a result of the trains not operating.

The Proposal would not result in any land acquisition and would not impact adjacent land uses, with works located on RailCorp land with the exception of local roads and footpaths.

Potential impacts relating to noise, vibration, traffic, access and visual amenity are considered in Sections 6.1, 6.2 and 6.3.

Operation phase

The Proposal would provide positive, long-term socio-economic benefits to the broader Unanderra community, including:

- improved accessibility for Unanderra station customers and pedestrians including those with a disability, limited mobility and parents/carers with prams and customers with luggage
- improved customer amenity and facilities, including accessible toilets
- improved access to transport interchange facilities through improved paths to meet DDA requirements
- potential increased use of public transport to and from Unanderra
- improved safety for customers on the station platform, including upgrade of station systems including CCTV and emergency help points.
- The Proposal would contribute to achieving the objectives of the Wollongong 2028 Community Strategic Plan, particularly Goal 6 provide connected and accessible places and spaces. The Proposal would provide accessible transport for elderly people and those with disabilities. The Proposal would also benefit Goal 5, by providing accessible transport routes for the community.

The Unanderra Station Upgrade would contribute to the objectives in the Unanderra Town Centre Master Plan and Implementation Strategy, specifically Principle 5 – Reconnecting Unanderra town centre through a network of pedestrian prioritised routes and a seamless connection to Unanderra Station. The Proposal would provide accessible transport for elderly, those with disabilities and those with luggage or prams, encouraging modes of public transport.

The Proposal would improve the overall accessibility of Unanderra Station. The Proposal would also ensure that the station would be able to handle the predicted increase in patronage in 2036.

No adverse socio-economic impacts are considered to result from the Proposal.

6.7.3 Mitigation measures

A number of environmental safeguards would be implemented to minimise potential impacts on the community with a particular focus on keeping the community informed including:

- mitigation measures in respect of potential impacts on amenity (e.g. noise, dust and visual) as listed in Section 7.2

- development of a Community Liaison Management Plan prior to construction which would identify potential stakeholders and the best-practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where possible
- informing the community of construction progress, activities and impacts in accordance with the Community Liaison Management Plan
- providing contact details for a 24-hour construction response line, Project Infoline and email address to enable ongoing stakeholder contact throughout the construction phase.

Refer to Section 7.2 for a full list of the proposed mitigation measures.

6.8 Contamination, landform, geology and soils

6.8.1 Existing environment

Landform

The landform to the east is generally flat and low lying and includes Allans Creek, which lies approximately 60 metres east of the rail corridor. Land to the west rises to the foothills of the Illawarra Escarpment.

Soils and geology

Geological Sheet 9029-9129 (Stroud et al, 1985) shows that Unanderra Station is underlain with quartz and lithic “fluvial” sand, silt and clay.

The Unanderra Station site is underlain by Fairy Meadow Soil Landscape that comprises of alluvial plains, floodplains, valley flats and terraces below the Illawarra Escarpment. The soils comprise friable alluvial soils and siliceous sands on the upper floodplains with dark brown sands and heavy clays on lower alluvial flats, Prairie Soils and Yellow Podzolic Soils.

A search of the NSW Planning portal tool (which shows acid sulfate soils mapping under the Wollongong LEP) and the Sharing and Enabling Environmental Data (SEED) showed that some of the site is mapped as Class 5 acid sulfate soils. Acid sulfate soils are not typically found in Class 5 areas. These areas are located within 500 metres on adjacent Class 1, 2, 3 or 4 land that is below five metres Australian Height Datum (AHD) and by which the water table is likely to be lowered below one metre AHD on adjacent Class 1, 2, 3 or 4 land.

This indicates a low probability of acid sulfate soils occurring at the site.

Contamination

Australian Standard AS 4482. 1-2005 – *Guide to the investigation and sampling of sites with potentially contaminated soils – Non-volatile and semi-volatile compounds* lists the chemicals used by specific industries. The standard lists the following chemicals that are commonly associated with railway yards and may be present at Unanderra Station:

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

A search of the List of NSW Contaminated Sites Notified to the EPA was searched on 22 April 2020 (list current at 15 April 2020), the following sites within Unanderra are listed:

- Caltex Services Station (95 metres to the north-west)
- Former Prime Service Station and adjoining lands (580 metres to the north-east).
- Unanderra Weekend Detention Centre (820 metres to the south)
- BlueScope Stainless Steel (1.15 kilometres to the north-east)
- Veolia Environmental Services (1.9 kilometres to the south-east).

The station may contain contaminated materials with the fabric of the existing buildings including:

- asbestos
- lead paint
- polychlorinated biphenyls in light fittings
- synthetic mineral fibres.

There may be contaminated fill present onsite, in particular beneath the hardstand of the platform and within the footprint of the railway corridor. Soils underlying the railway corridor may have also been impacted from previous spills or leaks.

6.8.2 Potential impacts

Construction phase

Erosion and sedimentation

The Proposal would require some excavation work for the installation of the lift shaft pits, new footpaths, new ramps and associated sign posts. Other trenching or excavation may be required for the relocation of services or vegetation removal.

Excavation and other earthworks such as trenching can result in erosion and sedimentation if not undertaken with appropriate controls. Impacts include:

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

Such impacts can also lead to adverse water quality and biodiversity impacts through the introduction of sediments into waterways. Erosion and sedimentation risks for the Proposal are considered to be low, as it is expected that erosion could be adequately managed through the implementation of the mitigation measure outlined in Section 7.2.

Contamination

Excavation has the potential to expose contaminants, which if not appropriately managed, can present a health risk to construction workers and the community. Contaminants would also pose an environmental risk if they were to enter nearby waterways through the stormwater infrastructure. As there are no confirmed contaminated sites within close proximity of the Proposal site, there is low risk of encountering contamination on the site.

During construction works, there is also the potential for soil to become contaminated through accidental chemical or fuel spills and leaks from construction plant and equipment. Such impacts would be managed with the implementation of mitigation measures outlined in Section 7.2.

Operation phase

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

6.8.3 Mitigation measures

As part of the CEMP, a site-specific erosion and sediment control plan would be prepared and implemented in accordance with the 'Blue Book' - *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004). The plan would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase.

An environmental risk assessment is to be undertaken prior to construction and must include a section on contamination as per the Transport for NSW Standard Requirements. Measures to mitigate potential impacts from any contaminated soil/materials during construction would be developed and implemented through an unexpected contamination finds procedure and Waste Management Plan as part of the CEMP.

Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and Transport for NSW's *Water Discharge and Reuse Guideline* (Transport for NSW, 2017a).

Prior to works commencing on buildings and structures a hazardous materials survey for lead paint, asbestos and other potentially hazardous materials would be completed. Remediation would be undertaken if identified contamination poses a risk to human health or the environment. All waste would be managed in accordance with relevant legislation.

Refer to Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.9 Hydrology and water quality

6.9.1 Existing environment

Surface water

The Proposal site is located in the Allans Creek sub-catchment of the Wollongong Coast Basin. The catchment drains from the Illawarra Escarpment to Port Kembla Harbour. Allans Creek is located about 60 metres east of the rail corridor at Unanderra Station.

Surface water in the vicinity of the Proposal site is managed by the Council stormwater drainage system consisting mainly of kerb and gutter drainage connected to an underground pipe network. Surface water quality in the vicinity of the Proposal is considered to be consistent with a highly urbanised environment with many sources of pollution such as oils from adjacent roads, rubbish and leaf litter.

Groundwater

A search of WaterNSW's realtime data website identified no existing groundwater bores in the vicinity of the Proposal.

Flooding

The Proposal site is not located in an area mapped as flood prone land under the Wollongong LEP.

A Flood Study of Allans Creek was prepared by the Advisian Worley Group on behalf of Wollongong City Council in 2019. The flood study identified that Unanderra Station would be impacted by 20 per cent Annual Exceedance Probability (AEP) events and heavier rainfall events. The predicted flood depth at the station during the 20 percent AEP event is between

0.3 and 0.5 metres and the flood depth during a peak flood event is up to one metre. Figure 23 demonstrates one per cent AEP event flood depths.

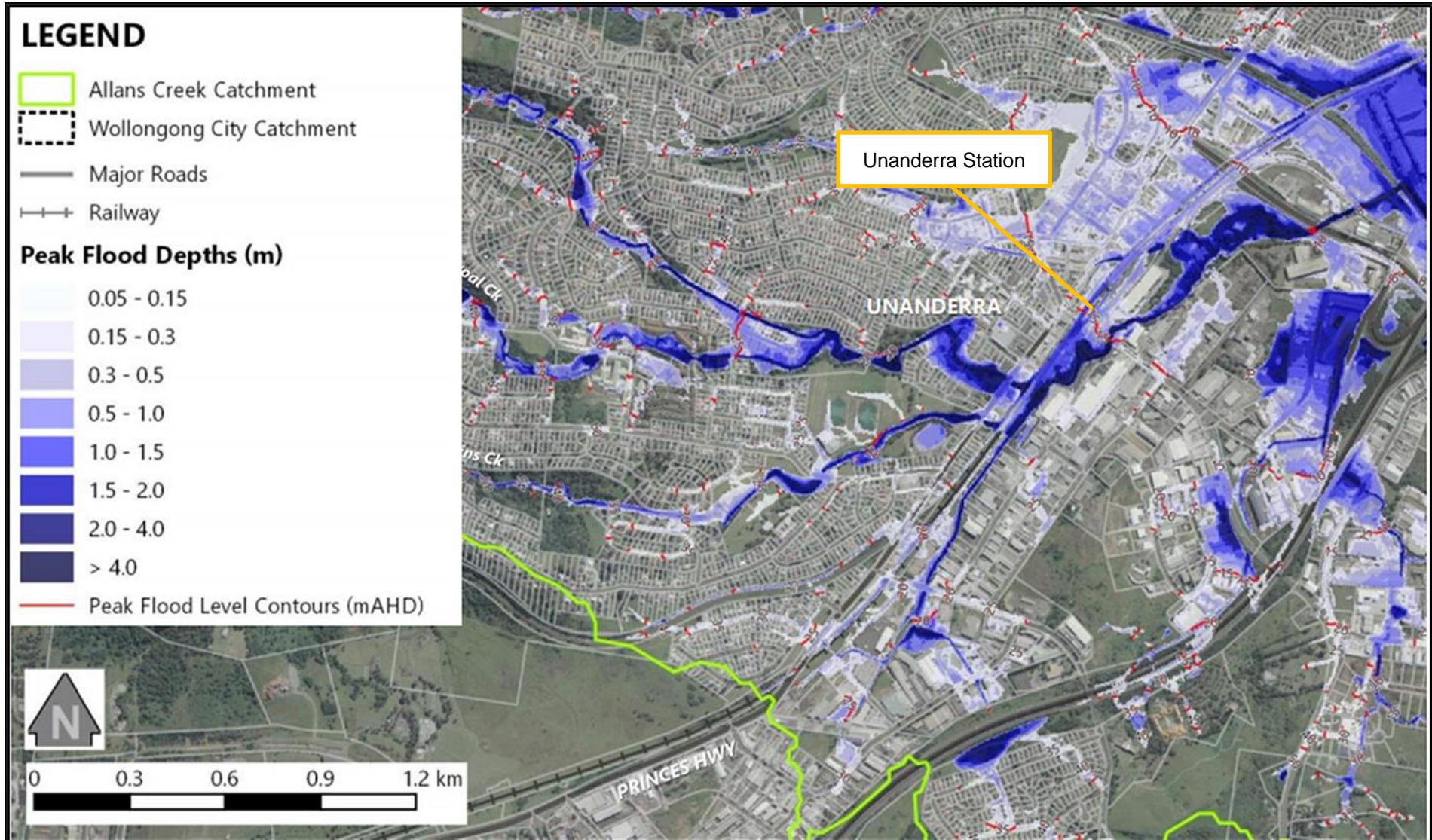


Figure 23 One percent AEP flood depths for Allans Creek catchment (Wollongong City Council, 2019)

6.9.2 Potential impacts

Construction phase

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby stormwater drains and the streams near the site.

Activities which would disturb soil during construction work (such as tree removal, excavation for footings, and realignment of kerbing) have the potential to impact upon local water quality as a result of erosion and sedimentation. There is also potential to contaminate local water quality as a result of accidental spills or inadequate fuel and chemical storage practices. Any translocating contaminants would be expected to flow towards the nearby council stormwater drainage infrastructure.

Areas of excavation may need to be locally dewatered as a result of groundwater seepage or rainfall events and runoff. Incorrect dewatering may pose risks to nearby waterways where run-off travels from the site to these areas. Any dewatering activities would be undertaken in line with Transport for NSW's *Water Discharge and Reuse Guideline* (Transport for NSW, 2017a).

Moderate to heavy wet weather events may cause localised flooding through the Proposal site, particularly the proposed construction compound, which would likely result in soil erosion and sedimentation impacts and downstream waterway impacts. Works would need to ensure that stormwater drains are kept unobstructed during construction and that all reasonable mitigation measures are implemented within the construction compound.

Mitigation measures have been provided in Chapter 7 to minimise the potential for these impacts.

Operation phase

The Proposal is unlikely to substantially change the hydrology of the area surrounding the station. The existing stormwater system would continue to manage surface water around the station. The Proposal would result in a small increase in impervious hardstand areas due to the extension of footpaths and accessible parking spaces, which would result in a minimal increase in runoff during rainfall events. However, the increase is considered to be negligible on flows around the station.

As the station is located in a flood prone area, further hydrological assessment would be undertaken during detailed design to determine final drainage arrangements and flooding risks.

6.9.3 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* (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.

Refer to Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.10 Air quality

6.10.1 Existing environment

Based on a review of the existing land uses surrounding the Proposal, the existing air quality is characteristic of an urban environment, with some transport emission influences.

DPIE undertakes air quality monitoring across NSW. The site is located within Illawarra monitoring region with air quality monitored at fixed sites. Kembla Grange is the closest monitoring site to the Proposal. A search of the daily regional air quality index for the Illawarra region on 30 March 2020 showed that the region experienced 'Very Good' air quality value.

Note that the above search is potentially atypical, as investigations were undertaken during COVID-19 social isolation. Therefore, the monitoring quality may not be an accurate representation.

A search of the National Pollutant Inventory 2018/19 data identified seven registered polluting facilities within the Unanderra area (Department of Environment and Energy, 2020). Of these facilities, Hydromet Corp Ltd is the closest which is located about 890 metres east of the Proposal site. Hydromet Corp Ltd collects and recycles contaminant metals in product waste residues from various smelter and industrial manufacturing processes. The Hydromet Corp Ltd in Unanderra regularly monitors and reports lead and compounds emissions to show compliance against EPA Licence limits.

There are two facilities within 2 kilometres of the Proposal site but none of these sites are considered to impact the Proposal site significantly in relation to air quality.

Potentially affected receivers within the vicinity of the site include the following:

- local residents
- staff and customers at Unanderra Station
- users of the adjacent commercial areas
- pedestrians and commuters within the Unanderra Station precinct.

6.10.2 Potential impacts

Construction phase

During construction, air quality impacts would be associated with the generation of dust and emissions from stationary and moving on-site machinery and associated vehicular traffic. Particulate emissions would be associated with a number of stationary and mobile sources as well as minor potential for wind erosion of areas of exposed soils.

Anticipated sources of dust and dust generating activities include:

- loading and transfer of material from trucks
- trenching and excavation activities associated with construction of the new lift, drainage works, etc
- widening of footpaths
- construction activities associated with platform building modifications and footbridge and platform regrading.

The Proposal would have a minimal impact on air quality as it would not involve extensive excavation or other land disturbances with the potential to generate significant quantities of dust. Appropriate measures would be established to manage dust emissions from demolition works.

The operation of plant, machinery and trucks may also lead to increases in exhaust emissions in the local area, however these impacts would be minor and short-term. The likely airborne dust load generated during a typical construction day would be small and therefore would be unlikely to result in reduced local air quality at the nearest potentially affected receivers, given the relatively small construction footprint, and with the implementation of proposed control measures.

Operation phase

The Proposal is not anticipated to significantly increase customer traffic to and from the station. However, over the long-term there is anticipated to be an increase in patronage at Unanderra Station. This is not anticipated to significantly impact air quality in the station area.

Overall impacts of air quality during the operation of the Proposal are considered minimal as the Proposal would not result in a significant change in land use.

6.10.3 Mitigation measures

Section 7.2 provides a list of mitigation measures that are proposed to manage air quality issues during construction. They are aimed around maintaining and operating plant and equipment efficiently and implementing measures for dust suppression including watering exposed soil surfaces, covering loads and appropriate management of tracked dirt or mud on vehicles. Such measures would be included in the CEMP to be prepared for the Proposal.

6.11 Waste and resources

6.11.1 Potential impacts

Construction phase

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

- asphalt and concrete
- surplus building materials
- excavated spoil
- building material wastes (including metals, timbers, plastics, packaging, fencing etc.)
- electrical wiring and conduit waste (from electrical connections)
- hazardous chemical wastes
- green waste (tree removal)
- demolition waste from existing bathrooms, station store and SSER
- general waste, including food scraps and other wastes generate by construction workers.

Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). A Waste Management Plan would be prepared to identify all potential waste streams associated with the works and outline methods of disposal of water that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping area tidy and free of rubbish.

Waste management would be undertaken in accordance with the ISCA IS Rating Tool v1.2 would be developed for the Proposal and would include reuse and recycling.

Operation phase

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

6.11.2 Mitigation measures

Refer to Section 7.2 for a full list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.12 Bushfire risk

6.12.1 Existing environment

The Proposal site is mostly mapped Bushfire Prone land under the classification vegetation buffer. The Proposal site is located over 40 metres from a heavily vegetated area to the east.

6.12.2 Potential impacts

Construction phase

Some construction activities that may cause or increase the risk of bush fire include:

- site preparation activities such as vegetation removal and use of power tools
- operating a petrol, gas or diesel-powered vehicles or plants near land containing combustible materials
- operating plant fitted with power hydraulics on land containing combustible material
- undertaking 'hot' works (for example welding, use of oxy acetylene torches)
- storage of fuel.

Due to the distance from the vegetation east of the site and the amount of cleared area the increased risk would be minimal.

Operation phase

Vegetation would be removed within the Proposal site on the west side of the station for the purpose of widening the footpath. The Proposal would be unlikely to increase bushfire risk in the vicinity.

6.12.3 Mitigation measures

Bushfire risk management measures would be incorporated in the CEMP to minimise risk of bushfire from construction activities particularly during high risk days. High risk activities would be undertaken with care or avoided where possible during high risk bushfire weather.

6.13 Sustainability

The design of the Proposal would be based on the principles of sustainability, including aiming for an excellent rating as a program under the ISCA Infrastructure Sustainability Rating Tool Version 1.2. These guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to Section 3.2.3 for more information regarding the application of these guidelines.

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

6.14 Climate change

The dynamic nature of our climate system indicates a need to focus attention on how to adapt to change. The potential climate changes in the Illawarra region can be assessed in terms of

weather changes, storm intensity, coastal inundation, heavy rainfall events and increased risk of fire.

A high-level climate change risk assessment was performed using the Transport for NSW *Climate Risk Assessment Guidelines* (Transport for NSW, 2018h), and relevant climate data and projections from NSW and ACT Regional Climate Modelling (NARClIM) and the Bureau of Meteorology as part of the preliminary environmental assessment of the Proposal.

The climate projections for the Illawarra region in 2030 include an increase in mean temperature of 0.7 °C, which is expected to rise to 1.9 °C by 2070. Projections also include an increase in number of hot days with a maximum temperature of over 35 °C and increased annual rainfall (NARClIM).

The risk assessment is based on the projected changes in the climate and the estimated design life of the Proposal components to assess the likely consequences and likelihood of climate risks occurring. It concluded that:

- increased extreme heat days will continue to increase risk of heat stress on station customers and staff, reduced capacity of staff due to increased illness and/or dehydration leading to disruptions to services
- increased extreme heat days leading to a decrease in network capacity and increased power outages causing signal and transport systems interruptions or failures
- increased fire weather could result in direct damage to assets, asset closure and/or access and egress impacts leading to service disruptions
- increase in extreme precipitation or storm events leads to an increase in flood events that would increase the frequency of local flooding and disruption of services, result in direct damage to assets, asset closures and/or access and egress impacts to service disruptions
- increase in incidents of storms with strong winds could lead to impacts on rail infrastructure, causing safety risks, delays and physical damage.

The design has considered the impacts of climate change on the Proposal through:

- improvements in pedestrian safety from flooding events through drainage design. Detailed hydrological assessment would be undertaken to ensure that the proposed infrastructure would not increase the potential flooding within the Proposal site
- implementation of measures to protect rail customers and staff from heat exposure and stress including a new canopy to provide shade
- appropriate fire protection measures such as new Fire Indicator Panels (FIP) and fire resistance standards in the new switchboard room.

Climate change could lead to an increase in frequency and severity of bushfires. The Proposal is situated on land mapped as bush fire-prone, therefore it would be designed with appropriate fire protection measures.

Climate change adaption measures will be considered in detailed design for the Proposal.

6.15 Greenhouse gas emissions

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

The detailed design process would undertake compliant carbon footprinting exercise in accordance with Transport for NSW's *Carbon Estimate and Reporting Tool* (Transport for

NSW, 2018) or other approved modelling tools. The carbon footprint would be used to inform decision making in design and construction.

Due to the small scale of the Proposal and the short-term temporary nature of the individual construction work, it is considered that greenhouse gas emissions resulting from the construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Section 7.2.

It is anticipated that, once operational, the Proposal may result in an increase in use of the public transport and a relative decrease in use of private motor vehicles by commuters to travel to and from Unanderra. 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.

6.16 Cumulative impacts

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

A search of the DPIE Major Projects Register, Southern Joint Regional Planning Panel Development and Planning Register, and Wollongong City Council Development Application Register in July 2020 identified that one major development application is listed in Unanderra for approval at this time. The proposed Unanderra Liquid Waste Treatment Facility is within one kilometre of Unanderra Station and the Environmental Impact Statement is currently in preparation. It is unlikely the project would be in construction at the same time as the Unanderra Station Upgrade.

During construction, the work would be coordinated with any other construction activities in the area where required. Consultation and liaison would occur with Wollongong City Council, RailCorp/Sydney Trains, and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

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

Based on this assessment, it is anticipated that the cumulative impacts would be manageable with the implementation of consultation with relevant stakeholders and associated mitigation measures in Chapter 7.

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

7 Environmental management

This chapter of the REF identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures.

7.1 Environmental management plans

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

The CEMP would incorporate but not be limited to the following key sub plans:

- Construction Traffic Management Plan (CTMP)
- Construction Noise and Vibration Management Plan (CNVMP)
- Erosion and Sediment Control Plan (ESCP)
- Waste Management Plan (WMP).

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

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 should the Proposal proceed.

Table 7-1 Proposed mitigation measures

No.	Mitigation measure
General	
1.	A Construction Environmental Management Plan (CEMP) would be prepared by the Construction Contractor in accordance with the relevant requirements of <i>Guideline for Preparation of Environmental Management Plans</i> , Department of Infrastructure, Planning and Natural Resources (2004) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Construction Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An Environmental Controls Map (ECM) would be developed by the Construction Contractor in accordance with Transport for NSW 's <i>Guide to Environmental Controls Map</i> (Transport for NSW, 2017b) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.

No.	Mitigation measure
6.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by Transport for NSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
Traffic and transport	
8.	<p>Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum:</p> <ul style="list-style-type: none"> • ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised • maximising safety and accessibility for pedestrians and cyclists • ensuring adequate sight lines to allow for safe entry and exit from the site • ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off-street parking and requirements for any temporary replacement provision • parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP. <p>Consultation with the relevant roads authorities would be undertaken during preparation of the CTMP. The performance of all project traffic arrangements must be monitored during construction.</p>
9.	Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
10.	Road Occupancy Licences for temporary road closures would be obtained, where required.

No.	Mitigation measure
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| 11. | <p>During detailed design, investigate the following to increase safety:</p> <ul style="list-style-type: none">• a crossing location at Berkeley Road (west) to provide safe access between the station and the bus stop• an additional footpath next to accessible parking spaces to access shared manoeuvring area• alternative pedestrian footpaths or traffic management from commuter carpark to station• speed humps, connected footpaths, pedestrian crossings and speed limits within the commuter carpark• additional signage and line marking on the single laned bridge on Berkeley Road (east) to clarify right of way and mitigate congestion• relocation of the proposed kiss and ride area on the eastern side of the station due to decreased manoeuvrability. |
| 12. | <p>During detailed design, investigate additional signage and line marking on Berkeley Road (east) to clarify right of way on the single-lane bridge.</p> |

Landscape and visual amenity

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| 13. | <p>An Urban Design Plan is to be submitted to Transport for NSW and endorsed by the Precincts and Urban Design team. The Urban Design Plan is to address the fundamental design principles as outlined in 'Around the Tracks' – urban design for heavy and light rail, Transport for NSW, Interim 2016. The Urban Design Plan shall:</p> <ul style="list-style-type: none">• Demonstrate a robust understanding of the site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances• Identify opportunities and challenges• Establish site specific principles to guide and test design options• Demonstrate how the preferred design option responds to the design principles established in 'Around the Tracks', including consideration of Crime Prevention through Environmental Design Principles. <p>The Urban Design Plan is to include the Public Domain Plan for the chosen option and will provide analysis of the:</p> <ul style="list-style-type: none">• Landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art• Materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping• An Artist's Impression or Photomontage to communicate the proposed changes to the precinct <p>The following design guidelines are available to assist and inform the Urban Design Plan for the Proposal:</p> <ul style="list-style-type: none">• TAP Urban Design Plan, Guidelines, Transport for NSW, Draft 2018• Commuter Car Parks, urban design guidelines, Transport for NSW, Interim 2017• Managing Heritage Issues in Rail Projects Guidelines, Transport for NSW Interim 2016• Creativity Guidelines for Transport Systems, Transport for NSW, Interim 2016• Water Sensitive Urban Design Guidelines for Transport for NSW Projects, 2016. |
| 14. | <p>All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to <i>AS 1158 Road Lighting</i> and <i>AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting</i>.</p> |

No.	Mitigation measure
15.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
16.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
17.	During construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements.
18.	Where possible, include one or several feature trees at the Berkeley Road (west) entrance to enhance the view of the station entry and provide amenity and shade for station customers.
19.	Where possible, select colours for the proposed lift shafts and footbridge to be as recessive as possible, so the station continues to be unobtrusive. Choose colours with low reflectivity and high grey content.
20.	Where possible, take all practice measures to ensure construction equipment, stockpiles, and other visible elements are located away from key views. Should equipment or stockpiles be located in visually prominent location for any reasonable period of time, incorporate screening measures and practices.
21.	Where possible, ensure construction activities, equipment and storage areas are located away from existing vegetation, the dripline of canopy trees, and other natural landscape features.
Noise and vibration	
22.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Construction Noise Strategy</i> (Transport for NSW, 2018b) and the Noise and Vibration Impact Assessment for the Proposal (Muller Acoustics, 2020). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
23.	<p>The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:</p> <ul style="list-style-type: none"> • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • avoiding any unnecessary noise when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks • avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded • avoiding deliveries at night/evenings wherever practicable • no idling of delivery trucks • keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site • minimising loud talking; swearing or unnecessary shouting, or loud stereos/radios onsite. No dropping of materials from height where practicable, no throwing of metal items and slamming of doors.

No.	Mitigation measure
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| 24. | <p>The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:</p> <ul style="list-style-type: none">• maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances• using the most suitable equipment necessary for the construction works at any one time• directing noise-emitting plant away from sensitive receivers• regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc• using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works• use of quieter and less vibration emitting construction methods where feasible and reasonable. |
| 25. | <p>Work would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any work outside these hours may be undertaken if approved by Transport for NSW and the community is notified prior to these works commencing. An Out of Hours Work application form would need to be prepared by the Construction Contractor and submitted to the Transport for NSW Environment and Planning Manager for any works outside normal hours.</p> |
| 26. | <p>Where the $L_{Aeq}(15\text{minute})$ 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 Transport for NSW's <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019). This would include restricting the hours that very noisy activities can occur.</p> |
| 27. | <p>Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.</p> |
| 28. | <p>Vibration resulting from construction and received at any structure outside of the Proposal site would be managed in accordance with:</p> <ul style="list-style-type: none">• for structural damage vibration –British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 and German Standard DIN 4150:Part 3 – 1999: <i>Structural Vibration in Buildings: Effects on Structures</i>• for human exposure to vibration – the acceptable vibration values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>. |
| 29. | <p>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 20 metres from the works and all heritage listed buildings and other sensitive structures within 50 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).</p> |
| 30. | <p>Affected pre-schools, schools, universities and other identified sensitive receivers are to be consulted in relation to noise mitigation measures to identify any noise sensitive periods, e.g. exam periods. As much as reasonably possible noise intensive construction works in the vicinity of affected educational buildings are to be minimised.</p> |

No.	Mitigation measure
31.	Where construction noise levels are still predicted to exceed the NMLs after the application of the standard mitigation measures, further mitigation measures as outlined Table 14 should be implemented where reasonable and in accordance with Transport for NSW <i>Construction Noise and Vibration Strategy</i> (2019).
Aboriginal heritage	
32.	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.
33.	If unforeseen Aboriginal objects are uncovered during construction, the procedures contained in Transport for NSW's <i>Unexpected Heritage Finds Guideline</i> (Transport for NSW, 2016) would be followed, and works within the vicinity of the find would cease immediately. The Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, the EES and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the EES 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	
34.	A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
35.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's <i>Unexpected Heritage Finds Guideline</i> (Transport for NSW, 2016) would be followed, and works within the vicinity of the find would cease immediately. The Construction Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and EES. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
36.	<p>During detailed design, it is recommended that further consideration to be given to refining the Proposal to further reduce the minor indirect visual impact on the Station Masters Residence, including:</p> <ul style="list-style-type: none"> • alignment of the western lift and link structure columns and structural supports to the existing footbridge arrangements to avoid unnecessary visual clutter of structural elements and maintain maximum views through from Berkley Road (west) to the Station Masters Residence • investigate all opportunities to reduce the overall height of the lift structures • a recessive material palette that is consistent with the station precinct should be adopted • opportunities for forecourt and landscaping works to better integrate the Station Masters Residence in to the new western station entry to facilitate possible future activation of this Residence by others.
37.	Investigate opportunities for heritage interpretation for Unanderra Station Master's Residence.

No.	Mitigation measure
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Biodiversity

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| 38. | Construction of the Proposal must be undertaken in accordance with Transport for NSW's <i>Vegetation Management (Protection and Removal) Guideline</i> (Transport for NSW, 2018c) and Transport for NSW's <i>Fauna Management Guideline</i> (Transport for NSW, 2018d). |
| 39. | 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. |
| 40. | Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees/vegetation nominated to be removed in the Arboricultural Impact Assessment (Eco Logical, 2020) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below. |
| 41. | Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Arboricultural Impact Assessment (Eco Logical, 2020). Tree protection would be undertaken in line with <i>AS 4970-2009 Protection of Trees on Development Sites</i> and would include exclusion fencing of TPZs. |
| 42. | In the event of any tree to be retained becoming damaged during construction, the Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible. |
| 43. | Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Construction Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval. |
| 44. | Weed control measures, consistent with Transport for NSW's <i>Weed Management and Disposal Guideline</i> (Transport for NSW, 2015), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the <i>Biosecurity Act 2015</i> . |
| 45. | During detailed design, investigate the position of the kerb ramps and path widening on Berkeley Street (west) to possibly avoid removal of vegetation, where possible. |
| 46. | An Urban Design and Landscaping Plan would be prepared to address replacement planting for vegetation removed during construction in accordance with Transport for NSW <i>Vegetation Offset Guide</i> (Transport for NSW, 2019a). |

Socio-economic

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| 47. | Sustainability criteria for the Proposal would be established to encourage the Construction Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal. |
| 48. | Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable. |

No.	Mitigation measure
49.	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.
50.	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.
51.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Management Plan to be developed prior to construction.
Soils and water	
52.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the <i>'Blue Book' Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
53.	Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.
54.	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.
55.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and Transport for NSW's <i>Chemical Storage and Spill Response Guidelines</i> (Transport for NSW, 2018e).
56.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the Transport for NSW <i>Chemical Storage and Spill Response Guidelines</i> (Transport for NSW, 2018e) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
57.	In the event of a pollution incident, works would cease in the immediate vicinity and the Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.
58.	The existing drainage systems would remain operational throughout the construction phase.
59.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the <i>Waste Classification Guidelines</i> (EPA, 2014) and Transport for NSW's <i>Water Discharge and Reuse Guideline</i> (Transport for NSW, 2017a).
60.	Due to the increase in impervious surfaces from the extension of footpaths and accessible parking, investigations should be undertaken on opportunities for stormwater runoff water quality improvements.

No.	Mitigation measure
61.	Further hydrological assessment would be undertaken during detailed design to determine final drainage arrangements and flooding risks.
Air quality	
62.	Air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's <i>Air Quality Management Guideline</i> (Transport for NSW, 2018f).
63.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
64.	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.
65.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
66.	<p>To minimise the generation of dust from construction activities, the following measures would be implemented:</p> <ul style="list-style-type: none"> • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.
Waste and contamination	
67.	<p>A Waste Management Plan is to be prepared as part of the CEMP to address waste management and would at a minimum:</p> <ul style="list-style-type: none"> • identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data.
68.	An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements.
69.	All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.
70.	All spoil and waste must be classified in accordance with the <i>Waste Classification Guidelines Part 1: Classifying waste</i> (EPA, 2014) prior to disposal.
71.	Any concrete washout would be established and maintained in accordance with Transport for NSW's <i>Concrete Washout Guideline</i> (Transport for NSW, 2018g) with details included in the CEMP and location marked on the ECM.

No.	Mitigation measure
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Bushfire Risk

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| 72. | Bushfire risk management measures would be incorporated in the CEMP to minimise risk of bushfire from construction activities particularly during high risk days. High risk activities would be undertaken with care or avoided where possible during high risk bushfire weather. |
| 73. | To minimise risk from bushfires to the Proposal during operation the following would be considered during detailed design: <ul style="list-style-type: none">• relevant requirements for bushfire prone land• limited use of timber• urban design is to limit selection of large canopy trees close to buildings• adequate ventilation to minimise risk of bushfire smoke impacts. |

Sustainability, climate change and greenhouse gases

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| 74. | Detailed design and construction of the Proposal is to be undertaken in accordance with the ISCA Infrastructure Sustainability Rating Scheme (v1.2). |
| 75. | The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW's Transport for NSW's <i>Carbon Estimate and Reporting Tool</i> (Transport for NSW, 2018) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction. |

Cumulative

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| 76. | 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. |
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8 Conclusion

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

The Proposal would provide the following benefits:

- improved and equitable access to Unanderra Station for customers resulting from the installation of lifts, accessible parking and kiss and ride areas
- improved station amenity and safety for customers at the station by providing one family accessible toilet, staff unisex ambulant toilet, new wheelchair waiting areas and upgrades to CCTV.
- The following key impacts have been identified should the Proposal proceed:
- temporary visual, noise and vibration impacts during construction
- temporary traffic and pedestrian impacts during construction
- loss of two trees which would be offset in accordance with the Vegetation Offset Guide (Transport for NSW, 2019a)
- permanent loss of one car parking space to provide three new DDA compliant parking spaces and the formalisation of the kiss and ride west of the station would result in permanent loss of three car parking spaces
- introduction of new built elements such as lifts to the visual environment.

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

The Proposal has also taken into account the principles of ESD and sustainability (refer to Section 4.3 and Section 6.13). These would be considered further during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

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Appendix A ~~Significance~~ **Significance of matters of**

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

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

Appendix B Consideration of clause 228

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

Factor	Impacts
<p>(a) Any environmental impact on a community?</p> <p>There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. Mitigation measures outlined in Section 7.2 would be implemented to manage and minimise adverse impacts.</p>	Minor
<p>(b) Any transformation of a locality?</p> <p>The Proposal would include the introduction of new visible elements in the landscape including three new lifts, new handrails and new TGSI'S at bottom of stairs. The appearance of the new elements would be consistent with the existing station elements and are considered to be common features in urban areas.</p>	Minor
<p>(c) Any environmental impact on the ecosystem of the locality?</p> <p>The Proposal will result in minimal vegetation removal. The Proposal is unlikely to impact on the ecosystem of the locality.</p>	Negligible
<p>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>During construction, temporary impacts will would include noise, traffic, access and visual amenity.</p> <p>Operational landscape impacts on locality would either be negligible or would not impact on identified sensitive receivers. Operational visual impacts range from moderate to negligible.</p>	Minor
<p>(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</p> <p>The Proposal creates equitable access to the station and the platforms, having a positive contribution to the locality.</p> <p>The Proposal is not anticipated to have any impacts on the locality from an archaeological, architectural, cultural or social element of the locality.</p>	Negligible
<p>(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>The Proposal would not have any impact on habitat of protected fauna.</p>	Nil
<p>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The Proposal is unlikely to have any impact on endangering species of animal, plant or other form of like, whether living on land, in water or in air.</p>	Nil
<p>(h) Any long-term effects on the environment?</p> <p>The Proposal is unlikely to have any long-term effects on the environment.</p>	Nil

Factor	Impacts
<p>(i) Any degradation of the quality of the environment? The Proposal is unlikely to have any long-term effects on the environment.</p>	Nil
<p>(j) Any risk to the safety of the environment? Provided the recommended mitigation measures are implemented, the Proposal is unlikely to cause any pollution or safety risks to the environment. Specific management measures would be implemented to manage asbestos and other hazardous materials that may be encountered during construction.</p>	Minor
<p>(k) Any reduction in the range of beneficial uses of the environment? The Proposal is unlikely to have any reductions in the range of beneficial uses of the environment.</p>	Nil
<p>(l) Any pollution of the environment? The Proposal is unlikely to cause any pollution of the environment provided the recommended mitigation measures are implemented as outlined Section 7.2.</p>	Nil
<p>(m) Any environmental problems associated with the disposal of waste? The Proposal is unlikely to cause any environmental problems associated with the disposal of waste. Hazardous waste and special waste may be generated from the Proposal. Prior to construction, contamination investigations would be undertaken to confirm the presence of contaminated material, particularly asbestos. All waste would be managed and disposed of with a site-specific Waste Management Plan. Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.</p>	Minor
<p>(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The Proposal is unlikely to increase demands on resources that are, or are likely to become, in short supply.</p>	Nil
<p>(o) Any cumulative environmental effect with other existing or likely future activities? Cumulative effects of the Proposal are described in Section 6.16. Where feasible, project activities and environmental management measures would be co-ordinated to reduce any cumulative construction impacts. The Proposal is unlikely to have any significant adverse long-term impacts.</p>	Nil
<p>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The Proposal is unlikely to impact on coastal processes and coastal hazards, including those under projected climate change conditions.</p>	Nil