Ingleburn Station Upgrade
Review of Environmental Factors

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NSW GOVERNMENT | Transport for NSW

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Abbreviations

AHIMS	Aboriginal Heritage Information Management System
ASA	Assets Standards Authority (refer to Definitions)
BCA	Building Code of Australia
CCP	Commuter Car Park
CCTV	Closed Circuit Television
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
DDA	*Disability Discrimination Act 1992* (Commonwealth)
DP&I	NSW Department of Planning and Infrastructure
DSFAPT	Disability Standards for Accessible Public Transport 2002 (under the *Disability Discrimination Act 1992)* (Commonwealth)
DSI	detailed site investigation (Phase II Contamination Investigation)
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
ESD	ecologically sustainable development (refer to Definitions)
ETS	Electronic Ticketing System
FM Act	*Fisheries Management Act 1994*
Heritage Act	*Heritage Act 1977*
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
NES	national environmental significance
Noxious Weeds Act	*Noxious Weeds Act 1993*
OHWS	Overhead Wiring Structure
NPW Act	*National Parks and Wildlife Act 1974*
PA system	Public Address system
PID	Public Information Display
PME	TfNSW Principal Manager Environment
POEO Act	*Protection of the Environment Operations Act 1997*
OEH	Office of Environment and Heritage
RailCorp	Rail Corporation of NSW

RAP	Remediation Action Plan
RMS	Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
SEWPAC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth)
TPD	Transport Projects Division (TfNSW)
TPZ	Tree Protection Zone
TfNSW	Transport for NSW
TCP	Traffic Control Plan
TGSI	Tactile Ground Surface Indicators ('tactiles')
TSC Act	*Threatened Species Conservation Act 1995*
TVM	Ticket Vending Machine

Definitions

Assets Standards Authority	The ASA is an independent body within TfNSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Design Authority functions currently performed by RailCorp are now exercised by ASA.
Ecologically Sustainable Development	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 (refer to Section 4.1).
Opal card	The integrated ticketing smartcard being introduced by TfNSW. The Opal card will provide smartcard access for travel on the public transport network in Sydney, the Blue Mountains, Central Coast, Hunter, Illawarra and Southern Highlands. The smartcard is similar in size to a credit card and will allow payment for travel on ferries, trains, buses and light rail, instead of buying a paper ticket. Customers using the Opal card will tap on at a card reader at the start of their trip and tap off at the end. The electronic ticketing system will automatically calculate the fare and deduct it from the value stored on the Opal card.
Sydney Trains	From 1 July 2013, Sydney Trains replaced RailCorp as a new rail operator created to service the different needs of Sydney and intercity customers. Sydney Trains is tasked with delivering metropolitan rail customers a better service.
The Proposal	The construction and operation of the Ingleburn Station Upgrade works.

Executive summary

Transport for NSW (TfNSW) is the proponent for the Ingleburn Station Upgrade (the Proposal). TfNSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW.

The Proposal is part of the Transport Access Program which is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure where it is needed most.

The Proposal is designed to ensure that the railway station and interchange facilities meet the future growth and transport needs of the Campbelltown Local Government Area (LGA) and the wider Sydney region.

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 Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Description of the Proposal

TfNSW proposes to upgrade facilities at Ingleburn Railway Station via:

- Modification of the existing footbridge with the addition of three (3) new lifts to provide accessible entry to the station platforms
- Creation of accessible walkways to connect the new lifts to the existing platform
- Modification of the existing platform heritage building to accommodate upgraded station facilities
- Demolition of the existing utilities building on Platform 1 and replacement with new facilities including an independent communications room
- Modification of both platforms to meet accessibility requirements
- Replacement of bus shelters on Ingleburn Road
- Relocation of kiss and ride, taxi zone and accessible parking
- Upgraded bicycle parking facilities
- Upgrading of signage, lighting, and CCTV surveillance cameras.

Construction is anticipated to commence last quarter 2013 with completion last quarter 2015.

Need for the Proposal

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport interchanges, train stations and commuter car parks 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 upgrades are 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 will also

assist in responding to forecasted growth in the region and as such would support growth in commercial and residential development.

The Proposal fulfils the program objectives by:

- Providing three new lifts to provide mobility access from street to platform
- Levelling the station platforms
- Reconfiguring the existing kiss and ride, taxi and bus access
- Relocating and replacing/upgrading bus shelters on Ingleburn Road
- Providing upgraded facilities for staff and customers including a family accessible toilet
- Providing upgraded lighting and CCTV
- Providing upgraded signage to the interchange
- Maintaining the cross-corridor axis and integrating with the existing street pattern.

The Proposal will also ensure that Ingleburn Station will meet the legislative requirements under the Disability Standards For Accessible Public Transport (DSFAPT).

Three alternative options were considered:

- Option 1– a new centrally located concourse with staff and retail facilities on the new concourse. This option included significant extension of the proposed structure over the tracks, associated piling activities, and relocation of the existing high voltage power cabling. The heritage platform building would be removed.
- Option 2 – a new centrally located footbridge with upgraded staff facilities and toilets on platform. This option required significant construction staging and refurbishment of the heritage building while remaining operational, and relocation of the existing high voltage cable.
- Option 3 – upgrade the existing footbridge, with upgraded staff facilities and toilets on platform. The cross-corridor axis is maintained and the heritage platform building is retained.

Option 3 was selected as the preferred design as it:

- Service life aligns with the likely capacity upgrade as a result of development in the surrounding area, namely the South West Growth Centre
- Increases accessibility for commuters with mobility impairment
- Promotes interchange with other modes of transport
- Better integrates with the surrounding precinct
- Provides accessible customer facilities
- Provides facilities to meet current staffing levels
- Should not affect signalling and overhead wiring
- Retains the heritage-listed building on Platform 1
- Reduces construction disturbance
- Can be constructed in a timely manner
- Is cost-effective.

Statutory considerations

The EP&A Act provides for the environmental impact assessment of development in NSW. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent.

State Environmental Planning Policy (Infrastructure) 2007 (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development. Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land. Clause 78 defines 'rail infrastructure facilities' as including: railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms, and associated public transport facilities for railway stations.

As TfNSW is a public authority and the proposed activity falls within the definition of rail infrastructure facilities under Infrastructure SEPP, the Proposal is permissible without development consent. Consequently the environmental impacts of the Proposal have been assessed by TfNSW under Part 5 of the EP&A Act.

This REF has been prepared to assess the construction and operational environmental impacts of the Proposal. The REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (the EP&A Regulation).

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

Community and stakeholder consultation

Under the Infrastructure SEPP, consultation is required with local councils or public authorities in certain circumstances, including where council-managed infrastructure is affected, or where local heritage items are affected. Additional consultation that is optional under the Infrastructure SEPP may include, but is not limited to:

- Direct notification to other community stakeholders and/or
- Public display of the REF.

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

During this period, the REF would be available for viewing at Campbelltown City Council's office and libraries, TfNSW's office in Chatswood and via download from the TfNSW website. Furthermore, an information line (1800 684 490) would be available for the public to make enquires about the Proposal.

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

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

Figure 1: 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.

During the construction period the following key impacts would be expected to occur if the Proposal were to proceed:

- disruptions to vehicle and pedestrian movements
- tree removal
- noise and vibration,
- visual impacts, and
- impacts to the heritage listed platform building.

Crime Prevention through Environmental Design principles would be incorporated into the design in order to minimise risk to personal safety and asset security.

The long term operational impacts of the Proposal would be positive for Ingleburn Railway Station commuters and the general community within the town centre. The upgrade would provide for enhanced amenity for access to and throughout the station and would provide upgraded bicycle parking facilities and parking for those with disabilities. Improved access

would service a growing population in the Campbelltown LGA and South West Growth Centre and encourage public transport use to the metropolitan areas of Sydney.

Conclusion

This REF has been prepared having regard to sections 111 and 112 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal has also been designed in accordance with the TfNSW's Sustainable Design Guidelines and has taken into account the principles of Ecologically Sustainable Development (ESD).

Key sustainability initiatives include the incorporation of energy efficient equipment and lighting. These initiatives would be considered amongst others further during the detailed design, construction and operational phases of the Proposal.

Potential adverse impacts associated with the Proposal would be appropriately managed in accordance with the mitigation measures outlined in this REF. 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.

The assessment concludes that the Proposal would not significantly affect the environment and the impacts of the Proposal would be reduced by implementing the specified mitigation measures. Overall, the Proposal is expected to provide significant benefits for Ingleburn, the wider Campbelltown Local Government Area and the South West Growth Centre.

1. Introduction

TfNSW was established in 2011 as the lead agency for integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Ingleburn Upgrade (the Proposal), to be delivered by Transport Projects Division (TPD).

1.1. Overview of the Proposal

The main elements of the Proposal include:

- Provision of three new lifts to provide mobility access from street to platform
- Creation of new entry forecourts on both sides of the station
- New ramp access to Platform 2
- Replacement of some existing bus shelters in Ingleburn Road
- Reconfiguration of the existing kiss and ride, taxi and bus access on Ingleburn Road, and formalised kiss and ride on Stanley Road
- Upgraded bicycle parking
- Provision of upgraded platform facilities for customers and staff
- Retention of the existing alignment for pedestrian access across the corridor, maintaining integration with the existing street pattern
- Provision of upgraded lighting and CCTV
- Provision of upgraded signage.

Artist's impressions are presented at Figure 7 and Figure 8.

The comparison below outlines existing facilities available at Ingleburn Station.

Current facilities

- Stairs
- Ramps
- Bus stop close by
- Taxi rank close by
- Commuter parking close by (on both sides of the station)
- Payphone
- Help point
- Ticket office hearing loop
- Portable Platform to train boarding ramp
- Toilet

Facilities not currently available

- Lifts
- DDA compliant ramps
- DDA compliant parking spaces
- Warning tactiles (on platform edges)
- Wheelchair accessible toilet
- Wheelchair accessible payphone
- Bike racks/lockers (on west side)
- Formal Kiss and Ride zone (on west side)
- Bus zone (on west side)

Figure 2: Indicative extent of proposed works
(Source: Google maps)

The population of Ingleburn is approximately 14,000 (2011) and the projected population is 20,000 by the year 2036.

The Proposal would facilitate extension of transport networks to connect the South West Growth Centre to the existing employment lands at Ingleburn, and to connect Ingleburn to employment opportunities in Liverpool and Campbelltown/ Macarthur. This would support a reduction in cross-regional trips, reducing the need to use private cars.

Ingleburn Station also acts as a vital pedestrian link between the eastern and western sides of the rail corridor. Without this crossing point, pedestrians would need to walk a 3.1km loop around to the north, or a 3.3km loop to the south (beneath a bridge structure).

It is anticipated that construction would start mid 2014 with completion in 2015.

1.2. Location of the Proposal

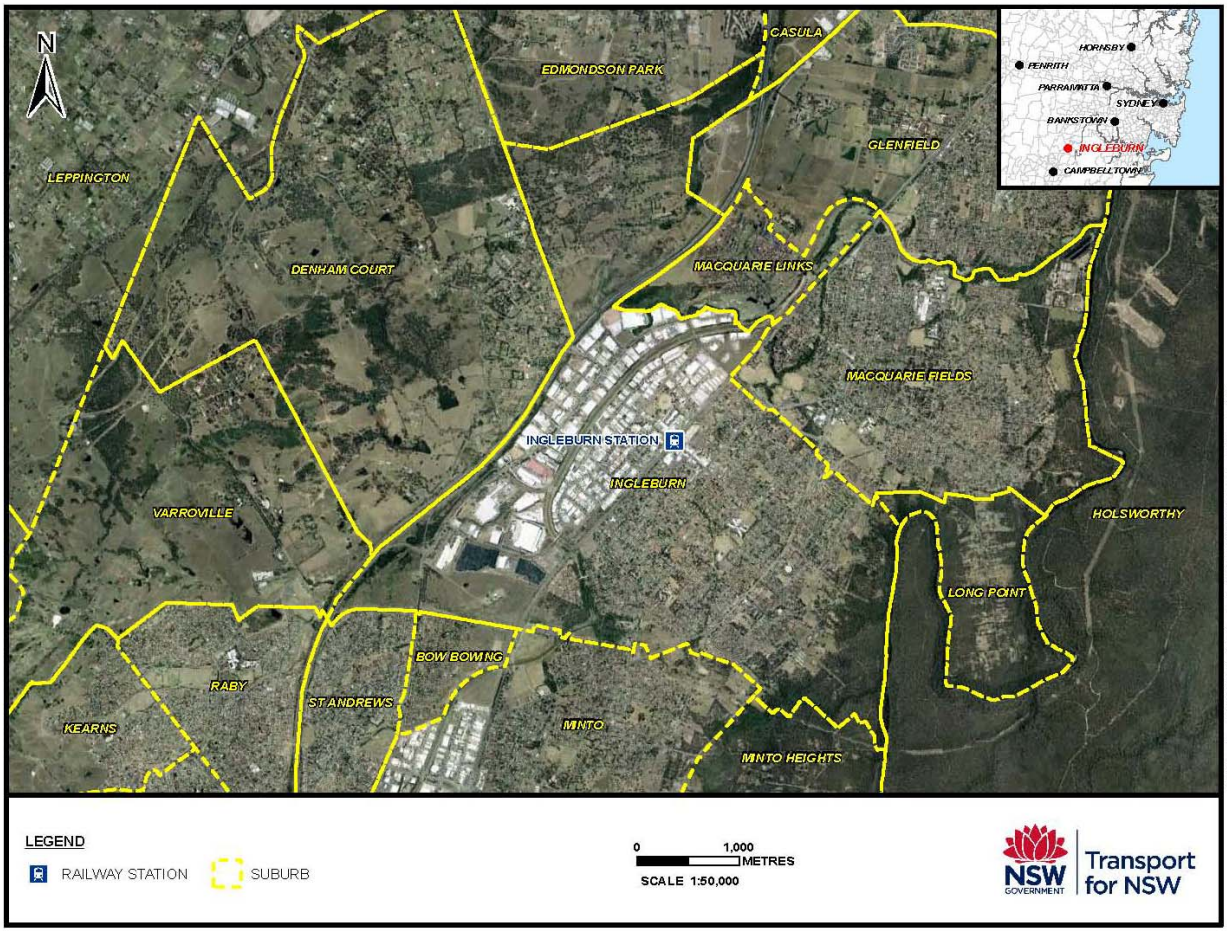


Figure 3: Regional context of Ingleburn Station

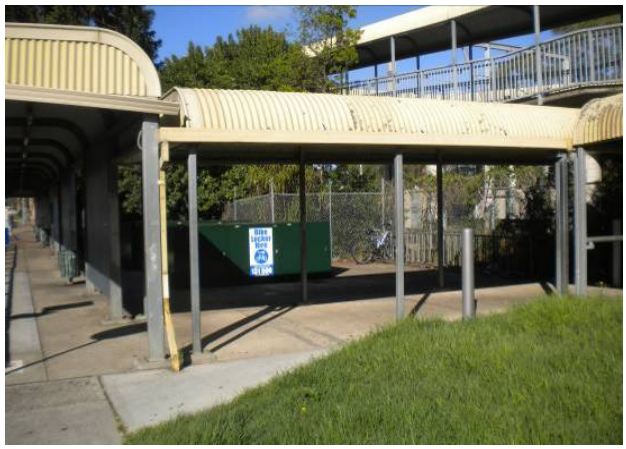
Ingleburn Railway Station is central to Ingleburn Transport Interchange, which is a multi-access facility. The Station has an existing overhead railway concourse that crosses the railway line via ramps and stairs, providing access to the two rail platforms below. The ramps are very long, relatively steep, and have few resting areas. There are currently no level access points to the platforms or to the local street network.

The existing Interchange allows for commuters to change between bus, rail, taxi, private car and bicycle. However there is no formalised kiss and ride zone on the western side of the interchange.

The proposed works are situated within the rail corridor and on local public roads under the care and control of Campbelltown Council.

Below are photos that indicate issues that would be addressed by the proposed works.

Bus stop at station entrance from Ingleburn Road/Oxford Road



Close up of station entrance in Ingleburn Road indicating deteriorated bus canopies

Trolley bay at bus shelter in Ingleburn Road near station entrance

Deteriorated bus shelter awnings viewed from ramp

Uneven surface on Platform 1

Drainage and uneven platform levels

Taxi rank in Ingleburn Road

Bunya Pine immediately behind bus shelter

Signal box on Platform 1

Heritage building on Platform 1

Interior of heritage platform building - Station Masters Office

Ceiling in heritage platform building

Amenities block narrows available space on Platform 1

Ramp and southern end of Platform 2

Station entrance in Stanley Road

Stanley Road commuter car park

DDA-compliant ramp on Stanley Road side

Non DDA-complaint ramp to Platform 1

1.3. Purpose of this Review of Environmental Factors

This REF has been prepared by TfNSW. For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 of the 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 111 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 EP&A Regulation.

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Threatened Species Conservation Act 1995* (TSC 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 significantly impact a matter of national environmental significance (NES) or Commonwealth land and the need to make a referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) for any necessary approvals under the EPBC Act.

2. Need for the Proposal

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

2.1. Strategic justification

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

The proposed Ingleburn Station Upgrade is consistent with the NSW Government's commitment to deliver an efficient and effective transport system around Sydney and NSW as detailed in *NSW 2021 – A Plan to Make NSW Number One* (Department of Premier and Cabinet 2011).

NSW 2021 is the NSW Government's ten year plan to guide budget and decision making in NSW. *NSW 2021* includes the following goals, targets and priority actions relevant to the Proposal:

- reduce travel times
- minimise public transport waiting times for customers
- improve co-ordination and integration between transport modes
- grow patronage on public transport
- improve public transport reliability
- improve customer experience with transport services

The NSW Government has developed a Long Term Transport Master Plan which was released in December 2012. This plan provides a comprehensive strategy for all modes of transport across NSW over the next 20 years, while also delivering on current commitments.

Further details of the application of NSW Government policies and strategies are discussed in Section 4.2 of this REF.

2.1.1. Objectives of the Transport Access Program

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

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

2.1.2. Objectives of the Proposal

The objectives of the Ingleburn Station Upgrade project are to:

- Improve accessibility in accordance with the DDA and DSFAPT requirements, and in relation to ASA Standards, NFPA 130 and Australian Building Codes and Standards
- Upgrade platforms to design compliance (height between the platform and train door entry)
- Promote interchange with other modes of transport
- Upgrade of mode access facilities – kiss and ride, taxi, parking and bus interchange
- Minimise pedestrian conflict points and crowding points
- Minimise queuing at station facilities
- Maximise perceptions of safety and security
- Improve customer experience (specifically weather protection, better interchange facilities and cosmetic appearance)
- Accommodate growth in patronage and changing travel patterns
- Improve integration with surrounding precinct
- Upgrade station and interchange facilities and equipment to current standards required by asset owner
- Minimise construction impacts to passengers and station operations
- Improve amenity for rail staff and commuters
- Minimise the cost of ownership and maintenance.

2.1.3. Existing Station Access

There are two separate platforms servicing Ingleburn Station. Platform 1 services city-bound trains on the Up Main South Line. The opposite (western) side of Platform 1 is currently fenced off to restrict access to operations on the Southern Sydney Freight Line (SSFL). Platform 2 services trains on the Down Main South Line towards Campbelltown. Platform 2 is a side platform which provides access to Ingleburn Road.

Access to Platform 1 is by stairs or ramps over the existing footbridge across the track from Stanley Road or Ingleburn Road. Access to Platform 2 is by the footbridge or directly from Ingleburn Road.

The station has a number of existing access constraints as follows:

- Accessible parking, ramps, staff facilities and public amenities are not compliant with current standards
- Egress and travel distance are not compliant with current standards.
- Platform coping edges have some variance from current standards for level access.

The Bureau of Transport Statistics provided data that indicates that in 2006, for the weekday AM Peak, the station access modes at Ingleburn were as follows: Walk 44%, Bus 13%, Car park 21%, Car lift 21%, Other 2%. (Source: A Compendium of CityRail Travel Statistics-Seventh Edition – Appendix 4 Station Access Modes, AM Peak).

2.2. Design development

Following initial consideration of current access constraints, three design options were developed to address the existing impediments at Ingleburn Station. Following consultation with key stakeholders, three new options superseded the original options for the purpose of defining a preferred option, and these are described below.

2.2.1. Option 1 – New Concourse

- Construction of a new concourse centrally located to platform to improve functionality of the station, but providing an offset cross corridor connection.

2.2.2. Option 2 New footbridge

- Construction of a new centrally located footbridge with upgraded staff facilities and toilets on platform, refurbishment of the heritage building and relocation of the existing high voltage cabling.

2.2.3. Option 3 Upgraded existing footbridge

- Upgrading of the existing footbridge, and upgraded staff facilities and toilets on Platform 1. The cross-corridor axis is maintained and the heritage platform building is retained.

See Figure 4, Figure 5, and Figure 6 below.

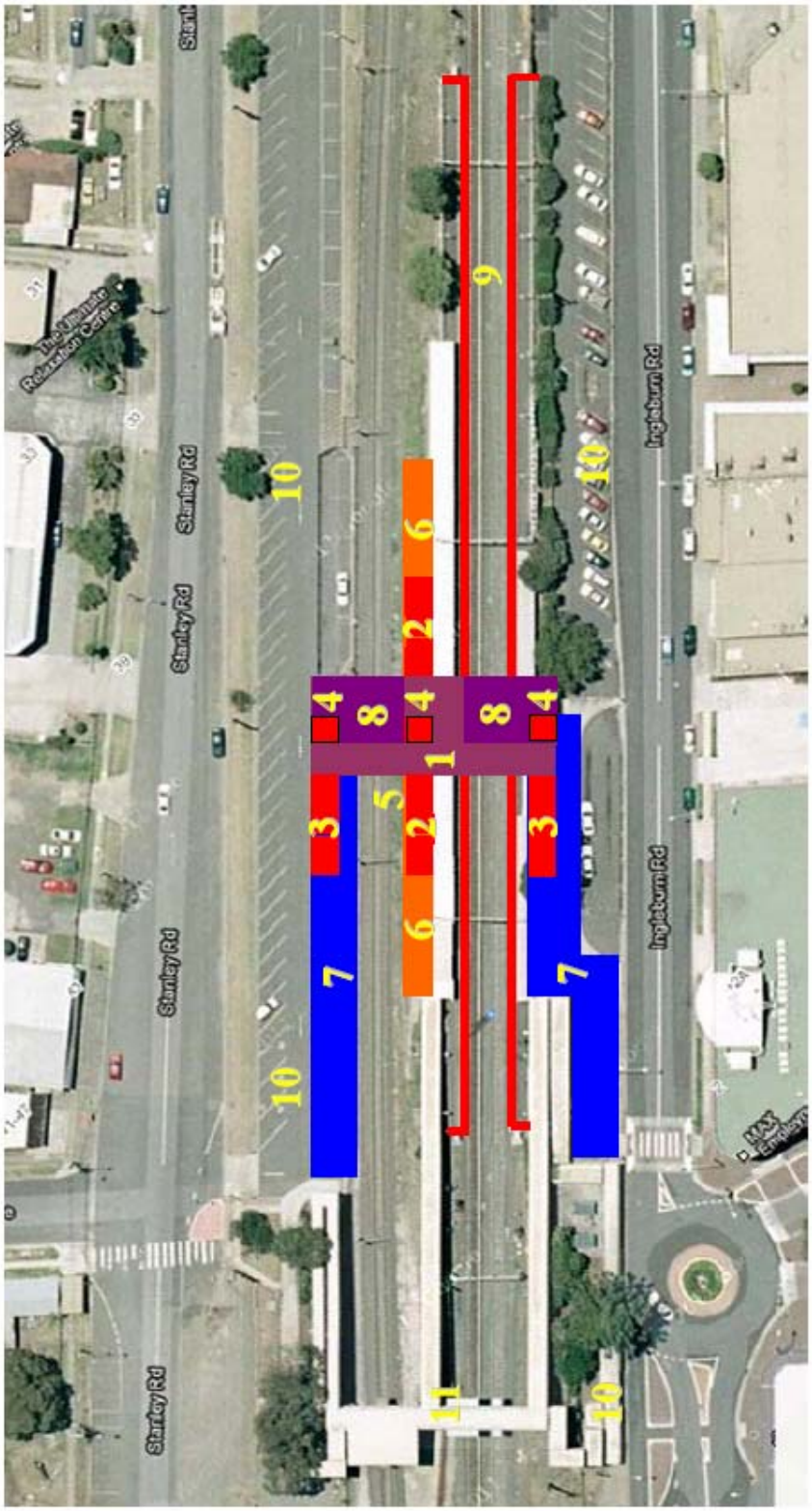


Figure 4: Option 1 Initial Concept Plan

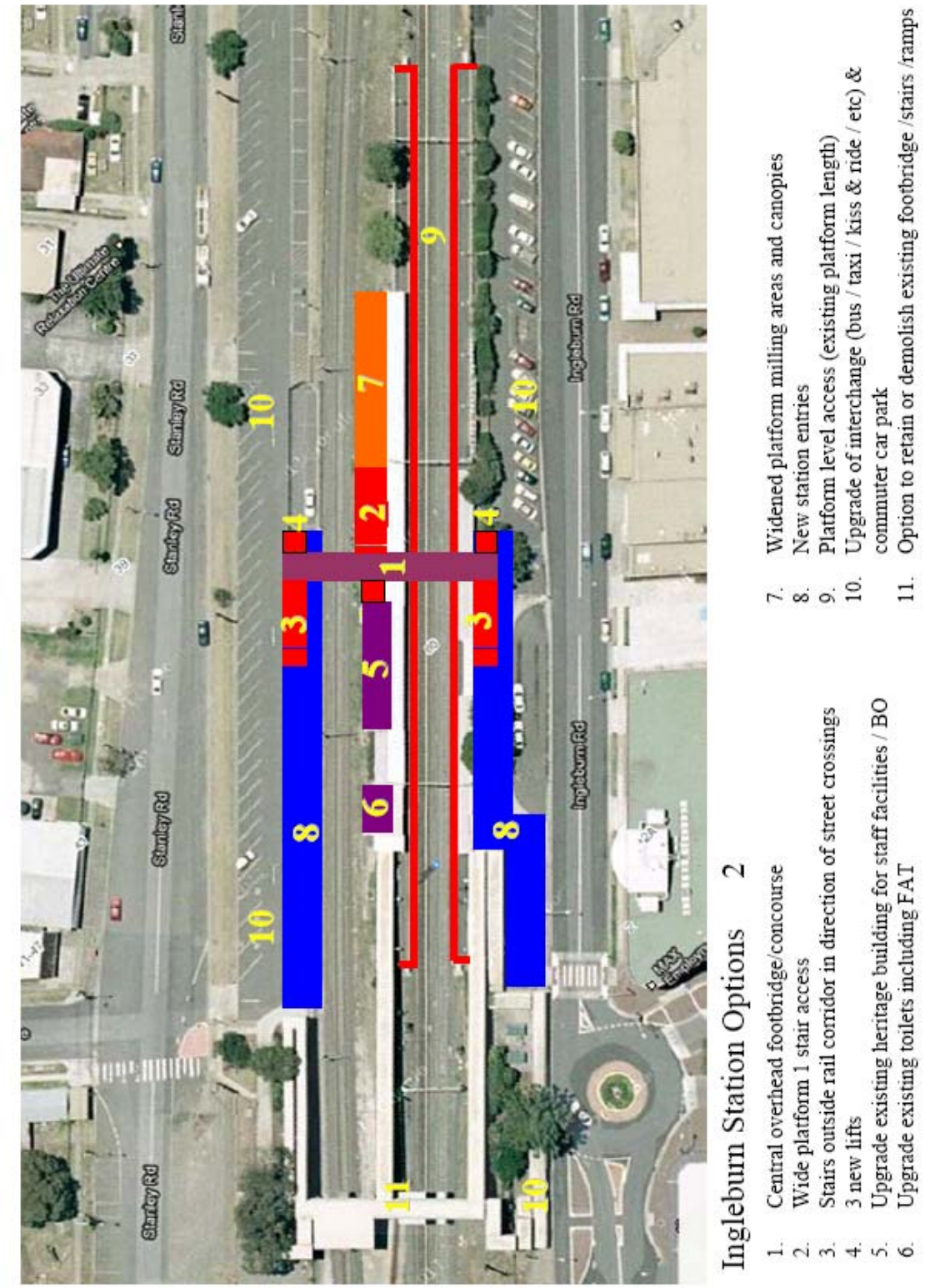


Figure 5: Option 2 Initial Concept Plan

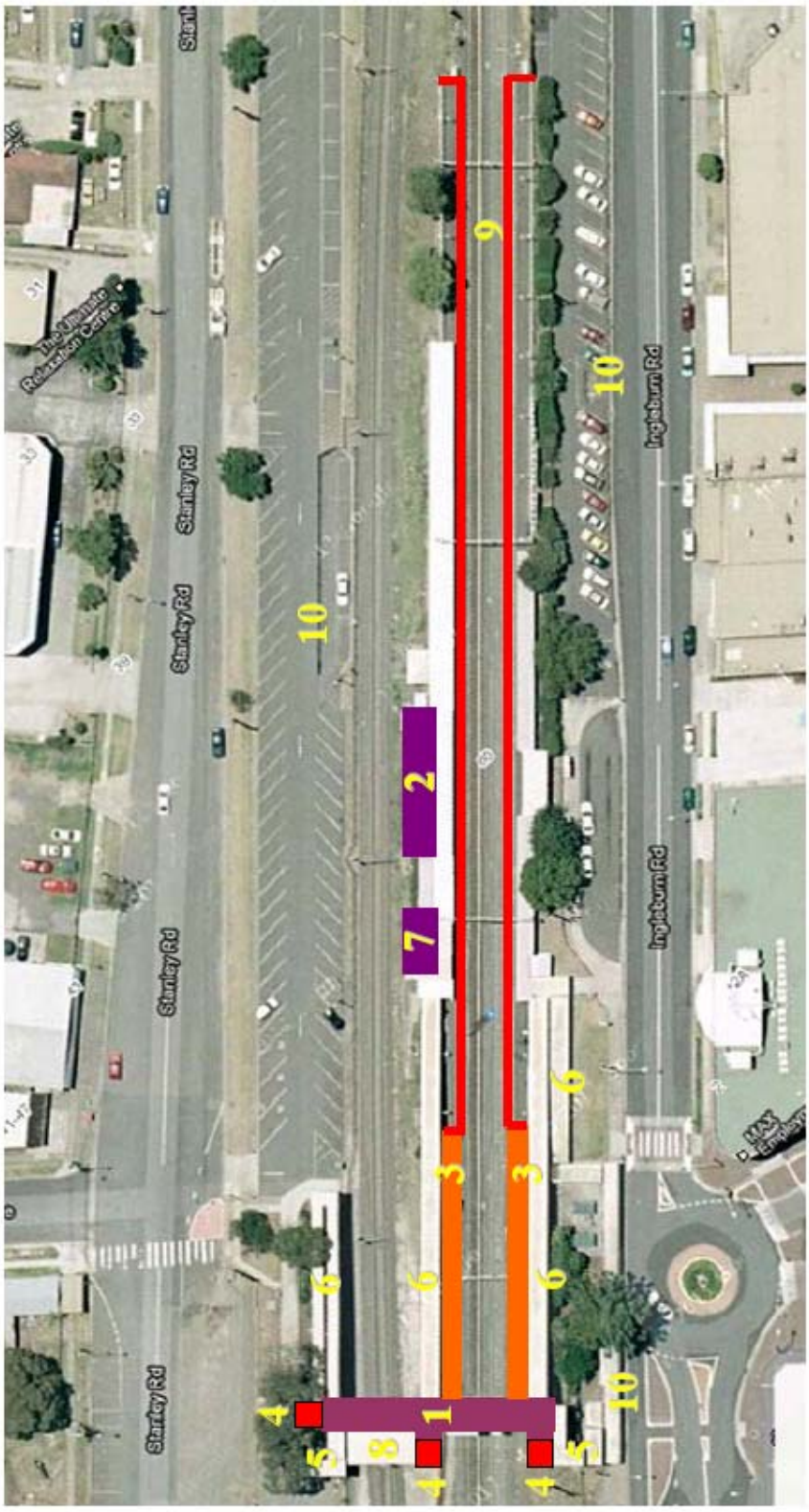


Figure 6: Option 3 Initial Concept Plan

2.2.4. Applicable Access Codes and Standards

Transport agencies are responsible for providing equitable access for their respective infrastructure under the *Disability Discrimination Act 1992* (DDA).

The following accessibility standards and legislation apply to railway stations, associated infrastructure and services in NSW:

- *Disability Discrimination Act 1992* (DDA)
- *Disability Standards for Accessible Public Transport 2002* (DSFAPT)
- Access to Premises Standards 2010 Part H2 (APS)
- National Construction Code 2012 Part H2 (NCC)
- Australian Standards (as referenced in DSAPT, APS and the NCC).

The 'do nothing' option was not considered a feasible alternative as it would not meet legislative requirements, NSW Government objectives and would not assist in encouraging the use of public transport.

2.2.5. Assessment

A Multi-Criteria Analysis (MCA) was carried out by key project stakeholders in February 2013, which included consideration of the following aspects:

- Customer experience
- Accessibility
- Precinct integration
- Modal integration
- Engineering constraints
- Capital costs
- Operations and maintenance.

As a result of this process, Option 3 (see Figure 6) was identified as the preferred solution.

Table 1: Design options

Option	Key Provision
Do nothing	No changes to the way the interchange operates.
Option 1 – new concourse	New concourse centrally located to platform to improve functionality of the station, but providing an offset cross corridor connection.
	All new staff and retail facilities meeting highest level of compliance.
	Upgrades to meet compliance with DSFAPT, ASA Standards, NFPA 130 and Australian Building Codes and Standards.
	Upgrade of platforms to “level access”.
	Upgrade of kiss and ride, taxi, parking and bus interchange.
	Improved station interchange and multimodal connections at each side of corridor.
	Removal of the existing non-compliant ramps, and creation of new lift and stair access.
	Significant extension of the proposed structure over the tracks with piling required.
	Demolition of heritage building.
	Improved station interchange and multimodal connections at each side of the corridor.
	New facilities to provide improved station operation.
	Option to retain cross corridor connection via existing footbridge and stairs.
	Access during construction to be maintained via existing ramps and stairs.
Option 2 – new footbridge	New footbridge centrally located to platform to improve functionality of the station, but providing an offset cross- corridor connection.
	Upgrades to meet compliance with DSFAPT, ASA Standards, NFPA 130 and Australian Building Codes and Standards.
	Upgrade of platforms to “level access”.
	Upgrade of kiss and ride, taxi, parking and bus interchange.
	Improved accessibility with stairs and lifts and accessible paths of travel from precinct boundaries.
	Removal of the existing non-compliant ramps, and creation of new lift and stair access.
	Heritage building retained and upgraded.
	Improved station interchange and multimodal connections at each side of the corridor.
	Option to retain existing cross corridor connection via existing footbridge and stairs.
	Upgraded staff facilities and toilets on platform.
	Significant construction staging required for new footbridge and

Option	Key Provision
	refurbishment of heritage building to ensure ongoing operation.
	OHWS to be reconfigured to underside of footbridge structure.
	Access during construction to be maintained via existing ramps and stairs.
	Existing amenities retained or demolished to suit operational requirements.
	Decentralised staff facilities and ticketing reduces operational efficiencies and customer experience.
Option 3 – upgraded existing footbridge	New forecourt on Ingleburn Road to provide a focal point.
	Three new lifts and associated walkways and ramps.
	Upgrades to meet compliance with DSFAPT, ASA Standards, NFPA 130 and Australian Building Codes and Standards.
	Upgrade of platforms to “level access” with platform resurfacing.
	Heritage building retained and upgraded via some internal demolition (attached signal hut and access stair removed).
	Existing modal integration and cross corridor axis is maintained (both sides).
	New bus stop and shelter, reconfigured accessible parking and taxis, and relocated bicycle rack and lockers on the eastern side.
	Formalised kiss and ride and off –street parking on western side, with new kerb and relocated pedestrian crossing.
	Pedestrian circulation improved by demolishing the existing amenities building, widening the platform and installing a new canopy on Platform 1.
	Staging of lift installation to ensure ongoing operation of the station.
	Demolition of existing amenities block and signal hut and new amenities and services building on Platform 1.
	OHWS and signalling retained.

2.3. Justification for the preferred option

Under the RailCorp station hierarchy, Ingleburn is classed as a Community station, and is unlikely to be reclassified as a Suburban class station for a considerable period. The classification (City, Major, Suburban, Community, Outer Urban) is based on factors including geographic location, future population, network function and intermodal interchange function.

Both Options 1 and 2 would relocate the existing cross corridor axis away from the central spine (Oxford Road – Memorial Avenue), and required demolition of the existing heritage building. These options would also have required significant relocation of overhead wiring and signals.

The chosen design is cost-effective and meets the objectives of the NSW Government's Transport Access Program. This option maintains the existing precinct alignments and therefore provides improved precinct integration with station interchange and multimodal connections at each side of the corridor. Option 3 provides better access to, within and around the station precinct for persons with limited mobility, along with improvements in the station amenity, as well as incorporating additional staff and customer facilities specific to Ingleburn Station.

The preferred design:

- Increases accessibility for commuters with mobility impairment, those with shopping/luggage and parents with prams
- Provides new electronic passenger information monitors and public address system
- Promotes interchange with other modes of transport
- Better integrates with the surrounding precinct
- Provides improved accessible customer facilities including family accessible toilet and bus canopies
- Provides improved facilities to meet current staffing levels
- Provides safety improvements including extra lighting and security measures, safer traffic/pedestrian arrangement including accessible car parking, taxi stops and kiss and ride zones
- Is unlikely to affect signalling and overhead wiring
- Retains the heritage-listed platform building
- Can be constructed in a timely manner
- Is cost-effective.

3. Description of the Proposal

Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities. The description of the Proposal is based on the Reference Design report.

3.1. The Proposal

As described in Section 1.1 of this REF, the Proposal involves the Ingleburn Station Upgrade as part of the Transport Access Program.

The design of the proposed works is described in more detail below.

3.1.1. Design Features

The artist's impression below indicates the proposed design on Ingleburn Road.

Figure 7: Artists impression of the proposed interchange upgrade on Ingleburn Road

The design of the proposed works incorporates:

New lifts and accessible connections

Three new lifts would be provided in close proximity to the existing footbridge for accessibility. These lifts are:

- Lift 1 – Ingleburn Road Town centre side of the corridor: three stop (split level) through lift (ground and footbridge openings on the same side and split level opening on through face
- Lift 2 – island platform access: two stop single side lift

- Lift 3 – Stanley Road side: two stop single side lift.

The new landings at the footbridge levels would be sized to allow accessible circulation and waiting spaces clear of the path of travel by pedestrians using the footbridge and stairs. All lifts would include telephone connection and control panel interface.

Lifts 1 and 2 would provide access to platforms by new walkways. These walkways would extend at platform height and parallel to existing footbridge ramps. Canopies, fencing, and screens would be provided and would be designed to allow passive surveillance. The journey from the lift location to platform entry would be approximately 60m.

Existing ramps, stairs and footbridge are all retained with no modifications. No structural modifications would be made to upgrade this existing infrastructure.

New forecourt entries

The proposed works would create a precinct with easily identifiable entries on each side of the corridor by creating clearly defined entry forecourts. The forecourts would connect the station precinct to the urban town centre by enhancing the cross-corridor connection and providing a landmark feature for the existing town centre. Providing legibility of the entries would reinforce the local identity through effective place-making.

Retention of the Bunya Pine tree in Ingleburn Road

The Bunya Pine near the Ingleburn Road station entry has local heritage value and is a significant element in the forecourt design. However, this species is renowned for dropping large size seed pods which are extremely heavy and have the potential to be a major hazard to pedestrians. To retain the tree, the design proposes an overhead canopy with a flexi mesh infill to catch the seed pods. However, this option is subject to feasibility assessment during detailed design, and may not be taken up as part of the proposed works. Alternatively, the seed pod drop is seasonal, so a maintenance schedule of ‘de-seeding’ each year would be an alternative option.

Platform 1 – Amenities

The existing amenities building on Platform 1 would be demolished to open the pedestrian approach from the existing ramp and new walkway to the end of the existing heritage station building. The southern end of the heritage building would house a new ticket window cut into the brickwork. This would create an improved line-of-sight from the ramps and walkways.

Platform 1 – Surface

The Platform 1 is classified as level access with some minor vertical and horizontal design track alignment issues. The variance is typically 10mm vertically and 20mm horizontally. Minor alignment issues such as these are usually addressed as part of routine track maintenance. The platform will be re-surfaced and cross fall altered to fall away from the coping edge and installation of tactiles.

The platform coping edge alignment with the track is required to comply with the asset owner’s Engineering Standard ESC215 and is not a DDA requirement.

Platform drainage is being raised and reworked to interface with door thresholds of the station building and to suit required gradients.

Platform 1 – Heritage building

The heritage station building would be reconfigured internally to provide accessible staff facilities in line with ASA requirements. The modifications require amending some of the internal walls to improve internal circulation for accessibility. While accessibility is a design consideration for this fit out, heritage value has also been considered. Internal walls would be maintained as much as practical, and the existing ceiling is also to be retained to reduce the heritage impact to the building.

The heritage building is proposed to house:

- Ticket room with one ticket desk and window
- Secure counting area and safes
- Staff office area (Note there is no dedicated Station Manager's office)
- Kitchenette with fridge, sink and bench
- Change room with lockers and seating
- Accessible staff amenity with toilet, basin and shower
- A separate Family Accessible Toilet – an accessible amenity with baby change (located at city end of the building with direct access from the platform)
- Upgraded services including air conditioning, lighting and plumbing.

The upgrade of the heritage building would include:

- Partial removal of most internal walls, existing fixtures and existing staff toilet at the city end of the building
- Retention of existing heritage features (openings in external walls and fireplaces) as far as practicable. It is noted that the pressed metal ceiling and ceiling roses would be retained.

A new building on the site of the existing signal relay hut would be set apart from the heritage building to accommodate items including:

- Male and female amenities
- Cleaner's room
- Rubbish room
- Communications room
- Electrical cupboard
- Store room.

See Section 6.5 for heritage impacts.

Platform 2 – access

Access to Platform 2 would be enhanced via new ramps and stairs, to open the entry spaces and provide improved circulation space at the proposed new station entry forecourt.

Platform 2 – Buildings and canopies

Limited work would be undertaken to Platform 2 buildings and canopies. The existing seating pavilion would remain. The enclosed area for the ticket vending machine is to be reconfigured to open the platform entry and would be reintegrated into the entry forecourt.

Platform 2 – Surface

Platform 2 is also classified as level access, and has some design alignment issues at the city end with a vertical variance of 38mm i.e. furthest end from the station entry and new lifts. Similar to Platform 1, the existing alignment issue with the asset owner's Engineering Standard ESC215 and not a DDA requirement. The platform will have new drainage installed, cross fall altered and re-surfaced with the inclusion of tactile indicators.

Ingleburn Road – Accessible parking

The existing commuter car park area on this side of the corridor is not compliant with current Australian Standards. The design proposes alterations to the accessible parking bays to meet the requirements of DDA/BCA Standards. The accessible parking spaces are to be reconfigured with separate entry from Ingleburn Road and include shared spaces required for code compliance.

To accommodate this change, the existing taxi rank on Ingleburn Road would be relocated. The leading/first bay has been designed to enable use by accessible taxis, and allowance is provided for accessible drop off for kiss and ride users. Accessible paths of travel from these bays to the station entry would also be provided.

Ingleburn Road – Bicycle storage

Existing bicycle lockers would be relocated to south of the existing footbridge to provide improved pedestrian circulation spaces and clearances at the station entry. The new position would provide better access, legibility and passive surveillance from passing pedestrians. An option is being considered for a new modular "cage" style design with improved urban design outcomes, which would incorporate provision for fees to be paid via the new Opal ticketing system; however this option is subject to a feasibility assessment, and may not be taken up as part of the proposed works.

Ingleburn Road – Improved pedestrian circulation

The Town Centre is the convergence of several pedestrian paths, and is the modal hub for those arriving by foot, bike, bus taxi, kiss and ride and general parking. To respond to the circulation requirements and better define the entries, a new Platform 2 access ramp, and stairs and walkways are proposed, to work together with the canopies to open the entry spaces. This would provide sufficient space for Electronic Ticketing System (ETS) ticketing, and entry and exit to Platform 2.

Ingleburn Road – Improved bus configuration

The existing bus interchange is being retained. However, it is proposed to reconfigure the area to create the more open entry forecourt. The Proposal is for parts of the existing bus canopies and shelters to be demolished and new canopies provided to enable improved function of the bus stops clear of the roundabout.

The two existing stops would be more clearly defined with functional canopies for all customers including the large groups of school children using this interchange.

The artist's impression below indicates the proposed design on Stanley Road.

Figure 8: Artists impression of the proposed interchange upgrade on Stanley Road

Stanley Road – Accessible parking

The current informal kiss and ride area would also be formalised and form part of a new entry forecourt. The unmarked off-street parking area adjacent to the existing stairs would be formalised and include new compliant accessible car parking spaces, drainage, lighting and CCTV cameras.

Stanley Road – Future bus service provision

Provision is to be made for location of bus stop infrastructure to support a proposed new bus service from Edmondson Park.

Overall Landscaping and Urban Design

The principal urban design elements relate to the proposed forecourts and design of the canopies. It is intended that the design would show an integrated approach to the interchange, and maintain desire lines and connectivity.

New landscaping includes installation of a mulched and mass planted garden bed around the Bunya Pine tree to form a focal point for the station entry on Ingleburn Road, and new garden beds around the formalised car park on Stanley Road, while tree planting would soften the view of the new western forecourt. Improved footpath finishes and paving would promote pedestrian safety by reducing trip hazards. Finishes and landscaping would complement Council's public domain works.

Lighting

The lighting design would be developed during the detailed design phase. It would be influenced by the resulting environment after installation of new lifts and walkways, and

redesign of the forecourt areas had occurred on both sides of the station. Lighting will be designed to meet ASA Standards.

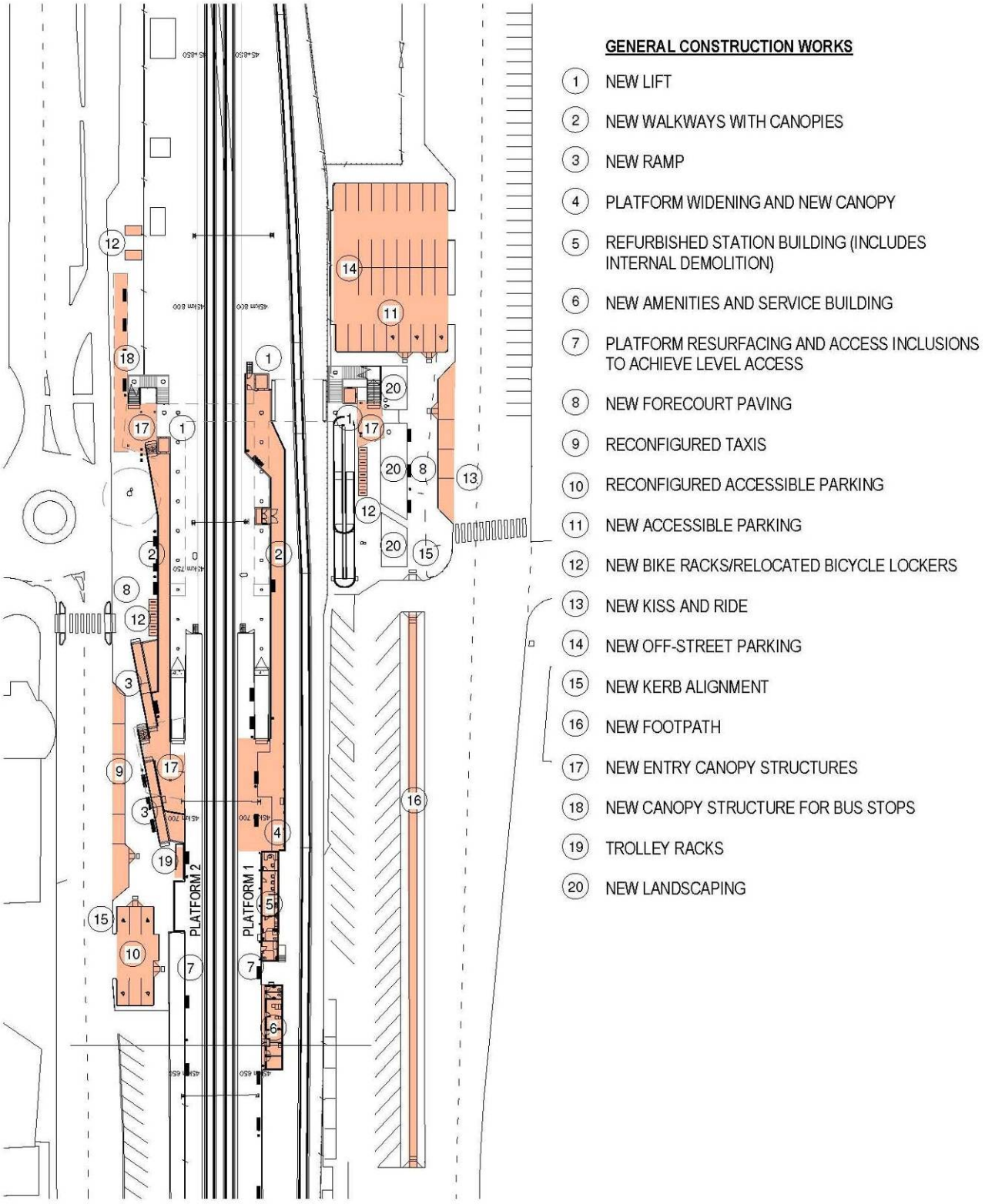


Figure 9: Reference Design – detailed view

3.1.2. Sustainability in design

TfNSW is committed to delivering projects in a manner that balances economic, environmental and social issues to ensure a sustainable transport system for NSW. TfNSW has environmental and sustainability targets, that apply to the delivery and operation of transport projects. TfNSW has developed the NSW Sustainable Design Guidelines which are to be complied with on our projects.

By applying these targets and guidelines, TfNSW covers the following sustainability themes:

- Energy management
- Pollution control
- Climate change resilience
- Resource management
- Biodiversity
- Heritage
- Liveable communities
- Corporate sustainability

The following sustainable design initiatives are to be included during detailed design:

Table 2: Sustainable design initiatives to be included during detailed design

Initiative	Description	Applicable
C.1 Carbon footprint	Undertake AS14064-2 (Greenhouse Gases – project level) compliant carbon footprinting exercise for all projects with a capital investment value over $10 million in accordance with TPD's 'Greenhouse Gas Inventory Guide for Construction Projects'. The carbon footprint is to be used to inform decision making in design and construction. Use standard carbon coefficient values for construction material and fuel usage.	Yes
C.5 Climate change impact assessment	Perform a climate change impact assessment for each project worth over $10M using current scientific predictions (ie Intergovernmental Panel on Climate Change (IPCC), Commonwealth Scientific and Industrial Research Organisation (CSIRO) etc) to determine the hazards/risks associated with future climatic conditions. Refer to 'Climate Change Impacts and Risk Management: A Guide for Business and Government' and the 'AGIC Guidelines for Climate Change Adaptation' for guidance.	Yes
C.8 Reduce waste to landfill	Ensure that at least 95 percent of construction waste generated during site preparation and construction is diverted from landfill and either recycled or reused.	Yes

Initiative	Description	Applicable
C.10 Biodiversity offsetting	For non significant impacts (inside or outside the rail corridor) offsetting is to be in accordance with either the RailCorp Biodiversity Offset requirements or Transport Project's Vegetation Offsetting Guide as appropriate.	Yes
C.11 Water balance study	Undertake a water balance study including groundwater where applicable to inform feasibility for reuse initiatives.	Yes
C.12 Water efficient fittings	Ensure onsite amenities using potable water comply with the following criteria: Toilets, if any, to be WELS (max 4.5/3 L/min) dual flush toilets; Urinals, if any, to be waterless urinals; All taps to be WELS (max 7.5 L/min) taps; (See Green Star Office v3) Any other water fixtures should achieve a 5 Star WELS rating.	Yes
C.14 Monitor and record construction water	Meter water consumption at site office and all of the outlets available to the construction site.	Yes
Energy and greenhouse gas		
1.17 Photo-electric switches	Install control systems for lighting that dim or switch-off lights according to the amount of daylight the zone is receiving. The lights can also switch on in order to maintain a minimum level of lighting. Lights should be off when areas are closed or unoccupied.	Yes
1.22 Lighting scheme	Prepare a lighting scheme by a suitably qualified lighting designer. Pay attention to zoning between lighting demands of different areas and strategic placement of lighting fixtures to maximise ground coverage.	Yes
1.25 Natural ventilation	Naturally ventilate structures (refer to AS1668.2-2002 (type 3)). Consider prevailing winds.	Yes
1.44 Vertical transport	Install energy efficient vertical transport systems (eg ramps; variable speed drive escalators that enable a 'slow-mode', so that they oscillate at lower speeds when not in use and increase in speed when users step into the foot panel at the entry to the escalator; and variable voltage variable frequency (VVVF) control gear for lifts. (Station Guidelines for Vertical Transport).	Yes
1.54 Green energy	Purchase 25% of site based electricity as 'green power' during construction of the asset.	Yes
Climate resilience		
2.8 Protection from extreme weather (sun, rain, wind)	Consider design measures for protecting customers and electrical equipment from wind and rain during storm events.	Yes
2.9 Protect sensitive assets	Protect sensitive assets (e.g. lifts) from the effects of extreme climate and weather.	Yes

Materials and waste		
3.6 Reduce cement	Reduce the absolute quantity of Portland cement by at least 30%, as an average across all concrete mixes, by substituting it with supplementary cementitious materials (such as a fly ash, ground granulated blast furnace slag or alkali-activated cements).	Yes
3.9 Recycled aggregate	Use recycled aggregate in non-structural uses (eg building base course, sub-grade to any car parks and footpaths, backfilling to service trenches, kerb and gutter).	Yes
3.15 Lower embodied energy bar and mesh	Source at least 60% of bar and mesh that is produced through energy reduction processes such as Polymer Injection Technology.	Yes
3.17 Low VOC paints and finishes	Specify low volatile organic compound (VOC) paints and finishes.	Yes
3.29 Segregation of waste	Enable waste segregation in the design process by including space for the collection and segregation of waste with appropriate marking (eg signage) and controls (eg lockable lids), located away from sensitive receptors (eg water courses).	Yes
3.30 Reuse construction waste	Maximise reuse of concrete, bricks, earthworks and other structural waste materials.	Yes
Biodiversity & Heritage		
4.9 Heritage items in the vicinity	Design for the interrelationship between new development/redevelopment and proximate buildings of heritage/cultural significance.	Yes
4.10 Heritage interpretation	Develop and implement a heritage interpretation strategy, eg incorporate interpretive signage at the station, which provides information on the heritage of the area.	Yes
Water		
5.10 Planting	Select plant species that require minimal or no irrigation after establishment.	Yes
Pollution Control		
6.4 Avoid dangerous goods and hazardous materials	Use Material Safety Data Sheets (MSDS) to avoid dangerous goods and hazardous materials.	Yes
Community		
7.7 Plan station entries	Plan stations entries that connect directly to existing key desire lines, pedestrian routes or for the most efficient pedestrian routes.	Yes

7.8 Bicycle and pedestrian links	Optimise local pedestrian links to and between community facilities, such as sports grounds etc. Plan pathways within the asset to connect directly with existing pedestrian routes, centre activities and station entries. Design station building in a way to prevent it becoming a visual or psychological barrier to crossing the railway.	Yes
7.14 Way-finding strategy	Develop and implement a way-finding strategy for the catchment area within 800 metres of the station.	Yes
7.19 Kiss and ride	Provide for kiss and ride at the station.	Yes
7.20 Taxi stand and/or bus stop	Provide shelter for nearby taxi stands and bus stops.	Yes
7.28 Bicycle lockers and/ or racks	Provide sheltered bicycle lock ups and/or lockers in or near entrance to the station. Allow for at least 5% of staff use at maintenance facilities. See Section 3.9.3.1 of the ASA Station Design and Standard Requirements for further information on bicycle parking requirements at stations.	Yes
7.29 Bicycle storage security	Locate bicycle storage area in an area with a high level of passive surveillance and/or prominent CCTV.	Yes
7.34 Safe pedestrian movement	Make sure that safe movement is promoted for pedestrians and cyclists by minimizing vehicle crossings of paths, providing clear signage, and providing freedom from obstacles such as poles, trees etc.	Yes
7.40 Reduce graffiti	Minimise graffiti risks during design, such as: treatment of fencing and other surfaces with anti-graffiti paint or coatings, vegetation cover to deter graffiti or providing designated walls for graffiti.	Yes
7.51 Shading	Provide shade through vegetation or structures over platform, concourse, car parks and pedestrian pathway areas and work/lunch areas at maintenance facilities.	Yes

3.2. Construction activities

3.2.1. Engineering constraints

There are a number of constraints impacting on the design of the Proposal. These include the limited space for development due to the fact that the existing concourse must remain open and the station must remain operational during the works. It is assumed lifts would be installed sequentially rather than concurrently.

3.2.2. Work methodology

The estimated construction duration of the Proposal would be up to 24 months, with completion scheduled for last quarter 2015.

To minimise impacts on commuters and the local community, it is proposed that the construction program would be staged. The work methodology would be developed further, in consultation with the construction contractor and TfNSW. The staging, as outlined in Table 3 is based on the current Reference Design and is subject to change during the detailed design stages.

Staging diagrams have been produced as part of the Reference Design development submissions.

The Proposal would need to be constructed within railway operating constraints and the track possession schedule. Some works would be required during weekend track possessions and during night periods to minimise impacts to commuters and local traffic. The concourse and platforms would remain accessible by commuters at all times during the normal train operations, and either closed or controlled during the relevant possession works.

Demolition activities include:

- existing external stairs at Ingleburn Road entry near the existing taxi rank (but maintain entry ramp to Platform 2)
- taxi shelter prior to re-configuring taxi, parking and access ramp
- demolish/remove screens and fixtures on Platform 1 south of the heritage building
- signalling building north of the heritage building
- existing ramp on Ingleburn Road opposite the pedestrian crossing
- existing bus shelter in Ingleburn Road
- existing staff WC
- remove existing trees outside the entrance on Stanley Road

This staging is based on the current Reference Design and may change once the detailed design methodology is finalised (refer to Table 3 below). See Appendix 3 for draft staging diagrams.

Table 3: Likely construction staging activities and works

Possession No.	Description of activity		
	Platform 1	Platform 2	General
1	Demolish redundant signal hut		Site establishment activities.
Between possession works (A)	Demolition and construction works; relocate TVM to temporary location.	Demolition and construction works.	Erect construction compounds relocate taxis and buses; construct new parking zones; tree removal
2	coping work (city end, one	coping work (city end,	Establish freight track

Possession No.	Description of activity		
	Platform 1	Platform 2	General
	third of platform)	one third of platform)	cross-overs locate piling rig behind hoarding
Between possession works (B)	Demolition and construction works; platform widening; Lift 2 piling; canopy works;; Platform 1 resurfacing (city end, one third of platform)	Demolition and construction works; Lift 1 piling; canopy works; Platform 2 resurfacing (city end, one third of platform).	
3	Demolition works; coping work (middle third of platform);	Coping work (middle third of platform)	
Between possession works (C)	Demolition works; piling;, platform widening works and partial canopy structures; Platform 1 resurfacing (middle third of platform)	Platform 2 resurfacing (middle third of platform)	Bus shelter; bike lockers; Lift 3 piling, landing and canopy structures; Stanley Road external works .
4	Coping work (country end third of platform); complete canopy structures and platform resurfacing.	Coping work (country end third of platform); remove Platform 2 hoardings	
Between possession works (D)	Complete Platform 1 resurfacing (country end third of platform)	Complete Platform 2 resurfacing (country end third of platform)	Complete Stanley Road Forecourt works
5			Final possession site works and clean-up as required
Between possession works (E)			Final site works and, clean up.

3.2.3. Plant and equipment

Indicative construction activities and equipment are shown in the following table:

Description of activity	Plant and equipment
Platform 1 Works	
Temporary boundary fencing, establishment of site compound	▪ Elevated Working Platform (EWP) ▪ Generator ▪ Hand tool” ▪ 4" grinder ▪ Circular saw ▪ Wacker rammer ▪ Air conditioners x 2
Temporary Construction to Platform 1	▪ Bobcat ▪ Hand tools ▪ Excavator (20t)

Description of activity	Plant and equipment
	▪ Concrete pump/vibrator ▪ Trucks (10t) ▪ Jackhammer
Installation of Temporary Facilities	▪ Crane (mobile 25t) ▪ Truck (10t) ▪ Handtools ▪ Generator
Modifications to Existing Staff Amenities Heritage Building New Public Amenities building Demolition of Existing Amenities Building Platform Extension Works (Country end) New Lift Access Walkway (to Lift 2)	▪ Demolition saw ▪ Sledge hammers ▪ Truck (10t) ▪ Jack hammers ▪ Hand tools ▪ Tracked wheel barrow ▪ Generator
Platform Works (Resurfacing, cross falls, lights, drainage etc)	▪ Backhoe ▪ Trucks (small) ▪ Wacker packers ▪ Concrete saw ▪ Line marking plant ▪ Paving plant ▪ Bobcat ▪ Concrete pump ▪ Concrete vibrator ▪ Jackhammers
New Station Entrance Forecourt off Ingleburn Road	
Temporary Public Access to Platform 2	▪ Bobcat ▪ Hand tools ▪ Excavator (20t) ▪ Concrete pump/vibrator ▪ Trucks (10t) ▪ Generator
Demolition of existing Ramps, Canopies, Bicycle Storage areas	▪ Concrete saw ▪ Hand tools ▪ Excavator (20t) ▪ Trucks ▪ Jackhammer
New Lift Access Walkway (to Lift 1)	▪ Bob cat ▪ Piling rig (bore) ▪ Excavator (20t) ▪ Mobile crane (10t) ▪ Concrete pump ▪ Concrete vibrator

Platform 2 Works	
Platform Works (Resurfacing, cross falls, lights, drainage etc)	▪ Backhoe ▪ Trucks (small) ▪ Wacker packers ▪ Concrete saw ▪ Line marking plant ▪ Paving plant ▪ Bobcat ▪ Concrete pump ▪ Concrete vibrator ▪ Jackhammers
Lift Construction (structure, cladding, fit-out and commissioning)	▪ Grinders ▪ Hand tools ▪ Trucks ▪ Mobile crane (25t) ▪ Excavator (20t)
Ingleburn Road Works	
Reconfigured Taxi Drop Off Zone, New bicycle storage area, Replacement of shelters to footbridge and ramps - roof sheeting and throw screens, Car park works	▪ Hand tools ▪ Concrete saw ▪ Bob cat ▪ Steel drum compactor ▪ Trucks ▪ Line marking and paving plant ▪ Concrete vibrator ▪ Concrete trucks ▪ Mobile crane (25t) ▪ Grinders ▪ Elevated Working Platform (EWP)
Stanley Road Works	
Reconstructed DDA and Commuter Car Parks	▪ Hand tools ▪ Concrete saw ▪ Bob cat ▪ Steel drum compactor ▪ Trucks ▪ Line marking and paving plant ▪ Concrete vibrator
Replacement of shelters to footbridge and ramps - roof sheeting and throw screens	▪ Mobile crane (25t) ▪ Hand tools ▪ Grinders ▪ Elevated Working Platform (EWP)

Table 4: Types of plant and associated maximum sound levels at point source

Plant	dBA	Plant	dBA	Plant	dBA
Chipping hammer	114	Elevated work platform	97	Jackhammer	108
Truck (10T)	98	Excavator (20T)	99	Miscellaneous hand tools	94
Circular saw	116	Mobile Crane (25T)	99	Bobcat	110
Concrete Pump	106	Generator	111	Grinder 4”	98
Concrete Vibrator	102	Wacker Rammer	108	Smooth drum roller	109
Paving Machine	104	Concrete Truck/Agitator	106	Line marking plant	98
Chainsaw	108	Chipper	120	Stump grinder	116

(Source: SLR Consulting, Construction Scenarios, 2013)

3.2.4. Working hours

Construction would take up to 24 months, from last quarter 2013 to last quarter 2015. The standard construction hours would be as follows:

- 7am to 6pm Monday to Friday
- 8am to 1pm Saturdays
- no work on Sundays or public holidays.

The project as designed is capable of being staged to be constructed within railway operating constraints and a track possession schedule. The majority of works are able to be undertaken in non-possession times using appropriate means of safe working to protect the live network. Therefore the majority of works would be conducted during standard working hours between 7am and 6pm Monday to Friday, and 8am to 1pm on Saturdays.

However, some works outside of standard hours would be required during evening, night periods and weekends during track possessions, and for key activities (including partial closures of commuter parking in Ingleburn Road and Stanley Road) to minimise impacts to commuters and pedestrians.

Where out of hours works are required, approval from TfNSW would be required and the affected community would be advised as outlined in the TfNSW’s *Construction Noise Strategy* (TfNSW, 2012), and as per the Ingleburn *Environmental Noise and Vibration Impact Assessment* (SLR May 2013).

3.2.5. Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal, and would consider the requirements of the sustainable design guidelines. Materials would be sourced from local suppliers where practicable. Traffic access and vehicle movements

3.2.6. Traffic access and vehicle movements

Traffic and access arrangements during construction of the Proposal are discussed in detail in Section 6.1 of this REF. An indicative construction methodology has been developed for the Proposal as outlined in Section 3.2.2 above. A detailed construction methodology and associated management plan would be developed as part of the detailed design stage of works.

The potential impacts of construction activities and construction traffic with regard to transport and parking include:

- Additional heavy vehicle flows and new construction vehicle access arrangements.
- Although works would be staged to minimise impacts to commuters, there is the potential for minor impacts to commuters and staff as a result of works during standard hours. This can include traffic diversions and temporary access restrictions near the interchange.
- Impact on surrounding land uses (including the temporary removal of existing parking spaces, and changes to bus, taxi and kiss and ride zones).
- Degradation of amenity via construction traffic noise.

A detailed Construction Traffic Management Plan (CTMP) would be prepared in consultation with the Roads and Maritime Services (RMS) and Campbelltown City Council prior to construction works to manage potential construction traffic impacts for the Proposal.

The following objectives would be incorporated into the construction methodology and management measures:

- Maintain pedestrian access to and from the rail, bus, bicycle, taxi and commuter parking facilities at all times during construction activities.
- Where practicable, minimise the use of local and town centre roads for construction vehicle access to and from the site.
- Major regional roads shall be utilised where practicable.
- The use of night time work periods needs to be considered to reduce the duration of works and thus to minimise town centre and interchange impacts, and overall construction impacts.

Indicative construction traffic routes are shown in Figure 10. The CTMP would include:

- Timing of proposed works
- Hours of construction activities
- Number of construction vehicles to be used
- Designation of construction routes

- Mitigation and management measures including use of stop/go signals, construction vehicle access arrangements and circulation
- Designation of temporary parking during construction works (for both the community and project personnel)
- Contact details for key onsite construction personnel.

Site-specific traffic management issues would be addressed through the implementation of appropriate Traffic Control Plans (TCPs) developed in consultation with the relevant Roads Authority. The TCPs would outline key details such as advanced warning signage, traffic flow management and pedestrian management measures.

To mitigate congestion due to on-street parking of construction works, project personnel would be required to park away from the Town Centre (Oxford Street), where possible. Contractors would be encouraged to utilise public transport or car share arrangements where practicable.

Figure 10: Potential materials haulage routes

3.2.7. Ancillary facilities

Details of stockpile sites, construction compounds and other ancillary facilities that would form part of the Proposal would be prepared at the detailed design phase in consultation with Sydney Trains, Roads and Maritime Services (RMS) and Campbelltown City Council.

It is estimated that a stockpile of around 250m^3 would be adequate. This is likely to be located where another project construction compound is currently located i.e. within the rail corridor off Ingleburn Road south of the station. Given the length of the construction program, the size of the stockpile is likely to vary over time, and multiple stockpiles for the sorted waste or skip bins may be required.

3.2.8. Public utility adjustments

A utility investigation, including Dial Before You Dig (DBYD) enquiries, has been undertaken during preliminary design stages, but in some areas was inconclusive. Further investigation may be required, although the Proposal is to designed to avoid relocation of services.

The following utilities occur within the Proposal area:

- Ausgrid – Electrical
- Endeavour Energy
- Telstra and Optus - Telecommunications
- Sydney Water Corporation (SWC) - water and sewerage
- Jemena - gas
- Campbelltown City Council - Stormwater
- RailCorp – CCTV, signalling and electrical.

The appropriate utility providers would be consulted during the detailed design phase.

It is likely some additional services may require relocation. Such relocation is unlikely to occur outside of the work footprint assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken.

3.3. Property impacts

While the majority of the proposed works are within the RailCorp corridor, part of the Proposal is on land under the care and control of Campbelltown City Council. Notably, this includes station infrastructure opposite the Ingleburn Road/Oxford Street intersection (the proposed new entry forecourt and bus shelter area) and the reconfigured accessible parking and taxi zone. In Stanley Road, the land under Council's care and control includes the new entry forecourt, and the footpath works along the existing commuter car park north of the station.

No property acquisition for the Proposal has currently been identified.

3.4. Operational management and maintenance

The future management and maintenance of the new station forecourts is subject to further discussions with Sydney Trains, TfNSW and Campbelltown City Council. Structures constructed under this Proposal would be maintained by TfNSW.

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, environmental planning instruments, and Commonwealth legislation.

4.1. Ecologically sustainable development

TfNSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD).

The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 to the EP&A Regulation as:

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

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the Ingleburn Station Upgrade. Section 3.1.2 summarises how ESD has been incorporated in the design development of the proposal. Section 6.12 includes an assessment of the proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction and operation of the proposal.

4.2. NSW Government policies and strategies

In addition to statutory requirements, several NSW Government policies and strategies are relevant to the Proposal. Table 5 summarises the NSW Government policies and strategies applicable to the Proposal.

Table 5: Relevant NSW Government policies/strategies

Policy/Strategy	Commitment	Comment
Metropolitan Plan for Sydney 2036	In 2010 the *Metropolitan Strategy* was updated and integrated with the *Metropolitan Transport Plan* to deliver a new 25-year *Metropolitan Plan for Sydney 2036.* The Metropolitan Plan is designed to	This Proposal supports the following Strategic Directions in the Metropolitan Strategy: A10.1 Develop Sydney's transport system to support its role as a global city

Policy/Strategy	Commitment	Comment
	meet the targets in the updated NSW State Plan—notably in integrated transport and land use planning. The *Metropolitan Transport Plan – Connecting the City of Cities* (February 2010) was the NSW Government's response to the specific challenges of passenger travel and transport within and across Sydney identifies in the Metropolitan Strategy. This Transport Plan has been integrated into the Metropolitan Plan. The Transport Plan identifies a number of initiatives to be delivered over the next decade. One of these initiatives is 'to improve passenger connections between buses and trains through upgrades to essential interchanges' across the greater Sydney Metropolitan area.	C2.2 Develop modal strategies including rail, bus, walking and roads to respond to growth in demand E3.3 Strengthen existing freight and industry clusters and support emergence of new clusters H3.1 Design and plan for healthy, safe, accessible and inclusive places
State Infrastructure Strategy (SIS)	The SIS is the 20-year strategy to identify and prioritise the delivery of critical public infrastructure that drives productivity and economic growth. The Strategy presents the NSW Government with clear and strategic options for delivering infrastructure and market reform in a way that provides the best value for taxpayers.	The Proposal is consistent with the Priority: Deliver a well connected region – reduce road congestion and improve public transport improved with integrated services to reduce travel times across the region and on to other destinations.
NSW 2021	NSW 2021 is the NSW Government's ten year plan to guide budget and decision making in NSW. NSW 2021 includes the following goals, targets and priority actions relevant to the Proposal: ▪ reduce travel times ▪ minimise public transport waiting times for customers ▪ improve co-ordination and integration between transport modes ▪ grow patronage on public transport ▪ improve public transport reliability ▪ improve customer experience with transport services. On 21st December 2012, the Government released the South Western (and Western Sydney and Blue Mountains) Regional Action Plans. These Plans outline the immediate actions the Government will take to address the priorities identified by the	The proposal is consistent with the NSW Government's commitment to: ▪ grow patronage on public transport, and ▪ improve customer experience with transport services. and in particular with NSW 2021 Goal 7 – Reduce travel times, and Goal 20 – build liveable centres. The Proposal contributes to Goal 14 – Increase opportunities for people with a disability, by improving transport access. The Proposal also supports active transport by contributing to the development of cycle facilities as part of an integrated local network.

Policy/Strategy	Commitment	Comment
	community.	
NSW Transport Master Plan	The *NSW Long Term Transport Master Plan* (December 2012) identifies a planned and coordinated set of actions to address transport challenges. It will guide the NSW Government's transport funding priorities over the next 20 years. The Long Term Master Plan will meet a number of challenges to building an integrated transport system for Sydney and NSW, including: ▪ Customer-focussed integrated transport planning ▪ Integrated modes to meet customer needs ▪ Getting Sydney Moving Again ▪ Sustaining Growth in Greater Sydney. The Master Plan links to *NSW 2021*, the *Metropolitan Strategy for Sydney*, the *State Infrastructure Strategy*, regional and sub-regional strategies, and national plans.	The Proposal implements key themes in the Master Plan: ▪ Improving customers' journey experience ▪ Making better use of existing assets ▪ Providing accessible transport to help address social exclusion.
Draft South West Subregional Strategy	The Draft South West Subregional Strategy is vital to the implementation of the broader Metropolitan Plan, as it applies the objectives of the Metropolitan Plan down to a local level. The draft Strategy was exhibited between December 2007 and March 2008. The Draft South West Subregional Strategy includes the LGAs of Liverpool, Campbelltown, Camden and Wollondilly local government areas. The South West Subregion is targeted for the biggest proportional growth in employment capacity in Sydney. This target includes: ▪ Increasing employment capacity in Liverpool (Regional City) from 16,000 in 2006 to 31,000 by 2036. ▪ Increasing employment capacity in Campbelltown /Macarthur (major centre) from 14,000 in 2006 to 25,000 by 2036. The transport system supports the	The Proposal is consistent with the Draft South West Sub-regional Strategy for the West Central Sydney subregion. The Proposal would facilitate extension of transport networks to connect the South West Growth Centre to the existing employment lands at Ingleburn, and to connect Ingleburn to employment opportunities in Liverpool and Campbelltown/ Macarthur. This would support a reduction in cross-regional trips, resulting in less need to use private cars.

Policy/Strategy	Commitment	Comment
	economic growth of every subregion in Sydney by getting people to jobs and services and other daily activities in a fast, safe and reliable way. Most travel is undertaken within the subregion where people live.	

4.3. NSW legislation and regulations

4.3.1. Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Part 5 of the EP&A Act. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent.

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal. Having regard to these provisions, TfNSW has determined that no significant environmental impact is likely and that therefore an environmental impact statement is not required.

Clause 228 of the EP&A Regulation defines the factors which must be considered when assessing an activity under Part 5 of the EP&A Act is likely to have a significant impact on the environment.

Chapter 6 of this REF provides an environmental impact assessment of the Proposal in accordance with clause 228. Appendix 1 specifically responds to the factors for consideration under clause 228.

4.3.2. Other NSW legislation and regulations

Table 6 provides a list of other relevant legislation applicable to the proposal.

Table 6: Other relevant legislation applicable to the Proposal

Legislation	Requirements for the Proposal
Heritage Act 1977 (NSW)	Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted. Sections 139 and 140 (permit) where relics are likely to be exposed. Section 170A: *Heritage management by government instrumentalities*, where items listed on a government agency Heritage and Conservation Register are to be impacted. Ingleburn Railway Station Group is listed on the RailCorp Section 170 register.

Legislation	Requirements for the Proposal
	No heritage approvals are required under the Act, but a government instrumentality must give the Heritage Council not less than 14 days written notice before the government instrumentality removes any item from its register under Section 170. Transport agencies are responsible for conserving heritage places under their stewardship, as well as provide equitable access under the *Disability Discrimination Act 1992* and relevant transport standards. The Proposal aims to ensure equitable access outcomes are achieved in a way that conserves heritage values and minimises impacts on heritage significance.
National Parks and Wildlife Act 1974 (NSW)	Sections 86, 87 and 90 require consent from the Office of Environment and Heritage (OEH) for the destruction or damage of Aboriginal objects. The Proposal is unlikely to disturb any Aboriginal objects.
Threatened Species Conservation Act 1995 (NSW)	The site does not contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer to section 6.7).
Fisheries Management Act 1994 (NSW)	Adequate stormwater quality measures would prevent any adverse impacts on any natural watercourse. The Proposal would not affect any listed threatened species, marine vegetation or involve dredging or dam works.
Contaminated Land Management Act 1997 (NSW)	The site has not been declared under the CLM Act as being significantly contaminated.
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The proposed works are not included as a scheduled activity under the PoEO Act. Therefore an environment protection licence under this Act is not required. Part 5 provides a Duty to notify the EPA in the event of a pollution incident occurring.
Water Management Act 2000 (NSW)	The Proposal would not involve any marked increase in water consumption, water management works, drainage or flood works, controlled activities or aquifer interference.
Waste Avoidance and Resource Recovery Act 2001 (NSW)	TfNSW would carry out the construction of the Proposal in accordance with the objects of this Act. A Waste Management Plan would be prepared and implemented during construction.
Native Title Act 1993 (Commonwealth)	The proposed site is unlikely to be affected by any native title holders or claim.

Legislation	Requirements for the Proposal
Disability Discrimination Act 1992 (DDA) (Commonwealth); *Disability Services Act 1993 (NSW);* *Disability Standards for Accessible Public Transport 2002 (DSFAPT) (Commonwealth)*	The objects of the DDA are to eliminate, as far as possible, discrimination against persons on the grounds of disability, including in the provision of services. The proposal would promote the objectives of TfNSW's Disability Action Plan 2012-2017 which aims to eliminate, as far as practicable, direct and indirect discrimination in the provision of transport services to NSW residents and visitors. The Plan requires all new and refurbished transport infrastructure to meet customer focussed design standards and comply with DDA requirements.

4.4. State Environmental Planning Policies

4.4.1. State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of the Proposal.

Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land. Clause 78 defines 'rail infrastructure facilities' as including: railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms, and associated public transport facilities for railway stations.

Consequently, development consent is not required, however the environmental impacts of the Proposal have been assessed under the provisions of Part 5 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils prior to the commencement of certain types of development. Section 5.6 of this REF discusses the consultation undertaken with Council during the development of the Proposal.

It is noted that the Infrastructure SEPP prevails over all other environmental planning instruments except where *State Environmental Planning Policy (Major Development) 2005*, *State Environmental Planning Policy No 14 – Coastal Wetlands* or *State Environmental Planning Policy No 26 – Littoral Rainforest* applies.

4.5. Local environmental planning instruments and development controls

4.5.1. Campbelltown (Urban Area) Local Environmental Plan 2002

Table 7: Relevant provisions of the Campbelltown (Urban Area) Local Environment Plan

Description	Comment
Zone	The site of the Proposal is zoned as 5(a) Special Uses A (refer Figure 11).
Zone Objectives and Development Control	The Proposal is consistent with the objectives of zone 5(a) Special Uses and is consistent with the objective that the development is for railway purposes. The works are also consistent as they would encourage a high quality standard of development which is aesthetically pleasing, functional and relates sympathetically to nearby and adjoining development.
Consent requirements	The objectives of zone 5(a) are: (a) to provide land for special uses which would otherwise be prohibited by the zoning of the surrounding area, and (b) to identify land used or required for railway purposes. Except as otherwise provided by this plan, consent must not be granted for development on land within this zone unless the consent authority is of the opinion that carrying out the proposed development would achieve the objective of this zone stated in paragraph (a). A further objective of this zone is to encourage a high quality standard of development which is aesthetically pleasing, functional and relates sympathetically to nearby and adjoining development. Development without consent may be carried out on land within this zone without consent for the purpose of drainage and utility installations.
Development on land identified on acid sulphate soil planning map	Under this clause, development in parts of the town centre must take into consideration the potential impacts associated with Acid Sulphate soils. Works are not to be carried out without consent. The ASS Risk assessment undertaken for ARTC by Connell Wagner in connection with the construction of the Southern Sydney Freight Line did not identify any acid sulfate soil risk in the rail corridor.
Restrictions applying to heritage items	Clause 44 of the LEP provides for protection of heritage items and Heritage Conservation Areas. There are no Heritage Conservation Areas in the vicinity of the Proposal.
Development in the vicinity of heritage items	Beyond the Ingleburn Railway Station Group S170 Register listing, there are no listed heritage items in the immediate vicinity that would be materially affected by the proposed development of Ingleburn Station. The Annis and George Bills (Ingleburn) Horse Trough at 14 Oxford Road Ingleburn (which is located approximately 50m southwest of the Station) is listed as an item of Local Significance on the Campbelltown LEP 2002, but would not be impacted by the Proposal. A mature Bunya Pine tree (which is located within close proximity, approximately 10m south of Platform 2, and obscured behind a modern bus shelter) has also been identified by the heritage consultant as an item of Local heritage significance for its association with early 1900s development of the station and local area. It is considered that the tree warrants either heritage listing on the Campbelltown LEP 2002, or inclusion as part of the S170 listing for the Ingleburn Station Group. These issues are further assessed in section 6.5.

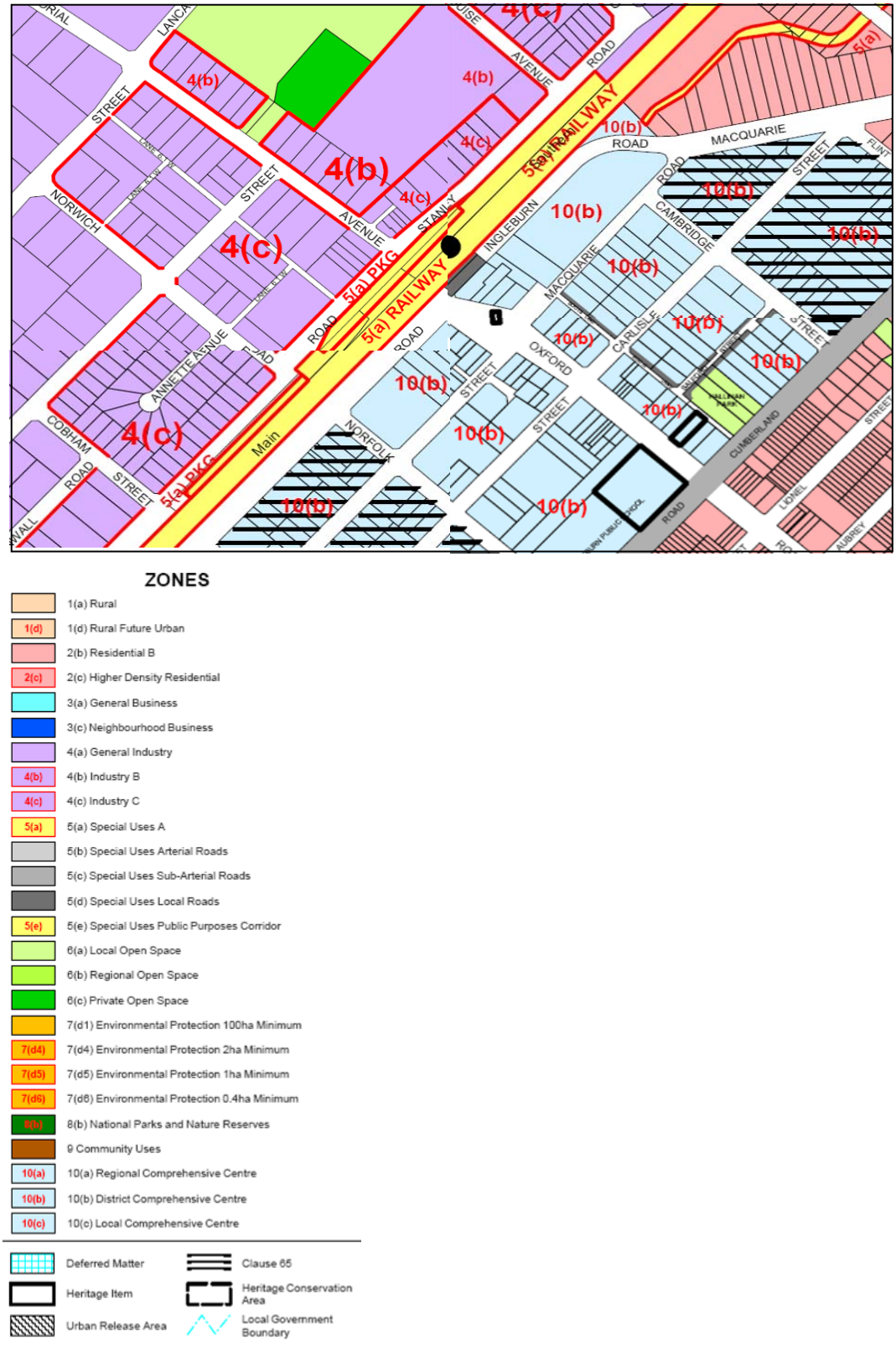


Figure 11: Campbelltown LEP 2002 zoning map
(Source: www.campbelltown.nsw.gov.au)

4.6. Commonwealth legislation

4.6.1. Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of National Environmental Significance (NES) or matters relating to Commonwealth land.

These matters are considered in full in Appendix 1.

The proposal would not impact on any matters of NES or on Commonwealth land. Therefore a referral to SEWPAC is not required.

5. Community and stakeholder consultation

Chapter 4.6 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. Consultation requirement

Table 8 provides details of consultation requirements under the Infrastructure SEPP.

Table 8: Infrastructure SEPP consultation requirements

Consultation with Councils – development with impacts on council related infrastructure and services	Relevance to the Proposal
Where railway station works: ▪ substantially impact on storm water management services ▪ 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.	ISEPP triggers the following requirements: Regulation 13: - consultation with councils (development with impacts on council-related infrastructure or services).
Consultation with Councils – development with impacts on local heritage	**Relevance to the Proposal**
Where railway station works: ▪ substantially impact on local heritage item (if not also a State heritage item) ▪ substantially impact on a heritage conservation area	ISEPP triggers the following requirements: Regulation 14: consultation with councils (development with impacts on local heritage).
Consultation with Councils – development with impacts on flood liable land	**Relevance to the Proposal**
Where railway station works: ▪ impact on land that is susceptible to flooding – reference would be made to *Floodplain Development Manual: the management of flood liable land'*.	The proposed site is not susceptible to flooding. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Hydrology assessment in section 6.9

Consultation with public authorities other than Councils	Relevance to the Proposal
Where development is undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974*, OEH and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult would include: ▪ Roads and Maritime Services (RMS) ▪ RailCorp ▪ Sydney Trains ▪ TfNSW ▪ OEH	The Proposal is not adjacent to land reserved under the *National Parks and Wildlife Act 1974.* Accordingly, consultation with Council is not required in regard to this aspect.

5.2. Consultation strategy

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

The objectives of the consultation strategy are to:

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

5.3. Consultation tools and activities

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

- public display of the REF
- distribution of project updates by letterbox drop up to a radius of approximately 500 metres to the station to local community and rail commuters, where appropriate, outlining the Proposal and inviting feedback on the REF
- advertisement of REF public display in local newspapers with details of the TfNSW website that includes a summary of the Proposal and information on how to provide feedback
- consultation with Council, RMS, Sydney Trains and other non-community stakeholders
- advertisement of the REF public display on posters installed at the station.

5.4. Public display period

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 placed on public display for a period of two weeks at the following locations:

1. Campbelltown Civic Centre
   Cnr Queen and Broughton Streets
   Campbelltown NSW 2560
   (Monday to Friday, 8.30am to 4:30pm)

2. HJ Daley Library
   1 Hurley Street
   Campbelltown NSW 2560
   (Monday to Friday, 9.30am to 8:30pm, Saturday 9.00am to 4.00pm, Sunday10.30am to 4.00pm)

3. Greg Percival Library
   Cnr Oxford and Cumberland Roads,
   Ingleburn NSW 2565
   (Monday and Friday 9:30am to 8:30pm, Tuesday to Thursday 9.30am to 5.00pm, Saturday 9.00am to 12.00pm)

4. TfNSW, Transport Projects Division
   Level 5, Tower A, Zenith Centre,
   821 Pacific Highway,
   Chatswood NSW 2067
   (Monday to Friday, 8.30am to 5:00pm)

The REF would also be available on the TfNSW website: www.transport.nsw.gov.au/projects. Information on the Proposal would be available through the Project Infoline (1800 684 490) or by email (projects@transport.nsw.gov.au).

During this time feedback is invited. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal.

5.5. Aboriginal community involvement

An Aboriginal Heritage Inventory Management System (AHIMS) search was undertaken for Ingleburn Railway Station and surrounding lands within a one kilometre radius. The search did not identify any Aboriginal sites recorded in or near the subject location, and no Aboriginal places have been declared in or near the subject location. Therefore it was not considered necessary to undertake specific Aboriginal consultation.

5.6. Stakeholder consultation

Transport for NSW established a Project Control Group (PCG) comprising representatives of the key state government agencies likely to have a significant input or involvement in delivery of the Proposal. The PCG consists of representatives from TfNSW, RailCorp/Sydney Trains, and RMS. The PCG meets on a regular basis to provide program direction and a conduit to key information sources within each organisation.

TfNSW conducted a briefing on the Proposal with Campbelltown City Council in May 2013. See Table 9 for a summary of the issues raised by Council at the meeting.

Table 9: Potential issues which Council raised during initial consultation

Item	Issue	TfNSW response
Property ownership	Elements of the proposed design were positioned outside the rail corridor on Council land i.e. taxi stand, bus shelter provisions, car parks and footpath.	TfNSW would maintain the canopies as they would be attached to existing RailCorp-owned infrastructure. It was agreed that further discussion would take place with Council regarding proposed accessible parking and other design interfaces with Council land.
	Council sought clarity on whether a pathway on the edge of the car park on the Ingleburn Road side of the Station could be provided.	TfNSW advised that existing constraints would mean that the provision of a footpath would impact the number of car parking spaces.
	Council asked if there was the possibility to have the proposed footpath adjacent to the Stanley Road car park concreted kerb to kerb to avoid mowing / maintenance.	TfNSW advised that this would be considered in the design development of the concept.
Parking	Council asked if any car spaces would be lost as a result of the design.	TfNSW advised that the design objective is for no loss of formalised parking.
	Council sought clarification regarding the formalisation of the car park on Stanley Road and whether this would restrict access for kiss and ride.	The existing kiss and ride is not currently formalised along Stanley Road. In addition to the proposed provisions, the proposed new footpath could serve as an overflow arrangement, however kiss and ride demand is expected to be low on this side of the station.

Item	Issue	TfNSW response
	Council asked if there would be any changes to Station staff parking.	Staff parking would be unchanged.
Shopping trolleys and taxi rank location	It was noted that the management of shopping trolleys in the area is an ongoing issue at the Station and surrounding areas. It was further suggested that the problem may be amplified on the other side of the Station when the lifts are in operation. Council advised that there are no current DA conditions for the supermarket to control the issue of discarded shopping trolleys within the station precinct. Council committed to liaise with the supermarket to represent the issue, and would consider other options as part of the design development of this project. The location of the taxi rank was discussed. It was suggested that the movement of taxis to the other side of Ingleburn Road may help alleviate the problem. Additional investigation and consultation was necessary for this to be an option.	Council to convene a meeting with Council and the Taxi Council to discuss the issue in further detail. Should this be approved, it is suggested that the matter be dealt with via future conditions for Development Consent. Options on the supermarket trolley issue to be pursued.
Community	Council advised that there is a special needs group across the road from the Station near Stanley Street. Council suggested a briefing of the proposed design to the group's nominated representative, who may have design inputs based on the group's disability requirements.	TfNSW to ensure the staff and operators of this facility would receive frequent and timely information during the project public display period and during construction.
	The Bunya tree on the Ingleburn Road side of the Station was discussed. Council advised that there is currently no maintenance undertaken on the tree.	TfNSW advised that options to mitigate the risk of the falling seed pods would be considered. TfNSW would investigate and discuss options with Council

Additional meetings and workshops would be held with key stakeholders during the detailed design process. These would include but not be limited to:

- TfNSW Transport Services Division
- Campbelltown City Council
- RMS
- Taxi Council
- RailCorp/Sydney Trains.

5.7. Ongoing consultation

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

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

Should TfNSW determine to proceed with the Proposal, the project team would keep the community, including local businesses, local disability groups, 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 throughout the construction phase would be undertaken in accordance with a community liaison plan (CLP) to be developed prior to the commencement of construction. See Figure 1 for the consultation process.

6. Environmental impact assessment

This environmental impact assessment has been undertaken in accordance with Part 5 of the EP&A Act and 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 1.

6.1. Traffic and transport

A Traffic Impact Assessment was carried out by GTA Consultants in April 2013.

The overall objectives of the project were to provide input to the preparation of the Reference design by:

- Minimising walking distances and promoting interchange with other modes of transport
- Minimising pedestrian conflict points and crowding points
- Minimising queuing at station facilities
- Maximising the perception of safety and security
- Minimising the cost of ownership and maintenance
- Accommodating growth in patronage and changing travel patterns
- Improving station functionality, including reduced congestion, access to ticketing and improved platform clearance rates
- Increasing accessibility for commuters with mobility impairment.

6.1.1. Existing environment

Ingleburn interchange is bounded by Stanley Road on the north west, where land use is predominantly industrial. To the south east the station is bounded by Ingleburn Road at the Oxford Road intersection with a mixture of commercial/retail uses and residential.

Existing interchange access/egress on the south east side of the station is via two locations:

- south of the Ingleburn Road/Oxford Road roundabout leading to the stairs, and
- the ramp landing north of the roundabout.

A pedestrian crossing north of the roundabout links the footpath on the station side of Ingleburn Road with the Ingleburn retail precinct on Oxford Road

A pedestrian refuge is provided south of the Ingleburn Road/Oxford Road roundabout.

Existing interchange access/egress on the north west side of the interchange, is via a marked pedestrian crossing (zebra crossing) provided, linking the stairway and ramp landing area with Memorial Avenue on the other side of Stanley Road (as per Figure 12 below).

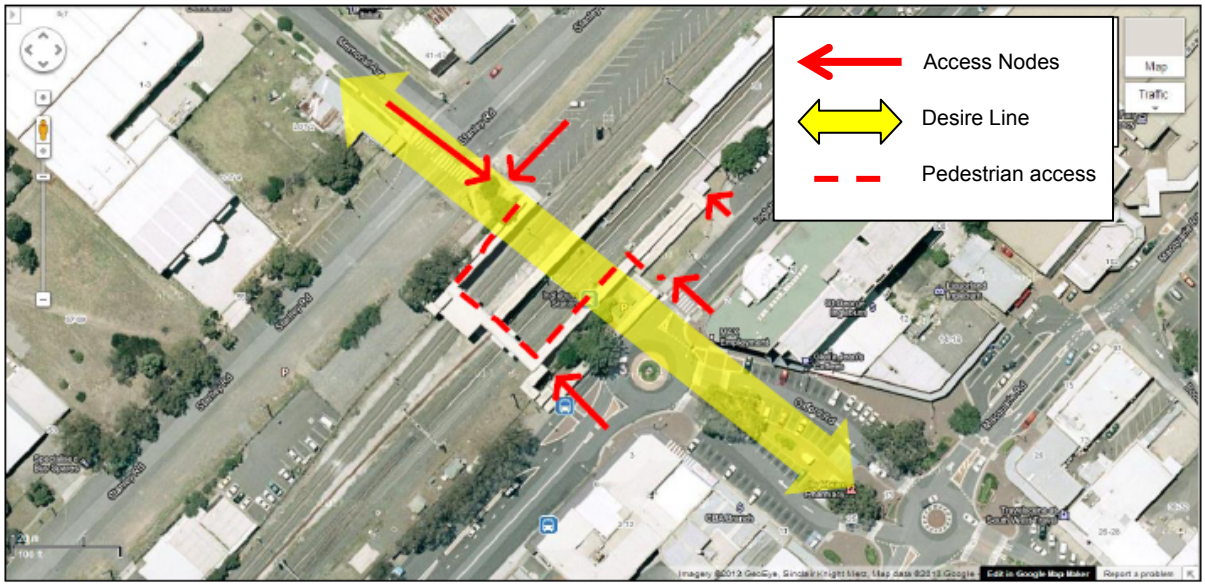


Figure 12: Current pedestrian access and desire lines

(Source: Google maps)

Access to the Ingleburn Railway Station does not meet current DDA standards i.e. does not comply with the requirements of DSFAPT. It is therefore proposed to upgrade access. The proposed upgrade would comprise:

- Full easy access upgrade from street to platform
- More accessible customer facilities throughout the precinct
- Accessible staff and commuter facilities (particularly toilet facilities).

Ingleburn Station is classified as a Community Station in relation to the RailCorp Station Functional Requirements hierarchy document (see below).

Table 10: Existing facilities at Ingleburn Station

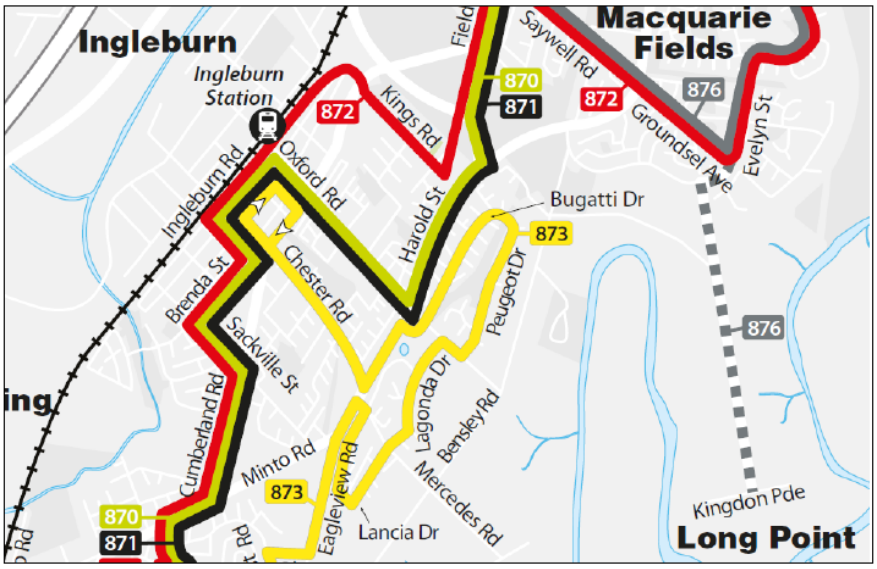
Getting around the station		Accessibility	
Stairs	✓	Hearing loop	✓
Escalator	✗	Platform tactile tiles	✗
Lift	✗	Portable boarding ramp	✓
Ramp (1:9 gradient)	✓	Wheelchair accessible toilet	✗
Level crossing	✗	Wheelchair accessible payphone	✗
		Wheelchair accessible carspace/s	✓

General facilities		Transport interchanges	
Ticket vending machine	✓	Bus stop close by	✓
Eftpos	✓	Ferry wharf close by	✗
Toilet	✓	Taxi rank close by	✓
Payphone	✓	Bike racks or bike lockers	✓
Passenger display screens	✗	Kiss and ride	✓
Help point	✓	Car park close by	✓

Source: http://www.cityrail.info/stations/station_details.htm

Table 11: Existing traffic and transport

Transport	Details
Train	Ingleburn Railway Station is serviced by three rail lines: ▪ Airport & East Hills Line ▪ South Line ▪ Cumberland Line. There are 10 city-bound services on a typical weekday running between 7-8am, dropping to 6 between 8-9am. After 9am, city services run at least 4 every hour. Services then increase to about 6 an hour between 3-7pm. Southbound services towards Campbelltown run 5 times between 6-7am, 6 times per hour between 7-9am, then 4-6 times per hour 9am-5pm. Services increase to 12 services to Campbelltown 5-6pm then 8 per hour 6-8pm. On the Cumberland Line, there are 2 services to Blacktown in the morning and 3 to

Transport	Details
	Campbelltown in the afternoon.
Bus	The bus interchange is located on the east side of the rail line in Ingleburn Road and services both through and terminating bus services. Bus layover is provided in a lay-by immediately south of the station There are no formal bus services on the west side of the interchange. Ingleburn bus operators are: ▪ Interline Bus Services ▪ Nightride services (Veolia) The following bus services currently operate in and out of the interchange: ▪ 870: Campbelltown - Ingleburn - Liverpool via Harrow Rd & Glenfield ▪ 871: Campbelltown - Ingleburn - Liverpool via Glenfield & Leacocks Ln ▪ 872: Campbelltown - Ingleburn - Glenfield via Macquarie Fields ▪ 873: Ingleburn - Minto ▪ N30: Night rider bus Town Hall to Macarthur There are also a number of school bus services. (A new bus service commencing in 2014 is proposed from Edmondson Park.) Bus shelters with seating run along the length of the eastern side of the interchange. The layout on the east side comprises a lay-by and a separate lane for buses to set-down and pick-up passengers. Three out of four bus routes use the roundabout at the intersection of Ingleburn Road and Oxford Road, immediately outside the station, to access the town centre.  **Bus routes accessing Ingleburn Station**
Parking for those with a disability	The three commuter car parks on both sides of the interchange have three spaces each (a total of nine spaces) for those with a disability. None of the spaces are compliant with DDA Standards.
Kiss and Ride	A formal kiss and ride facility with capacity for about 3 vehicles is provided on the southbound side of Ingleburn Road (opposite the station and taxi rank). It operates 6-9am and 3:30-6:30pm weekdays. Otherwise the spaces provide 2 hour parking 9am – 3:30pm Monday – Saturday.

Transport	Details
	An informal kiss and ride zone operates on Stanley Road on the west side of the station.
Taxi	A taxi rank is located in a lay-by off Ingleburn Road, on the east side of the interchange. The taxi rank has capacity for a minimum of 6-8 taxis. There is no taxi rank on the Stanley Road side of the interchange.
Bicycle Facilities	Two banks of secure bike lockers (12 lockers) accessed from Ingleburn Road are available for hire. There are adjacent bike racks for around 20 bicycles. There is bicycle parking available at the Stanley Road entrance to the station.
Commuter Car Parking	Formalised commuter car parking is available on both sides of the interchange in the form of formalised off-street parking provided along Stanley Road and Ingleburn Road, adjacent to the rail line. Unrestricted informal commuter parking also takes place on the rail corridor side of Stanley Street, and on Ingleburn Road and Norfolk Street. Time restricted on-street parking is also available on roads within the town centre, and within the vicinity of the interchange.
Traffic Access and Movements	Buses service the interchange on the east side of the station. The layout comprises a lay-by and a separate lane for buses to set-down and pick-up passengers. As well as being used by buses, the roundabout in Ingleburn Road outside the interchange is a major access point for vehicles accessing the town centre.
Pedestrian Access and Movements	On the east side, pedestrians access the interchange via stairs or a ramp that lead directly to Platform 2 (Down). Otherwise, the ramp continues, to lead up to the concourse and then ramp down to Platform 1 (Up). These ramps are not DDA compliant. From the west side, the access to Platform 1 (Up) is more circuitous, via ramps which are DDA compliant, and stairs. Continuing along the concourse leads down a ramp to Platform 2, or continuing across the concourse leads to ramps and stairs that access the town centre. These ramps are not DDA compliant. There are zebra crossings on both sides of the interchange, one across Stanley Road outside the station and one across Ingleburn Road immediately to the north side of the Oxford Road roundabout.
Local road network	Stanley Road north west of the proposal is a two way road with one lane travelling in each direction, in a 40 km/h speed zone. This road runs parallel to the railway line and is located to the north of the Proposal. There is a pedestrian crossing from the Station entrance to the northern side of the road along Stanley Road. Ingleburn Road runs parallel to the railway line, south east of the Proposal. It is a two-way road with one travel line in each direction. There is a bus stop immediately adjacent to the southern station entry. There is a pedestrian crossing at the eastern end of the bus stop on Ingleburn Road.

6.1.2. Potential impacts

(a) Construction phase

The key impacts for the construction phase have been identified and are discussed below:

Heavy vehicles. During construction heavy vehicles would be required to bring building material, precast sections, and large plant and equipment to the site and remove any waste.

The number of heavy vehicles would be kept to a minimum and where practical they would operate outside the peak hours. A Construction Traffic Management Plan (CTMP) would be prepared to manage construction traffic movements, including temporary traffic controls, pedestrian access, turning movements of the heavy vehicles as well as standing locations. The CTMP would identify specific management measures to be implemented for the Proposal. Construction traffic routes would be dependent on the contractor chosen for construction and the location of their source material. See map at Figure 10.

- *Construction worker parking and traffic*. As parking is in high demand in the vicinity of Ingleburn Railway Station, construction workers would be restricted from parking in certain areas. The CTMP would designate areas for construction worker parking, however it is anticipated that construction workers would be restricted from parking in any off-street commuter car park or in unrestricted spaces within the town centre. The CTMP would include a parking plan to address construction worker parking for the duration of the construction period.
- *Untimed/Commuter car parking*. There is likely to be a perceived loss of untimed informal commuter car parking off Stanley Road as a result of the construction activities, specifically proposed works compound and site amenities.
- *Pedestrian access to Ingleburn Railway Station.* Works would be staged so that works likely to impact upon passenger and pedestrian movements through the concourse, would be undertaken during night periods, outside of peak train travel periods or during possessions.

A Traffic and Transport Access Impact Assessment and a Road Safety Audit would be completed at the detailed design phase, and would be required prior to construction.

(b) Operational phase

The Proposal includes amendments to existing traffic infrastructure, particularly accessible parking, taxis and kiss and ride zones. No additional congestion is anticipated, and no need for additional traffic management has been identified. However, the Traffic and Transport Access Impact Assessment would confirm this.

There would be a gain in formalised commuter car parking as a result of these works, and there would be modified parking for those with a disability, kiss and ride, taxis, and buses.

Key impacts on the interchange during operation would be those that result from:

- Increased provision for those with a disability resulting from the addition of passenger lifts, and the extension of existing platforms to access proposed lift locations
- Reallocation of DDA- parking, taxi and kiss and ride zones in Ingleburn Road
- Upgrade of bus facilities, including provision of an expanded bus waiting area and a longer bus canopy for weather protection
- Upgrade of accessible car parking spaces to current standards
- An improved entry forecourt with additional weather protection on the east side to improve amenity and access to the station

- Provision of a footpath on the north west commuter car park on Stanley Road to provide safe pedestrian access
- Provision of upgraded bicycle racks adjacent to the taxi rank
- Improvement to the pedestrian crossings on Stanley Road immediately south of Memorial Avenue, including provision of kerb extensions, to facilitate safer pedestrian access and egress
- Provision of a formalised commuter car park on Stanley Road south of the western station entry, with capacity for 30 car spaces, including three accessible spaces.
- More legible entry forecourt on the Stanley Road side of the station with upgraded accessible car parking spaces and kiss and ride zone
- A new bus zone on Stanley Road (for a proposed Edmondson Park service).
- Installation of new bike racks on the western side of the station.

6.1.3. Mitigation measures

- A Construction Traffic Management Plan (CTMP) would be prepared that addresses the management of the construction where discussed in this report. It would be provided to Council as the relevant Roads Authority. Specifically the CTMP would include:
  - traffic management – signage, local traffic control
  - pedestrian management – safety and access
  - routes, turning movements, and sight lines for heavy vehicles
  - loading/delivery zones, and
  - any temporary parking arrangements (construction worker and commuter).
- Installation of pedestrian fencing and signage in locations as required to direct pedestrians to designated crossing locations.
- Installation of temporary way finding signage to guide passengers around the railway station and construction activities.
- Heavy vehicles would be restricted to specified routes, with the aim of minimising impacts on local roads, high pedestrian areas and school zones. Where feasible, route markers would be installed for heavy vehicles along designated routes.
- The impacts of construction traffic on the local road network and the impacts on intersection operation would be minimised by undertaking construction vehicle traffic movements outside of peak road traffic periods and outside of school peak periods where feasible.
- Signs would be provided at each access point to assist in deliveries to each work site.
- Limit off-site construction vehicle parking to designated areas. Areas of temporary on-street parking during peak construction events would be identified in the CTMP to minimise the impact on surrounding properties and businesses.

- Pedestrian access to the station platforms to be maintained at all times trains are operational.
- Safe and efficient interchange facilities to be maintained for passengers arriving by car, bus, taxi, bicycle or on foot.
- Pedestrian access across the rail corridor to be maintained at all times.
- Access for deliveries to the retail on the footbridge to be provided as agreed with the operator.
- Staging would provide the ability to reduce the overall impact of construction works on access. Phasing of construction would maintain access to the rail corridor for ARTC/Sydney Trains, and take into consideration access to the station by pedestrians and vehicles.
- Adequate signage would be in place to advise Contractor's contact details so that adequate access provision can be made as required.
- Appropriate signage would be installed to meet the various stages of construction. Any pedestrian diversions or bus or commuter parking relocation required during works would be implemented in consultation with the Sydney Trains Station Manager, TfNSW and the 131500 Transport Infoline.
- Temporary traffic management to be in place at the Ingleburn Road/Oxford Road, and Stanley Road/Memorial Avenue intersections for critical activities. Traffic staff to limit access to priority vehicles during critical activities if required.
- The queuing and idling of construction vehicles in residential streets would be minimised.
- A pre and post construction assessment of road pavement assets would be conducted in areas likely to be used by heavy construction vehicles.
- Where required, public communications would be conducted to warn the community and local residents of vehicle movements and anticipated effects on the local road network relating to site works in accordance with the CEMP.
- Access to all private properties adjacent to the works would be maintained during construction, unless otherwise agreed by consultation with specific relevant property owners.

Refer to Table 27 for a consolidated list of proposed mitigation measures.

6.2. Urban design, landscape and visual amenity

6.2.1. Existing environment

The Proposal site is located within the Ingleburn Town Centre, within a highly urban context. The works would be confined within the bounds of the rail corridor and in the open spaces adjacent to the interchange, some of which are under Council care and control.

The current interchange is well connected with the Ingleburn Town Centre, and the station footbridge concourse provides an almost direct connection between the east and west of the rail corridor, connecting the retail centre on the east with the industrial zone and other recreational activities to the west. In direct line of sight from the station are marked pedestrian crossings on both sides. The bus interchange and taxi zone are immediately adjacent to the railway station in Ingleburn Road.

The suburban landscape in the surrounding neighbourhood is characterised by relatively low rise industrial areas to the west and low rise commercial buildings to the east, including some larger retail centres and car parks.

There are no nearby buildings or shopfronts which retain historical character. The adjoining landscape is in reasonable condition and is well maintained. There are some mature street trees planted along the borders of rail corridor, and outside the station entries.

The town centre forecourt is the convergence of several pedestrian paths, and is the modal hub for those arriving by foot, bike, taxi, kiss and ride and car as driver.

- *Kiss & Ride:* For vehicles coming from the south on Ingleburn Road, there is no opportunity for a formal kiss and ride zone. There is no formal zone provided in Stanley Road.

  Taxi: The taxi rank is in an indented lay by off Ingleburn Road, immediately outside the entry to the station, with provision for around eight (8) taxis. There is a trolley bay, bench seat and a small shelter at the taxi rank. The head of the rank faces away from the station entry/egress, and is therefore located further away, meaning customers have to walk further. No taxi rank is provided on the west side of the interchange.

  Trolleys have been observed to interfere with access, and this indicates that users of the taxi rank are likely to come from the town centre. Other impacts from trolleys relate to littering, illegal dumping, vandalism, pedestrian safety and damage to vehicles.

- *Bus:* The bus stops are located on both sides of Ingleburn Road, south of the Oxford Street roundabout. The northbound services have their own segregated bus lane separate from other traffic movement, and there is an indented lay-by for bus layover south of the station. There is no provision for buses on the west side of the station.

- *Bicycle:* There is adequate bicycle parking on the east side of the station via lockers and racks, and racks on the west side. Location of the bicycle lockers (and trolley racks) gives the forecourt on the east side an untidy appearance relative to adjacent spaces, and inhibits pedestrian circulation.

- *Commuter parking:* There is a high demand for commuter parking but existing capacity appears to meet peak demand. The overall supply includes formal, informal and unrestricted on-street parking, some of which creates an unattractive streetscape on the west side. Pedestrian links between the car parks and the station entries are not legible or continuous.
- *Flora and fauna:* There is a large Bunya Pine tree (*Araucaria bidwillii*) that is listed as a Significant Tree in Campbelltown City Council's Register and which has great environmental, historical and visual significance.

  There are a number of other trees around the interchange that would be impacted by the Proposal, mainly on the western side. These include both native and exotic species, including three *Eucalyptus tereticornis* in Stanley Road immediately outside the station entry, and a large Camphor Laurel (*Camphora cinnamomum*) and Grevillea (*Grevillea robusta*) on the east side.

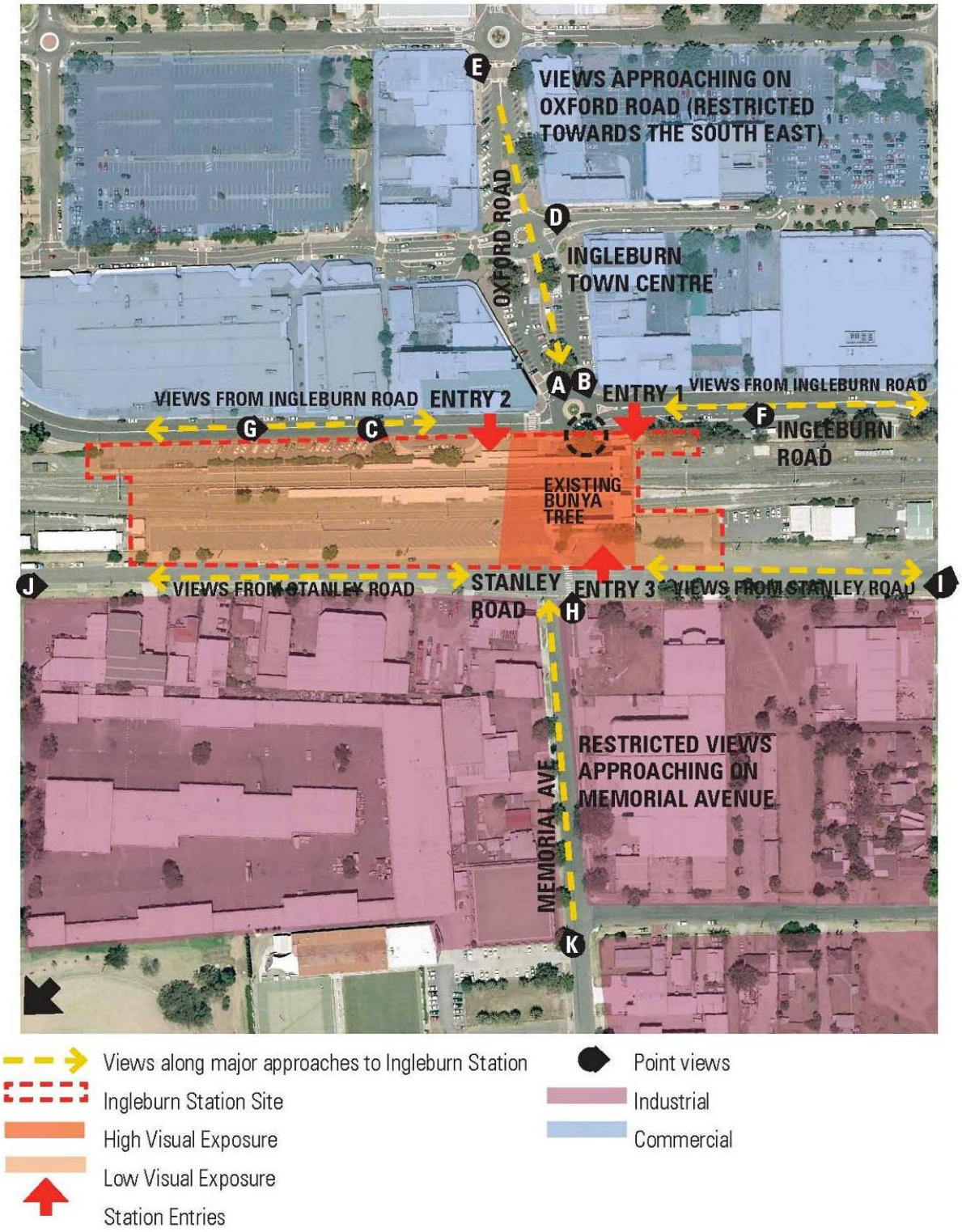


Figure 13: Landscape character analysis

6.2.2. Potential impacts

The greatest visual impacts would be the proposed new entry forecourts on each side of the corridor which would serve to connect the pedestrian paths between the multiple modes of arrival and departure. The planned hard and soft landscape elements would provide definition to these spaces. Proposed new street furniture (seats and bins), signage, lighting, CCTV, tactile indicators, canopies and the materials palette would also constitute part of this visual impact.

An *Ingleburn Station Easy Access Upgrade Visual Impact Assessment* was carried out by DesignInc in June 2013. The report finds that, in terms of visual impact, due to the existing vegetation and the built up nature of the area, generally the prominent views of the station are located along Ingleburn Road and Stanley Road. As one approaches along Oxford Road on the east, or Memorial Avenue on the west, there are generally restricted views of Entrance 1 and 3 at a distance of up to 150m, after which the views become fragmented or minimal.

(a) Construction phase

Potential visual impacts during construction include: perceptions of security and safety; temporary changes to access for all modes; changes to way-finding and orientation; potential pedestrian/vehicle conflicts; and potential pedestrian crowding points and queuing.

Under the current Proposal, on both sides of the station a total of six trees are to be removed for arboricultural reasons, seven trees as a direct result of the Proposal, (and there is one dead tree). A total of 13 exotic and native trees are impacted.

East side - Ingleburn Road

The greatest visual impact in Ingleburn Road would relate to works in relation to the construction of the new entry forecourt and new canopies and ramps to Platform 2, and from the temporary parking arrangements relating to reallocation of road space in Ingleburn Road.

- New ramps, stairs, walkways and canopies are proposed on the east side of the station, and a new forecourt extension with new canopies are planned on the west side, with a new footpath along the existing commuter car park.
- The Bunya Pine tree will be the focal point of the new entry forecourt, with a new mulched and mass planted garden around the trunk, and new paving. The westernmost of the two trunks would be removed on safety grounds, and is recommended for the long-term health of the tree.
- Other visual impacts relate to the works relating to the reconfiguration of the existing taxi zone to provide for kiss and ride and accessible parking. The taxis would need to be temporarily relocated until construction on the east side of the station is completed. Existing bicycle lockers would be relocated due to limitation for circulation space and clearance in the east entry forecourt.

West side – Stanley Road

On the western side of the interchange in Stanley Road, the greatest visual impacts would be the construction of the new canopy and reconfiguring the adjacent road space to create the new entry forecourt. The existing space would be reconfigured to provide a formal kiss and

ride zone and accessible parking, with additional formalised commuter parking and a new footpath nearby.

Ingleburn Station

Within the station itself, impacts relate to works in relation to:

- Three new lifts in close proximity to the existing footbridge. New landings would be constructed at footbridge levels, with accessible circulation and waiting spaces clear of the pedestrian path of travel. The platforms would be extended to the south to meet the new lift access.
- The existing blond brick amenities building on Platform 1 would be removed to open up circulation space. The signal hut, which has moderate heritage significance, would be demolished to allow for a new amenities and service building to be constructed to the north of the heritage station building.
- The exterior appearance of the heritage station building on Platform 1 would remain substantially the same, with a new ticket window installed at the southern end of the building, and the doorway onto the platform at the northern end would be widened to allow for an accessible toilet.
- On Platform 2 the existing seating pavilion would remain. The enclosed area for the ticket vending machine would be reconfigured to open the platform entry and would be reintegrated into the entry forecourt.

Receptors to the Proposal include the community and patrons of Ingleburn interchange. There would also be visual receptors within the retail areas east of the Railway Station and in the industrial area to the west.

In relation to the above works, visual impacts would typically include:

- Construction fencing
- Temporary site signage
- Cranes and other construction plant
- Construction compound and construction worker parking
- Temporary lighting
- Temporary pedestrian detours and associated signage
- Temporary relocation of taxi, bus and kiss and ride zones and associated signage.

These works would be temporary in nature (up to 24 months) and therefore visual impacts as a result of these items would be temporary. The following would minimise the visual impact of the works:

- Additional lighting would be kept as low as possible, where adequate safety is maintained and to minimise it dominating surrounding areas
- Construction sites and work areas would be kept tidy and well maintained at all times.

(b) Operational phase

The *Ingleburn Station Easy Access Upgrade Visual Impact Assessment* identifies key viewpoints and proposed impacts from the works (See Figure 15 and Figure 16). Artist's impressions of the Proposal are at Figure 7 and Figure 8.

During operation, the following permanent structure elements would contribute to visual impact:

- Three (3) new lifts and extend platform walkways to meet the lifts
- New platform building (amenities and services)
- New bus shelter on Ingleburn Road
- Platform and entry canopies
- Permanent screening and fencing
- Ramps to Platform 2 (forecourt).

Generally, urban design, landscape and visual impacts would be as follows:

Forecourts: The urban design intent is to create a precinct with clearly-identifiable station entries on both sides of the corridor by creating clearly defined entry forecourts, with a unified architectural appearance.

These forecourts connect the station precinct to the urban town centre by enhancing the cross-corridor connection and providing a landmark feature for the existing town centre. There would be increased visual connection between the Bunya Pine tree and the Ingleburn Town Centre. Providing legibility of the entries would reinforce the local identity through effective place-making. A new patterned screen is to be provided between the Ingleburn road forecourt and Platform 2 to define the forecourt space, provide separation of public space and the rail corridor while also allowing overlooking by casual passers-by.

The entry forecourts on each side of the corridor serve to connect the pedestrian paths between multi-modes of arrival and departure. The hard and soft landscape elements provide definition to these spaces. Selection and incorporation of street furniture (seats and bins), signage, lighting, CCTV, tactile indicators, canopies, and the materials palette would also enhance the customer experience and create effective place-making. The two forecourts would be surfaced in hard paving to create a unified appearance.

The design responds to the pedestrian movements and inclusion of seating and gathering space at the front of the station precinct adds value to the customer experience.

On Platform 2, the enclosed area for the ticket vending machine would be reconfigured.

Lifts: Three new lift towers attached to the existing overhead concourse would be visible, mainly from the south of the interchange, one at each entry and one to service Platform 1. The lifts connect to the existing footbridge and would be connected to the existing platforms by extending the platforms to the south. The scale impact of the lift shafts has been minimised by limiting the height of the lift shafts to around one metre above the top of the existing footbridge roof.

New platform building: A new building is provided on Platform 1 to house amenities and services. It is located next to the existing heritage station building and will be built to match the scale and with materials sympathetic to the adjacent station building.

Kiss & Ride and Taxi:. The taxi rank would be reconfigured to provide four spaces including an accessible parking bay. The reallocation of space also provides for accessible parking bays. A formalised kiss and ride would be provided on the Stanley Road side of the interchange as part of the new forecourt.

Bus: The existing bus interchange is being retained. However, in reconfiguring the area to create the entry forecourt, the bus stop would be moved slightly south and will have a longer canopy extending to the second bus stop within the existing bus zone.

Canopies: There would be three new canopies at the three entrances to the station, along with new platform canopies. The new bus shelter and new platform canopies would be at a similar height to the existing canopies. The three new entry canopies would be situated at a higher level to create landmarks at the entry locations, thereby facilitating way-finding. All new canopies are skillion roofs with a significantly reduced profile compared to that of the existing curved structures, thereby reducing visual impact, and providing a more modern appearance for the station along the streetscape of Ingleburn and Stanley Roads.

Bicycle: On the eastern side, the bicycle lockers would be relocated to the south of the interchange to provide better access to the station forecourt. It is proposed to provide a more attractive “cage” facility, but this would be determined at the detailed design phase. Bike racks would be replaced with more modern designs. CCTV and additional lighting would be provided if a security assessment shows this is warranted.

Commuter parking. The un-marked informal off street parking area adjacent to the existing stairs is being formalised and includes new compliant accessible car parking spaces with line marking.

Flora and fauna. Landscape impacts on the east side include removal of three trees, including the large Camphor Laurel. The Bunya Pine tree near the station entry has a bark inclusion where the two co-dominant trunks join. Should the tree fail at this point, it would pose a risk both to pedestrian safety and to the long term future of the tree. Therefore the western most truck would be removed. The base would be mulched and planted to provide a focal point for the entry forecourt.

New mulched and mass planted gardens would soften the view of the new building works, while the existing trees in the retained garden bed along the commuter parking area to the north of the station entry would be reinforced with additional planting.

On the west side, six trees would be removed from outside the station entrance, and a further five trees (including a dead tree) from nearby. Three new trees are proposed to soften the view of the new building works and to provide shade and improve the amenity of the Stanley Road forecourt area. Trees that are removed would be replaced in accordance with TfNSW’s Vegetation Offset Guideline.

Platform 1 heritage building: The heritage station building is to be retained, with little impacts to the exterior of the building. The design provides for a new ticket window in the southern end of the building. A more attractive appearance would be created from improving the drainage and platform levels.

Balustrades, safety screens and handrails: Platform fences would have a powder coated black finish, or be galvanised and painted. Forecourts screens would be modular patterned screening used as a feature backdrop, and other screens would be framed mesh. Handrails would be stainless steel.

Street furniture: Bench seating would have bright silver metallic finished frames with powder coated silver arms. Bins would be 80 litre aluminium, with an integrated ash and saucer bases.

The station precinct would have clearly defined entry forecourts on each side of the rail line. These forecourts would connect the station precinct to the urban town centre by enhancing the cross-corridor connection and providing a landmark feature, providing effective place-making.

Overall, weather protection is improved and the Proposal would result in a significant improvement in pedestrian amenity. The Proposal would see reallocation of existing road space in accordance with interchange guidelines, where modes of transport are prioritised in favour of sustainable modes. The new entry forecourts would facilitate self orientation and through natural way-finding. It is envisaged that minimal signage would be required to navigate between the station and other modes.

Following are key views and their impacts, extracted from the *Ingleburn Station Easy Access Upgrade Visual Impact Assessment* report, prepared in June 2013 for TfNSW by DesignInc.

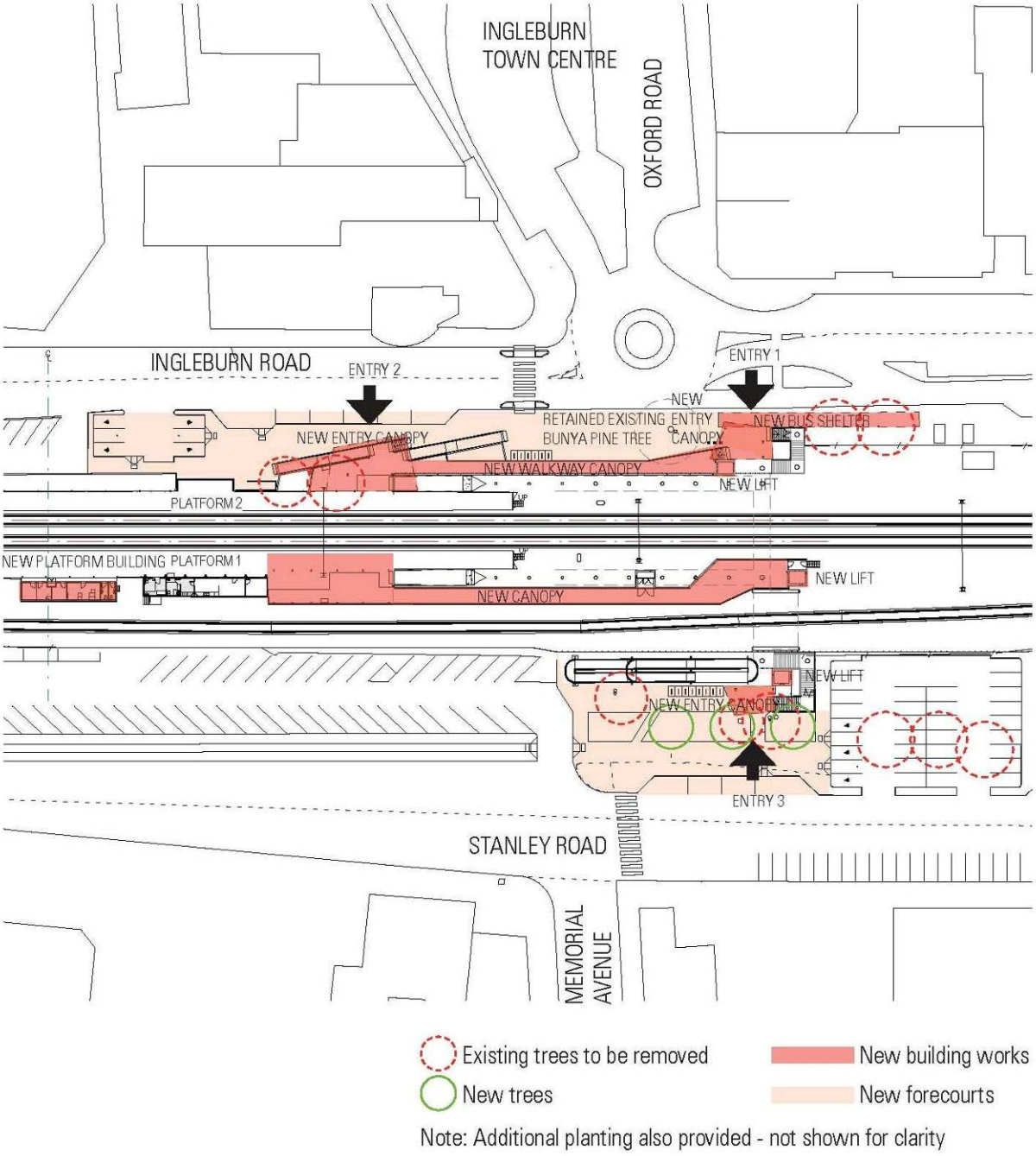


Figure 14: Plan indicating elements contributing to Visual Impact

View 2: Existing view from the corner of Oxford Road and Macquarie Road

View 2A: View from the corner of Oxford Road and Macquarie Road indicating proposed new works

View 3: Existing view from Ingleburn Road (south of the station)

View 3A: View from Ingleburn Road (south of the station) indicating proposed works

View 4: Existing view from Ingleburn Road (north of the station)

View 4A: View from Ingleburn Road (north of the station) indicating proposed new works

Figure 15: Key viewpoints Ingleburn Road (eastern) side of the station

View 6: Existing view from Memorial Avenue

View 6A: View from Memorial Avenue indicating proposed works

View 7: Existing view from Stanley Road (north of the station)

View 7A: View from Stanley Road (north of the station) indicating proposed works.

View 8: Existing view from Stanley Road, south of the station

View 8A: Existing view from Stanley Road, south of the station, indicating proposed works

Figure 16: Key viewpoints Stanley Road (western side) of the station

In terms of urban design, the impact of the Proposal would be positive, as the design provides new modern canopies that greatly improve urban design outcomes, with the new entry forecourts contributing to community spaces and place-making, strengthening desire lines and improving connectivity between both sides of the interchange.

Some key impacts are summarised in Table 12 below.

Table 12: Potential visual impacts as a result of the proposed works

Setting	Sensitivity	Magnitude	Distance Zone	Overall Rating	Comment
View 2: Oxford Street acts as a main street within Ingleburn Town Centre. The streetscape is characterised by single and double storey small commercial tenancies with awnings and shopfronts opening onto the sidewalk. There are two medium rise buildings to the east of Entry One (near the intersection of Ingleburn Road and Oxford Road)	Moderate	Low	MZ 100m-200m)	Moderate-Low	The view of the Ingleburn Station is restricted by existing buildings. The existing Bunya Pine tree forms a major focal point and way-finding element. The visibility of the Bunya Pine tree is increased by the removal of the existing bus shelter. The lift shaft and Entry One canopy is visible, and assists with way-finding. Entry three is not visible.
View 3: Ingleburn Road is bounded by the rail corridor on one side, and the edge of Ingleburn Town Centre on the other side. There are tall trees along one side of the street, along the rail corridor.	Moderate – Low	Moderate-Low	FZ (<100m)	Moderate-Low	The removal of two existing trees adjacent to the station will allow for increased visibility of the station entrance and the retained Bunya Pine. This will improve way-finding. The new bus shelter canopy relates to the scale of the awnings on the opposite side of Ingleburn Road and reflects the scale and proportion of the tother existing canopies throughout the station.
View 4: Ingleburn Road is bounded by the station of one side and the edge of Ingleburn Town Centre on the other. The buildings on the corner of Ingleburn Road and Oxford Road are 3-4 storey commercial premises, which differ in character from the rest of the town centre.	Moderate	Moderate	FZ (<100m)	Moderate	The new entry and walkway canopies accentuate Station Entry Two and improve way-finding. New ramps improve station access. Entry One canopy is mostly blocked from view by the existing Bunya Pine which remains a dominant element. The visibility of this tree is improved by removing the existing bus shelter. A new forecourt with waiting areas provides and improved relationship to the town centre and public amenity.
View 6: Memorial Avenue is predominantly low-rise industrial in character. The	Low	Moderate	MZ (100m-	Low	The impact of this view is the removal of the existing trees in the station forecourt area.

Setting	Sensitivity	Magnitude	Distance Zone	Overall Rating	Comment
street is tree-lined on both sides.			200m)		However, three new trees are proposed in the forecourt. The view of the Ingleburn Station is restricted by existing buildings and largely screened by the existing trees along Memorial Avenue. On the footpaths the view of he station is even more fragmented due to the trees. the new Entry Three canopy will not be visible in this view.
View 7: The existing station structures are highly visible from Stanley Road, as there are less trees to provide screening. The opposite side if the road is predominantly single/double storey industrial buildings, with no unifying architectural character. The building set-backs also vary. The street is wide with parking on both sides.	Moderate-Low	Moderate	FZ (<100m)	Moderate	The visual impact from the new work in this instance is from the removal of the large trees at the Stanley Road entry. New trees will replace these and will be located to suit the entry forecourt arrangement and canopy. The entry

6.2.3. Mitigation measures

- Finishes and materials would be complementary to the existing locality and landscape, would minimise reflective surfaces with a preferred use of muted/less intrusive colours, and would be subject to consultation with Council.
- Unnecessary loss or damage to vegetation would be avoided by protecting trees prior to construction and/or trimming vegetation to avoid total removal.
- Light spill from the rail corridor into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas and ensuring the site complies with Australian Standards but is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
- Temporary hoardings, barriers, traffic management and signage would be removed when no longer required
- Work/site compounds would be screened, with shade cloth (or similar material) (where necessary) to minimise visual impacts from elevated locations
- Maintenance of structures constructed for this Proposal would be the responsibility of TfNSW.
- Way-finding signage would be installed as per TfNSW guidelines.
- Options on relocating the taxi rank to the opposite side of Ingleburn Road are to be pursued, with one outcome sought being removal of shopping trolleys from the immediate interchange environs.

Refer to Table 27 for a consolidated list of proposed mitigation measures.

6.3. Noise and Vibration

A Noise and Vibration Impact Assessment for the Proposal was carried out by SLR Consulting Australia Pty Ltd in April/May 2013. The findings of the assessment are discussed in this section.

The noise and vibration guidelines for construction and operations are based on the publications managed by the NSW Environment Protection Authority (EPA). The EPA guidelines applicable to this assessment include:

- Operational Noise – Industrial Noise Policy (OEH 2010).
- Construction Noise – Interim Construction Noise Guideline (DECC 2009).
- Construction and Operational Vibration (human comfort) - Assessing Vibration - a technical guideline (DEC 2006).

The following additional guidelines and standards are also referenced in this study:

- Construction Noise and Vibration Mitigation - Construction Noise Strategy (TfNSW 2012)
- Sleep Disturbance – Application Notes to Industrial Noise Policy (OEH 2010).

6.3.1. Existing environment

Ingleburn Railway Station is located in an urban setting, with mainly retail/commercial on the east side of the station and industrial on the west side. The predominant sources of noise in the vicinity of the railway station include road traffic on Ingleburn Road and Stanley Road and adjoining local streets, as well as train noise from operations on the rail corridor, including freight trains on the Southern Sydney Freight Line.

The nearest noise sensitive receivers consist of commercial and residential premises. Nearby noise sensitive receivers are identified in Figure 17.

Table 13: Representative Noise Sensitive Receivers

Receiver	Address	Brief Description
R1	2 Norwich Road, Ingleburn	Residential, single storey
R2	41 Stanley Road, Ingleburn	Commercial, single storey
R3	29 Stanley Road, Ingleburn	Residential, single storey
R4	102-104 Macquarie Road, Ingleburn	Commercial, single storey
R5	14 Ingleburn Road, Ingleburn	Other sensitive (Hotel), two storey
R6	8 Oxford Street, Ingleburn	Other Sensitive (Café), Ground floor

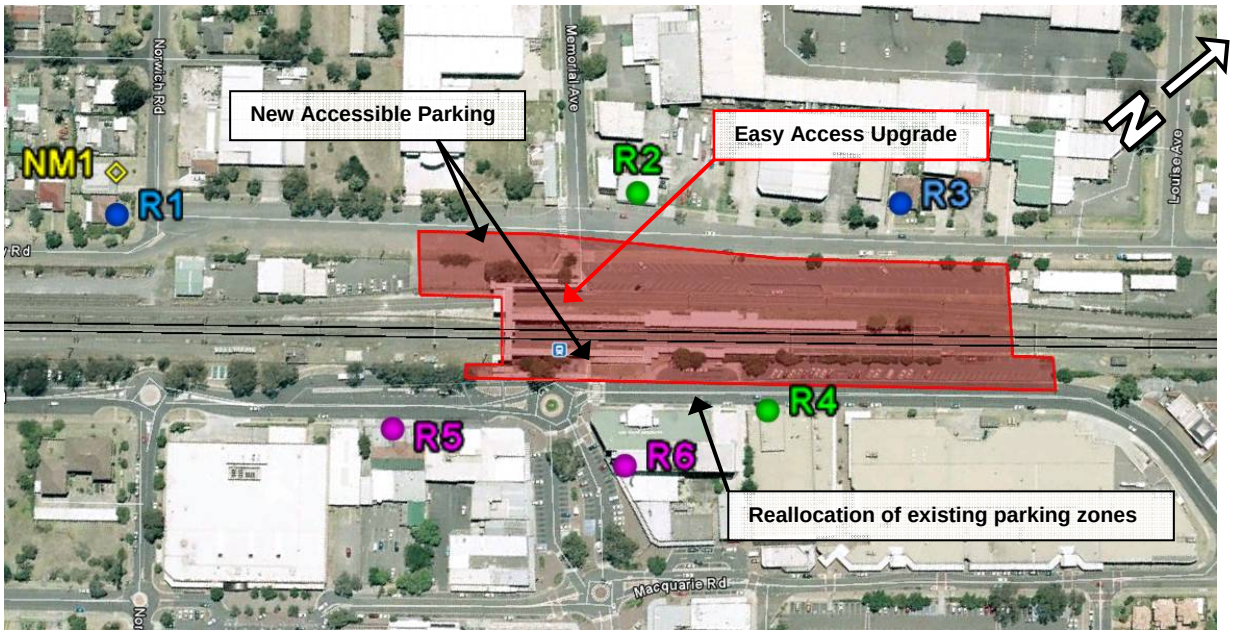
Operator-attended ambient noise surveys were conducted on Friday 26 April 2013 at noise monitoring location NM1 (4 Norwich Street, Ingleburn) to establish background noise levels.

Daytime ambient noise levels were observed to be relatively quiet and were largely controlled by traffic movements along adjacent local roads.

Table 14: Operator Attended Ambient Noise Survey

Measurement Location	Measured Noise Levels (dBA)				Observations (dBA)
	LAmax	LA10	LAeq	LA90	
NM1 4 Norwich Street, 12:40 pm 26/04/2013 15 min Attended Clear, Calm, No rain	75	59	55	44	Road Traffic (Norwich Street): Light Vehicles: 58-75 LAmax Heavy Vehicles: 54-74 LAmax Air Traffic: up to 48 LAmax Birds: up to 55 LAmax

The existing average noise level (LAeq) represents the average noise level over the monitoring period. The Background noise level (LA90) represents the noise level exceeded for 90% of the monitoring period.



Aerial image courtesy of Google

Figure 17: Sensitive receivers within proximity to the proposed works

The noise measurements taken at location NM1 were considered representative of the background noise level for neighbouring sensitive receivers and were used to locate the noise logger that was deployed from Friday 26 April 2013 to Friday 3 May 2013.

The results of the continuous unattended noise monitoring surveys are presented in Table 14. The results of at this location were used for the Noise and Vibration Impact Assessment. They show levels typical of a suburban noise environment with low evening and night-time noise levels dominated by the natural environment with some infrequent human activity. Daytime noise levels are likely to be dominated by road traffic on adjacent roads and nearby industrial/commercial activities.

Table 15: Operator Attended Ambient Noise Survey

Location	Period[1]	Measurement Parameter (dBA)			
		LA1	LA10	LA90 (RBL)	LAeq
NM1	Daytime	66	57	42	55
	Evening	63	55	38	53
	Night-time	61	46	36	51

Note 1: INP Governing Periods - Day: 7:00 am to 6:00 pm Monday to Saturday, 8:00 am to 6:00 pm Sundays & Public Holidays, Evening: 6:00 pm to 10:00 pm, Night: 10:00 pm to 7:00 am Monday to Saturday, 10:00 pm to 8:00 am Sundays & Public Holidays.

6.3.2. Potential impacts

(a) Construction scenarios

The construction works associated with the Proposal on both sides of the interchange consist of the scenarios outlined in Table 16:

Predicted noise levels occurring during construction of the Proposal are also provided in Table 16.

Most works would be undertaken during the standard work hours. However there are some activities that need to take place during track possessions and which would be required to be undertaken outside standard construction hours for operational reasons and to maximise safety and minimise potential impact to commuters and the general public. These activities may be undertaken during evening or night periods or on weekends.

Table 16: Construction Noise Predictions – Standard Construction Hours

Scenario		Receiver	Noise Level – $L_{Aeq(15minute)}$ (dBA)			
			Worst-case Predicted	RBL	Daytime NML	Exceedance
1.1	Installation of temporary boundary fencing, establishment of a site compound	R1	60	42	52	8
		R2	75	n/a	70	5
		R3	75	42	52	23
		R4	79	n/a	70	9
		R5	72	n/a	60	12
		R6	69	n/a	60	9
2.1	Temporary Construction to Platform 1	R1	57	42	52	5
		R2	68	n/a	70	-
		R3	67	42	52	15
		R4	71	n/a	70	1
		R5	65	n/a	60	5
		R6	63	n/a	60	3
2.2	Installation of Temporary Facilities	R1	51	42	52	-
		R2	63	n/a	70	-
		R3	62	42	52	10
		R4	66	n/a	70	-
		R5	60	n/a	60	-
		R6	58	n/a	60	-
2.3	Amenities Building Demo/Construction Works, Platform Extension (country end, new lift access walkway	R1	62	42	52	10
		R2	74	n/a	70	4
		R3	71	42	52	19
		R4	77	n/a	70	7
		R5	71	n/a	60	11

Scenario		Receiver	Noise Level – $L_{Aeq(15minute)}$ (dBA)			
			Worst-case Predicted	RBL	Daytime NML	Exceedance
		R6	69	n/a	60	9
2.4	Platform Works (Resurfacing, cross falls, lights, drainage etc)	R1	62	42	52	10
		R2	73	n/a	70	3
		R3	72	42	52	20
		R4	76	n/a	70	6
		R5	70	n/a	60	10
		R6	68	n/a	60	8
3.1	Temporary Public Access to Platform 2	R1	56	42	52	4
		R2	65	n/a	70	-
		R3	63	42	52	11
		R4	76	n/a	70	6
		R5	71	n/a	60	11
		R6	67	n/a	60	7
3.2	Demolition of existing Ramps, Canopies, Bicycle Storage areas	R1	57	42	52	5
		R2	65	n/a	70	-
		R3	61	42	52	9
		R4	69	n/a	70	-
		R5	70	n/a	60	10
		R6	65	n/a	60	5
3.3	New Lift Access Walkway (to Lift 1)	R1	57	42	52	5
		R2	63	n/a	70	-
		R3	58	42	52	6
		R4	62	n/a	70	-
		R5	71	n/a	60	11
		R6	67	n/a	60	7
4.1	Platform Works (Resurfacing, platform raising, lights, drainage etc)	R1	61	42	52	9
		R2	71	n/a	70	-
		R3	71	42	52	19
		R4	79	n/a	70	9
		R5	74	n/a	60	14
		R6	71	n/a	60	11
4.2	Lift 1 Construction (structure, cladding, fit-out and commissioning)	R1	51	42	52	-
		R2	57	n/a	70	-
		R3	50	42	52	-
		R4	55	n/a	70	-
		R5	63	n/a	60	3

Scenario		Receiver	Noise Level – $L_{Aeq(15minute)}$ (dBA)			
			Worst-case Predicted	RBL	Daytime NML	Exceedance
		R6	60	n/a	60	-
4.3	Lift 2 Construction (structure, cladding, fit-out and commissioning)	R1	51	42	52	-
		R2	58	n/a	70	-
		R3	51	42	52	-
		R4	55	n/a	70	-
		R5	60	n/a	60	-
		R6	56	n/a	60	-
4.4	Lift 3 Construction (structure, cladding, fit-out and commissioning)	R1	51	42	52	-
		R2	61	n/a	70	-
		R3	51	42	52	-
		R4	54	n/a	70	-
		R5	58	n/a	60	-
		R6	56	n/a	60	-
5.1	Reconfigured Taxi Drop Off Zone	R1	58	42	52	6
		R2	69	n/a	70	-
		R3	65	42	52	13
		R4	84	n/a	70	14
		R5	66	n/a	60	6
		R6	67	n/a	60	7
5.2	New bicycle storage area	R1	56	42	52	4
		R2	67	n/a	70	-
		R3	64	42	52	12
		R4	79	n/a	70	9
		R5	61	n/a	60	1
		R6	65	n/a	60	5
5.3	New DDA Car park	R1	62	42	52	10
		R2	69	n/a	70	-
		R3	60	42	52	8
		R4	63	n/a	70	-
		R5	69	n/a	60	9
		R6	63	n/a	60	3
5.4	Replacement of Shelters to footbridge and ramps	R1	49	42	52	-
		R2	57	n/a	70	-
		R3	54	42	52	2
		R4	67	n/a	70	-
		R5	60	n/a	60	-

Scenario		Receiver	Noise Level – $L_{Aeq(15minute)}$ (dBA)			
			Worst-case Predicted	RBL	Daytime NML	Exceedance
		R6	58	n/a	60	-
6.1	Reconstructed DDA and Commuter Car Parks	R1	63	42	52	11
		R2	77	n/a	70	7
		R3	77	42	52	25
		R4	83	n/a	70	13
		R5	66	n/a	60	6
		R6	71	n/a	60	11
6.2	Replacement of Shelters to footbridge and ramps	R1	50	42	52	-
		R2	60	n/a	70	-
		R3	51	42	52	-
		R4	54	n/a	70	-
		R5	57	n/a	60	-
		R6	54	n/a	60	-
7.1	Removal of Existing Trees	R1	69	42	52	17
		R2	80	n/a	70	10
		R3	69	42	52	17
		R4	73	n/a	70	3
		R5	77	n/a	60	17
		R6	77	n/a	60	17

The scenarios with potential to subject immediately adjacent receivers to noise levels above 75 dBA are shown in Table 16 above in red shading. These highly noise-affected receivers were identified for several works scenarios. These receivers would therefore be considered as 'highly noise affected' during the respective works, (as defined by OEH's *Interim Construction Noise Guideline* (ICNG)).

A worst-case exceedance of the daytime (standard construction hours) LAeq (15minute) noise goal of up to 25 dB is predicted at the most affected sensitive receiver locations during Scenario 6.1 - Reconstructed DDA and Commuter Car Parks. This level of exceedance is common for these types of construction activities. It is noted that these works are restricted to the daytime periods only.

Construction works for lift construction (Scenarios 4.2, 4.3 and 4.4) may require works to be undertaken outside of standard construction hours. The predictions for this scenario are detailed in Table 17.

Table 17: **Out-of-Hours Construction Noise Predictions**

Ref	Scenario	Receiver	Noise Level – LAeq(15minute) (dBA)										Noise Level – LA1(60second) (dBA)		
			Worst-case Predicted	RBL			NML			Exceed.			Worst-case Predicted	Screen. Crit. RBL+15 dBA	Exceed.
				Day	Eve	Night	Day OOH	Eve	Night	Day OOH	Eve	Night			
4.2	Lift 2 Construct-ion (structure, cladding, fit-out and commission-ing	R1	51	42	38	36	47	43	41	4	8	10	59	51	8
		R2	57	n/a	n/a	n/a	70	n/a	n/a	-	n/a	n/a	65	n/a	n/a
		R3	50	42	38	36	47	43	41	3	7	9	58	51	7
		R4	55	n/a	n/a	n/a	70	n/a	n/a	-	n/a	n/a	63	n/a	n/a
		R5	63	n/a	n/a	n/a	60	60	45	3	3	18	71	n/a	n/a
		R6	60	n/a	n/a	n/a	60	n/a	n/a	-	-	n/a	68	n/a	n/a
4.3	Lift 2 Construct-ion (structure, cladding, fit-out and commission-ing	R1	51	42	38	36	47	43	41	4	8	10	59	51	8
		R2	58	n/a	n/a	n/a	70	n/a	n/a	-	n/a	n/a	66	n/a	n/a
		R3	51	42	38	36	47	43	41	4	8	10	59	51	8
		R4	55	n/a	n/a	n/a	70	n/a	n/a	-	n/a	n/a	63	n/a	n/a
		R5	60	n/a	n/a	n/a	60	60	45	-	-	15	68	n/a	n/a
		R6	56	n/a	n/a	n/a	60	n/a	n/a	-	-	n/a	64	n/a	n/a
		R1	51	42	38	36	47	43	41	4	8	10	59	51	8
		R2	61	n/a	n/a	n/a	70	n/a	n/a	-	n/a	n/a	69	n/a	n/a
		R3	51	42	38	36	47	43	41	4	8	10	59	51	8
		R4	54	n/a	n/a	n/a	70	n/a	n/a	-	n/a	n/a	62	n/a	n/a
		R5	58	n/a	n/a	n/a	60	60	45	-	-	13	66	n/a	n/a
		R6	56	n/a	n/a	n/a	60	n/a	n/a	-	n/a	n/a	64	n/a	n/a

Exceedances of the LAeq(15minute) noise goal of up to 18 dB are predicted at the surrounding sensitive receiver locations.

The sleep disturbance screening criterion is also predicted to be exceeded by up to 8 dB for the proposed works.

There is the potential that works at Ingleburn Station undertaken during construction could temporarily impact the intelligibility of the Public Address (PA) System, which could impact upon workers and commuters.

(b) Vibration

Existing sources of vibration in the area are most likely due to trains along the interstate freight rail corridor (Southern Sydney Freight Line).

The vibration generated from civil and structures construction works would vary depending on the level and type of activity carried out at each site during each activity. Typical plant and equipment in use at construction compounds have been identified. The dominant vibration

generating plant and equipment include the bobcat, excavator, rock hammer, jack hammer and truck and trailer.

The nearest sensitive receivers to the proposed works are shown in Figure 17. Due to the nature of works being carried out, the risk of structural damage is assessed as being low.

When assessing vibration, there are two categories of vibration criteria, one related to the impact of vibration on building structures, and one relating to human comfort.

The *Assessing Vibration: A Technical Guideline* (DEC, 2006) provides vibration criteria for human comfort. For intermittent vibration (like that which could result from construction machinery) the criteria is based on a concept of a vibration 'dose'. The maximum criteria level is (0.4 m/s) 1.75 for residences. Appendix C of the Vibration Guideline contains values for the assessment of continuous vibration for repeated period during day and night time hours.

Table 18: Criteria for exposure to continuous and impulsive vibration

Location	Daytime[1]		Night-time[1]	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

1 Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am.
2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.
Source: BS 6472–1992

As a guide, safe working distances for typical items of vibration intensive plant are listed in Table 19. The safe working distances are quoted for both "cosmetic" damage (refer British Standard BS 7385) and human comfort (refer British Standard BS 6472). The safe working distances must be complied with at all times, unless otherwise approved by the relevant authority.

Table 19: Recommended Safe Working Distances for Vibration Intensive Plant

Plant Item	Rating/Description	Safe Working Distance	
		Cosmetic Damage (BS 7385)	Human Response (EPA Vibration Guideline)
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	N/A
Jackhammer	Hand held	1 m (nominal)	Avoid contact with structure

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

The proposed activities either contain plant items that are not significantly vibration intensive or the separation distance from the nearest receivers is sufficient to mitigate the potential impacts.

To effectively mitigate potential impacts of vibration on the heritage items at Ingleburn Station, activities that cause vibration would be managed in accordance with German Standard DIN 4150 – Part 3 (DIN 1999) which has specific standards relating to heritage items.

(c) Operational phase

The proposed works do not involve any modification or addition to the Public Address (PA) system currently installed at the railway station, nor are there any changes proposed to the mechanical services equipment.

With regard to patron noise, whilst the project works seek to improve access and movement through the railway station, and provided additional formalised commuter car parking and accessible parking, the changes to the railway station layout should not alter the extent or nature of noise generated by people utilising the railway station.

6.3.3. Mitigation measures

During design

- Reference should be made to ASA Engineering Standard ESB 002 *Station Design and Standard Requirements* which set out guidelines for the incorporation of

acoustically absorptive finishes which can control reverberance and improve speech intelligibility from the PA system.

Construction Noise

- Prior to construction, it is recommended that a site specific Construction Noise and Vibration Management Plan is prepared, consistent with the requirements of the TfNSW *Construction Noise Strategy 2012* and OEH's *Interim Construction Noise Guideline*.
- Where the LAeq (15minute) construction noise levels are predicted to exceed 75 dBA, respite periods would be observed (in line with TfNSW *Construction Noise Strategy 2012)*. This would include restricting the hours that the very noisy activities can occur.
- Construction noise and vibration would be managed in accordance with TfNSW Construction Noise Strategy 2012.
- The Construction Noise and Vibration Management Plan would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
- In order to minimise the potential noise and vibration impacts upon nearby sensitive receivers, wherever possible, works are to be undertaken during the EPA's standard daytime construction periods (7.00 am to 6.00 pm Monday to Friday and 8.00 am to 1.00 pm on Saturdays).
- Planning of the higher Noise Management Level exceedance activities/locations to be undertaken predominantly during less noise-sensitive periods, where available and possible. The adjacent residents should be consulted to assist in identifying less noise sensitive periods.
- Consultation as per the TfNSW *Construction Noise Strategy (CNS)* would be adopted. These would be in line with the following mitigation measures:

Table 20: TfNSW CNS noise mitigation measures

Time Period		Mitigation Measures/Predicted $L_{Aeq(15min)}$ Noise Level above RBL			
		0 to 10 dB(A) Noticeable	10 to 20 dB(A) Clearly audible	20 to 30 dB(A) Moderately intrusive	>30 dB(A) Highly intrusive
Standard	Mon-Fri (7am-6pm) Sat (8am-1pm) Sun/ Public Hol (Nil)	-	-	Letterbox drop, Monitoring	Letterbox drop, Monitoring
OOHW Period 1	Mon-Fri (6pm-10pm) Sat (7am to 8am & 1pm-10pm) Sun/ Public Hol (8am -6pm)	-	Letterbox Drop	Monitoring, Letterbox Drop	Monitoring, Individual Briefing, Letterbox Drop Project Specific Respite Offer, Phone Calls, Specific Notification
OOHW Period 2	Mon-Fri (10pm-7am) Sat (10pm-7am) Sun/ Public Hol (6pm-8am)	Letterbox Drop	Monitoring, Letterbox Drop	Monitoring, Individual Briefing, Letterbox drop, Phone Calls, Specific Notification	Alternate Accommodation, Monitoring, Individual Briefing, Letterbox Drop, Phone Calls, Specific Notification

Source: TFNSW Construction Noise Strategy 2011

- Where impacts from construction noise are unavoidable and it is not feasible to achieve the construction noise objectives, additional noise mitigation measures as per TfNSW CNS are to be followed. A summary of these noise mitigation measures is provided in Table 21 below.
- The work team is to be briefed in order to create awareness of the locality of sensitive receivers and the importance of minimising noise emissions.
- Ensure spoil is placed and not dropped into awaiting trucks.
- Use quieter and less vibration emitting construction methods where feasible and reasonable.
- Only the equipment necessary for the upgrade works would be used at any one time. Avoid any unnecessary noise when carrying out manual operations and when operating plant
- Any equipment not in use for extended periods shall be switched off. For example, heavy vehicles should switch engines off whilst being unloaded.
- Simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver would be avoided/ limited where possible.
- Where possible, the offset distance between noisy plant and adjacent sensitive receivers shall be maximised.

- Noise-emitting plant should, where possible, be directed away from sensitive receivers.
- Alternative reverse alarms, such as 'quackers' shall be installed where possible.
- Where attended noise monitoring indicate noise levels are in excess of levels reported within the Noise and Vibration Assessment report, and where it is practical and safe to do so, temporary noise screens (or equipment/placement) shall be used to shield noisy, fixed works.
- No swearing or unnecessary shouting or loud stereos/radios are to be used on site. No dropping of materials from height where practicable, throwing of metal items or slamming of doors.
- Noise and vibration emissions shall be qualitatively assessed throughout works and additional measures shall be implemented to prevent jeopardising the intelligibility of the PA system and the safety of commuters and staff as a result.

Table 21: Proposed activity-specific mitigation measures for the works

Scenario		Worst-Case Scheduled Construction Period	INP Defined Period	Receiver	LAeq Exceedance of RBL (dBA)	TfNSW CNS Mitigation Measures
1.1	Installation of temporary boundary fencing, establishment of a site compound	Standard	Daytime	R1	18	-
				R2	n/a	n/a
				R3	33	Letterbox drop, Monitoring
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
2.1	Temporary Construction to Platform 1	Standard	Daytime	R1	14	-
				R2	n/a	n/a
				R3	24	Letterbox drop, Monitoring
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
2.2	Installation of Temporary Facilities	Standard	Daytime	R1	9	-
				R2	n/a	n/a
				R3	20	-
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
2.3	Amenities Building Demo/Construction Works,	Standard	Daytime	R1	20	-
				R2	n/a	n/a

Scenario		Worst-Case Scheduled Construction Period	INP Defined Period	Receiver	LAeq Exceedance of RBL (dBA)	TfNSW CNS Mitigation Measures
	Platform Extension (country end, new lift access walkway			R3	29	Letterbox drop, Monitoring
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
2.4	Platform 1 Works (Resurfacing, cross falls, lights, drainage etc)	Standard	Daytime	R1	19	-
				R2	n/a	n/a
				R3	30	Letterbox drop, Monitoring
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
3.1	Temporary Public Access to Platform 2	Standard	Daytime	R1	14	-
				R2	n/a	n/a
				R3	20	-
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
3.2	Demolition of existing Ramps, Canopies, Bicycle Storage areas	Standard	Daytime	R1	15	-
				R2	n/a	n/a
				R3	19	-
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
3.3	New Lift Access Walkway (to Lift 1)	Standard	Daytime	R1	15	-
				R2	n/a	n/a
				R3	16	-
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
4.1	Platform 2 Works (Resurfacing, cross falls, lights, drainage etc)	Standard	Daytime	R1	19	-
				R2	n/a	n/a
				R3	29	Letterbox drop, Monitoring
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
4.2	Lift 1 Construction	OOHW	Night-	R1	15	Monitoring,

Scenario		Worst-Case Scheduled Construction Period	INP Defined Period	Receiver	LAeq Exceedance of RBL (dBA)	TfNSW CNS Mitigation Measures
	(structure, cladding, fit-out and commissioning)	Period 2	time			Letterbox drop
				R2	n/a	n/a
				R3	14	Monitoring, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
4.3	Lift 2 Construction (structure, cladding, fit-out and commissioning)	OOHW Period 2	Night-time	R1	15	M, Letterbox drop
				R2	n/a	n/a
				R3	15	M, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
4.4	Lift 3 Construction (structure, cladding, fit-out and commissioning)	OOHW Period 2	Night-time	R1	15	M, Letterbox drop
				R2	n/a	n/a
				R3	15	M, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
5.1	Reconfigured Taxi Drop Off Zone	Standard	Daytime	R1	16	-
				R2	n/a	n/a
				R3	23	M, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
5.2	New bicycle storage area	Standard	Daytime	R1	14	-
				R2	n/a	n/a
				R3	22	M, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a

Scenario		Worst-Case Scheduled Construction Period	INP Defined Period	Receiver	LAeq Exceedance of RBL (dBA)	TfNSW CNS Mitigation Measures
				R6	n/a	n/a
5.3	New DDA Car park	Standard	Daytime	R1	20	-
				R2	n/a	n/a
				R3	18	-
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
5.4	Replacement of Shelters to footbridge and ramps	Standard	Daytime	R1	20	-
				R2	n/a	n/a
				R3	18	-
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
6.1	Reconstructed DDA and Commuter Car Parks	Standard	Daytime	R1	21	M, Letterbox drop
				R2	n/a	n/a
				R3	35	M, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
6.2	Replacement of Shelters to footbridge and ramps	Standard	Daytime	R1	21	M, Letterbox drop
				R2	n/a	n/a
				R3	35	M, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a
7.1	Removal of Existing Trees	Standard	Daytime	R1	27	M, Letterbox drop
				R2	n/a	n/a
				R3	27	M, Letterbox drop
				R4	n/a	n/a
				R5	n/a	n/a
				R6	n/a	n/a

Vibration

- Recommended Safe Working Distances for Vibration Intensive Plant in relation to human comfort levels for residential receivers, as per Table 19 above, would be followed. (However, higher vibration levels, if occurring over shorter periods, are permitted.)
- Building surveys of sensitive structures (including the Platform 1 heritage building) would be carried out in order to assess the potential for increased susceptibility to building damage from vibration. Should these buildings be considered more susceptible to vibration, reduced vibration criteria levels may be applicable (as per German Standard DIN 4150 – Part 3 (DIN 1999)) and subsequently adopted during the selection process for suitable equipment to be used in the vicinity of these buildings.
- At the commencement of operation for each plant or activity that may impact on heritage items, and which has the potential to generate significant vibration levels, attended vibration monitoring should be undertaken to refine the recommended minimum working distances and provide a site-specific table of minimum working distances.
- Where vibration is found to be excessive, management measures shall be implemented to ensure vibration compliance is achieved. Management measures may include modification of construction methods such as using smaller pieces of equipment, establishment of larger minimum working distances, and if necessary, time restrictions for the most excessive vibration activities. Time restrictions are to be negotiated with affected receivers.
- Preparation of a dilapidation report on the state of the Platform 1 heritage building prior to construction.

Refer to Table 27 for a consolidated list of proposed mitigation measures.

6.4. Indigenous Heritage

A search of OEH's AHIMS Web Services (Aboriginal Heritage Information Management System) was undertaken on 13 February 2013. This search indicated that no Aboriginal sites are recorded in or near the Proposal, and no Aboriginal places have been declared in or near the Proposal.

The Proposal is located in an area that has been highly modified for a range of uses. The site has low archaeological potential and therefore it is considered unlikely that any Indigenous heritage items would be located in the vicinity of the proposal, due to the past history of disturbance.

6.4.1. Potential impacts

(a) Construction phase

As no known Indigenous heritage items are located in the vicinity of the proposal works and the potential for unknown items is low, the proposal is unlikely to affect Indigenous heritage during construction.

(b) Operational phase

As no known Indigenous heritage items are located in the vicinity of the proposal works and the potential for unknown items is low, the proposal is unlikely to affect Indigenous heritage during operation.

6.4.2. Mitigation measures

As no known Indigenous heritage items are located in the vicinity of the proposal works, no additional mitigation measures are proposed other than those listed in Table 27.

6.5. Non-indigenous Heritage

A Statement of Heritage Impact has been prepared by JCIS Consulting. A summary of the report is provided below.

6.5.1. Existing environment

The statutory listed heritage items within the vicinity of the works are summarised in Table 22. The site is not listed on the State Heritage Register (SHR) and is not subject to an Interim Order (IHO) under the Heritage Act 1977 (NSW).

Table 22: Heritage items within the vicinity of the works

Name	Address	Register	Significance
Ingleburn Railway Station Group	Stanley Road	RailCorp s. 170 Register, Campbelltown LEP	Local
Ingleburn Horse Trough	14 Oxford Road Ingleburn	Campbelltown LEP	Local

The heritage curtilage for the site is determined by the length of Platforms 1 and 2; it includes the northern ramps to the footbridge but excludes the main overhead footbridge to the south (see Figure 18 below).

The 1901 station building is a representative early 1900s station building of high integrity, displaying intact characteristics of its type including: linear form, face brickwork, corrugated sheet metal gabled roof, bracketed awnings and arched window heads. Internally, the building retains a number of original features, including corrugated steel sheeting and ceiling roses, original timber seating in the waiting area, and two hardwood sliding doors to the east and west faces of the northern elevation.

Figure 18: Ingleburn Station heritage curtilage

(Note the southern portion of the pedestrian footbridge is not included in the S170 listing curtilage.)

The 1901 station building makes an important contribution to the local significance of the Ingleburn Station Group. Platforms 1 and 2 also make an important contribution as the earliest surviving elements on the site, constructed in 1883 and 1891 respectively. The relay hut (c1920) makes a moderate contribution as an intact 1920s relay hut building.

Ingleburn Station was modified during the 1980s by the construction of a footbridge with a curved canopy, a face-brick amenities block on Platform 1, and a sheltered waiting area on Platform 2. While the ramps to the footbridge, amenities block and waiting area are included in the s170 listing for the site, the heritage assessment found that these elements are intrusive in their impact on the heritage significance of the station group, as they are not aesthetically sympathetic and obscure a visual understanding of the platforms and the 1901 station building.

Within the boundaries of a heritage listing, not all elements may make an equal contribution to the overall significance of an item. A Statement of Heritage Significance (SoHI) report was prepared by JCIS in June 2013. This report grades the specific elements in the Section 170 register and grades their significance according to criteria set out in the *Heritage Branch Guidelines – Assessing Heritage Significance.*

Table 23. Items within the curtilage of Ingleburn Station

Name	Condition	Integrity	Grading
Platform building, Platform 1 (type 11) (c.1901)	Good	Altered sympathetically	High
Platform building Platform 1 (1980s)	Good	Good	Little
Platform 1 (c. 1883, extended 1939, 1968)	Good	Altered sympathetically	High
Platform 2	Good	High	Little
Relay Hut (c. 1920)	Good	Equipment removed	Moderate
Canopies (modern)	Good	High	Little
Footbridge Ramps (1988)	Good	Good	Little
Car Park	Good	Good	Little

It can be seen from the assessment above that the grading of items within the curtilage boundaries of Ingleburn Station (see Figure 18) demonstrates that, while all the items generally support the heritage listing, the core items of original fabric are:

- Platform 1 Building, (type 11) (c. 1901) and
- Platform 1 (c. 1883, extended 1939, 1968).

6.5.2. Potential impacts

The following aspects of the Proposal could detrimentally impact on the heritage significance of the core items (as above):

- Works impacting on the heritage building. The existing amenities building on Platform 1 adjacent to the heritage building is being demolished to open the pedestrian approach to, and views of, the end of the existing heritage building (i.e. from the existing ramp and new walkway). This will improve access and circulation and sight of the proposed new ticket window. The existing staff toilet addition at the north (city) end of the building is also removed.

  To replace the removed facilities, the heritage building needs to be reconfigured internally. DDA-accessible staff facilities would be provided, and this will require widened internal doorways, with installation of an accessible staff toilet/shower. Any new partitions are to be timber-framed to allow future removal.

  A Family Accessible Toilet with baby change table, with direct access from the platform, is provided at the northern end of the building. Access is via a widened doorway opening that would retain the existing lintel from the original Parcels Office door, retain the existing cast iron rollers and hardwood patent sliding doors, and use new panels to match the style of the existing door.

  Some internal fixtures need to be removed, but wherever possible, existing heritage features (corrugated iron sheet metal ceiling, cast iron vents, ceiling roses, fireplaces, hardwood sliding doors and cast iron door rollers, openings in external walls) would be retained. The southern end of the heritage building would house a new ticket window

cut into the brickwork. The hardwood timber seating from the existing public waiting room is to be re-instated for public seating elsewhere in the station precinct. The final location of the seating will be confirmed during detailed the detailed design phase in consultation with the Sydney Trains Heritage Group.

Upgraded services including air-conditioning, lighting and plumbing are also proposed. Ceiling services are to be suspended/limited to avoid penetrations into the pressed metal ceiling, and service penetrations into external walls are to be minimised.

- Platform coping works. The Platform 1 coping edge appears to be very close to the correct coping design alignment. The variance is typically 10mm vertically and 20mm horizontally and would be corrected by new coping and re-surfacing works.

  The platform surface is currently uneven with potential trip hazards. The platform drainage is to be raised to provide a level surface. Platform drainage is being reworked to interface with door thresholds (including on the heritage building) and to suit gradients. Tactile indicators would also be installed.

The relationship between all the heritage elements and the level of impact is summarised in Table 24 below.

Table 24: Elements of heritage item and impact on the Ingleburn Railway Station Group

Element	Proposal	Level of Impact
Platform building, Platform 1, 1980s	Demolition of existing amenities building	No substantial impact
Relay Hut c1920	Demolition of relay hut. Plans do not show building until 1963 and fabric is consistent with this date.	Lacks relays or any electrical equipment. No substantial impact.
Staff toilet (modern addition)	Demolition of staff toilet	No substantial impact
Platform 1 Building c1901	Internal refurbishment	Potential major impact (subject to implementation of mitigation measures)
Platform 1 c1883	Widening of Platform 1 usable area (via removal of existing amenities building, as above)	Minor impact
Platform 1 c1883	Construction of a new amenities and service (toilets) building	Minor impact
Platforms 1 and 2 c1883	Resurfacing and access inclusions (TGSIs)	Minor impact
Existing ramp and canopies (near Bunya Pine)	Demolition of ramp and canopies	Outside the curtilage, no impact
Existing bus shelter (near Bunya Pine)	Demolition of section of bus shelter	Outside the curtilage, no impact
Bunya Pine tree (flagged for potential listing)	Westernmost trunk to be removed	Minor impact

Element	Proposal	Level of Impact
Bike lockers	Relocation of bike lockers	Outside the curtilage, no impact
Lift construction	Three lifts located on the concourse	Outside the curtilage, no impact
Platform 1 extension	Country end, new lift access walkway	Minor impact

The Proposal would therefore impact on the Ingleburn Railway Station Group by impacting upon its elements. All demolition and construction work has the potential to indirectly impact on the core items of original fabric (Platform 1 Building, and Platform 1)

Whilst the proposed works will have an adverse impact on the Platform 1 Building (due to internal layout amendments and provision of additional doorways between adjacent rooms), works affecting heritage fabric will be restricted to the minimum required to achieve operational requirements. This will include the retention of internal walls, ceilings and openings insofar as possible. It is noted that some openings may be infilled, however the original faces of the structure(s) would remain visible.

As part of the refurbishment, the existing (disused) toilet area in the building will be reused as a Ticket Office requiring the construction of a ticket window in the southern end of the building. This will be an alteration of the original building fabric but is a sympathetic alteration as it still allows that original building design to be understood and also adaptively reuses a space for railway operations purposes.

The need to provide accessible amenities for both railway staff and commuters has been balanced, as far as possible, with the heritage values of the item.

The Proposal would improve the amenity of the Platform 1 building as a working heritage item by improving access for both passengers and staff. The works would ensure the on-going adaptive use of the building, while maintaining original features. The proposed changes, with internal heritage features retained, would not have a significant impact on the local heritage significance of the Ingleburn Station Group in its entirety.

It should be noted that Platform 1 is likely to be resilient to indirect impacts, whereas the fabric of the station building may be more vulnerable to impacts from dust and vibration.

The Bunya Pine is likely to be sensitive to indirect impacts such as dust and accidental construction impacts as work is going to be undertaken around the Bunya Pine.

6.5.3. Mitigation measures

- Detailed designs for the Platform 1 heritage building to be submitted to TfNSW for approval, in consultation with the Sydney Trains heritage team.
- TfNSW and the Sydney Trains Heritage Group would be consulted in regard to the final design of the Platform 1 heritage building.
- The final design would be sympathetic to the original design of the heritage building and new design elements would reflect, but not replicate original design elements.
- The design of the new ticket window in the southern end of the heritage building is to be sympathetic to the existing windows in the building.

- The new amenities and services building on Platform 1 adjacent to the existing heritage building is to be designed and built to match the scale and with materials sympathetic to the adjacent heritage station building.
- As much as possible of the original fabric of the building, and internal features would be retained in situ. The corrugated iron sheet ceiling and cornices, cast iron vents, ceiling roses, fireplaces, hardwood sliding doors and cast iron door rollers, and openings in external walls are to be retained as far as possible, with some cut backs for DDA-compliant circulation. New partitions are to be timber-framed to allow future removal. Ceiling services are to be suspended/limited to avoid penetrations into the pressed metal ceiling, and service penetrations into external walls are to be minimised.
- The widened doorway opening to the Family Accessible Toilet is to retain the existing lintel from the original Parcels Office door, retain the existing cast iron rollers and hardwood patent sliding doors, and use new panels to match the style of the existing door.
- Removed original elements may be re-used in the final design, where this does not compromise design principles. In consultation with TfNSW, hardwood timber seating is to be re-located as public seating in the station precinct, or used as a simple interpretive tool to provide an understanding of the original design.
- The Contractor will be required to prepare a Construction Environmental Management Plan that specifically addresses the heritage impacts and required mitigation measures.
- Non-Indigenous heritage items would be identified on the construction contractor's Environmental Constraints Maps (ECMs).
- The Contractor is to provide a heritage induction to workers before construction begins, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
- Where agreed by TfNSW, original elements are to be removed carefully so that they can be reused within the precinct, and any architraves or timber detailing is to be reinstated or matched.
- Heritage building on Platform 1 to be assessed by a Structural Engineer in relation to removal of internal walls. If an adverse report is received, further advice is to be sought from a heritage consultant prior to any work being undertaken.
- Surfaces of heritage items to be protected as appropriate through use of plywood sheeting or similar, particularly during any platform works.
- If platform levels are changed, a geotextile fabric (or similar non adhesive barrier) is to be inserted between the heritage station building and any adjacent works as an appropriate protective measure.
- Construction impacts, such as vibration and dust on adjacent items must be avoided. In particular, the contractor would prepare details of how impacts of dust and vibration from the construction work at the entrance to the Ticket Office would be minimised – this will be specifically addressed in the CEMP.
- To effectively mitigate potential impacts of vibration on Ingleburn Station and other heritage items, activities that cause vibration would be managed in accordance with German Standard DIN 4150 – Part 3 (DIN 1999) which has specific standards relating to heritage.

- TfNSW would provide a minimum of one heritage interpretive panel (at A1 size or greater) in a conspicuous location on Platform 1, on or near the heritage station building.
- The finishes to the heritage building would be treated in a similar colour and finish to the existing, and any new fixtures (electrical or plumbing conduits) are to be sympathetically attached to the walls (i.e. colour and fixings).
- If any unanticipated archaeological deposits are identified within the project site during construction, work likely to impact on the deposit would cease immediately and the NSW Heritage Council and an archaeologist would be contacted. Where required, further archaeological work and/or consents would be obtained for the unanticipated archaeological deposits prior to works recommencing at the location.
- RailCorp/Sydney Trains would be notified of the proposed works and be provided with a copy of this report. Changes to the form, fabric and landscape setting of the Ingleburn Railway Station would be recorded in the Heritage inventory for this item.
- An Archival Record would be made of the Station Building on Platform 1, and in particular, of its interior. The Archival Record would to be undertaken by means of Laser Scanning using a unit such as a Trimble TX5 Laser to capture digital images.
- Copies of the 'as built' construction plans, photographs illustrating the completed works and the Archival Record would be lodged with RailCorp's Office of Rail Heritage as a documentary record of changes to the station precinct.

Refer to Table 27 for a consolidated list of proposed mitigation measures.

6.6. Socio-economic impacts

Ingleburn is a suburb in the Campbelltown LGA, and is south east of the South West Growth Centre (SWGC). The SWGC covers approximately 17,000 hectares and has capacity for around 110,000 new dwellings for 300,000 people. Two stations north of Ingleburn is the Glenfield Interchange which services the South West Rail Link, a new 11.4-kilometre rail line from Glenfield to Leppington. Three stations to the south is the Major Centre of Campbelltown with its large retail precinct, and facilities including Council administration and public and private hospitals.

SWGC comprises 18 Precincts, with Edmondson Park one of the first Precincts to be planned. It has potential for 6,000 new dwellings, and at its closest, the southern boundary of SWGC is around 1.5kms north of Ingleburn Interchange.

The Ingleburn Interchange has the potential to provide access to jobs in the Ingleburn employment lands (318 hectares of zoned land). The South West Subregion is targeted for the biggest proportional growth in employment capacity in Sydney.

This target includes:

- Increasing employment capacity in Liverpool (Regional City) from 16,000 in 2006 to 31,000 by 2036.
- Increasing employment capacity in Campbelltown/Macarthur (major centre) from 14,000 in 2006, to 25,000 by 2036.

6.6.1. Existing environment

Relevant statistics that relate to Ingleburn from the 2011 Census include:

- 7.1% of children are aged 0-4 years of age (NSW average is 6.6%)
- Children aged 0 - 14 years made up 19.6% of the population
- People aged 65 years and over made up 10.8% of the population
- 4.2% of persons reported that they required assistance due to disability.

There is a higher proportion than the NSW average of people:

- who work full-time
- who are unemployed
- whose country of birth is India, Philippines, England New Zealand and Bangladesh.

In relation to transport:

- There is an average of 1.5 motor vehicles per dwelling
- 10.7% of households do not have a car (i.e. a total population of 5,025 persons)

On Census day 2011, 24.1% of employed people travelled to work on public transport and 59.6% by car (either as driver or as passenger). The methods of travel to work for employed people were:

- Car, as driver 55.1%
- Train 17.1% (Of all commuting trips, train trips in Sydney comprise around 13.5%).
- Car, as passenger 4.3%
- Walked 2%
- Bicycle 0.1%.

Sources: www.censusdata.abs.gov.au Release 28/03/2013
http://profile.id.com.au/campbelltown

Ingleburn is ranked the 60th busiest station in the CityRail network, with weekday station entries and exits of 7,640 customers. Rail mode share for those who work in the CBD is likely to be high – for Campbelltown LGA, the figure is 89%.

Source: Compendium of Sydney Rail Travel Statistics 8th Edition v1.1, November 2012

The Table below indicates forecast population growth:

Table 25: Forecast population growth

Ingleburn	Forecast population growth (five year on five year)					
Kilometre radius	2011	2016	2021	2026	2031	2036
1	0.0%	1.4%	2.0%	5.3%	8.6%	4.2%
2	0.0%	1.2%	1.5%	4.7%	7.6%	6.0%
3	0.0%	10.6%	13.9%	10.8%	8.9%	7.7%

4	0.0%	9.6%	23.7%	13.7%	7.7%	8.0%
5	0.0%	11.6%	28.9%	17.2%	7.6%	6.7%
STM (station entries)						
5 year on 5 year growth	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**
Ingleburn	0.0%	19.5%	12.9%	10.5%	10.6%	9.9%
Forecast population growth (base year)						
Kilometre radius	2011	2016	2021	2026	2031	2036
1	0.0%	1.4%	3.4%	8.9%	18.2%	23.2%
2	0.0%	1.2%	2.7%	7.6%	15.7%	22.6%
3	0.0%	10.6%	26.0%	39.6%	52.0%	63.7%
4	0.0%	9.6%	35.6%	54.2%	66.0%	79.3%
5	0.0%	11.6%	43.9%	68.7%	81.5%	93.6%
STM (station entries)						
Base year growth	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**
Ingleburn	0.0%	19.5%	34.9%	49.0%	64.9%	81.3%
Population numbers						
Kilometre radius	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**
1	1,116	1,131	1,154	1,215	1,319	1,375
2	15,121	15,296	15,530	16,263	17,494	18,545
3	25,883	28,634	32,612	36,123	39,352	42,379
4	45,216	49,557	61,302	69,706	75,078	81,068
5	62,535	69,808	89,975	105,469	113,475	121,070

Source: BTS

NB. one kilometre population growth is considered more reflective of likely forecast.

A Risk Assessment was conducted to assess the security hazards associated with developing the Reference Design. The station has a number of security controls which have been effective in minimising security events. The foreseeable new hazard that was likely to be introduced was the lack of visibility of passengers whilst operating the lifts.

The design team incorporated CCTV surveillance into the lifts and associated waiting areas to mitigate this risk. The lift shafts have also been designed with glazing such that passengers are visible at all times. The remaining parts of the design occur in areas with existing security controls, which are considered effective.

As part of the further design development, a Security Risk Workshop would be held to further assess risk. This would, for example, determine camera placements to reduce blind spots as a result of new works, and consider lighting levels and the like, to ensure the design adequately delivers on security requirements for the station and interchange.

6.6.2. Potential impacts

(a) Construction phase

The proposed works could have potential impacts to local businesses, pedestrians and drivers during the construction phase of the interchange upgrade. This would include:

- changes to access arrangements including pedestrian diversions
- potential relocation of buses, taxis, and kiss and ride during construction
- potential pedestrian/vehicle conflicts
- temporary changed parking conditions
- potential temporary loss of parking spaces
- construction noise and visual impacts.

Other risks include:

- short delays to commuters accessing the platforms, or to pedestrians crossing the corridor
- the existing retail could have disruptions to trading at certain times, due to changes to pedestrian or delivery activities
- the demolition of the existing utilities building on Platform 1 could mean that Platform 1 exit could be blocked for a short time
- potential for damage to existing utilities, including high pressure gas and high voltage electricity lines
- potential for asbestos to be found in the signal hut to be demolished.

(b) Operational phase

Given the desire to maximise parking spaces, there are limitations to addressing potential safety issues with pedestrian access on the Council-provided kerbside parking spaces on the northbound side of Ingleburn Road adjacent to the north east commuter car park.

There are also potential safety issues relating to moving the current location of transport links in that trolleys may be stored in new locations.

Due to only having one exit from Platform 1, there is a risk that a fire at certain locations may stop people from exiting Platform 1.

The long term operational impacts of the Proposal would primarily be positive for the Ingleburn Town Centre and surrounding area. The Proposal would provide improved amenity with links between different modes of transport, making access more convenient and efficient. The Proposal would also facilitate extension of transport networks to connect the population of the South West Growth Centre to the existing employment lands at Ingleburn, and to connect Ingleburn to employment opportunities in Liverpool and Campbelltown/ Macarthur. This would support a reduction in cross-regional trips, resulting in reduced need to use private cars.

The improvements would have a positive economic impact on the town centre by increasing cross-corridor pedestrian traffic, pedestrian activity around the interchange, and improving access to jobs in the large industrial area to the west.

The Proposal has been designed having regard to the four key principles established in the Crime Prevention through Environmental Design (CPTED) criteria as follows:

- natural surveillance – clear sight lines would be provided within through the station entry forecourts. The wider through areas, improved lighting and additional number of commuters using the facility would improve surveillance.
- access control –pedestrian access points would be located in more highly visible locations
- territorial reinforcement – the proposed works to the concourse and the forecourts are extensions to the existing rail infrastructure facilities and are appropriate for the interchange precinct and town centre, and
- space/activity management – the proposed station upgrade has been designed to avoid creating spaces that would compromise the safety of users and adjoining residents.

There are unlikely to be any long term negative impacts as a result of the proposed works. Impacts are likely to be positive in terms of amenity, including public safety, security, views, and a sense of wellbeing.

6.6.3. Mitigation measures

- The proposed sustainability criteria for the project would encourage the contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
- A number of noise mitigation measures would be implemented to minimise impacts on local businesses. Refer to Section 6.3 for discussion on the potential for noise impacts and for the environmental safeguards for construction noise.
- A CTMP would be developed to address changed traffic and pedestrian conditions. Refer to Section 6.1 for details.
- The Consultation Strategy would identify all potential stakeholders and the best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where possible.
- 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.

Refer to Table 27 for a consolidated list of proposed mitigation measures.

6.7. Biodiversity

6.7.1. Existing environment

An arborist assessment (Birds Tree Consultancy, 2013) has been undertaken to assess the current state of the vegetation in the vicinity of Ingleburn Railway Station. The results of that assessment is summarised below

The natural landscape of the site has been extensively altered due to past development and its location within a highly urbanised environment. The vegetation on site was mostly planted and consisted of some mature trees and low lying herbs and shrubs.

The site is relatively flat in the vicinity of all trees with the exception of trees 1-14 which are located on top of an existing timber retaining wall in the Ingleburn Road car park.

Vegetation within vicinity to works on the Ingleburn Road side of the station consists mainly of a retained area between the rail corridor and the commuter parking area with some mature trees (Trees 1-12). There are also two (2) trees near the existing taxi rank (Trees 13 and 14). Of significance is a mature Bunya Pine (Tree 15) outside the entrance to the station and adjacent to the bus zone. This tree is listed as a Significant Tree in the Campbelltown Council Register of Significant Trees, and has great environmental and historical significance. The base of the tree is currently sealed by paving to a great extent. This tree is to be retained and protected during the proposed development, and all new paving would be permeable. Trees 16 and 17 are located near the bus bay, and would not be impacted by the proposed works.

On the Stanley Road side of the station, there are several existing trees (Trees 18-23) that would be impacted by the proposed car parking and new building works. Trees 24 are to the south of the station entrance where there is commuter car parking and would be removed, together with Trees 27 – 30 which are located along the commuter car parking to the north of the station entrance.

Figure 19 indicates the trees that are proposed for removal as a result of the proposed works. (Trees shown in red require removal, mainly due to safety concerns, see Figure 19.)

The site is considered highly unlikely to support suitable habitat for any threatened flora species previously recorded or predicted to occur in the locality of the subject site given that the vegetation present comprises a small area of predominantly planted and highly disturbed vegetation isolated by surrounding urban development. Vegetation within the Proposal site does not constitute a Threatened Endangered Community (TEC) listed under the TSC Act or the EPBC Act.

The site does not contain any intact native vegetation patches, tree hollows, rock outcrops, wetlands, and extensive areas of understorey vegetation or any other important habitat resources for native fauna. The site would contribute to available habitat for local populations of common, opportunistic native fauna as occasional foraging habitat in a transitory basis, however no fauna (threatened or otherwise) are considered to rely on the site as primary habitat.

There is no recommended or declared critical habitat on the OEH NSW critical habitat register in the locality or of relevance to the assessment of the proposed works (OEH 2011). There is no critical habitat on the Commonwealth register of critical habitat in the locality or of relevance to the assessment of the proposed works (DSEWPC 2009).

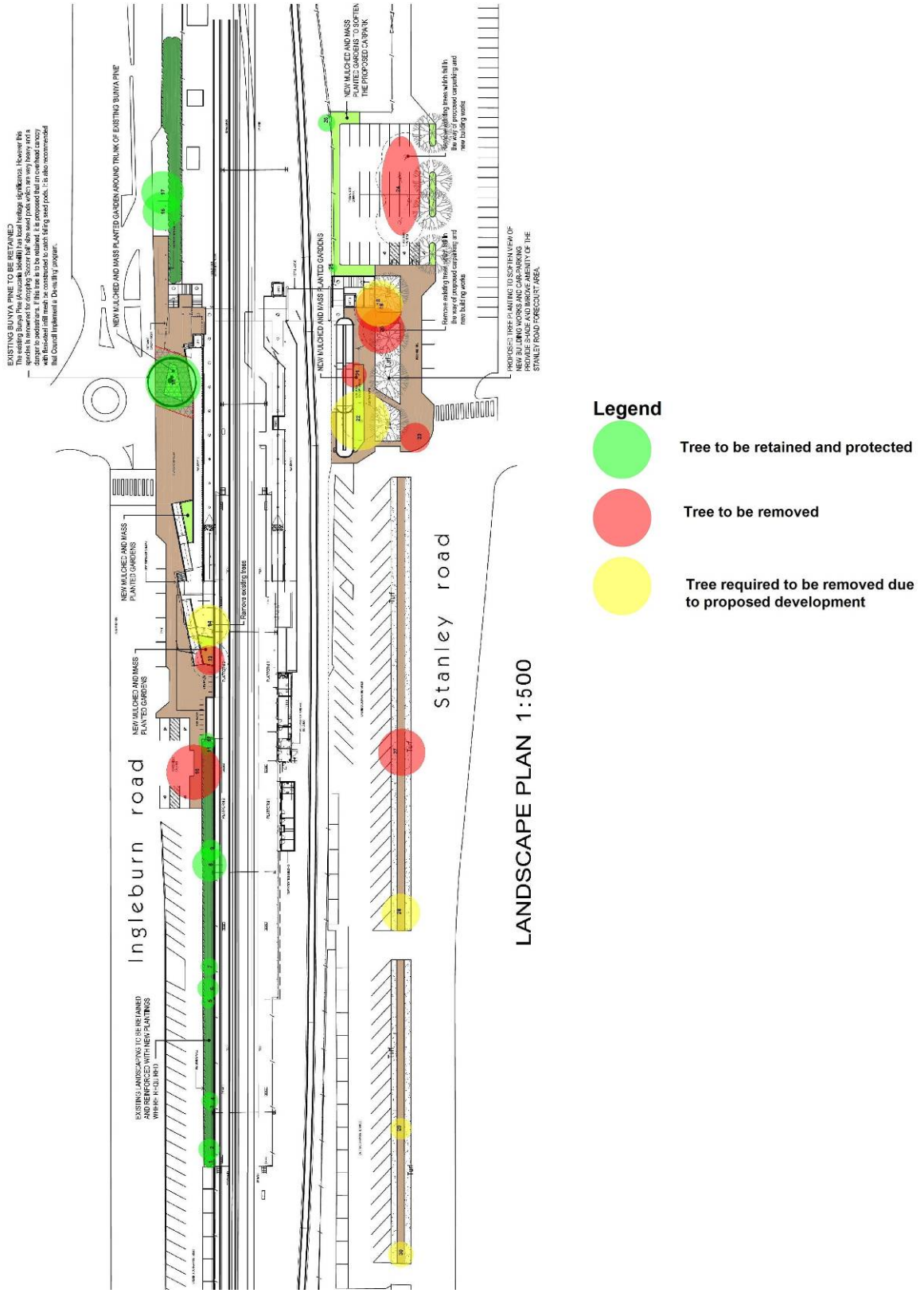


Figure 19: Trees required to be removed due to the proposed development

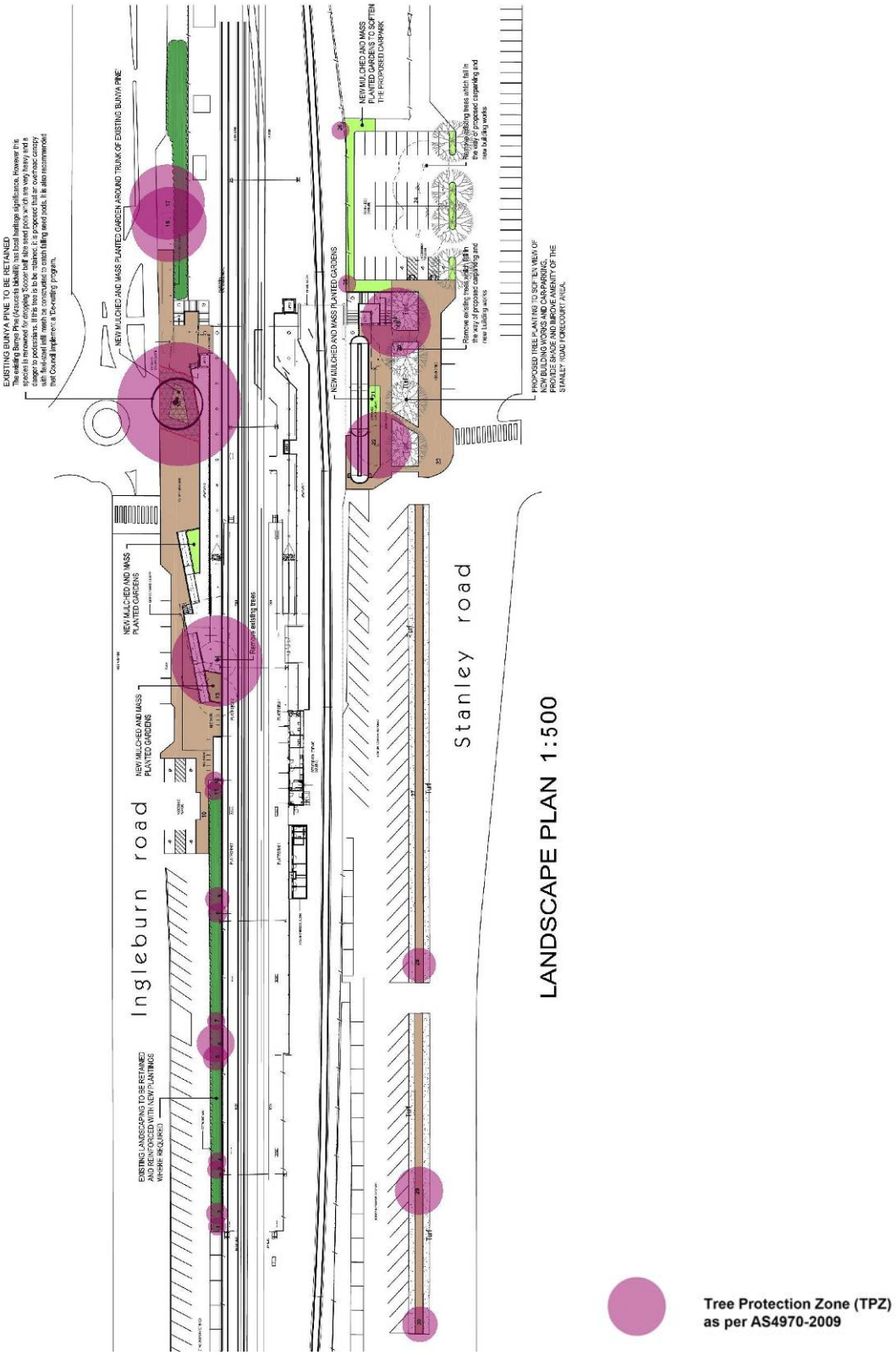


Figure 20: Tree Protection Zones (TPZs)

Table 26: Tree retention, removal and replacement

Tree No.	Species	Recommendation	Comments	Campbelltown City Council DCP 114 Status
1	*Callistemon salignus*	Retain & Protect		Preserved
2	*Callistemon salignus*	Retain & Protect		Preserved
3	*Callistemon salignus*	Retain & Protect		Preserved
4	*Callistemon salignus*	Retain & Protect		Preserved
5	*Callistemon salignus*	Retain & Protect		Preserved
6	*Callistemon salignus*	Retain & Protect		Preserved
7	*Callistemon salignus*	Retain & Protect		Preserved
8	*Acacia salifolia*	Retain & Protect		Preserved
9	*Acacia salifolia*	Retain & Protect		Preserved
10	*Camphora cinnamomum*	Remove	Weed species. Required to be removed due to development	Preserved
11	*Callistemon salignus*	Retain & Protect		Preserved
12	*Callistemon salignus*	Retain & Protect		Preserved
13	*Grevillea robusta*	Remove and replace	Poor and declining health, termite infestation with cavities and decay	Preserved
14	*Camphora cinnamomum*	Remove and replace	Weed species. Required to be removed due to development	Preserved
15	*Araucaria bidwillii*	Retain & Protect	All excavation within the TPZ to be carried out by hand and no greater roots than 30mm are to be cut. All paving at the base of the tree within the TPZ is to be permeable.	Preserved/Significant Tree
16	*Eucalyptus tereticornis*	Retain & Protect	Viable based on pavement remaining intact within TPZ	Preserved

Tree No.	Species	Recommendation	Comments	Campbelltown City Council DCP 114 Status
17	*Eucalyptus tereticornis*	Retain & Protect	Viable based on pavement remaining intact within TPZ	Preserved
18	*Eucalyptus tereticornis*	Remove and replace	Required to be removed due to development	Preserved
19	*Eucalyptus tereticornis*	Remove and replace	Extensive cavities and decay	Preserved
20	*Eucalyptus tereticornis*	Remove and replace	Termite infestation with cavities and decay	Preserved
21	*Eucalyptus tereticornis*	Remove		Preserved
22	*Eucalyptus tereticornis*	Remove and replace	Required to be removed due to development	Preserved
23	*Acacia decurrens*	Remove	Almost dead	Preserved
24	*Acacia decurrens*	Remove	Almost dead	Preserved
25	*Eucalyptus tereticornis*	Retain & Protect		Preserved
26	*Casuarina spp*	Retain & Protect		Preserved
27	*Dead tree*	Remove		Exempt
28	*Pistacia chinensis*	Remove and replace	Required to be removed due to development	Preserved
29	*Pistacia chinensis*	Remove and replace	Required to be removed due to development	Preserved
30	*Pistacia chinensis*	Remove and replace	Required to be removed due to development	Preserved

6.7.2. Potential impacts

(a) Construction phase

The proposed works would result in direct impacts on some planted vegetation within the construction footprint of the upgrade. Construction impacts would comprise the removal of a small number of individuals of non-threatened native plants and weeds. This would include the removal of 13 trees:

- Trees 10 and 14 (Camphor laurels) are a weed species with low retention value. These trees are required to be removed due to the development.
- Tree 13 (Grevillea) is in poor and declining health and has large cavities and decay present.

- Trees 18 and 22 (Eucalypts) are required to be removed due to major encroachment of the proposed development.
- Trees 19 and 20 (Eucalypts) have extensive decay. Tree 20 has a termite infestation.
- Tree 21 is a Phoenix palm which has unsafe large spikes. This tree will grow into the existing ramp and pose a safety risk to pedestrians.
- Tree 23 and 24 are Acacia species that are at the end of their useful life expectancies and are almost dead.
- Trees 28, 29 and 30 (Pistacia) are all located where the new pedestrian footpath is proposed and for this reason the trees will not be viable under the proposed development, unless the footpath is moved/relocated outside the Tree Protection Zones.

The removal of these trees would have a minor impact to the biodiversity of the area, but would allow for significant works on both sides of the station in order to improve the access and amenity of the interchange.

All the other trees are to be retained and protected, as per mitigation measures below.

In particular, protection measures and mitigation would apply to Tree 15, the large Bunya Pine in the proposed new forecourt in Ingleburn Road.

The trees to be removed would be offset in line with the TfNSW's *Draft Vegetation Offset Guide 2010*, refer to section 6.7.3 below.

Some threatened or migratory birds could potentially fly over or roost on the site. The works would be unlikely to impact any of these species however because these species are highly mobile and as there is no ideal habitat located on the site, would not be reliant on the site. There is other planted vegetation nearby that would provide a similar level and quality of roosting habitat for these species.

Given that the area is exposed to high frequency rail passenger and freight operations, it is unlikely that works would impact threatened fauna species.

A generic assessment of significance was performed for threatened biota listed under the TSC and EPBC Acts (Appendix 2). The outcome of this assessment is that the Proposal is not likely to have a significant negative effect on any biota or other matters protected under the Act. No significant impact was considered likely for any Matters of National Environmental Significance listed under the EPBC Act. The proposed works are unlikely to be a controlled action and would not require additional assessment or approval by the Commonwealth.

(b) Operational phase

As the site is so urbanised, it is not considered that there is potential for the proposal to create or extend any barriers to the movement between populations of flora and fauna.

Tree 15 Bunya Pine is to be retained as a focal point for the gateway to station. This tree is currently sealed all around with paving, and the proposal includes relocation of the bus shelter to provide more space for the tree, and a mulched and mass planted garden bed around the tree. Any additional paving would be permeable to allow percolation of water and air infiltration. This treatment would be expected to extend the useful life expectancy of this tree.

New mulched and mass planted garden beds are also proposed for the area near the access to Platform 2 in Ingleburn Road, while the existing retained landscaped area along the rail line would be retained and reinforced with new plantings where required.

On the Stanley Road side of the station, new mulched and mass planted garden beds would be installed to soften the proposed car park to the south of the station entrance. It is also proposed that the Stanley Road forecourt would have tree planting to soften the view of the new building works and car parking, provide shade and improve amenity.

6.7.3. Mitigation measures

- A Consulting Arborist meeting Australian Qualifications Framework (AQF) Level 5 would be retained to provide advice for any potentially sensitive works in the vicinity of retained trees, and in particular, Tree 15 Bunya Pine.
- The Contractor is to provide all workers with an environmental induction prior to commencing work on-site. This induction would include information on the ecological values of the site, protection measures to be implemented to protect biodiversity and penalties for breaches.
- All tree protection works would be carried out in accordance with the Tree Protection Zone (TPZ) drawing at Figure 20 and before any further excavation, grading or site works commence.
- The trunk of trees to be retained would be armoured with 2m lengths of 50x100mm hardwood timbers spaced at 150mm centres and secured by 8 gauge wires or steel strapping at 300mm spacing, in line with Australian Standard AS4970-2009 Protection of Trees on Development Sites.
- Tree protection works would be inspected and approved by the Site Arborist prior to works commencing.
- The trees to be removed would be clearly demarcated on-site (where appropriate) prior to construction to avoid unnecessary vegetation removal.
- Native trees to be removed to be chipped and reused as leaf mulch (as per AS 4454 and AS 4419) and placed within tree protection fencing.
- All excavation within the TPZ of Tree 15 to be carried out under the direction of the Site Arborist. A photographic record should be maintained of Tree 15 site inspections, including the state of the tree and any injury inflicted.
- The western of the two co dominant trunks is to be removed, under the direction of the Site Arborist. This trunk is not to be chipped, but is to be cut in a manner that would allow potential re-use of the timber.
- The wound caused by the removal of the western co dominant trunks is to be inspected by the Site Arborist every three months, for a total of 12 months. Remedial action is to be taken as required.
- All excavation at Tree 15 to be done by hand and no roots greater than 30mm or greater are to be damaged or cut without the express advice of the Site Arborist.
- In the case of any tree other than Tree 15, where any access is required within the TPZs for building purposes, the fence should be set back 1.5m from the construction

and the soil surface between the fence and the building should be protected by plywood sheets or strapped planking.

- Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refuelling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the TPZs of existing trees to be retained.
- No backfilling would occur within the TPZs of existing trees.
- Trees shall not be removed or lopped unless as specified and approved for removal.
- Installation of the mulched and mass planted garden bed around Tree 15 Bunya Pine to be undertaken under the direction of the consulting Arborist, and in co-operation with Campbelltown City Council.
- Approximately 50 trees would need to be planted to offset the removal of the thirteen trees required for safety, or due to the proposed works. Trees and other vegetation would be selected, planted and maintained in line with TfNSW's – Transport Projects Draft Vegetation Offsetting Guide. All vegetation planted on-site would consist of locally endemic native species, unless otherwise agreed by the PME, and following consultation with the relevant Local Authority, where relevant, and/or the owner of the land upon which the vegetation is to be planted.
- Additional landscaping to be implemented along the borders of the car parks is to be undertaken in accordance with the RailCorp Revegetation Guide. Accent shrubs and groundcovers would augment the retained trees and shrubs.
- Proposed planting is predominantly indigenous and native plant species with low maintenance and low water requirements and which are appropriate for the site's soil and climatic conditions.
- The TPZ trunk protection should be maintained intact until the completion of all work on the site.
- In the event of any tree to be retained becoming damaged during construction, the Site Arborist should be informed to inspect and provide advice on remedial action.

6.8. Contamination, landform, geology and soils

A *Geotechnical Investigation* for the Ingleburn Station Upgrade was undertaken by Coffey Geotechnics Pty Ltd (Coffey) for Kellogg Brown & Root Pty Ltd on 23 April 2013. The purpose was to assess ground condition in the vicinity of the existing overbridge and car park areas as a basis for comment and recommendation on geotechnical aspects for the proposed station upgrade works.

Two boreholes were drilled to a depth of 7m in the vicinity of the existing overbridge with rock core drilling of the bedrock, and five bore holes to a depth of 1.5m were drilled in the existing car park areas.

A *Phase 1 Contamination Assessment* was carried out by Coffey Geotechnics Pty Ltd (Coffey) in June 2013.

The results of the reports are discussed below.

6.8.1. Existing regional environment

Regional geology

The 1:100,000 scale Geological Sheet for Penrith indicates the site to be underlain by Hawkesbury Sandstone but located near a geological boundary with Ashfield Shale. The Penrith 1:100,000 Soil Landscape Series Sheet (Soil Conservation Service of New South Wales, 1989) indicates that the site is characterised by shallow to moderately deep hardsetting, mottled texture contrast soils, red and brown podzolic soils on crests which grade to yellow podzolic soils on lower slopes and drainage lines.

Regional Hydrogeology

Groundwater is expected to occur within the bedrock. Perched/seepage water may be present at the fill/natural soil and soil/bedrock interfaces following periods of rainfall. Groundwater flow in the vicinity is considered likely to follow the regional topography, or be in a northerly direction, towards Bunbury Curran Creek located approximately 400m to the north.

A search of groundwater bore licenses was undertaken using the NSW Natural Resources Atlas (NSW-NRA, http://nratlas.nsw.gov.au) on 24 June 2013. A total of three groundwater bores were located within a 2km radius of the site.

Contaminated Land Public Registers

Coffey undertook a search of the NSW Department of Environment and Heritage (OEH) online contaminated land public register on 13 June 2013. The search identified no records of notices issued under the *Contaminated Land Management Act 1997*, registered contaminated sites, or POEO Act licences being issued to the site or properties immediately adjacent to the site.

6.8.2. Existing site conditions

East (Ingleburn Road Side)

An asphalt commuter car park is located on the north-eastern portion of the station. A bus stop stand/canopy is located on the south-eastern portion of the station. Several small garden beds, grassed areas and retaining walls are located along the railway fence line to the west. Some general litter was observed on the ground surface in various parts near the main pedestrian walkway and station entrance. Evidence of recent pesticide/herbicide application was also evident at the base of the station structures.

Central (Rail Corridor including Platform)

Several station buildings (amenity block, station office and a timber shed) are located on the up-line platform. With the exception of the timber shed, the buildings appear to be mostly of brick construction with a metal roof and suspended floor. A timber shed, painted, is located to the north of the station office and is not accessible by the public.

A brick shelter on suspended floor is located on the down-line platform. Some waste debris was observed underneath the floor within the subfloor void.

A large concrete and metal pedestrian access structure with an overbridge, access ramps and stairs provides access to the raised concrete and asphalt platforms.

Some minor waste stockpiles comprising timber and plywood were observed within the rail corridor and some minor litter debris was also observed. Some localised oil staining was also observed in the vicinity of the hydraulic operated points along the railway tracks.

With the exception of the raised rail tracks on ballast and the raised platforms, elevation of the rail corridor is generally comparable or slightly raised compared to the surrounding street levels. Evident of raised fill mounds was observed adjacent to the up-line platforms.

West (Stanley Road Side)

An unpaved gravel car park is located in the south-western portion of the station. An asphalt paved commuter car park is located on the north-western portion of the station. The narrow strip between the car park and Stanley Road was observed to be grassed. Some minor surface litter debris was observed adjacent to the car park and along the road verge. Evidence of recent pesticide/herbicide application was also evident along the grassed road verge.

6.8.3. Potential impacts

Generally, activities which would disturb soils include tree removal, drilling for lift footings, removal and establishment of certain ramps and stairs, paving works associated with the reallocation of road space for taxis and commuter parking on Ingleburn Road, and extension of the forecourt entry and reallocation of road space for commuter parking on Stanley Road.

Such activities have the potential to impact upon local water quality and drainage as a result of erosion through runoff and sedimentation downstream. Given the existing sealed surfaces there is relatively low risk. Regardless, mitigation measures have been provided below to further minimise the potential for impacts to water quality as a result of erosion and sedimentation.

There is the potential to contaminate soils as a result of an incidental spill over exposed soils, or during periods of rainfall. Measures have been provided below to minimise the potential for this impact.

The following potential areas of environmental concern were identified in the *Contamination Assessment*:

- Potential presence of contamination in the uncontrolled fill;
- Potential weathering of hazardous building material or remnants of building rubble of rail infrastructure and buildings;
- Historical rail usages, track works, asbestos brake pads, oil lubricants and point hydraulics within the rail corridor;
- Potential disposal/deposition of ash/coal within the rail corridor;
- Waste debris and potential waste dumping;
- Applications of pesticides/herbicides in the rail corridor and around buildings; and
- Potential leakages of engine oil in the car park.

Coffey considers the above potential areas of environmental concern are unlikely to present a significant constraint to the proposed station upgrade.

Coffey considers the proposed station upgrade is unlikely to present an increased human health risk to the intended site users, with respect to land contamination, provided appropriate mitigation is undertaken.

6.8.4. Mitigation measures

- The CEMP would have a Contamination Sub-plan that would include an unexpected finds protocol, that is to be implemented during the upgrade work.
- Excavation/demolition/waste materials are to be appropriately managed in accordance with relevant NEPC and NSW EPA guidelines, including but not limited to the Waste Classification Guidelines (NSW EPA, 2009).
- Sampling and laboratory testing is to be undertaken prior for any spoil removed from site of the upgrade work to further characterise site contamination and to assist in waste classification of material to be excavated.
- A hazardous materials assessment is to be carried out on the Platform 1 heritage building before any construction works commence.
- Erosion and sediment control plans would be prepared in accordance with Managing Urban Stormwater: Soils and Construction Guidelines (Landcom/Department of Housing). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase. Measure would include:
- Stabilised surfaces would be reinstated as quickly as practicable after construction
- All stockpiled materials would be stored in bunded areas, covered appropriately and kept away from waterways to avoid sediment entering the waterways.
- Sediment would be prevented from moving off-site and sediment laden water prevented from entering any watercourse, drainage line or drainage inlet.
- Any material transported onto pavement surfaces would be swept and removed at the end of each working day.
- Erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality.
- Erosion and sediment control measures would be left in place until the works are complete and areas are stabilised.

Refer to the Table 27 for a consolidated list of proposed mitigation measures.

6.9. Hydrology and water quality

As per the Geotechnical Investigation for the Ingleburn Station Upgrade undertaken by Coffey in April 2013, no groundwater was observed in any bore holes during drilling. It is expected that following periods of rainfall groundwater seepage may be observed as transient flows within the soil profile and as perched water at the fill/natural soil and soil/bedrock interfaces.

There are no nearby waterways within the area of proposed works. Surface runoff within the vicinity of the proposal is managed by Council's stormwater drainage infrastructure which consists mainly of on-grade stormwater pits connected to an underground pipe network. The closest drainage line is the open channel of Bow Bowing Creek which is located approximately 765m to the north west of the Proposal. This creek flows into Georges River about 4.7km to the north east.

The Bow Bowing/Bunbury/Curran Creek catchment and its tributaries are part of the Georges River catchment. These are mainly formalised and convey storm flows in a controlled manner. The Proposal is not expected to impact existing drainage capacity or water quality.

6.9.1. Potential impacts

The Proposal is unlikely to impact upon the hydrology of the proposal site or the surrounding area. The detailed design would take stormwater management into consideration. There would not be a significant increase in impervious areas nor would there be significant changes to the existing layout. Therefore the proposal is unlikely to significantly impact upon Council's drainage infrastructure.

Activities which would disturb soils include tree removal, drilling for lift footings, removal and establishment of certain ramps and stairs, reallocation of road space for taxis and commuter parking on Ingleburn Road, and extension of the forecourt entry and reallocation of road space for commuter parking on Stanley Road.

Such activities have the potential to impact upon local water quality and drainage as a result of erosion through runoff and sedimentation downstream. Given the existing sealed surfaces there is relatively low risk. Regardless, mitigation measures have been provided below to further minimise the potential for impacts to water quality as a result of erosion and sedimentation.

There is the potential to contaminate local water quality as a result of an incidental spill over exposed soils, or during periods of rainfall. Measures have been provided below to minimise the potential for this impact.

6.9.2. Mitigation measures

- Erosion and sediment control plans would be prepared in accordance with Managing Urban Stormwater: Soils and Construction Guidelines (Landcom/Department of Housing). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase. Measures would include:

  - Stabilised surfaces would be reinstated as quickly as practicable after construction
  - All stockpiled materials would be stored in bunded areas, covered appropriately and kept away from waterways to avoid sediment entering the waterways.
  - Sediment would be prevented from moving off-site and sediment laden water prevented from entering any watercourse, drainage line or drainage inlet.
  - Any material transported onto pavement surfaces would be swept and removed at the end of each working day.
  - Clean water would be diverted around the work site.
- Erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality.
- Erosion and sediment control measures would be left in place until the works are complete and areas are stabilised.
- Works would be avoided where practicable during rainfall (or whilst the ground remains sodden) to minimise vehicle disturbance to the topsoil.
- Adequate water quality and hazardous material procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implanted during the construction of the Project.
- The refuelling of plant and maintenance of machinery would be undertaken within impervious bunding on a hardstand area.
- Excavated soils for disposal/reuse would be tested during construction to determine appropriate waste classification. Further toxicity characteristics leaching procedure testing would also be undertaken in the field while construction is being undertaken to fully classify the waste if it is not able to be classified as virgin excavated natural material (VENM).

Refer to Table 27 for a list of consolidated proposed mitigation measures.

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 considered to be characteristic of an urban environment. There are several sources that may be contributing to the air quality in the study area as discussed below.

Regional sources

The Office of Environment and Heritage (OEH) monitor air quality across NSW. Ground-level ozone (a key component of photochemical smog which appears as white haze in summer) remains an issue for Sydney and concentrations generally continued to exceed national air quality standards on up to 16 days a year between 2009 and 2011.

There is growing evidence about the adverse health impacts of airborne particles. Particle pollution or Particulate Matter (PM) (appearing as brown haze) generally meets standards in

Sydney except when bushfires or dust storms occur, though concentrations exceeded national air quality standards on up to 18 days a year from 2009 to 2011.

A search of the 2011/2012 National Pollutant Inventory database (NPI) data within Campbelltown LGA - All Substances from Diffuse Sources, shows 72 substances were emitted to air. Diffuse emissions were: total Phosphorus, total Volatile Organic Compounds, Total Nitrogen, Toluene (methylbenzene), Xylenes (individual or mixed isomers).

The Proposal is not expected to impact overall regional air quality.

Local sources

A search of the National Pollutant Inventory database (NPI) 2011-2012 indicated that there are four industrial sources that have reported emissions in the 2565 postcode. These premises are located at: 14 Williamson Road, Ingleburn, 55 Stennett Road Ingleburn, 8 Williamson Road, Ingleburn, and 14a Williamson Road, Ingleburn. Most commonly reported substances were: total Volatile Organic Compounds, Carbon monoxide, Oxides of Nitrogen, Acetone and Arsenic & compounds

A number of non-industrial sources in the study area have the potential to influence the local air quality to varying degrees. These include:

- vehicle exhaust from the surrounding road network, with particular focus on routes where there are a large number of heavy vehicles
- train exhaust from diesel services along the existing rail corridor
- domestic solid fuel burning.

These activities are likely to create emissions of Particulate Matter, Oxides of Nitrogen, Sulphur dioxide, Carbon monoxide, Volatile Organic Compounds and heavy metals.

The Proposal is not expected to impact overall local air quality.

Sensitive receptors

Potentially affected receptors within the vicinity of the site proposal include the following:

- pedestrians and commuters within the Ingleburn Interchange and Ingleburn Town Centre, and
- retailers and commercial operators of businesses within the Ingleburn Town Centre.

6.10.2. Potential impacts

(a) 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.

Air emission sources

Particulate emissions would be associated with a number of stationary and mobile sources as well as potential wind erosion of areas of exposed soil.

Anticipated sources of dust and dust-generating activities from the proposal are as follows:

- operation of earth moving equipment
- dust loading from aggregate material on trucks and excavators
- wind erosion from exposed surfaces at disturbed areas.

The total amount of dust generated would depend on the properties of the soil material (silt and moisture content), the activities undertaken and the prevailing meteorological conditions.

Vehicular emissions are also likely during the construction phase of the proposal. These emissions are associated with the combustion of diesel fuel and petrol. Emission rates and impact potential depend on the number and power output of the combustion engines, the quality of the fuel and the condition of the combustion engines.

Impacts from air emission sources

The activities which would result in areas of soils exposed would include the works in Ingleburn Road and Stanley Road, and to the construction of the lift shafts.

The anticipated levels of Particulate Matter generated during construction is not likely to be excessive, given the small scale of the activity and provided suitable control measures are implemented, as outlined below. Particulate concentrations could be expected to decrease significantly with distance from the source. However, during unfavourable meteorological conditions, such as dry and windy conditions, dust emissions could be higher.

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 receptors, given the relatively small construction footprint, and with the implementation of proposed control measures.

(b) Operational phase

Air emission sources

The proposal would not result in any significant changes to the number or frequency of trains operating within the rail corridor. Nor would it result in the number or frequency of vehicles accessing the area.

Conversely, increased patronage of the rail system would likely reduce commuter vehicle movements on local roads and therefore reduce vehicle emissions in the long term, would have some beneficial effects on local and regional air quality.

Impacts from air emission sources

Impacts on air quality during the operation of the proposal are considered minimal as the Proposal would not result in any significant increase in train or vehicular movements.

6.10.3. Mitigation measures

- Methods for management of emissions would be incorporated into project inductions, training and pre-start talks.
- Site rehabilitation of disturbed areas would be undertaken progressively as soon as practicable to prevent or minimise wind-blown dust.

- Disturbed areas are to be stabilised as soon as practical to prevent or minimise wind-blown dust.
- Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
- Visual monitoring of dust to be undertaken, where visible levels of dust are high, on-site activities are to be reviewed, with additional control measures and/or varied site operations implemented if required, in consultation with the TPD team.
- Any visible dust leaving the construction site area as a result of construction works would be managed as per the project Environmental Control Map to be prepared by the Contractor.
- Vehicles transporting material to and from the site would be covered after loading to prevent wind blown dust emissions and spillages. Tailgates of road transport trucks would be securely fixed prior to loading and after unloading.
- All site vehicles and machinery would be switched off or throttled down to a minimum when not in use.
- Hardstand material, rumble grids or other appropriate measures would be installed at entry and exit points to minimise tracking of dirt onto roadways where reasonable and feasible.
- Contractor would ensure that vehicles, plant and equipment are maintained in accordance with their maintenance schedule and are regularly inspected to ensure efficient operation.
- Contractor to conduct daily inspections and surveillance to identify any vehicle, plant or equipment that is causing visible emissions.

Refer to the Table 27 for a consolidated list of proposed mitigation measures.

6.11. Cumulative impacts

Cumulative impacts may result when a number of construction or development projects are undertaken concurrently and in close proximity to one another. During construction the works would be coordinated with any other construction activities in the area with Campbelltown City Council, RailCorp and any other developers identified to minimise cumulative construction impacts such as traffic and noise.

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

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

Refer to the Table 27 for a consolidated list of proposed mitigation measures.

6.11.1. Mitigation measures

- During construction the works would be coordinated with any other construction activities in the area (with Campbelltown City Council, RailCorp/Sydney Trains, ARTC and any other developers identified) to minimise cumulative construction impacts such as traffic and noise where feasible and reasonable.

6.12. Climate change and sustainability

6.12.1. Greenhouse gas emissions

TfNSW is committed to ensuring that the development, expansion and management of the transport network is sustainable and resilient to climate change.

The project is to conduct a detailed climate change impact assessment that would be utilised to remove and/or mitigate the extreme, high and medium risks that are identified and inform the design of this project.

This assessment would include assessing project specific risks from changes to the following climate variables:

- Temperature
- Sea Level Rise
- Humidity
- Precipitation
- Wind
- Storms
- Fire
- Flooding
- Hydrological Drought
- Soil Deterioration

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

The detailed design process would undertake a AS14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TPD's 'Greenhouse Gas Inventory Guide for Construction Projects'. The carbon footprint would to 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 works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Section 7.

It is anticipated that, once operational, the Proposal would result in an increase in use of public transport and a decrease in use of private motor vehicles by commuters to travel to and from Ingleburn town centre. This shift in transport usage would reduce the amount of fuel consumed by private motor vehicles and would result in a relative reduction in associated greenhouse gas emissions in the local area.

6.12.2. Mitigation measures

- The detailed design process would undertake a AS14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TPD's 'Greenhouse Gas Inventory Guide for Construction Projects'. The carbon footprint would to be used to inform decision making in design and construction.

6.12.3. Climate change

Climate change has the potential to change weather patterns and could result in increased temperatures and decreased precipitation in the Sydney region, as well as an increase in intensity of rainfall events due to weather.

Such changes in weather in the region are unlikely to impact on the operation of Ingleburn Railway Station. However, a Climate Change Impact Assessment would be carried out at the detailed design phase to determine the hazards/risks associated with future climatic conditions. Issues including protecting customers and electrical equipment from wind and rain during storm events, size of guttering, cross flow ventilation, reflective surfaces etc would be considered in the design.

6.12.4. Sustainability

The design of the upgraded interchange would be based on the principles of sustainability, with the incorporation of the TPD Sustainable Design Guidelines for Rail (Version 2.0) and the TPD Environmental Management System (EMS).

Table 2 provides details in relation to sustainable design features which would be incorporated into the Proposal and these can be summarised as follows:

- Various construction and materials selection measures, including:
  - Water efficient fittings
  - Use of recycle water
  - Reduced power use
  - Photo-electric switches
- Wider circulation areas on Platform 1 to enhance safety and service.
- Protection for customers and electrical equipment from wind and rain during storm events
- Provision for future electric vehicle recharging points.

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

6.12.5. Waste

Waste minimisation features would be incorporated into the Proposal and these can be summarised as follows:

- Reduction of waste to landfill (via recycling or reuse):
    - Ensuring that at least 95 percent of construction waste generated during site preparation and construction is diverted from landfill
    - Enabling waste segregation in the design process by including space for the collection and segregation of waste with appropriate marking (eg signage) and controls (eg lockable lids), located away from sensitive receptors (eg water courses).
    - Excavation/demolition/waste materials to be appropriately managed in accordance with relevant NEPC and NSW EPA guidelines, including but not limited to the Waste Classification Guidelines (NSW EPA, 2009).

7. Environmental management

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

7.1. Environmental management plans

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

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

7.2. Mitigation measures

Mitigation measures for the Proposal are listed below in Table 27 below. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6, should the Proposal proceed.

Table 27: Proposed mitigation measures

ID no.	Environmental safeguards
	General
1	An Environmental Design Constraints Map will be prepared prior to commencement of detailed design.
	Traffic and Site Access
2	A Construction Traffic Management Plan (CTMP) would be prepared that addresses the management of the construction where discussed in this report. It would be provided to the relevant Roads Authority. Specifically the CTMP would need to include: – traffic management – signage, local traffic control – pedestrian management – safety and access – routes, turning movements, and sight lines for heavy vehicles – loading/delivery zones, and – any temporary parking arrangements (construction and commuter).
3	Pedestrian access to the station platforms to be maintained at all times trains are operational.
4	Pedestrian access across the rail corridor to be maintained at all times.
5	Access to all private properties adjacent to the works to be maintained during construction, unless otherwise agreed by relevant property owners.
6	Safe and efficient interchange facilities to be maintained for passengers arriving by car, bus, taxi, bicycle or on foot.
7	Access for deliveries to the retail on the footbridge to be provided as agreed with the operator.
8	Pedestrian fencing to be installed in locations to direct pedestrians to designated crossing locations.
9	Temporary way finding signage to be installed to guide passengers around the railway station and construction activities
10	Any pedestrian diversions or bus or commuter parking relocation required during works to be implemented in consultation with the Sydney Trains Station Manager, TfNSW and the 131500 Transport Infoline.
11	Temporary traffic management to be in place at the Ingleburn Road/Oxford Road, and Stanley Road/Memorial Avenue intersections for critical activities. Traffic staff

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	to limit access to priority vehicles during critical activities if required.
12	Signs to be provided at each access point to assist in deliveries to each work site.
13	Appropriate signage to be installed to meet the various stages of construction.
14	Adequate signage to be in place to advise Contractor's contact details so that adequate access provision can be made as required.
15	Heavy vehicles to be restricted to specified routes, with the aim of avoiding local streets, high pedestrian areas and school zones. Where feasible, route markers would be installed for heavy vehicles along designated routes.
16	The impacts of construction traffic on the local road network and the impacts on intersection operation to be minimised by undertaking construction vehicle traffic movements outside of peak road traffic periods and outside of school peak periods where feasible.
17	Limit off-site construction vehicle parking to designated areas. Areas of temporary on-street parking during peak construction events would be identified in the CTMP to minimise the impact on surrounding properties and businesses.
18	The queuing and idling of construction vehicles in residential streets to be minimised.
19	A pre and post construction assessment of road pavement assets would be conducted in areas likely to be used by heavy construction vehicles.
20	Where required, public communications would be conducted to warn the community and local residents of vehicle movements and anticipated effects on the local road network relating to site works in accordance with the CEMP.
21	Staging is to be developed to provide the ability to reduce the overall impact of construction works on access. Phasing of construction to maintain access to the rail corridor for ARTC/RailCorp, and take into consideration access to the station by pedestrians and vehicles.
22	Options on relocating the taxi rank to the opposite side of Ingleburn Road are to be pursued, with one outcome sought being removal of shopping trolleys from the immediate interchange environs.
	Urban design, landscape and visual amenity
23	Finishes and materials would be complementary to the existing locality and landscape and will minimise reflective surfaces with a preferred use of muted/less intrusive colours.
24	Avoid unnecessary loss or damage to vegetation protecting trees prior to construction and/or trimming vegetation to avoid total removal.
25	Minimise light spill from the rail corridor into adjacent visually sensitive properties by directing construction lighting into the construction areas and ensuring the site complies with AS, but is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
26	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required

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27	Work/site compounds would be screened, with shade cloth (or similar material) (where necessary) to minimise visual impacts from elevated locations
28	Maintenance of structures constructed for this Proposal would be the responsibility of TfNSW.
29	Way-finding signage would be installed as per TfNSW guidelines.
	Noise and Vibration
30	Reference should be made to ASA Engineering Standard ESB 002 *Station Design and Standard Requirements* which set out guidelines for the incorporation of acoustically absorptive finishes which can control reverberance and improve speech intelligibility from the PA system.
31	Construction noise and vibration would be managed in accordance with TfNSW Construction Noise Strategy 2012
32	Prior to construction, a site specific Construction Noise and Vibration Management Plan is to be prepared, consistent with the requirements of the TfNSW Transport Project Division's *Construction Noise Strategy* 2010 and OEH's Interim Construction Noise Guideline.
33	Where the LAeq (15minute) construction noise levels are predicted to exceed 75 dBA, respite periods would be observed. This would include restricting the hours that the very noisy activities can occur.
34	The Construction Noise and Vibration Management Plan would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
35	In order to minimise the potential noise and vibration impacts upon nearby sensitive receivers, wherever possible, works are to be undertaken during the EPA's standard daytime construction periods (7.00 am to 6.00 pm Monday to Friday and 8.00 am to 1.00 pm on Saturdays).
36	Planning of the higher Noise Management Level exceedance activities/locations to be undertaken predominantly during less noise-sensitive periods, where available and possible. The adjacent residents should be consulted to assist in identifying less noise sensitive periods.
37	Consultation as per the TfNSW *Construction Noise Strategy* would be adopted. These would be in line with the following:

Time Period		Mitigation Measures/Predicted $L_{Aeq(15min)}$ Noise Level above RBL			
		0 to 10 dB(A) Noticeable	10 to 20 dB(A) Clearly audible	20 to 30 dB(A) Moderately intrusive	>30 dB(A) Highly intrusive
Standard	Mon-Fri (7am-6pm) Sat (8am-1pm) Sun/ Public Hol (Nil)	-	-	Letterbox drop, Monitoring	Letterbox drop, Monitoring

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	OOHW Period 1	Mon-Fri (6pm-10pm) Sat (7am to 8am & 1pm-10pm) Sun/ Public Hol (8am -6pm)	-	Letterbox Drop	Monitoring, Letterbox Drop	Monitoring, Individual Briefing, Letterbox Drop Project Specific Respite Offer, Phone Calls, Specific Notification
	OOHW Period 2	Mon-Fri (10pm-7am) Sat (10pm-7am) Sun/ Public Hol (6pm-8am)	Letterbox Drop	Monitoring, Letterbox Drop	Monitoring, Individual Briefing, Letterbox drop, Phone Calls, Specific Notification	Alternate Accommodation, Monitoring, Individual Briefing, Letterbox Drop, Phone Calls, Specific Notification
38	The installation of construction hoarding should take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible. The hoarding should be a minimum height of 4 metres, where practicable.					
39	Use quieter and less vibration emitting construction methods where feasible and reasonable.					
40	Only the equipment necessary for the upgrade works will be used at any time. Avoid any unnecessary noise when carrying out manual operations and when operating plant.					
41	Any equipment not in use for extended periods shall be switched off. For example, heavy vehicles should switch engines off whilst being unloaded.					
42	Simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver will be avoided/ limited where possible.					
43	Where possible, maximise the offset distance between noisy plant and adjacent sensitive receivers.					
44	Noise-emitting plant should, where possible, be directed away from sensitive receivers.					
45	Alternative reverse alarms, such as 'quackers' shall be installed where possible.					
46	Where attended noise monitoring indicate noise levels are in excess of levels reported within this report and where it is practical and safe to do so, temporary noise screens (or equipment placement) shall be used to shield noisy, fixed works.					
47	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height where practicable, throwing of metal items and slamming of doors.					

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48	At the commencement of operation for each plant or activity on site, which has the potential to generate significant vibration levels, attended vibration monitoring should be undertaken to refine the recommended minimum working distances and provide a site-specific table of minimum working distances.
49	Where vibration is found to be excessive, management measures shall be implemented to ensure vibration compliance is achieved. Management measures may include modification of construction methods such as using smaller pieces of equipment, establishment of larger minimum working distances, and if necessary, time restrictions for the most excessive vibration activities. Time restrictions are to be negotiated with affected receivers.
50	Additional vibration monitoring would be carried out when construction activities are at the nearest point to the nominated occupancies. This monitoring may signal to the contractor by way of a buzzer or flashing light, when levels approach/exceed the recommended limits in nearby occupancies.
51	The work team is to be briefed in order to create awareness of the locality of sensitive receivers and the importance of minimising noise emissions.
52	Noise and vibration emissions shall be qualitatively assessed throughout works and additional measures shall be implemented to prevent jeopardising the intelligibility of the PA system and the safety of commuters and staff as a result.
53	Ensure spoil is placed and not dropped into awaiting trucks.
54	Recommended Safe Working Distances for Vibration Intensive Plant in relation to human comfort levels for residential receivers, as per Table 19, would be followed. (However, higher vibration levels, if occurring over shorter periods, are permitted.)
55	Building surveys of sensitive structures (including the Platform 1 heritage building) would be carried out in order to assess the potential for increased susceptibility to building damage from vibration. Should these buildings be considered more susceptible to vibration, reduced vibration criteria levels may be applicable and subsequently adopted during the selection process for suitable equipment to be used in the vicinity of these buildings.
56	A dilapidation report would be prepared on the state of the Platform 1 heritage building prior to construction.
	Non-Indigenous Heritage
57	TfNSW is to be consulted in regard to the final design of the Platform 1 heritage building.
58	Detailed designs for the Platform 1 heritage building to be submitted to TfNSW for approval, in consultation with the Sydney Trains heritage team.
59	The final design would be sympathetic to the original design of the heritage building and new design elements would reflect, but not replicate original design elements.
60	The design of the new ticket window in the southern end of the heritage building is to be sympathetic to the existing windows in the building.
61	The new amenities and services building on Platform 1 adjacent to the existing heritage building is to be designed and built to match the scale and with materials sympathetic to the adjacent heritage station building.

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62	As much as possible of the original fabric of the Platform 1 building, and internal features would be retained in situ. The corrugated iron sheet ceiling and cornices, cast iron vents, ceiling roses, fireplaces, hardwood sliding doors and cast iron door rollers, and openings in external walls are to be retained, and internal walls are to be retained as far as possible, with some cut backs for DDA-compliant circulation. New partitions are to be timber-framed to allow future removal. Ceiling services are to be suspended/limited to avoid penetrations into the pressed metal ceiling, and service penetrations into external walls are to be minimised.
63	The widened doorway opening to the Family Accessible Toilet is to retain the existing lintel from the original Parcels Office door, retain the existing cast iron rollers and hardwood patent sliding doors, and use new panels to match the style of the existing door.
64	Removed original elements may be re-used in the final design, where this does not compromise design principles. Hardwood timber seating is to be re-located as public seating in the station precinct, or used as a simple interpretive tool to provide an understanding of the original design.
65	The Contractor will be required to prepare a Construction Environmental Management Plan that specifically addresses the heritage impacts and required mitigation measures.
66	Non-Indigenous heritage items would be identified on the construction contractor's Environmental Constraints Maps (ECMs).
67	The Contractor would provide a heritage induction to workers before construction begins, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
68	Where agreed by TfNSW, original elements are to be removed carefully so that they can be reused within the precinct, and any architraves or timber detailing is to be reinstated or matched.
69	Heritage building on Platform 1 to be assessed by a Structural Engineer in relation to partial removal of internal walls. If an adverse report is received, further advice is to be sought from a heritage consultant prior to any work being undertaken.
70	Surfaces of heritage items to be protected as appropriate through use of plywood sheeting or similar, particularly during any platform works.
71	If platform levels are changed, a geotextile fabric (or similar non adhesive barrier) is to be inserted between the heritage station building and any adjacent works as an appropriate protective measure.
72	Construction impacts, such as vibration and dust on adjacent items must be avoided. In particular, the contractor would prepare details of how impacts of dust and vibration from the construction work at the entrance to the Ticket Office will be minimised – this will be specifically addressed in the CEMP.
73	To effectively mitigate potential impacts of vibration on Ingleburn Station and other heritage items, activities that cause vibration will be managed in accordance with German Standard DIN 4150 – Part 3 (DIN 1999) which has specific standards relating to heritage.
74	TfNSW to provide a minimum of one heritage interpretive panel (at A1 size or

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	greater) in a conspicuous location on Platform 1, on or near the heritage station building.
75	The finishes to the heritage building would be treated in a similar colour and finish to the existing, and any new fixtures (electrical or plumbing conduits) are to be sympathetically attached to the walls (i.e. colour and fixings).
76	If any unanticipated archaeological deposits are identified within the project site during construction, work likely to impact on the deposit would cease immediately and the NSW Heritage Council and an archaeologist would be contacted. Where required, further archaeological work and/or consents would be obtained for the unanticipated archaeological deposits prior to works recommencing at the location.
77	RailCorp/Sydney Trains would be notified of the proposed works and be provided with a copy of this report. Changes to the form, fabric and landscape setting of the Ingleburn Railway Station would be recorded in the Heritage inventory for this item.
78	An Archival Record would be made of the Station Building on Platform 1, and in particular, of its interior. The Archival Record would to be undertaken by means of Laser Scanning using a unit such as a Trimble TX5 Laser to capture digital images.
79	Copies of the 'as built' construction plans, photographs illustrating the completed works and the Archival Record would be lodged with RailCorp's Office of Rail Heritage as a documentary record of changes to the station precinct.
80	If any unanticipated archaeological deposits are identified within the project site during construction, work likely to impact on the deposit would cease immediately and the NSW Heritage Council and an archaeologist would be contacted. Where required, further archaeological work and/or consents would be obtained for the unanticipated archaeological deposits prior to works recommencing at the location.
	Indigenous Heritage
81	If previously unidentified Indigenous heritage items are uncovered during the work, all work in the vicinity of the find would cease and appropriate advice be sought from OEH in order to mitigate potential impacts. Construction activities and machinery would be restricted to the designated work areas.
	Socio-Economic Impacts
82	The proposed sustainability criteria for the project would encourage the contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
83	A number of noise mitigation measures would be implemented to minimise impacts on local businesses, as per the Noise and Vibration mitigation measures above.
84	A CTMP would be developed to address changed traffic and pedestrian conditions, as per Traffic and Site Access mitigation measures above.
85	The Consultation Strategy would identify all potential stakeholders and the best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where possible.
86	Contact details for a 24-hour construction response line, project infoline and email address would be provided for ongoing stakeholder contact throughout the

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	construction phase.
	Biodiversity
87	A Consulting Arborist meeting Australian Qualifications Framework (AQF) Level 5 would be retained to provide advice for any potentially sensitive works in the vicinity of retained trees, and in particular, Tree 15 Bunya Pine.
88	The Contractor would provide all workers with an environmental induction prior to commencing work on-site. This induction would include information on the ecological values of the site, protection measures to be implemented to protect biodiversity and penalties for breaches.
89	All tree protection works would be carried out in accordance with the Tree Protection Zone (TPZ) drawing at Figure 20 and before any further excavation, grading or site works commence.
90	The trunk of trees to be retained would be armoured with 2m lengths of 50x100mm hardwood timbers spaced at 150mm centres and secured by 8 gauge wires or steel strapping at 300mm spacing, in line with Australian Standard AS4970-2009 Protection of Trees on Development Sites.
91	Tree protection works would be inspected and approved by the Site Arborist prior to works commencing.
92	The trees to be removed would be clearly demarcated on-site (where appropriate) prior to construction to avoid unnecessary vegetation removal.
93	Native trees to be removed to be chipped and reused as leaf mulch (as per AS 4454 and AS 4419) and placed within tree protection fencing.
94	All excavation within the TPZ of Tree 15 to be carried out under the direction of the Site Arborist. A photographic record should be maintained of Tree 15 site inspections, including the state of the tree and any injury inflicted.
95	The western of the two co-dominant trunks is to be removed, under the direction of the Site Arborist. This trunk is not to be chipped, but is to be cut in a manner that would allow potential re-use of the timber.
96	The wound caused by the removal of the western co dominant trunks is to be inspected by the Site Arborist every three months, for a total of 12 months. Remedial action is to be taken as required.
97	All excavation at Tree 15 to be done by hand and no roots greater than 30mm or greater are to be damaged or cut without the express advice of the Site Arborist.
98	In the case of any tree other than Tree 15, where any access is required within the TPZs for building purposes, the fence should be set back 1.5m from the construction and the soil surface between the fence and the building should be protected by plywood sheets or strapped planking.
99	Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refuelling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the TPZs of existing trees to be retained.
100	No backfilling would occur within the TPZs of existing trees.

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101	Trees shall not be removed or lopped unless as specified and approved for removal.
102	Installation of the mulched and mass planted garden bed around Tree 15 Bunya Pine to be undertaken under the direction of the consulting Arborist, and in co-operation with Campbelltown City Council.
103	Approximately 50 trees need to be planted to offset the removal of the thirteen trees required for safety, or due to the proposed works. Trees and other vegetation would be selected, planted and maintained in line with TfNSW's – Transport Projects *Draft Vegetation Offsetting Guide*. All vegetation planted on-site is to consist of locally endemic native species, unless otherwise agreed by the PME, and following consultation with the relevant Local Authority, where relevant, and/or the owner of the land upon which the vegetation is to be planted.
104	Additional landscaping to be implemented along the borders of the car parks is to be undertaken in accordance with the RailCorp Revegetation Guide. Accent shrubs and groundcovers will augment the retained trees and shrubs.
105	Proposed planting is predominantly indigenous and native plant species with low maintenance and low water requirements and which are appropriate for the site's soil and climatic conditions.
106	The TPZ trunk protection should be maintained intact until the completion of all work on the site.
107	In the event of any tree to be retained becoming damaged during construction, the Site Arborist should be informed to inspect and provide advice on remedial action.
	Contamination, landform, geology and soils
108	The CEMP would have a contaminated lands sub-pan that would include an Unexpected Finds Protocol, that is to be implemented during the upgrade work.
109	Excavation/demolition/waste materials are to be appropriately managed in accordance with relevant NEPC and NSW EPA guidelines, including but not limited to the Waste Classification Guidelines (NSW EPA, 2009).
110	Sampling and laboratory testing is to be undertaken for any spoil removed from the site of the upgrade work to further characterise site contamination and to assist in waste classification of material to be excavated.
111	A hazardous materials assessment is to be carried out on the Platform 1 heritage building before any construction works commence.
112	Erosion and sediment control plans would be prepared in accordance with *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom/Department of Housing). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase. Measure would include:
113	Stabilised surfaces would be reinstated as quickly as practicable after construction.
114	All stockpiled materials would be stored in bunded areas, covered appropriately and kept away from waterways to avoid sediment entering the waterways.

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115	Sediment would be prevented from moving off-site and sediment laden water prevented from entering any watercourse, drainage line or drainage inlet.
116	Any material transported onto pavement surfaces would be swept and removed at the end of each working day.
117	Erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality.
118	Erosion and sediment control measures would be left in place until the works are complete and areas are stabilised.
	Hydrology and Water Quality
119	Erosion and sediment control plans would be prepared in accordance with Managing Urban Stormwater: Soils and Construction Guidelines (Landcom/Department of Housing). The erosion and sediment control plans would be established prior to the commencement of construction and be updated and managed throughout as relevant to the activities during the construction phase. Measure would include: – Stabilised surfaces would be reinstated as quickly as practicable after construction – All stockpiled materials would be stored in bunded areas and kept away from waterways to avoid sediment entering the waterways. – Sediment would be prevented from moving off-site and sediment laden water prevented from entering any watercourse, drainage line or drainage inlet. – Any material transported onto pavement surfaces would be swept and removed at the end of each working day. – Clean water would be diverted around the work site.
120	Erosion and sediment control measures would be regularly inspected (particularly following rainfall events) to ensure their ongoing functionality.
121	Erosion and sediment control measures would be left in place until the works are complete and areas are stabilised.
122	Works would be avoided where practicable during rainfall (or whilst the ground remains sodden) to minimise vehicle disturbance to the topsoil.
123	Adequate water quality and hazardous material procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implanted during the construction of the Project.
124	The refuelling of plant and maintenance of machinery would be undertaken within impervious bunding on a hardstand area.
125	Excavated soils for disposal/reuse would be tested during construction to determine appropriate waste classification. Further toxicity characteristics leaching procedure testing would also be undertaken in the field while construction is being undertaken to fully classify the waste if it is not able to be classified as virgin excavated natural material (VENM).

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	Air Quality
126	Methods for management of emissions would be incorporated into project inductions, training and pre-start talks.
127	Site rehabilitation are to be undertaken progressively as soon as practicable within given areas.
128	Disturbed areas are to be stabilised as soon as practical to prevent or minimise wind-blown dust.
129	Vehicle and machinery movements during construction are to be restricted to designated areas, and sealed/compacted surfaces where practicable.
130	Vehicles transporting material to and from the site are to be covered after loading to prevent wind blown dust emissions and spillages. Tailgates of road transport trucks would be securely fixed prior to loading and after unloading.
131	All site vehicles and machinery is to be switched off or throttled down to a minimum when not in use.
132	Visual monitoring of dust to be undertaken, where visible levels of dust are high, on-site activities are to be reviewed, with additional control measures and/or varied site operations implemented if required, in consultation with the TPD team.
133	Ensure plant and machinery is regularly checked and maintained in a proper and efficient condition to reduce the likelihood of exceeding relevant emissions standards.
134	Hardstand material, rumble grids or other appropriate measures will be installed at entry and exit points to minimise tracking of dirt onto roadways where reasonable and feasible.
135	Contractor to ensure that vehicles, plant and equipment are maintained in accordance with their maintenance schedule and are regularly inspected to ensure efficient operation.
136	Contractor to conduct daily inspections and surveillance to identify any vehicle, plant or equipment that is causing visible emissions.
	Cumulative Impacts
137	During construction, the works are to be coordinated with any other construction activities in the area (with Campbelltown City Council, RailCorp/Sydney Trains, ARTC and any other developers identified) to minimise cumulative construction impacts such as traffic and noise where feasible and reasonable.
	Climate change and Sustainability
138	The Contractor is to undertake a detailed design process - undertake a AS14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise - in accordance with TPD's 'Greenhouse Gas Inventory Guide for Construction Projects'. The carbon footprint is to be used to inform decision making in design and construction.
139	Provision is to be made for a future electric car recharging point on each side of the station.

8. Conclusion

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

- Addition of three (3) new lifts and accessible walkways to provide accessible access to the station
- Upgrade both platforms to achieve DDA compliance
- Upgraded passenger and station staff facilities
- Widened Platform 1 to improve passenger access and circulation
- New station entry forecourts on both sides of the station, with additional canopies
- Relocation of kiss and ride and taxi zones to provide improved and accessible parking
- Improved bicycle parking on both sides of the station.

The Proposal is consistent with the NSW Government's Metropolitan Plan for Sydney 2036, NSW 2021 and Long Term Transport Master Plan, and is an integral part of the Transport Access Program. The Proposal would encourage greater use of public transport.

The key likely impacts of the Proposal are as follows:

- Disruptions to vehicle and pedestrian movements during construction
- Loss of 15 trees
- Impacts on the heritage-listed building on Platform 1
- Noise and vibration during construction, and
- Short-term visual impacts.

The benefits are considered to outweigh the adverse environmental impacts of the Proposal.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulations and the requirements of the EPBC Act (refer to Chapter 7, and Appendices). Should the project proceed, these impacts would be effectively managed through the proposed Ingleburn Station Upgrade CEMP, mitigation measures (refer to Chapter 8) and the conditions of approval. As a result, these environmental impacts are not considered to be significant. Accordingly an EIS is not required.

The Proposal has also taken into account the principles of ESD (refer to Section 5.6). 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.

9. Certification

This REF provides a true and fair review of the Proposal in relation to its potential impacts on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the Proposal.

Catherine Barlow
Planning and Environment Manager
Date: 24/7/13

I have examined the REF and the certification by Catherine Barlow and accept the REF on behalf of Transport for NSW.

24/7/13

Stacy Mitchell
Senior Project manager
Date:

24/7/13

Ben Groth

A/Principal Manager Planning and Assessments
Date:

References

JCIS Consulting (2013) *Heritage Assessment, Transport Access Program, Ingleburn Railway Station*, report prepared for Transport for NSW.

SLR (2013) *Transport Access Program Environmental Noise and Vibration Impact Assessment – Ingleburn Easy Accessibility Upgrade*, report prepared for Transport for NSW.

Birds Trees (2013) *Tree Report and Arboricultural Impact Assessment – Ingleburn Station Access Upgrade*, report prepared for Transport for NSW.

Coffey geotechnics (2013) *Phase 1 Contamination Assessment*, *Ingleburn Station Upgrade*, report prepared for Kellogg Brown & Root Pty Ltd.

Coffey geotechnics (2013) *Geotechnical Investigation*, *Ingleburn Station Upgrade*, report prepared for Kellogg Brown & Root Pty Ltd.

Kellogg Brown & Root Pty Ltd (2013) *Ingleburn Station Access Upgrade – Reference Design,* report prepared for Transport for NSW.

Appendix 1 – Consideration of Clause 228 factors

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

Factor	Impacts
Any environmental impact on a community? Comment: Some short-term impacts would be anticipated during construction, particularly in relation to noise, traffic and pedestrian access and visual impacts. Mitigation measures outlined in Table 27 would be implemented to manage and minimise any adverse impacts.	☑ minor ☑ negative ☑ short term
Any transformation of a locality? Comment: The Proposal would impact the locality surrounding the Station in a positive manner by providing a community focal point, improving place-making and providing legibility for the interchange functions .	☑ moderate ☑ positive ☑ long term
Any environmental impact on the ecosystem of the locality? Comment: The Proposal is unlikely to impact the local ecosystem as confirmed in Section 6.	☑ minor ☑ negative ☑ short term
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? Comment: Some short-term impacts are anticipated during construction, particularly in relation to noise and visual impacts. During operation the Proposal would have positive impacts to the visual amenity of the subway concourse by improving sight lines and ensuring lighting is up to current standards.	☑ minor ☑ positive ☑ long term
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? Comment: The Proposal would have a positive effect on place-making and would be sympathetic to the existing surroundings. The impacts on the heritage building on Platform 1 have been minimised as far as possible. Rehabilitation of surfaces would be similar to those adjacent. Overall, effects are positive.	☑ moderate ☑ positive ☑ long term
Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)? Comment: The Proposal is unlikely to have any impact on the habitat of protected fauna.	Nil
Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Comment: The Proposal is unlikely to have any impact on endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.	Nil

Any long-term effects on the environment? Comment: The Proposal is unlikely to have any long-term effects on the environment.	☑ minor ☑ negative ☑ long term
Any degradation of the quality of the environment? Comment: The Proposal is unlikely to have any degradation of the quality of the environment.	☑ minor ☑ negative ☑ short term
Any risk to the safety of the environment? Comment: Construction of the Proposal would be managed in accordance with a CEMP to reduce any risks to the environment.	☑ minor ☑ negative ☑ short term
Any reduction in the range of beneficial uses of the environment? Comment: The Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.	☑ minor ☑ negative ☑ short term
Any pollution of the environment? Comment: The Proposal is unlikely to cause any pollution to the environment.	☑ minor ☑ negative ☑ short term
Any environmental problems associated with the disposal of waste? Comment: The Proposal is unlikely to cause any environmental problems associated with the disposal of waste. All waste would be managed and disposed of in accordance with the OEH *Waste Classification Guidelines* (April 2008). Mitigation measures would be implemented to ensure waste is reduced, recycled or reused where applicable.	☑ minor ☑ negative ☑ short term
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? Comment: The Proposal is unlikely to have any increased demands on limited resources.	☑ minor ☑ negative ☑ short term
Any cumulative environmental effect with other existing or likely future activities? Comment: Cumulative effects of the Proposal are described in Section 6. Where feasible, environmental management measures would be coordinated to reduce cumulative construction impacts. The Proposal is unlikely to have any significant long term cumulative impacts.	☑ minor ☑ negative ☑ short term

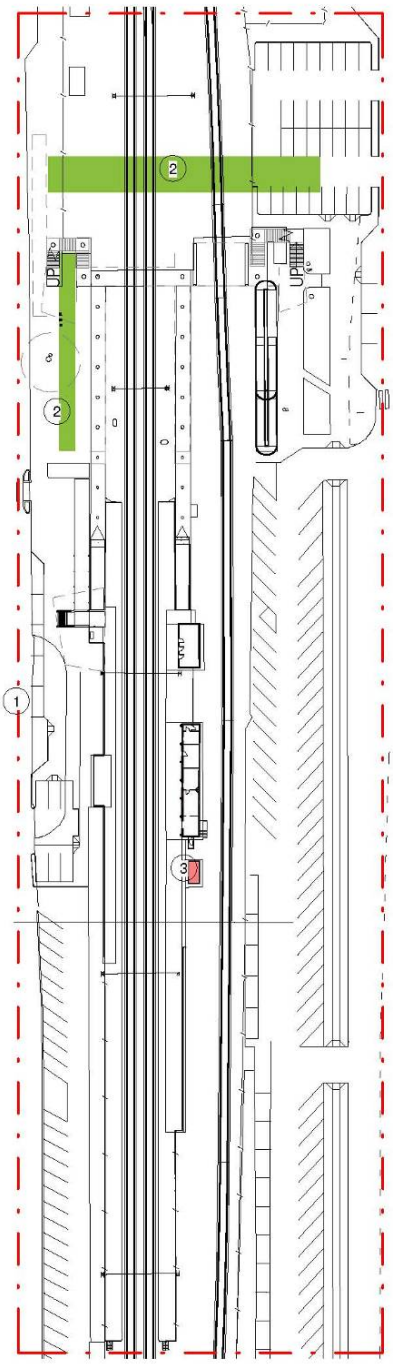
Appendix 2 – Consideration of matters of national environmental significance

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

Factor	Impacts
Any impact on a World Heritage property? Comments: There are no World Heritage properties in the vicinity of the Proposal.	☑ nil ☐ minor ☐ significant
Any impact on a National Heritage place? Comments: There are no National Heritage places in the vicinity of the Proposal.	☑ nil ☐ minor ☐ significant
Any impact on a wetland of international importance? Comments: There are no wetlands if international significance in the vicinity of the Proposal.	☑ nil ☐ minor ☐ significant
Any impact on a listed threatened species or communities? Comments: It is unlikely that the development of the Proposal would significantly affect threat-listed species or ecological communities.	☑ nil ☐ minor ☐ significant
Any impacts on listed migratory species? Comments: It is unlikely that the development of the Proposal would significantly affect threat-listed migratory species.	☑ nil ☐ minor ☐ significant
Any impact on a Commonwealth marine area? Comments: The works are not in the vicinity of a Commonwealth marine area.	☑ nil ☐ minor ☐ significant
Does the Proposal involve a nuclear action (including uranium mining)? Comments: The Proposal does not involve a nuclear action.	☑ nil ☐ minor ☐ significant
Additionally, any impact (direct or indirect) on Commonwealth land? Comments: The Proposal would not be undertaken on or near to any Commonwealth land.	☑ nil ☐ minor ☐ significant

Appendix 3 – Proposed staging diagrams

Note: All drawings are indicative only, subject to detailed design

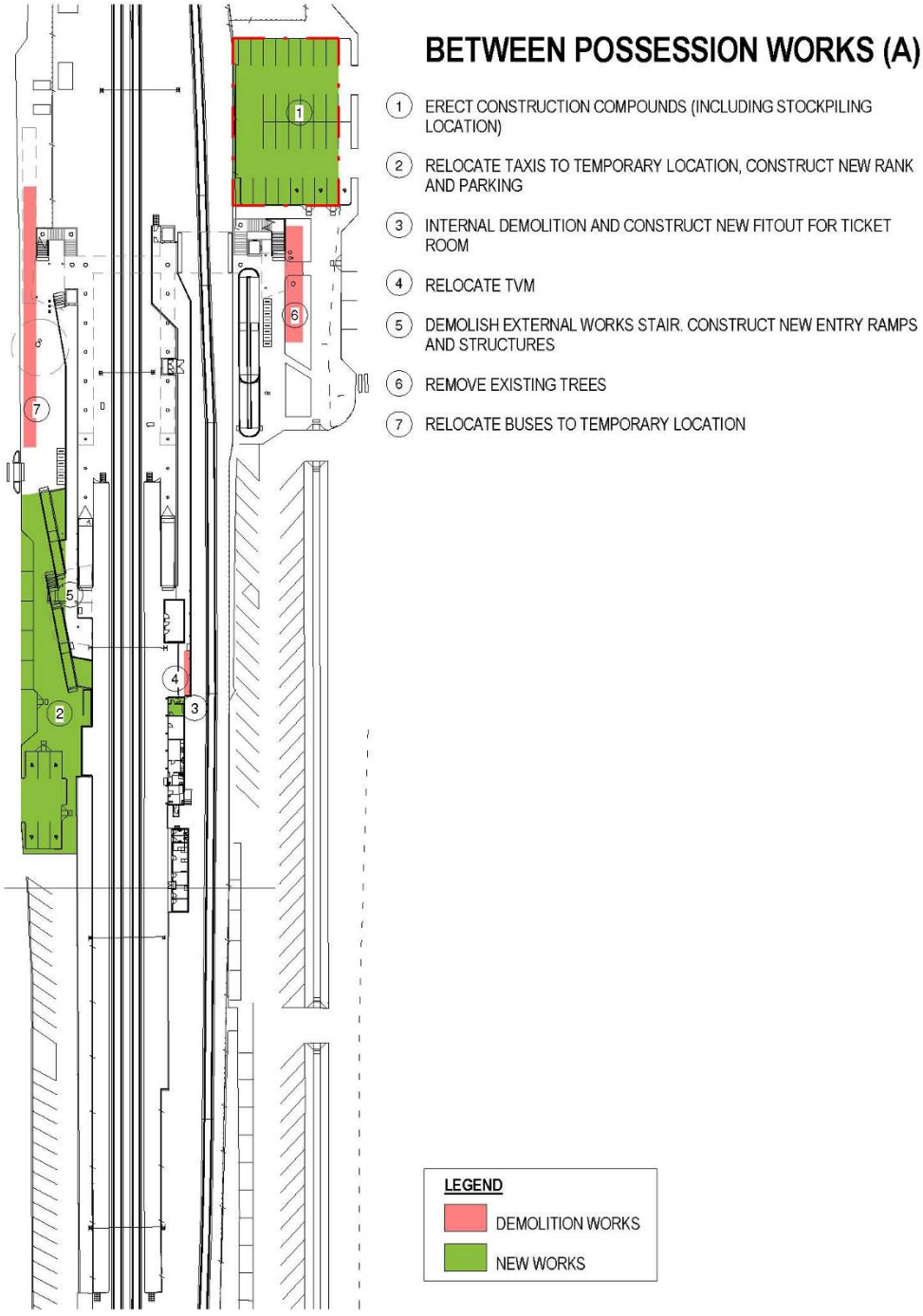


POSSESSION 1

1. SITE ESTABLISHMENT - DETAILED SURVEY
2. SERVICES INVESTIGATION (JEMENA ETC.)
3. DEMOLISH REDUNDANT SIGNAL HUT

LEGEND
- DEMOLITION WORKS
- NEW WORKS

Note: Indicative only, subject to detailed design



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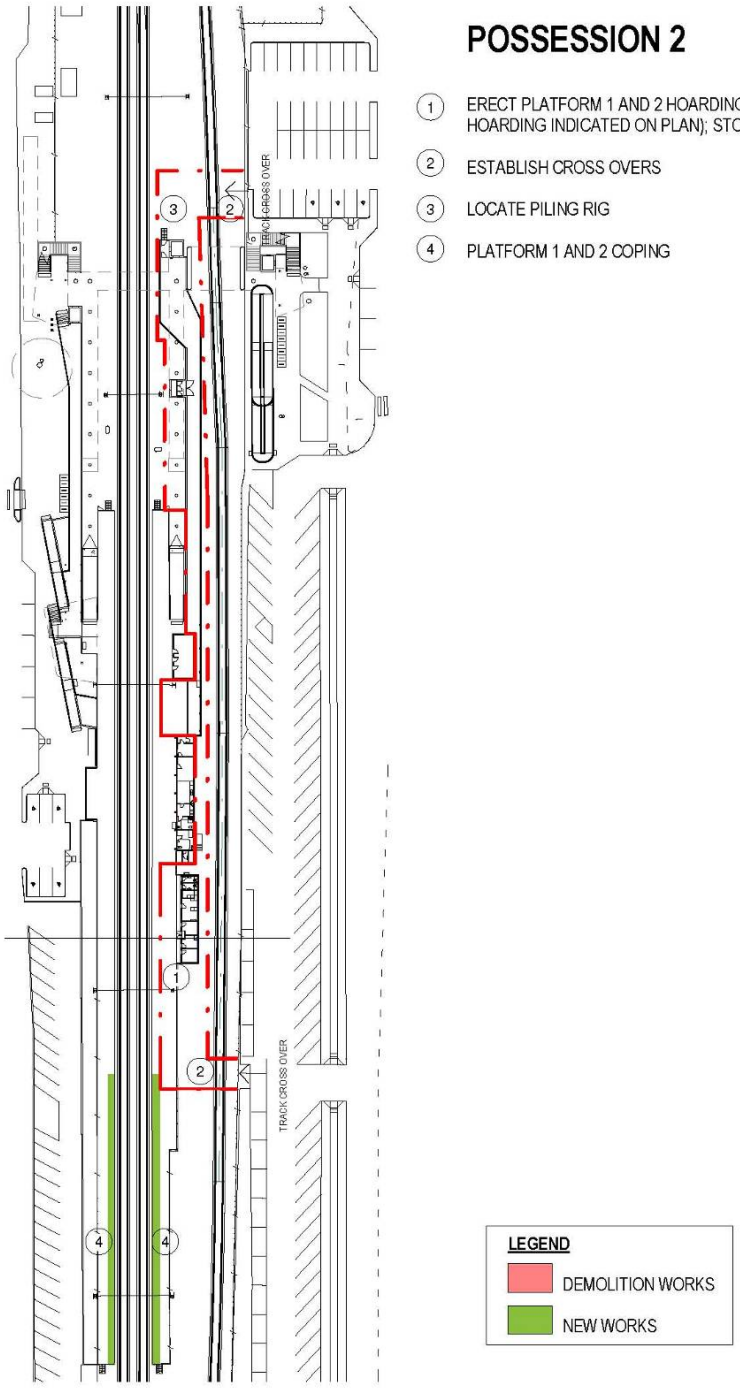

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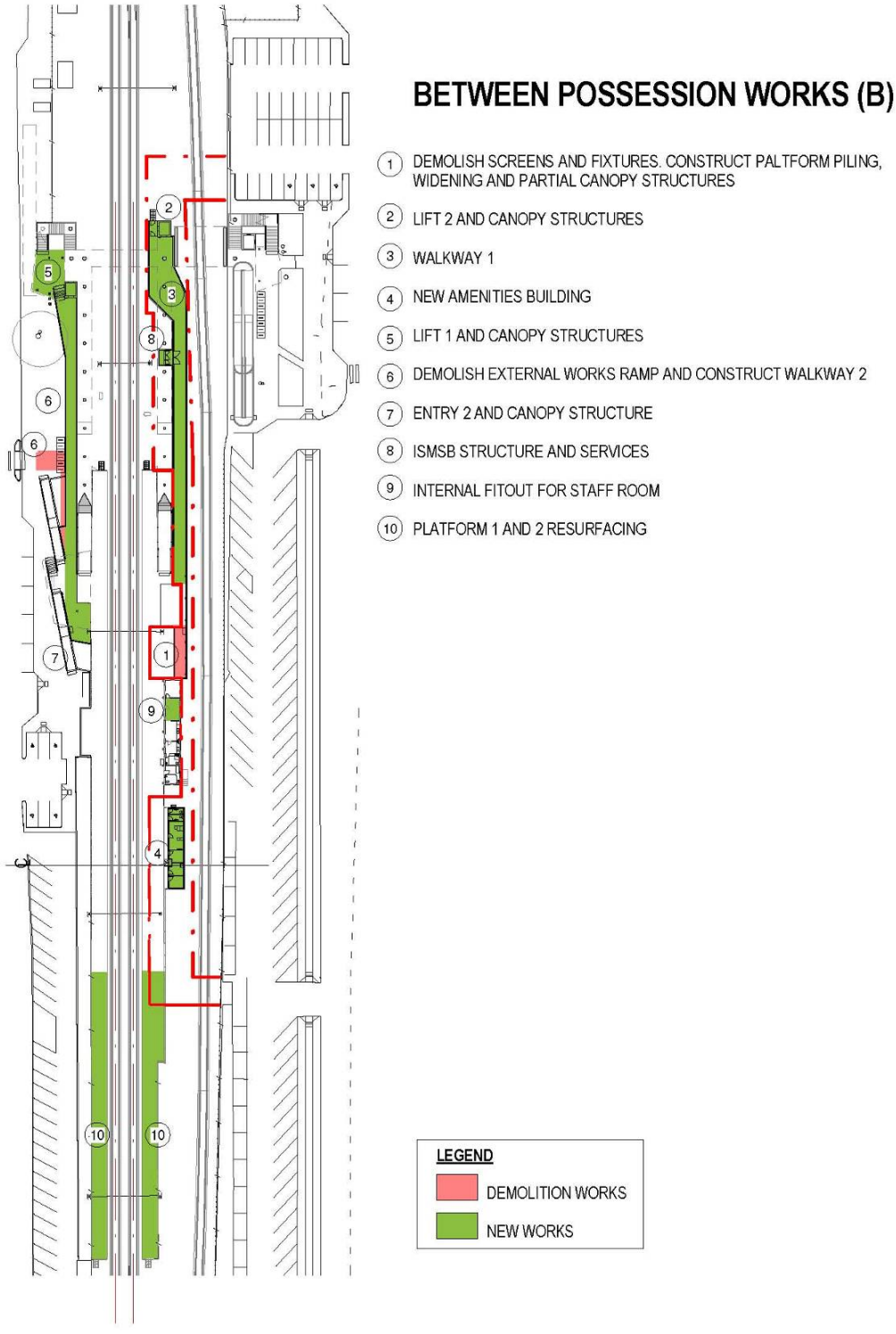

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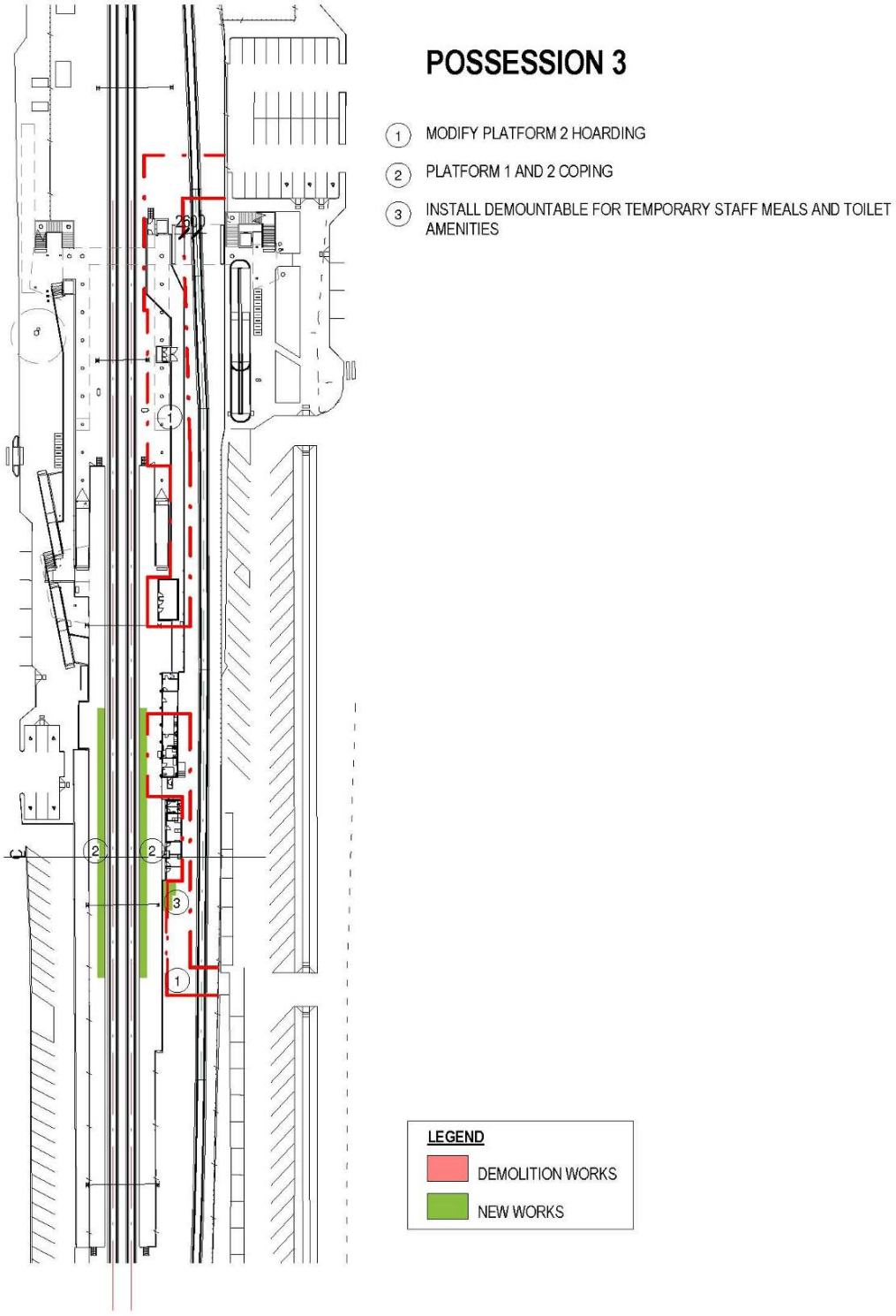
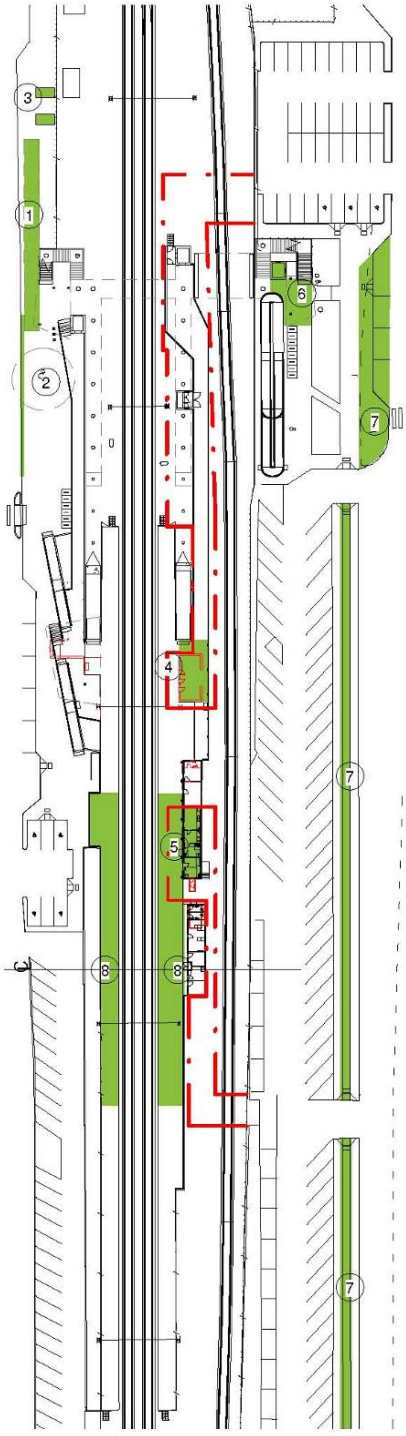


Note: Indicative only, subject to detailed design



BETWEEN POSSESSION WORKS (C)

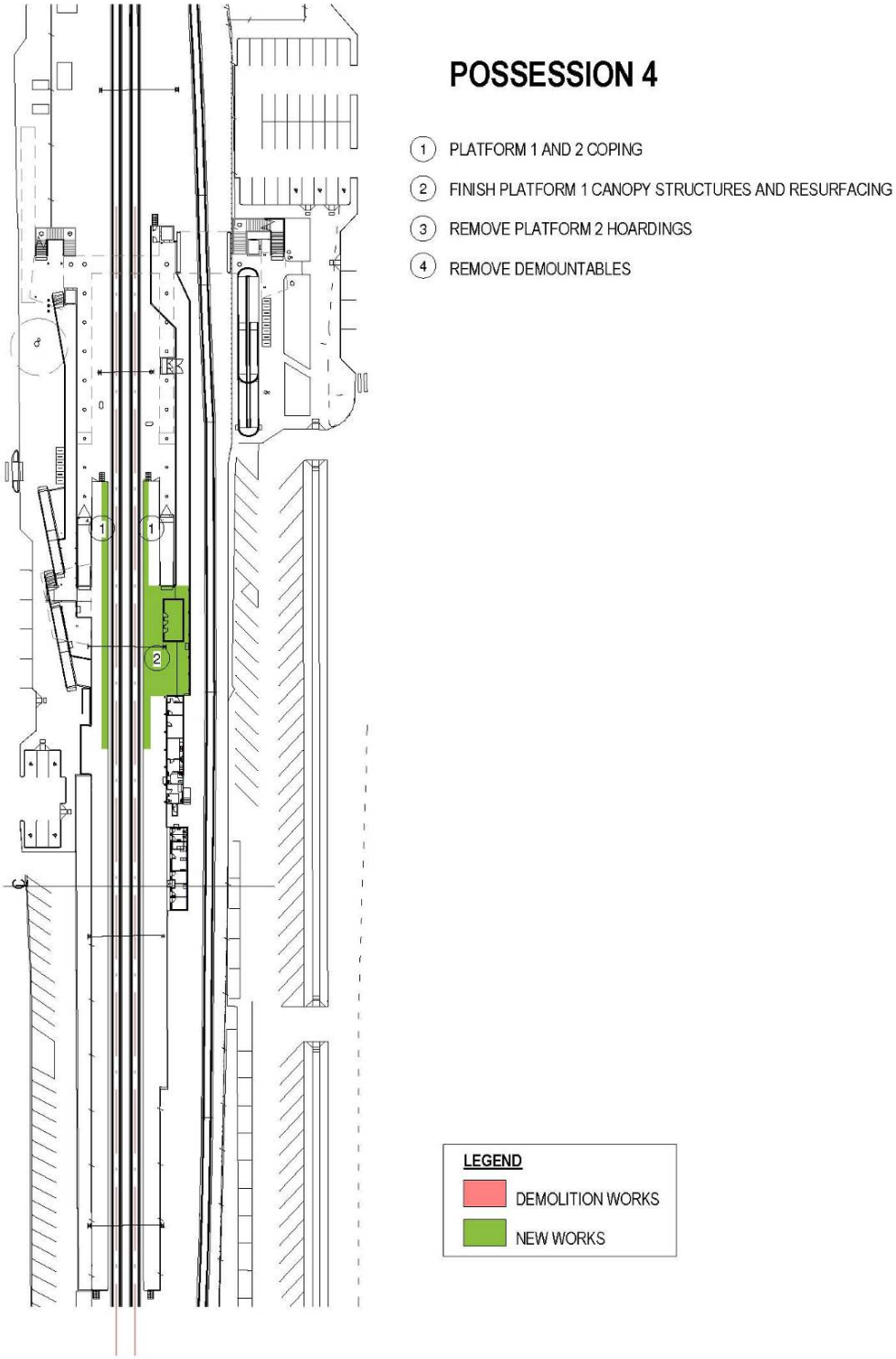
1. NEW BUS SHELTER
2. REINSTATE COUNCIL BARRIER
3. REINSTATE BIKE LOCKERS
4. DEMOLISH EXISTING AMENITIES, CONSTRUCT PLATFORM WIDENING AND PARTIAL CANOPY STRUCTURE
5. REMAINING STATION BUILDING INTERNAL DEMOLITION AND CONSTRUCT REMAINING FITOUT
6. LIFT 3 AND CANOPY STRUCTURES
7. EXTERNAL WORKS AND KISS AND RIDE
8. PLATFORM 1 AND 2 RESURFACING

LEGEND

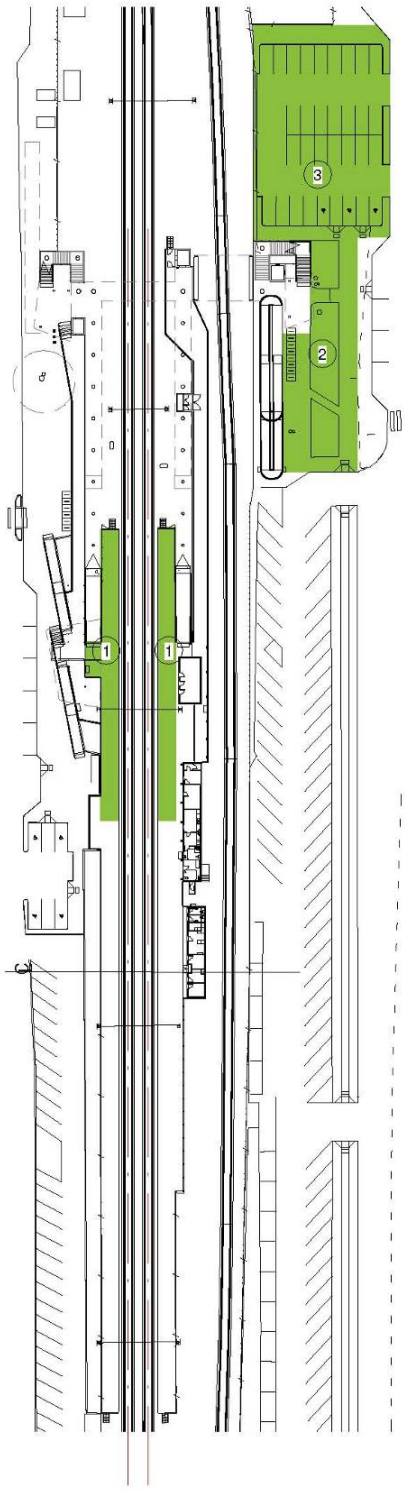
DEMOLITION WORKS

NEW WORKS

Note: Indicative only, subject to detailed design



Note: Indicative only, subject to detailed design



OUTSIDE OF POSSESSION WORKS (D)

1. FINISH PLATFORM 1 AND 2 RESURFACING
2. FINISH STANLEY ROAD FORECOURT WORKS
3. OFF-STREET PARKING
4. GENERAL FINISHING AND COMMISSIONING
5. DEMOBILISE COMPOUND

LEGEND

- DEMOLITION WORKS
- NEW WORKS

Note: Indicative only, subject to detailed design