

WARATAH STATION

**Transport Access Program
Traffic, Transport and Access Assessment**

Prepared for:

Transport for New South Wales



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SLR 

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Transport for New South Wales (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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EXECUTIVE SUMMARY

Background and upgrade works

Transport for NSW (TfNSW) has proposed the Waratah Station Upgrade (the ‘Proposal’). The Proposal forms part of the Transport Access Program (TAP). TAP is a New South Wales (NSW) Government initiative to improve existing transport infrastructure, such as train stations, so they are modern, accessible, and secure. The primary aim is to improve station access and surrounding transport networks so they are more accessible for the mobility impaired, elderly persons, parents and carers, and persons with a disability.

The Proposal involves an upgrade of Waratah Station which would improve accessibility and amenity for customers. The Proposal would include the following key elements:

- installation of a new access ramp and stairs from Platt Street to Platform 2
- installation of three new lifts connecting to the existing footbridge, with canopies for weather protection at the waiting areas
- installation of a new elevated walkway connecting the lift on Platform 1 to the existing footbridge, and localised widening of Platform 1 at the lift location
- refurbishment works to the existing footbridge including: replacement of stair treads and handrails, work to the footbridge walkway including provision for TGSIs and localised strengthening, repairs and repainting
- works to the existing station building including: provision of a new Family Accessible Toilet (FAT) and a new unisex ambulant toilet (to replace existing male and female toilets), works to make the waiting room accessible and work to provide a new Station Services Equipment Room (SSER) including extension of the building,
- platform works including localised regrading for accessible paths of travel, platform resurfacing and repairs where impacted by construction activities, adjustment to seating and other facilities on the platforms, and TGSIs adjustments including for the stairways
- ancillary works including:
 - protection or relocation of services and utilities to accommodate the new works
 - upgrade to the station power supply to cater for the new lifts
 - lighting upgrades required for the new work
 - improvement to station security and communication systems, including CCTV upgrade, public address system and new hearing induction loops within the station platforms)
- modifications to wayfinding and other signage.

EXECUTIVE SUMMARY

Existing conditions

Station patronage data provided by TfNSW indicates that the average weekday passenger demand for Waratah Station was 334 persons in 2017. Existing station facilities include the following:

- bike racks with capacity for six bicycles
- stair access to station from Railway Terrace and Platt Street
- pedestrian overbridge crossing the rail line and providing access to platforms
- kiss and ride/taxi facilities on Railway Terrace and Platt Street
- no off-street commuter car parking facility.

On-site and desktop observations indicate that there is a low-moderate demand for commuter car parking as unutilised on-street parking can be observed within reasonable walking distance to the station.

Passenger kiss and ride facilities are present on both frontages. Traffic surveys of both station frontage kiss and ride facilities observed that they are lightly used

External traffic performance was observed to be reasonable with no material congestion or deficiencies noted during peak periods.

The existing pedestrian footpaths constructed in the public road verges surrounding the station can generally be described as good quality although several examples were noted of localised constrictions caused by utility poles, sign posts and fences which further reduce the available path width such that it would be impossible or very difficult for a person travelling in a wheelchair or a parent/carer walking with a pram.

Operational impacts

Forecast station patronage data provide by TfNSW indicates that the Waratah Station annual customer demand will increase by 12% up to 2036. Typical daily (weekday) patronage is projected to increase from 334 persons in 2017 to 375 persons in 2036.

The Proposal would provide adequate capacity to accommodate this expected growth whilst also enabling more direct, legible and safe pedestrian routes. The Proposal would also improve compliance with the *Disability Discrimination Act* (DDA) and *Disability Standards for Accessible Public Transport* (DSAPT). Overall, the user experience including amenity and convenience would be improved.

No new capacity for kiss and ride or taxi facilities are proposed although the existing facility design would be enhanced through improved geometry, line marking and signage as part of the Proposal.

A new accessible parking space would be provided in Platt Street which would require the reallocation of existing general use kerbside parking, the loss of which can be accommodated within the surrounding on-street parking supply.

The Proposal retains the same number of bicycle parking spaces in the same general locale.

EXECUTIVE SUMMARY

Changes to existing traffic capacity and performance are projected to be insignificant given the relatively minor nature and scale of the improvements delivered as part of the Proposal. Whilst there would be some increase in station utilisation as a result of improvements to accessibility and amenity, it is expected that these incremental increases would not result in a material increase in traffic demand.

Construction impacts

The following key construction-stage impacts are likely to be generated:

- increased construction vehicle traffic including light and heavy vehicles within the station precinct and along proximity roads and streets including Railway Terrace and Platt Street (B63 route and local segment) for movement to/from the proposed construction compound accessed via Platt Street
- temporary loss of approximately 2-4 existing untimed on-street car parking spaces in the Platt Street
- temporary increased demand for all-day parking for construction staff assuming the compound cannot accommodate sufficient staff parking
- potential confusion and loss of amenity to customers accessing the station via temporary and changed facilities during construction
- short-term occupation of kerbside space by cranes facilitating construction
- minor travel delays on account of likely Traffic Control Plan (TCP) implementation requiring some users to stop for construction traffic.

Construction impacts are considered to be manageable subject to the preparation and implementation of a Construction Traffic Management Plan (CTMP). The CTMP and subordinate Traffic Control Plans (TCP) should review issues and identify solutions and temporary arrangement to avoid, mitigate and manage risk involving construction activities, users of the transport system, and local residents.

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Glossary of terms

Term Meaning	Term Meaning
AADT	Annual Average Daily Traffic
ABS	Australian Bureau of Statistics
AS	Australian Standards
ASA	Asset Standards Authority
BTS	Bureau of Transport Statistics, a division of Transport for NSW
CBD	Central Business District
CTMP	Construction Traffic Management Plan
DDA	<i>Disability Discrimination Act 1992</i> (Commonwealth)
DP&E	New South Wales – Department of Planning and Environment
DSAPT	Disability Standards for Accessible Public Transport
Fruin	John J Fruin, who pioneered studies on pedestrian flows and crowding levels. Fruin defined six levels of crowding for queueing areas, walkways and stairways, and given in terms of Levels of Service (LOS).
HV	Heavy vehicles
I & S	Infrastructure and Services, a division of Transport for NSW (formerly Transport Projects Division)
JTW	Journey to Work
LEP	Local Environmental Plan
LGA	Local Government Area
LOS	Level of Service – a qualitative measure of flow and crowding, with LOS A as the ‘most pleasant’ and F the ‘least pleasant’ in terms of pedestrian flow and crowding.
m	metres
mm	millimetres
NSW	State of New South Wales
OOHW	Out of Hours Works
PEA	Preliminary Environmental Assessment
PLC	Presbyterian Ladies College
pmm	pedestrians per metre per minute, a measure of pedestrian flow rate
Rail possession	Possession is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
RailCorp	Rail Corporation New South Wales (now Sydney Trains)
REF	Review of Environmental Factors
Roads Act	<i>Roads Act 1993</i> (NSW)
TAP	Transport Access Program
TCP	Traffic Control Plan
TfNSW	Transport for New South Wales
TT&AIA	Traffic, Transport and Access Impact Assessment (this report)

Term Meaning	Term Meaning
TGSI	Tactile Ground Surface Indicator
TZ	Travel zone – a geographical unit used as a basis for travel data analysis and statistics.

1 Introduction

1.1 Background

Transport for New South Wales (TfNSW) has proposed the Waratah Station Upgrade (the ‘Proposal’). The Proposal forms part of the Transport Access Program (TAP) which is a New South Wales Government initiative to improve existing transport infrastructure, including train stations, so they are modern, accessible, and secure. The primary aim is to enhance station access and surrounding transport networks so they are more accessible for the mobility impaired, elderly persons, parents and carers, and persons with a disability.

In 2018, SMEC was commissioned by TfNSW to prepare concept plans and undertake option development for Waratah Station as part of the preliminary concept design project phase. A preferred concept has since been selected.

SLR Consulting (SLR) has been commissioned by TfNSW to undertake a review of traffic, transport and access matters as part of the Review of Environmental Factors (REF) for the proposal.

1.2 Proposal overview

The Proposal involves an upgrade of Waratah Station which would improve accessibility and amenity for customers. The Proposal would include the following key elements:

- installation of a new access ramp and stairs from Platt Street to Platform 2
- installation of three new lifts connecting to the existing footbridge, with canopies for weather protection at the waiting areas
- installation of a new elevated walkway connecting the lift on Platform 1 to the existing footbridge, and localised widening of Platform 1 at the lift location
- refurbishment works to the existing footbridge including: replacement of stair treads and handrails, work to the footbridge walkway including provision for TGSIs and localised strengthening, repairs and repainting
- works to the existing station building including: provision of a new Family Accessible Toilet (FAT) and a new unisex ambulant toilet (to replace existing male and female toilets), works to make the waiting room accessible and work to provide a new Station Services Equipment Room (SSER) including extension of the building,
- platform works including localised regrading for accessible paths of travel, platform resurfacing and repairs where impacted by construction activities, adjustment to seating and other facilities on the platforms, and TGSIs adjustments including for the stairways
- ancillary works including:
 - protection or relocation of services and utilities to accommodate the new works
 - upgrade to the station power supply to cater for the new lifts
 - lighting upgrades required for the new work
 - improvement to station security and communication systems, including CCTV upgrade, public address system and new hearing induction loops within the station platforms)

1.3 modifications to wayfinding and other signage. TAP objectives

The overall objectives of TAP include:

- stations that are accessible to people with a disability, limited mobility 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 transport modes for all customers.

1.4 Study scope

SLR Consulting (SLR) has been commissioned by TfNSW to prepare this Traffic, Transport and Access Impact Assessment which will form part of the Proposal REF. This report details consideration of the anticipated traffic, transport and access matters associated with the Proposal for inclusion in the REF. This consideration includes the following:

- existing traffic, transport and access conditions and facilities
- operational traffic impacts associated with the proposed facilities
- construction impacts associated with the Proposal
- potential mitigation measures recommended to avoid, mitigate or manage impacts.

This assessment has been prepared noting the following:

- stakeholder consultation was not conducted by SLR as part of this study
- construction activity assumptions were provided by TfNSW
- demand surveys included observations of the following:
 - pedestrian movements entering and exiting the station and the pedestrian overbridge
 - kiss and ride/taxi demands on both road frontages
 - pedestrian crossing demands at the existing Railway Terrace zebra crossing.
- no traffic modelling was completed as part of this project, nor by other consultants during the concept design development phase given the Proposal is not anticipated to generate any significant additional or changes traffic demand.

1.5 Study area

Waratah Station is located approximately 5.7 kilometres northwest of the Newcastle CBD and is situated on the suburb boundary of Waratah and Mayfield. The station is located within the local government jurisdiction of the City of Newcastle.

The study area adopted by SLR is illustrated in Figure 1. It incorporates the station, the immediate fronting road and pathway system, kerbside kiss and ride and taxi facilities, and the construction compound area proposed in relation to the Proposal.

Additional consideration is also made for the area and transport systems surrounding the Figure 1 study area; however, this is not considered the primary area influenced by the Proposal.

Figure 1 Waratah Station study area



Basemap source: Nearmap, 2018

1.5.1 References

The following has been relied upon and/or referenced in undertaking this assessment:

- a site inspection undertaken by SLR Consulting staff Thursday 28 September, 2018
- Australian Standards AS2890 – Part 5 (2004): On-street car parking
- Australian Standards AS2890 – Part 6 (2009): Off-street car parking for people with disabilities
- RailCorp (May 2010). *Engineering Standard: Stations and Buildings – Station Design Standard Requirements: ESB 003 – Station Functional Spaces*.

2 Existing conditions

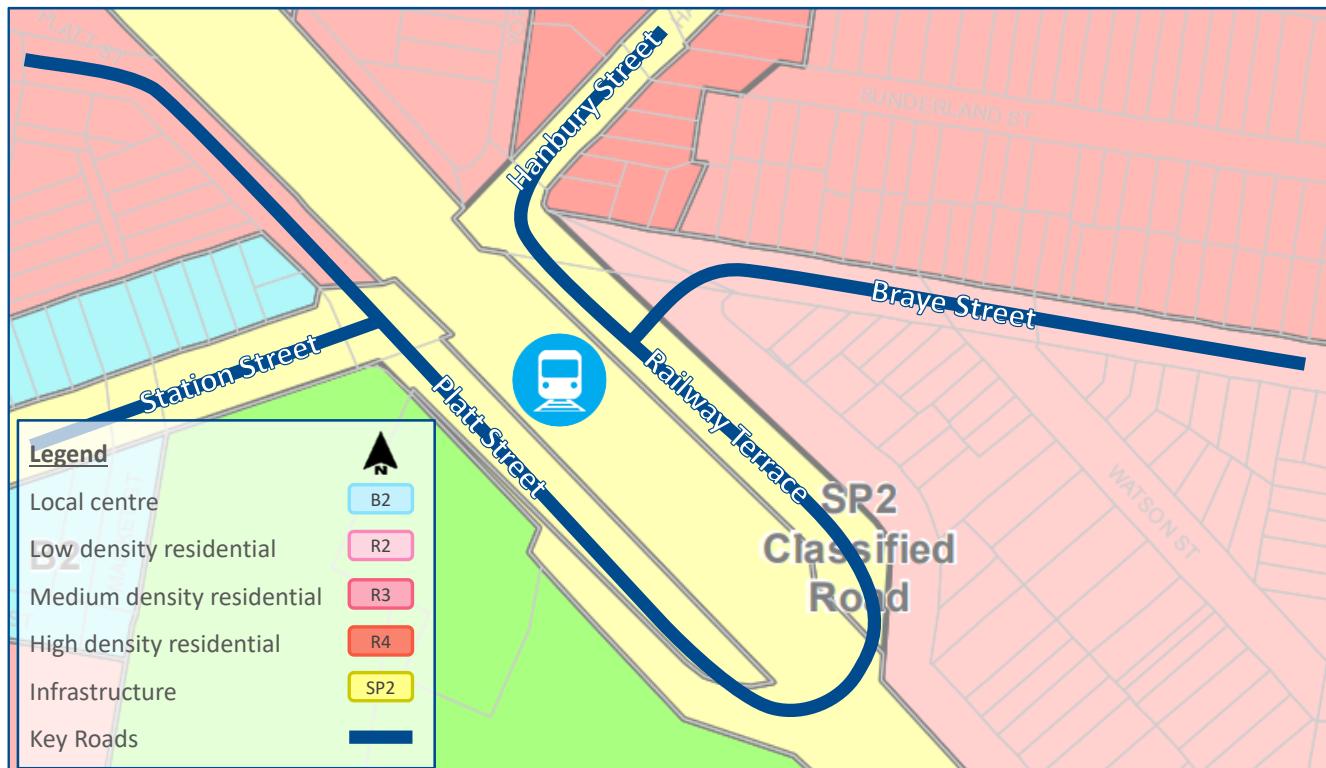
2.1 Surrounding land uses

Being located within the City of Newcastle LGA, the subject site is bound by the provisions of the *Newcastle Local Environment Plans 2012* (NLEP 2012) and the *Newcastle Development Control Plan 2012*.

The NLEP 2012 *Land Zoning Map LZN_004B* designates the land on which the station is located as 'SP2 Infrastructure'. Land to the north of the station and railway line is classified as residential with varying densities ranging from 'R2 Low Density Residential' to 'R4 High Density Residential'. South-west of the station and rail corridor exists a wider variety of land uses consisting of 'RE1 Public Recreation' to the south, 'B2 Local Centre' to the west, and 'R3 Medium Density Residential' to the northwest.

An extract from the abovementioned NLEP 2012 map shown in Figure 2 shows the surrounding land uses in more detail.

Figure 2 Surrounding land uses



Basemap source: City of Newcastle, 2018

2.2 Movement network

Waratah Station is bound on three sides by Railway Terrace/Platt Street (signed as route B63), which loops around the station via a bridge structure so that it can pass over the railway line to the immediate southeast. The location of the station within the local road network is shown in Figure 3 and the characteristics of nearby key roads and streets is summarised in Table 1.

Figure 3 Local context and surrounding road network



Basemap source: Nearmap, 2018

Table 1 Surrounding road network characteristics

Road Name	Posted Speed Limit	School Zone	Configuration
Hanbury Street	60km/h	No	2-4 lanes, undivided, no parking restrictions
Railway Terrace	Residential: 50km/h Station Frontage: 60km/h	No	Residential: 2 lanes unmarked, undivided, no parking restrictions Frontage: 2 lanes, divided, bicycle lane on both sides with indented passenger kiss and ride and taxi zone
Platt Street	Residential: 50km/h Station Frontage: 60km/h	No	Residential: 2 lanes unmarked, undivided, no parking restrictions Frontage: 2-3 lanes, mostly undivided, bicycle lane on both sides
Braye Street	50km/h	No	2 lanes undivided, no parking restrictions
Turton Road	Residential: 50km/h B63: 60km/h	Yes	Residential: 2-3 lanes, mostly unmarked, undivided, no parking restrictions B63: 4 lanes, undivided
Upfold Street	50km/h	No	2 lanes, unmarked, undivided, no parking restrictions
York Street	50km/h	No	2 lanes unmarked, undivided, no parking restrictions
Station Street	Residential: 50km/h B63: 60km/h	No	Residential: 2 lanes unmarked, undivided, restricted parking east of Tighe Street - otherwise unrestricted B63: 3 lanes, mostly undivided

2.3 Station access and facilities

2.3.1 Station facilities

The following accessibility and convenience features are currently installed at the station:

- toilets (one female and one male, neither of which are wheelchair accessible)
- payphone
- emergency help point
- hearing loop
- a PA system to broadcast audible/verbal announcements to passengers.

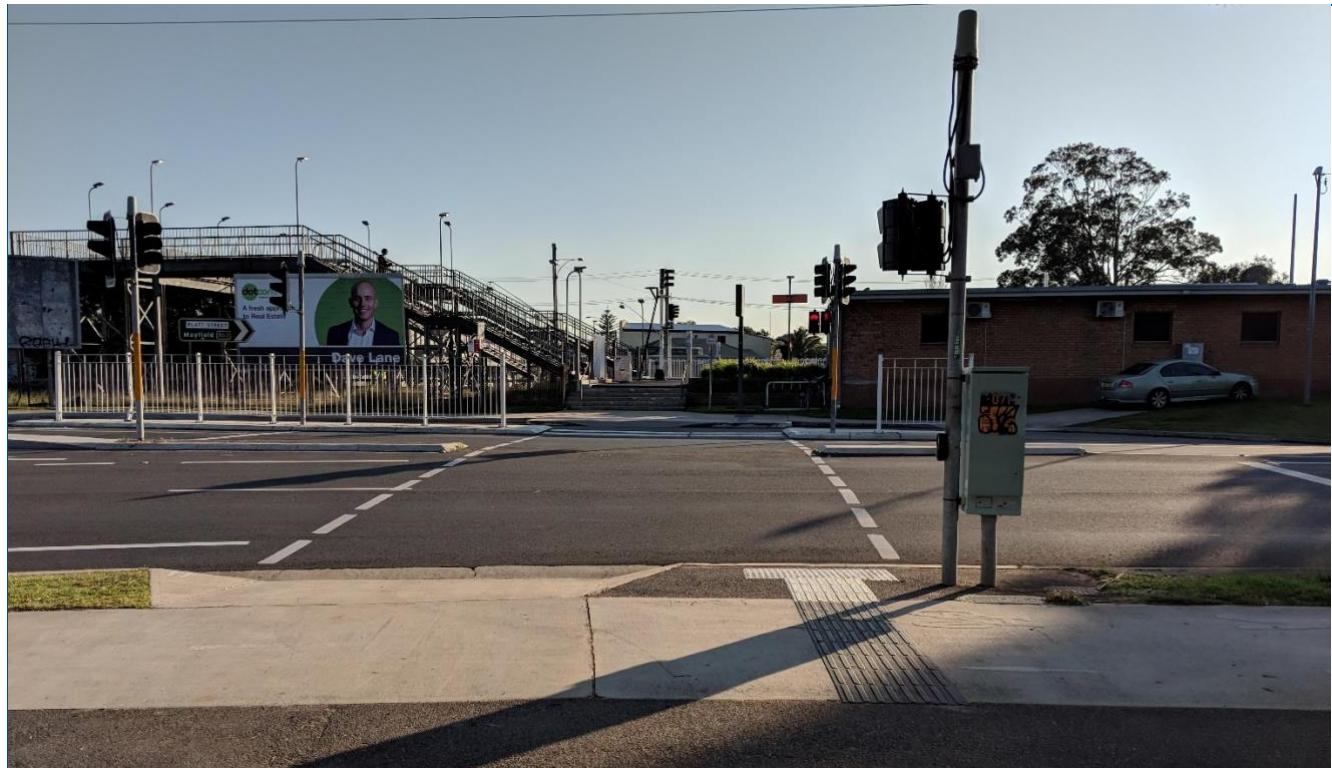
No ticket purchasing or live visual information facilities and passenger display screens are present at Waratah Station.

2.3.2 Pedestrians

2.3.2.1 Waratah Station access

Pedestrian access to Waratah Station is currently possible from Railway Terrace (north) and Platt Street (south). Both access locations require users to navigate stairs in order to reach train platforms.

Figure 4 Access stairs at Waratah Station



Given the lack of ramps or lifts, the Waratah Station does not currently accommodate persons with a disability, mobility impaired or elderly persons, or parents and carers with prams and is not DSAPT compliant.

2.3.2.2 External movement network

There is a pedestrian footpath adjacent to the Platt Street station entrance and kiss and ride/taxi facility that connects to the broader network including a signalised crossing to/from Waratah Park and the following:

- Platt Street (B63) – 2.5 metre footpath on the southern side
- Platt Street – 3.0 metre shared path on the eastern side and 1.2 metre pathway on the western side
- Station Street – 2.5 metre footpath on the northern side and 1.5 metre pathway on the southern side.

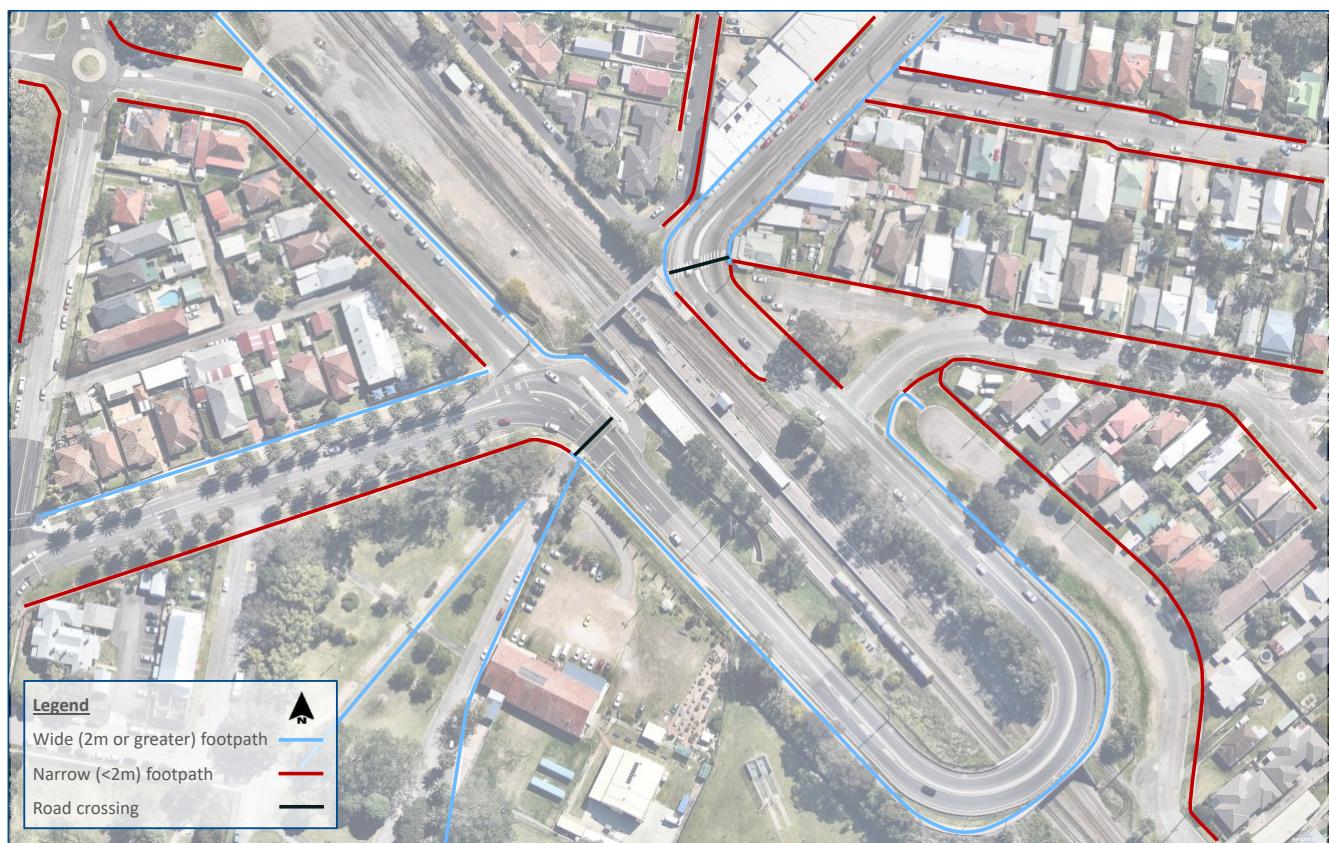
There is no pedestrian footpath currently provided on the northern side of Platt Street south of the kiss and ride facility.

On the Railway Terrace frontage, the following pedestrian infrastructure is currently provided:

- Railway Terrace (south) – 1.2 metre pathway adjacent to the kiss and ride/taxi facility widening to a full verge pavement seal opposite the station entrance and continuing north along the northern side of Hanbury Street
- Railway Terrace (north) – 1.2 metre pathway in immediate proximity to the station that widens to approximately 2.8 metre south of Braye Street.

The extent and quality of the surrounding pedestrian infrastructure is illustrated in Figure 5.

Figure 5 Local pedestrian infrastructure network



Basemap source: Nearmap, 2018

The following constraints are noted:

- There is a zebra crossing currently provided at the Hanbury Street end of Railway Terrace although it is located on the apex of a sharp curve in the road and provides less than desirable sight distance between vehicles and crossing pedestrians. A median is present either side of the crossing (Figure 4); however, it's too narrow to safely accommodate pedestrians
- The pathway along the Platt Street/Railway Terrace bridge also narrows considerably at the railway overpass, at which point the only protection from the adjacent roadway is a guardrail while a short balustrade (with no throw screens) protects pedestrians and cyclists from falling onto the railway line below
- The footpath in the immediate vicinity of the Railway Terrace station entrance and existing kiss and ride/taxi facility is narrow and cluttered with signage and posts that restrict movement in a wheelchair (Figure 6).

Figure 6 Railway Terrace footpath



2.3.2.3 Pedestrian demand activity

A pedestrian demand survey was undertaken by Trans Traffic Survey (TTS) on behalf of SLR between 6.00 am and 7.00 pm on 26 September 2018. Analysis of the survey results indicates that there were 1,232 pedestrian movements to/from the site throughout the day of which approximately 55% enter via Platt Street and 45% enter via Hanbury Street/Railway Terrace.

Table 2 summarises the results of these surveys from the AM and PM peak periods specified for intercity services by TfNSW (6.00-8.00 am and 4.00-6.30 pm).

Table 2 Waratah Station peak pedestrian demand and distribution

Peak Period	Peak Pedestrian Demand	In/Out Distribution		Directional Distribution	
		In	Out	North (Hanbury St)	South (Platt St)
AM	65 per hour	60%	40%	38%	62%
PM	73 per hour	45%	55%	43%	57%

The surveys also observed that the existing Railway Terrace/Hanbury Street zebra crossing is a primary route for pedestrian movement between the station and the north with 60% and 42% of persons entering the station crossing at this location during the AM and PM peak periods respectively.

The observed peak pedestrian demand at the zebra crossing equates to an average of one movement every 50 seconds. Accordingly, the existing facility would not meet typical threshold adopted for zebra crossing which require higher product of pedestrian demand multiplied by vehicle demand.

2.3.3 Cyclists

2.3.3.1 Waratah Station access

At present, there are no means of transporting a bicycle to the station platform without having to carry it up (and down) a number of stairs. There is a single unsheltered bicycle rail facilitating parking for approximately six bicycles adjacent to the Platt Street station entrance.

2.3.3.2 External movement network

Waratah Station is located along Bicycle Route 6 which consists of shared pathways and residential streets between the Newcastle CBD and the University of Newcastle. Figure 7 illustrates the route in the broader context of the City of Newcastle cycling network. The route is signposted for the entire length to assist wayfinding.

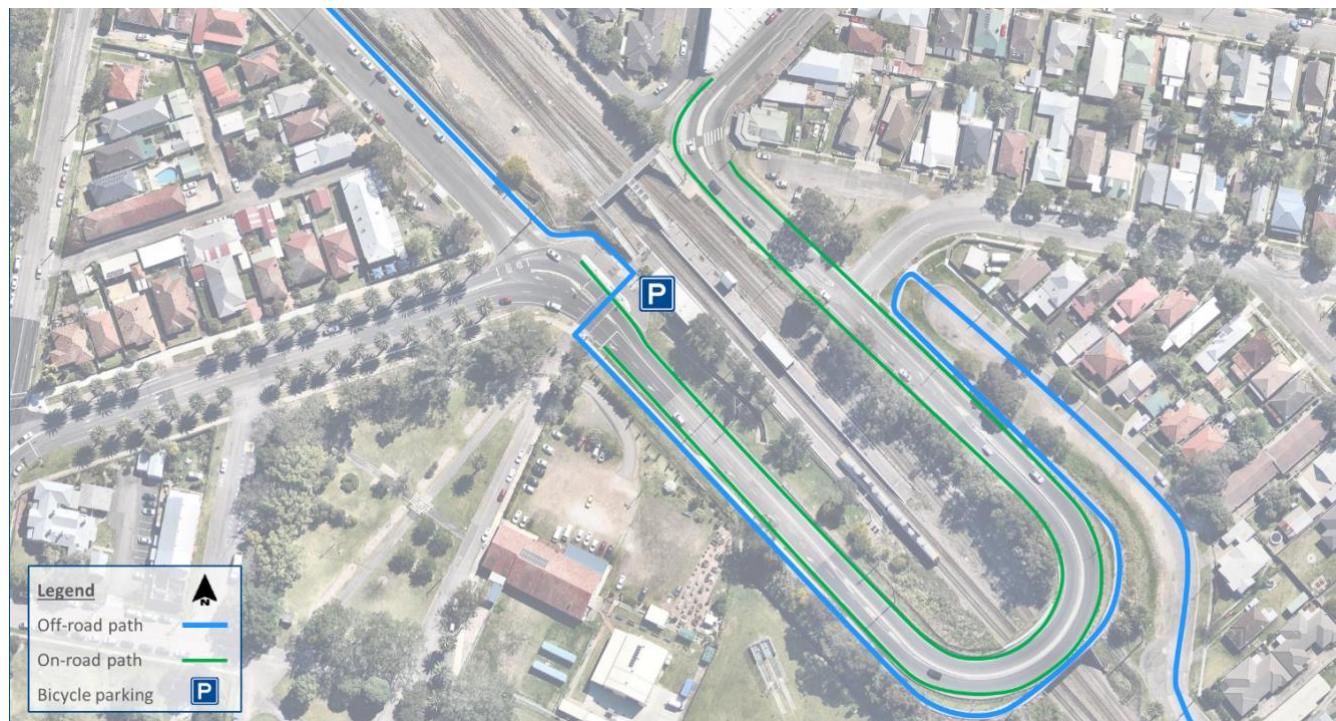
Figure 7 Newcastle CBD - University of Newcastle bicycle route (Route 6)



Source: City of Newcastle, 2018

Adjacent to the station, this bicycle route consists of an off-road shared path on Platt Street from Prince Street which requires cyclists to cross at the signalised crossing in front of the station. The path then continues beside Platt Street/Railway Terrace over the railway overpass before deviating to Upfold Street. Bicycle lanes are also provided along the Platt Street and Railway Terrace frontages of the station. The existing bicycle infrastructure in close proximity to the station is illustrated in Figure 8.

Figure 8 Bicycle infrastructure surrounding Waratah Station



Basemap source: Nearmap, 2018

2.4 External transport networks and interchange facilities

2.4.1 Rail

2.4.1.1 Services

Waratah Station is situated on the regional Hunter Line and is serviced by trains travelling between Dungog/Scone and the Newcastle interchange via Maitland. The location of Waratah Station within the northern section of the Intercity Trains network is shown in Figure 9 overleaf, with service frequency summarised in Table 3.

Figure 9 Location of Waratah Station within the Hunter region of the Intercity Trains network



Source: TfNSW, 2018

Table 3 Waratah Station service frequency

Destination	Operating Days	Service Frequency
Newcastle Interchange	Monday to Friday	Peak: approx. 30 mins Off-peak: approx. 27-60 mins
	Weekends and public holidays	Peak: approx. 2-60 mins Off-peak: approx. 30-60 mins
Scone/Dungog	Monday to Friday	Peak: approx. 10-28 mins Off-peak: approx. 15-85 mins
	Weekends and public holidays	Peak: approx. 20-60 mins Off-peak: approx. 12-90 mins

Source: TfNSW, 2018

2.4.1.2 Patronage

Station patronage data provided by TfNSW indicates that the average weekday passenger demand for Waratah Station was 334 persons in 2017.

2.4.2 Bus

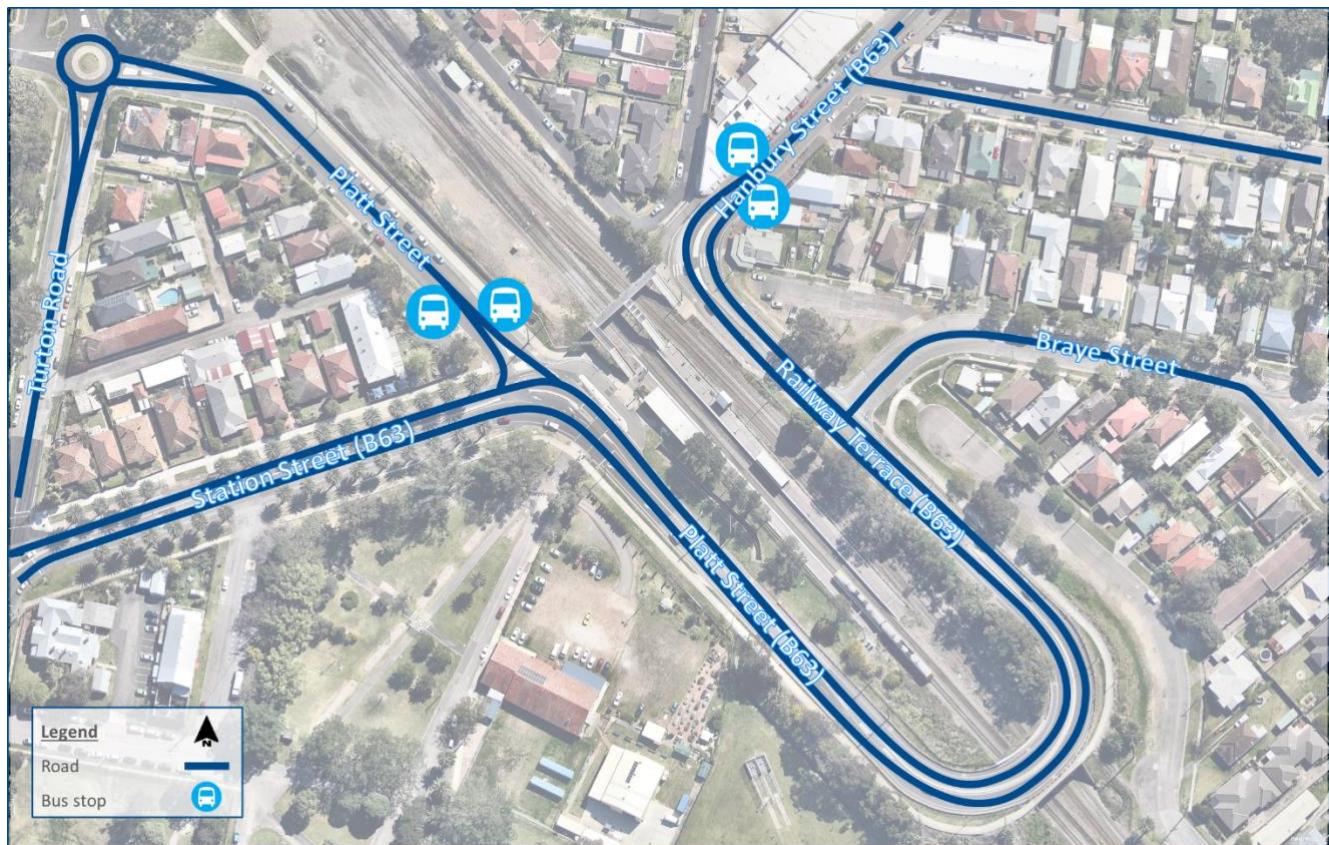
2.4.2.1 Services and Stops

There are two bus stop locations in close proximity to Waratah Station:

- both sides of Platt Street to the north of Station Street
- both sides of Hanbury Street opposite Sunderland Street.

The locations of these stops are shown in Figure 10. The bus stops themselves are shown in Figure 11 and Figure 12.

Figure 10 Bus stops adjacent to Waratah Station



Basemap source: Nearmap, 2018

Figure 11 Hanbury Street bus stops



Figure 12 Platt Street bus stop (southbound)

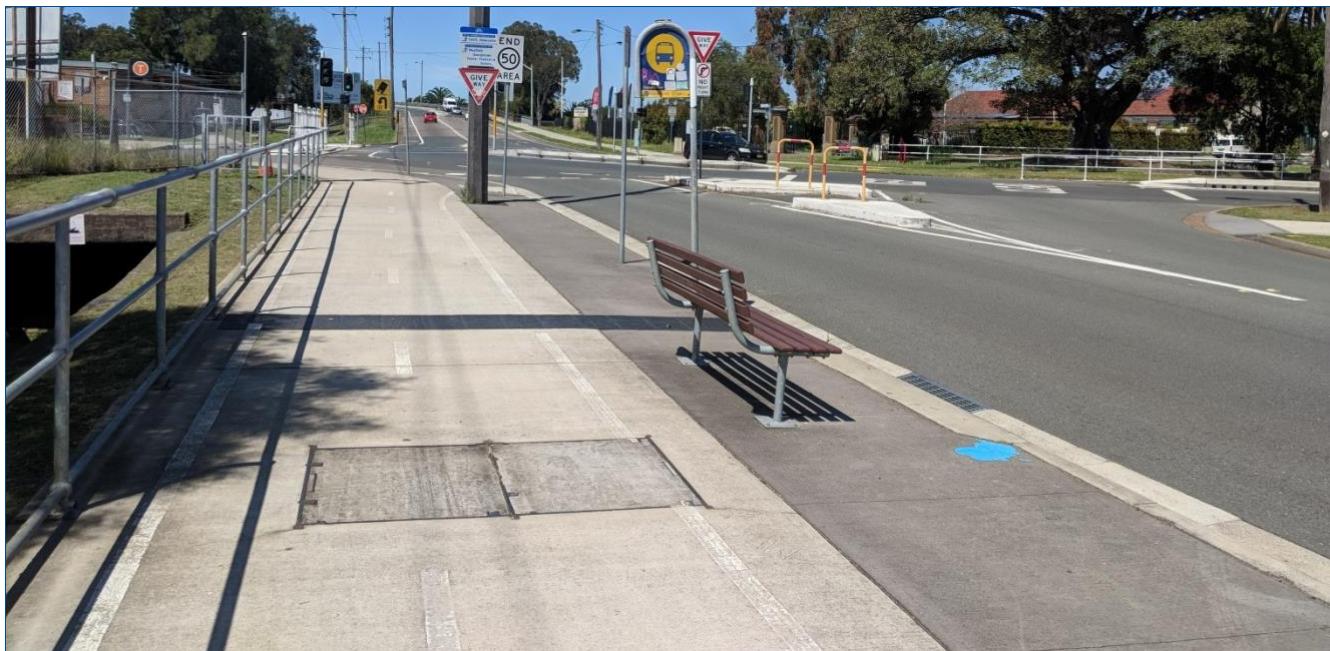


Table 4 summarises the public bus routes and school services that utilises these bus stops.

Table 4 Waratah Station bus services

Stop Location	Service	Route	Approximate Frequency	
			Peak	Off-Peak
Platt Street north of Station Street (Stop ID: 229811 & 229842)	24	Wallsend - Marketown via Mayfield	20-30 mins	60 mins
	705*	Mayfield East - Lambton High	-	Once per day
	706*	Warabrook - Merewether High	Once per day	Once per day
	735*	Cooks Hill - Hunter Christian School	Once per day	Once per day
	840*	Charlestown - Hunter Christian School	-	Once per day
	841*	Charlestown - Hunter Christian School	Once per day	Once per day
	842*	Lakelands - Hunter Christian School	Once per day	Once per day
	845*	New Lambton Heights - Hunter Christian School	Once per day	Once per day
	849*	Charlestown - Lambton High	Once per day	-
Hanbury Street opposite Sunderland Street (ID: 230450 & 230451)	24	Wallsend - Marketown via Mayfield	20-30 mins	60 mins
	138	Newcastle - Lemon Tree Passage via Newcastle Airport	Twice per day	120 mins
	705*	Mayfield East - Lambton High	-	Once per day
	735*	Cooks Hill - Hunter Christian School	Once per day	Once per day
	840*	Charlestown - Hunter Christian School	-	Once per day
	841*	Charlestown - Hunter Christian School	Once per day	Once per day
	842*	Lakelands - Hunter Christian School	Once per day	Once per day
	845*	New Lambton Heights - Hunter Christian School	Once per day	Once per day
	849*	Charlestown - Lambton High	Once per day	-
	858*	Hunter Christian - Ambleside Circuit & Lakelands	-	Once per day
	1001*	Callaghan College - Stockton Wharf	-	Once per day
	1202*	Hunter School of Performing Arts - Lemon Tree Passage	-	Once per day
	1251*	St Phillips Christian College - Lemon Tree Passage	-	Once per day
	1272*	Callaghan College - Clarence Town	-	Once per day
	1341*	Lemon Tree Passage - St Phillips College	Once per day	-
	1401*	Medowie - Newcastle High School	Once per day	-
	1402*	Merewether High School - Stockton & Medowie	-	Once per day
	1412*	St Phillips Christian College - Medowie	-	Once per day
	2373*	Hunter Christian Mayfield - Dunmore & Morpeth	-	Once per day
	2554*	Waratah High School - Stockton	-	Once per day (Monday only)
	6165*	Mayfield Christian - Oakville Road & Minmi	-	Once per day
	6222*	Seahampton - Hunter Christian College	Once per day	-

Note: * indicates school service. Source: TfNSW, 2018.

2.4.3 Taxis and kiss and ride

2.4.3.1 Facilities

Taxi and kiss and ride facilities are currently provided on both station frontages. The Platt Street frontage has sufficient length to accommodate 2-3 waiting vehicles in a No Parking zone.

The Railway Terrace/Hanbury Street frontage has sufficient kerbside length to accommodate 4-5 vehicles. Approximately two-thirds of the kerb is not sign-posted while the remaining one-third is signed as a Taxi Zone.

Both kiss and ride/taxi facilities are illustrated in Figure 13.

It was also observed that motorists travelling southbound from Hanbury Street would pick-up and/or set-down passengers in the unsealed area located in road reserve north of Railway Terrace.

Figure 13 Waratah Station taxi and kiss and ride facilities



2.4.3.2 Demand

Traffic surveys of both station frontage kiss and ride facilities observed that they are lightly used. Only one vehicle was observed to use the Railway Terrace facility across the combined AM and PM peak periods. The Platt Street facility was observed to be marginally busier with three vehicles utilising it during the observed AM peak period.

These findings suggest that there is low demand for kiss-and-ride type travel at the station at present.

2.4.4 Parking

There is no commuter car parking facility available to users of Waratah Station. There is unrestricted on-street car parking available on surrounding streets, including:

- both sides of Platt Street to the north of Station Street
- both sides of Turton Road to the north of Station Street
- both sides of Upfold Street

- both sides of Braye Street (including the informal parking area at the Railway Terrace/Braye Street intersection); and
- the western side of York Street and the northern side of Railway Terrace (to the northwest of Hanbury Street).

Observations of nearby on-street parking demand using aerial imagery collected on weekdays suggests that there is spare capacity available within reasonable walking distance.

2.5 Road safety

Crash statistics from the TfNSW Centre for Road Safety suggest that there is a noteworthy history of crashes resulting in injury and property damage on the surrounding road system. A total of 17 incidents were noted for the period 2013-2017. A summary of this crash history is shown on Figure 14 and Table 5.

Figure 14 TfNSW crash history adjacent to Waratah Station

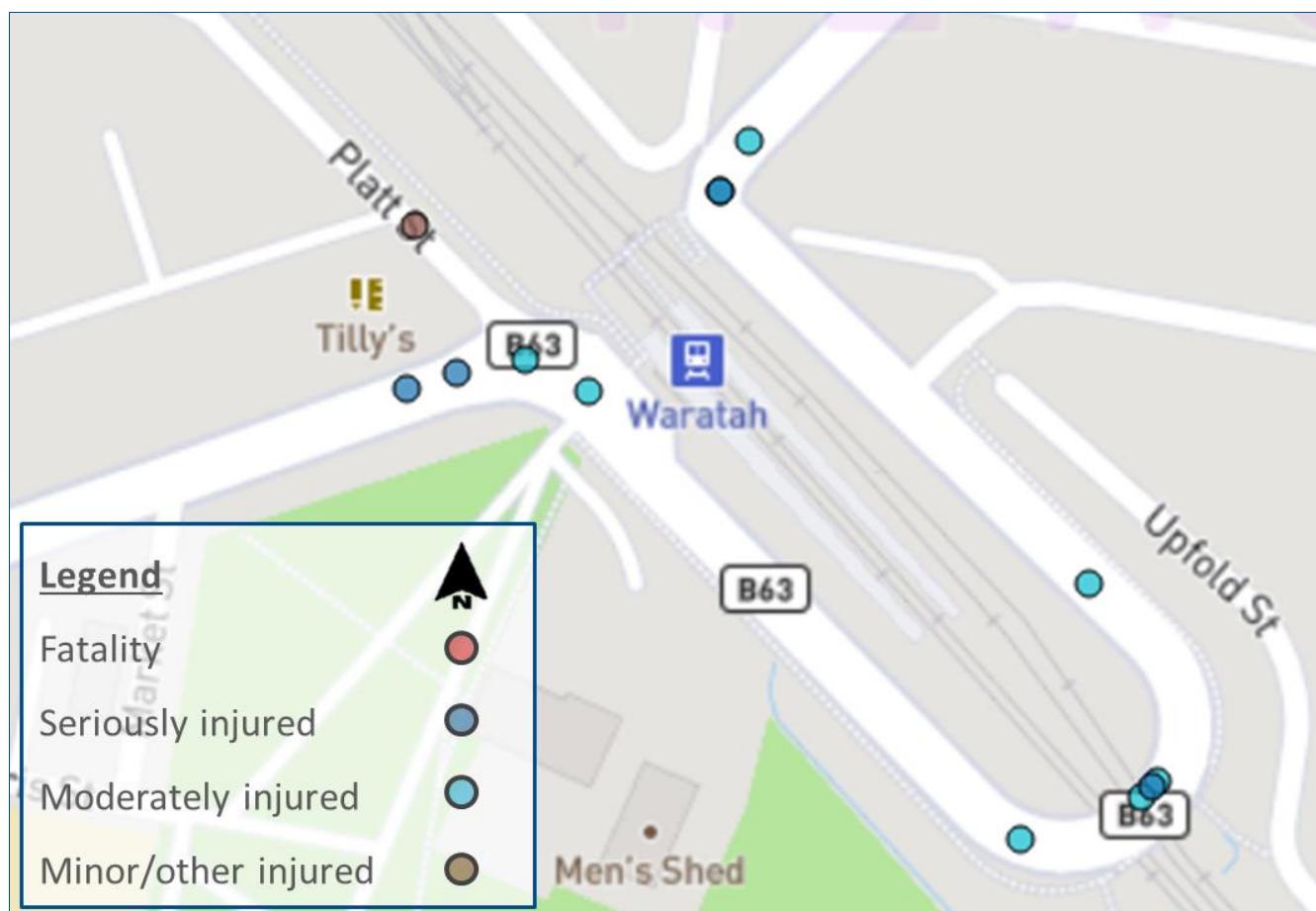


Table 5 TfNSW crash history adjacent to Waratah Station

Year	Location	Crash ID	Severity	Description
2013	Platt Street north of Station Street	829269	Minor injury	Off-path straight, hit object
	Platt Street/Railway Terrace rail overpass	834209	Serious injury	Head on
	Platt Street signalised crossing	834210	Moderate injury	Head on
	Braye Street north of Railway Terrace	834584	Non-casualty (tow away)	Off-path bend, hit object
	Platt Street/Railway Terrace rail overpass	838262	Moderate injury	Off-path bend, hit object
	Platt Street/Station Street intersection	841677	Non-casualty (tow away)	Leaving parking
	Station Street east of Platt Street	1006203	Serious injury	Head on
	Platt Street east of overpass	1008969	Moderate injury	Rear end
2014	Hanbury Street south of Sunderland Street	1016568	Non-casualty (tow away)	Off-path straight, hit object
	Platt Street/Railway Terrace rail overpass	1032547	Moderate injury	Out of control on bend
	Platt Street/Station Street intersection	1036471	Moderate injury	Pedestrian on footpath
	Hanbury Street north of zebra crossing	1046389	Moderate injury	Off-path bend, hit object
2015	Hanbury Street zebra crossing	1068608	Serious injury	Head on
	Railway Terrace southeast of Braye Street	1088792	Moderate injury	Off-path bend, hit object
2016	Railway Terrace/Braye Street intersection	1099472	Non-casualty (tow away)	Off-path straight, hit object
	Station Street west of Platt Street	1107087	Serious injury	Off-path straight, hit object
2017	Hanbury Street zebra crossing	1163087	Moderate injury	From footpath

Source: TfNSW, 2016.

Whilst this review isn't a crash analysis, the summary details of the recent 2013-2017 period do indicate a series of possible location clusters and/or recurrent issues involving the corners and bends of the Hanbury Street, Railway Terrace, Platt Street route and a high proportion of 'off-path' and 'head on' crashes that have been reported at these locations.

Importantly, the crash record does not indicate any deficiencies or recurrent issues associated with elements of the Proposal that are 'in scope', i.e. station entrances or kiss and ride facilities. Addressing existing deficiencies associated with the existing road geometry is outside of the scope of the Proposal; however, a more detailed assessment is suggested as being warranted as part of a different project.

3 Proposal description

3.1 Station access upgrades

- installation of a new access ramp and stairs from Platt Street to Platform 2, which would involve removal of the existing garden beds, and relocation or adjustment to the existing billboards
- installation of three new lifts connecting to the existing footbridge, which would include lift landings with canopies for weather protection at the waiting areas along with screens or balustrades
- installation of a new elevated walkway connecting the lift on Platform 1 to the existing footbridge with balustrades, and localised widening of Platform 1 at the lift location
- refurbishment and other works to the existing footbridge including:
 - replacement of stair treads and handrails
 - work to the footbridge walkway including provision for TGSIs
 - additional containment lines and cabling installation for power and communications associated with the new lifts, and station services upgrades including upgrades to the station lighting, CCTV, PA system and hearing induction loops.

3.2 Station building upgrades

- construction of a new Family Accessible Toilet (FAT) with baby change table, and a new unisex ambulant toilet (to replace existing male and female toilets)
- works to make the waiting room accessible including removal of the door threshold by lowering the floor, removal of the front wall, and modification to the seating to provide space for wheelchair users
- provision of a new Station Services Equipment Room (SSER) which would house the station communications and electrical equipment. The building works would include extension of the existing building, existing internal wall demolition, new internal wall construction, and works to provide the required fire resistance. Services would include power, lighting, air conditioning, electronic access control and an intruder alarm system
- relocation of equipment into the new SSER and reconfiguration of the station office including required building works, furniture adjustment, services and finishes
- decommissioning of the former ticket window.

3.3 Platform improvements

- localised regrading for accessible paths of travel
- platform resurfacing and repairs where impacted by installation of hearing induction loops and other construction activities
- adjustment to seating, rubbish bins and other facilities on the platforms
- TGSI installation, including reinstatement and new TGSI for the stairways and line marking.

3.4 Interchange facilities including external movement networks

Interchange facility works proposed are:

- a new accessible parking space on Platt Street, including pavement cross falls adjustment (where required), line marking, signage, new kerb ramp and kerb adjustments
- provision of an access path from the station entrance between Platt Street, the lower lift landing on Platform 2, and the new accessible parking space
- upgrade work including footpath adjustments, new kerb ramps and signage to provide improved kiss and ride facilities on Railway Terrace to the east, and Platt Street to the west of the station
- installation of new DSAPT compliant bus stop seating on Hanbury Street and Platt Street
- provision of 6 new bicycle hoops on Platt Street, adjacent to the station entrance
- local adjustments to the rail corridor fencing on Railway Terrace to accommodate the improved kiss and ride facility.

4 Operational impacts

4.1 Future demand

Forecast station patronage data provided by TfNSW indicates that the average weekday passenger demand for Waratah Station is expected to increase by 12% from 334 persons in 2017 to 375 persons in 2036.

An additional 15% has also been evaluated by SLR as a ‘factor of safety’ to account for any unforeseen circumstances and to provide a conservative assessment. As such, the forecast daily design patronage for a 2036 time horizon is 431 persons. The projected passenger demands are summarised in Table 6.

Table 6 Waratah Station patronage demand and forecasts

Year	Average Weekday	Peak Hour	Weekday AM Peak	Weekday PM Peak
2017	334	42	108	103
2036	375	47	121	115
Design (2036 + 15%)	431	54	139	132

Source: TfNSW, 2018

4.2 Public transport

The Proposal is not projected to have any material impact on the existing operation of public transport services, nor would it prejudice future planning and design for services. The existing stop locations and timetable arrangements are not affected by the Proposal and the minimal increase in station demands would not require changes to existing service.

If the Proposal is to impact public transport in any way, it is likely to be positive given the proposed accessibility enhancements would improve movement between modes.

Similarly, the proposed upgrade to seating at the surrounding bus stops would increase convenience and attractiveness of the facilities for existing and possible future users.

The proposed new accessible parking space would need to be located such that it does not impact on the existing southbound bus stop on Platt Street.

4.3 Pedestrians

4.3.1 Pedestrian improvements

The Proposal would significantly enhance pedestrian accessibility given the inclusion of facilities such as new lifts to each platform and station access, a new access ramp at the Platt Street entrance, replacement of the overpass stairs and handrails/balustrades, and resurfacing of platforms. Beyond station accessibility, these enhancements would also serve to improve the connection across the rail corridor and improve user amenity.

The new lifts in particular are integral in allowing all areas of the station to be accessed by persons with a disability or mobility impairment, which is not currently possible given the design of the existing pedestrian overpass. This would facilitate improved community outcomes by increasing the independence and mobility of the local community regardless of their level of mobility, therefore reducing reliance on private vehicles as a means of travel.

The new access ramp to Platt Street would remove the requirement for all passengers to traverse at least one flight of stairs to access the station. The proposed location of the ramp also directs passengers to the kiss and ride area and new accessible parking space. This would assist in wayfinding and better aligns with user desire lines. A flight of stairs would be maintained adjacent to the access ramp to facilitate direct access to the external pathway system for those not needing the ramp.

The replacement of the stair treads, handrails and balustrades along the pedestrian overpass would provide benefits for pedestrian safety and security by improving grip (especially in inclement weather) and casual surveillance. Throw screens would also improve customer and rail safety by preventing objects falling or being thrown onto passing trains from above.

Resurfacing and re-grading the platforms and waiting room floor to maintain a consistent level would also assist in reducing trip hazards and ease in traversing the platform with a wheelchair or other mobility device. This would also enhance platform drainage, thus reducing the slip hazard and inconvenience caused by pooled water on the platform.

The proposed external footpath upgrades would also provide similar benefits through eliminating trip hazards as well as enhancing circulation by widening the paths where necessary, especially adjacent to kiss and ride/taxi facilities. All footpaths that form part of the Proposal must be a minimum of 1.2 metres wide in accordance with DSAPT and AS1428 although 1.5 metres is desirable.

4.3.2 Capacity assessment

A pedestrian capacity assessment has been performed to determine that the Proposal would provide sufficient capacity for pedestrian movement both before and after implementation of the proposed enhancements. This was done at the pedestrian overpass, which is the narrowest point through which pedestrians must travel to access the station. It is worth noting that it is not proposed to change the width - and therefore the pedestrian capacity - of the overpass in any way as part of the Proposal.

This assessment was undertaken in accordance with RailCorp's *Engineering Standard: Stations and Buildings - Station Design Standard Requirements: ESB 003 - Station Functional Spaces*, which mandates a minimum standard of Level of Service (LOS) C as determined by the Fruin Theory. This theory assesses capacity in terms of pedestrian throughput within a certain width, in this case pedestrians per metre per minute (pmm), and then classifies the results according to the categories specified in Table 7.

Table 7 Pedestrian level of service using the Fruin Theory

Level of Service	Pedestrian Flow Rate (pmm)
A	0-23
B	23-33
C	33-49
D	49-66
E	66-82

Table 8 summarises the results of the pedestrian capacity analysis. The pedestrian demand data collected by SLR was used as a baseline data set rather than the station patronage data as the TfNSW data does not account for pedestrians travelling over the rail line without travelling on trains.

To ensure a conservative assessment and account for future growth in pedestrian demand, the growth rate specified within the TfNSW patronage data was applied to the pedestrian survey data to estimate the ultimate 2036 design demand.

Table 8 Pedestrian capacity assessment results

Scenario	Peak Demand (peds/hr)	Design Demand (peds/15 min)	Design Demand (peds/min)	Pathway Width (m)	Pedestrian Flow Rate (pmm)	Level of Service
2017 before upgrade	73	18	1	2.5	0.4	A
2017 after upgrade						
2036 design (incl. additional 15%)	94	24	2		0.8	A

The Table 8 results suggest that the pedestrian overpass would operate well within the desired performance thresholds achieving a Level of Service (LOS) A at the 2036 design horizon.

4.4 Cyclists

The Proposal would retain the same number of bicycle parking spaces on the Platt Street frontage. Based on current station patronage and observed demand for existing parking, this supply is considered reasonable and can accommodate existing and any projected increase attributable to the Proposal. The expanded facility is shown adjacent to the shared path on Platt Street which forms part of the Route 6 cycle network.

4.5 Kiss and ride/taxi

The Proposal does not include the provision of any new capacity for kiss and ride/taxi facilities but rather seeks to formalise and enhance the existing facilities by improving line marking and signage and kerbs on the Railway Terrace frontage.

Given the very low existing demand observed at both facilities, the proposed improvements are not projected to bring about an increase in demand such that the current capacity is exceeded. The proposed enhancements would improve pedestrian loading/unloading from vehicles. It is recommended that the improved kiss and ride/taxi facility is sign posted as a No Parking zone such that it can be used by the general public, taxis and rideshare services.

The improved Railway Terrace facility would improve safety and amenity for motorists and loading/unloading passengers contingent on the proposed reconfiguration of kerbs and line marking being such that the design accords with AS2890.5 whereby kiss and ride/taxi spaces are at least 2.1 metre (minimum) and 2.3 metre (desirable) wide.

4.6 Parking

The Proposal includes the conversion of existing kerbside space on Platt Street north-west of the station to provide a new accessible parking space. The loss of 7.8 metres of existing general use parking kerb (i.e. 1-1.5 parking spaces) is not projected to be a significant impact given the availability of other parking locations that are located within reasonable walking distance.

The design of the new accessible parking space and the associated passenger loading areas should be refined in the detailed design stage and should accord with AS2890.6.

Resolution is required during the detailed design stage to ensure the new accessible parking space also does not impact either the existing bus stop or bicycle transition kerb ramp.

Although the station improvements may encourage additional passenger throughput and associated demand for car parking, this is expected to be relatively minor given the primary focus of the Proposal is improving accessibility for mobility impaired customers rather than increasing utilisation and passenger capacity.

4.7 Traffic impacts

Consistent with that noted above with respect to kiss and ride/taxi facilities and car parking, the Proposal is not projected to generate a material volume of additional traffic movements that would have an impact on the existing operational performance or capacity of the surrounding road network.

On the other hand, given the key attraction of the Proposal is for persons with a disability and mobility impairments, the elderly, as well as parents/carers with prams - i.e. those who are unlikely to travel to the station via active or public transport - any new demand generated by the Proposal is likely to manifest in additional traffic. This increase is expected to be relatively small in magnitude and is thus unlikely to result in a significant deterioration in local traffic conditions.

4.8 Property access

The Proposal is not expected to have any impact on existing property accesses within the vicinity of the station.

4.9 Safety

The Proposal is expected to improve pedestrian safety and mobility to/from and surrounding the station given the installation of widened paths and new lifts. The enhancement of existing kiss and ride/taxi facilities is also likely to improving safety by minimising conflicts between pedestrians and vehicles.

5 Construction impacts

5.1 Construction works

The key construction activities expected to occur as part of the upgrade of Waratah Station is expected to primarily consist of construction of the lift shafts and associated overpass extensions, replacement of overpass steps, handrails and balustrades, reinforcement of the overpass structure as well as the internal renovation of the station buildings and resurfacing of the platforms. Limited earthworks and excavation is also expected as part of the works, including that for the following:

- the foundations for the lifts (subject to ground conditions)
- excavation for the lift pits
- reinforced concrete footings for the reinforcement of trestle columns
- adjustment / diversion of existing underground services
- localised platform regrading / resurfacing work
- construction of upgraded footpath areas, entry plaza areas, and kerb realignment works
- other minor civil works including drainage/stormwater works, footings and foundations for light poles and other structures / infrastructure
- tree removal.

It is estimated that approximately 250 cubic metres of excavated material would be generated from the above activities. Excavated material would be re-used on site where possible or disposed of in accordance with relevant legislative requirements.

The source and quantity of materials would be determined during the detailed design phase. Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

As part of the aforementioned construction works, ancillary facilities would also be required to accommodate the needs of construction workers. A construction compound area has been proposed within the railway corridor off Platt Street (Figure 15) for the provision of a site office and amenities as well as for the laydown and storage of materials and plant. Other worksite areas would be established during the course of the construction period and would be staged to minimise inconvenience to the customers and adjacent public areas, and would include suitable demarcation hoarding or fencing, including for the following:

- worksite areas on the station platforms, ensure access to the station platform is available at all times when trains are running
- worksite area at the Platt Street station entrance for the proposed ramp and adjustment to existing stairs
- worksites in and around the existing footbridge, including:
 - for bridge repair works
 - for the lift construction at the junction of Railway Terrace and Hanbury Street
- worksites external to the rail corridor for utility protection, adjustments or diversions and power supply upgrade work
- worksites for interchange works within the adjacent road reserves.

The existing station interchange areas at the station entrance on Platt Street and Railway Terrace may be closed off from time to time to allow some of the above activities to take place but would only be for short durations.

5.2 Hours of works

The majority of works would be undertaken during standard construction hours, which are as follows:

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

Certain works may need to occur outside standard hours and would include night works and works during track possessions (which are scheduled closures that would occur regardless of the Proposal, when part of the rail network is temporarily closed and trains are not operating). A number of these track possession would take place on weekends as well as on weekdays, and for the Hunter Line range typically from 48 to 96 hours in duration.

Out of hours works are required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers, and to ensure the safety of railway workers and operational assets. It is estimated that no less than 5 to 7 track possessions would be required to facilitate activities including the following:

- surveying in the corridor
- GPR and potholing / non-destructive digging to confirm u/g services location
- condition assessments / inspect pits, etc
- drilling for geotechnical boreholes and other site investigation in the rail corridor
- install platform / site demarcation fencing and hoardings
- install temporary concrete pump line
- tree removal / veg trimming
- services protection / relocation works in the rail corridor
- repairs / strengthening / patch painting of existing footbridge / stairs
- install lift shafts and upper lift landing to Platform 1
- install elevated walkway cantilever beams, stringers and precast deck slabs
- install elevated walkway protection screens and external finishes
- replace stair treads and hand railing (platform stairs)
- construct foundations / retaining structure for local platform widening
- platform re-grading/resurfacing, TGSI and hearing induction loops
- platform finishing works (reinstatement / resurfacing, etc)
- cutover / commission digital PA / hearing induction loops
- test / commission CCTV cameras / station systems installation

- test / commission new lifts / open to public.

Out of hours works may also be scheduled outside possession periods for activities such as:

- delivery of oversized loads to the site such as construction plant and portable construction compound buildings, lift shaft components, steel beams, and precast deck elements
- construction activities involving crane setups on Railway Terrace such as lift shaft construction at Railway Terrace / Hanbury Street junction.
- works to upgrade the existing footbridge (e.g. replace stair treads and hand railing for the street access stairways)
- interchange works that may impact on traffic flow if lane closures are required.

5.3 Construction timing

Subject to approval, construction is expected to commence in early 2019 and take around 18 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with TfNSW.

The proposed construction activities for the Proposal are identified in Table 9. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

Table 9 Indicative construction staging for key activities

Stage	Activities
Site Investigations (Pre-detailed design)	<ul style="list-style-type: none">• Surveying• GPR and potholing / non-destructive digging to confirm u/g services location• Condition assessments / inspect pits, etc• Geotech boreholes and other site investigation
Site Establishment & Enabling Works	<ul style="list-style-type: none">• Site establishment – install site sheds / amenities and services connection and demarcation fencing• Remove billboards / adjust fencing• Modifications to noise wall and install temporary (Railway Terrace side)• Install platform / site demarcation fencing and hoardings• Install temporary concrete pump line• Tree removal / veg trimming• Services protection / relocation (incl. signalling in GST)• Services diversion / relocation works including in platforms (if required)

Stage	Activities
Footbridge, Stairs, Lifts & Ramps	<ul style="list-style-type: none"> • Repairs / strengthening / patch painting of existing footbridge / stairs • Install lift shafts and upper lift landing to Platform 1 • Install elevated walkway cantilever beams, stringers and precast deck slabs (with temporary balustrades) • Install elevated walkway protection screens and external finishes • Replace stair treads and hand railing (platform stairs) • Construct lift pits / foundations / lift bases (behind hoardings) • Install lift shafts and upper lift landings (lifts to streets) • Construct new ramp to Platform 2 and modifications to stairs • Install services containment to elevated walkway • Install lift shaft services, lift cars and fitout lift cars • Replace stair treads and hand railing in night works (street access stairs) • Install lighting / CCTV / PA services to elevated walkway and lift landings • Replace stair treads and hand railing in night works (street access stairs)
Building & Platform Works	<ul style="list-style-type: none"> • Construct foundations / retaining structure for local platform widening • Platform re-grading/resurfacing, TGSI and hearing loops • Platform finishing works (reinstatement / resurfacing, line marking etc) • Install select fill material / concrete for local platform widening • Construct combined services route for power /comms to new station services equipment room / switch room • Building works and services for new FAT, ambulant toilet and waiting room • Construct new station services equipment room / switch room • Building services / fitout for new FAT, ambulant toilet and waiting room • Building services / fitout and equipment installation for new station services equipment room / switch room • Make good existing station building following removal of comms equipment / racks.
Interchange Works, Finalisation, & Site demobilisation	<ul style="list-style-type: none"> • Test /commission new station power supply • Interchange works including civil/lighting (as required) • Finishing works including landscaping, fencing • Site demobilisation • Cutover / commission digital PA / hearing induction loops • Test / commission CCTV cameras / station systems installation • Test / commission new lifts / open to public

5.4 Construction compound access

At this time, TfNSW has identified two possible construction compound access/egress locations noted as #1 and #2 on Figure 15.

- Location 1 is an existing vehicle crossover approximately 130 metres north of Station Street
- Location 2 does not currently exist.

Waratah Station is surrounding by a well-established road network, including a state road (Route B63) which fronts the station to the north and south. At this time, the composition of the construction vehicle fleet is not known although its likely to constitute 19 metre articulated trucks and smaller rigid trucks.

A swept path assessment was conducted using AutoTURN and adopted two design vehicles being:

- 19 metre articulated truck
- 12.5m rigid truck.

The findings of the assessments indicate that the access location (1 or 2) will prescribe which route trucks can use in travelling to/from the construction compound. The future CTMP should consider these routes and constraints in resolving detail regarding access and traffic control measures.

Table 10 Construction compound travel paths

Construction compound access location	Travel Direction	19 metre Articulated Vehicle	12.5 metre Rigid Vehicle
[1] Platt Street North	North	Travel is possible to/from the north via Railway Tce without modification to existing road network	
	South	Entry/exit is not possible from either Station St or Platt St without modifications to existing intersection infrastructure	Entry is possible via Station St Exit is possible via Turton St
[2] Platt/Station Street intersection	North	Entry from north is not possible Exit is possible via Railway Tce	Entry from north is not possible Exit is possible via Railway Tce
	South	Entry is possible from Station St Exit to south is not possible	Entry from south is possible from Station St Exit to south is not possible

Basemap source: Google, 2018

Figure 15 Indicative site compound location

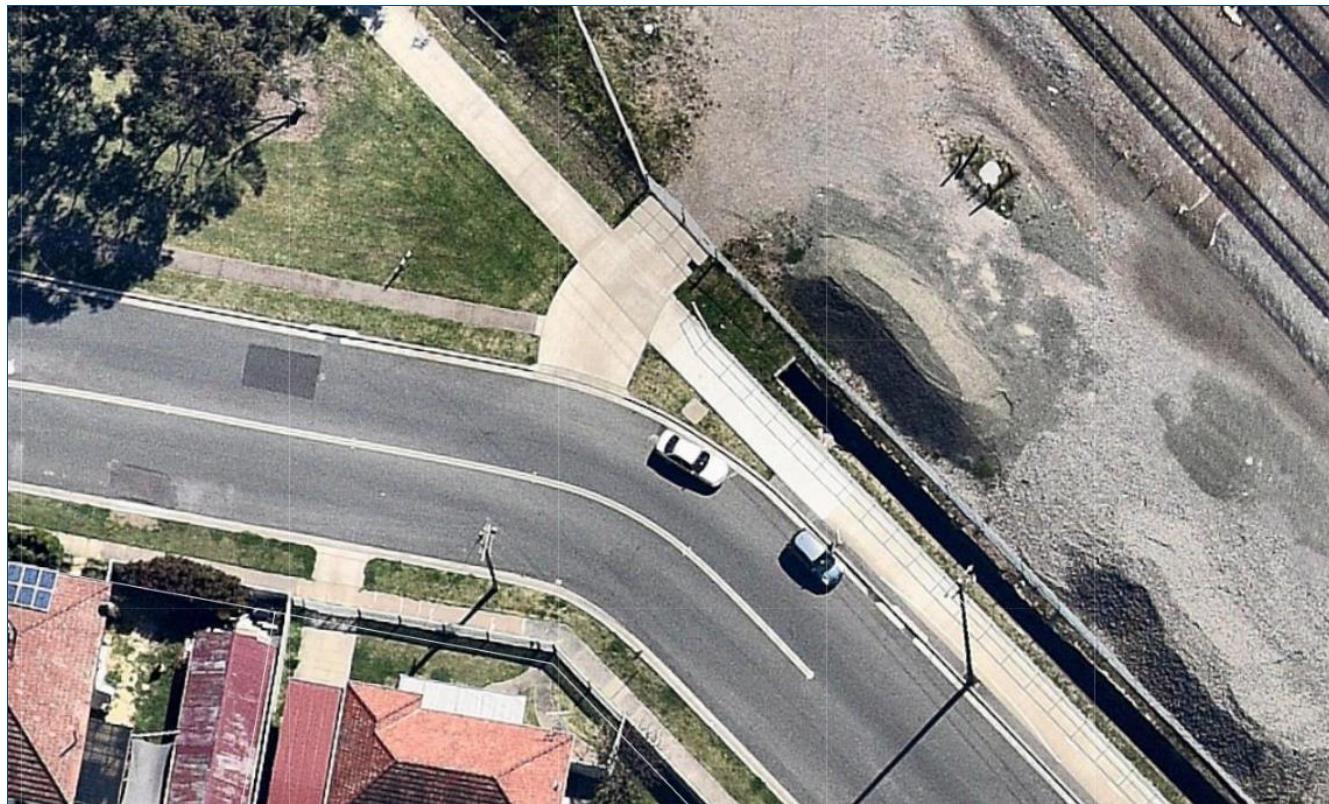


Source: TfNSW, 2018

5.4.1 Construction compound access location 1

This is an existing vehicle crossover to the area proposed for the construction compound shown in Figure 16. This location would require trucks to travel approximately 130 metres along Platt Street. The impact of construction traffic on residents and other users is projected to be manageable given that most work is expected to be conducted during standard working hours and the site is expected to generate no more than 25 light vehicles and 15 heavy vehicles per day.

Figure 16 Construction compound location 1



The swept path assessment indicates the existing crossover would have to be widened to accommodate the articulated design vehicle. Construction traffic would have to turn across the shared pedestrian/cycle path although sight lines are reasonable. Solutions to control for conflict risks should form part of the CTMP to be resolved during the construction planning process. No material impact with station users is anticipated given the separation to the station.

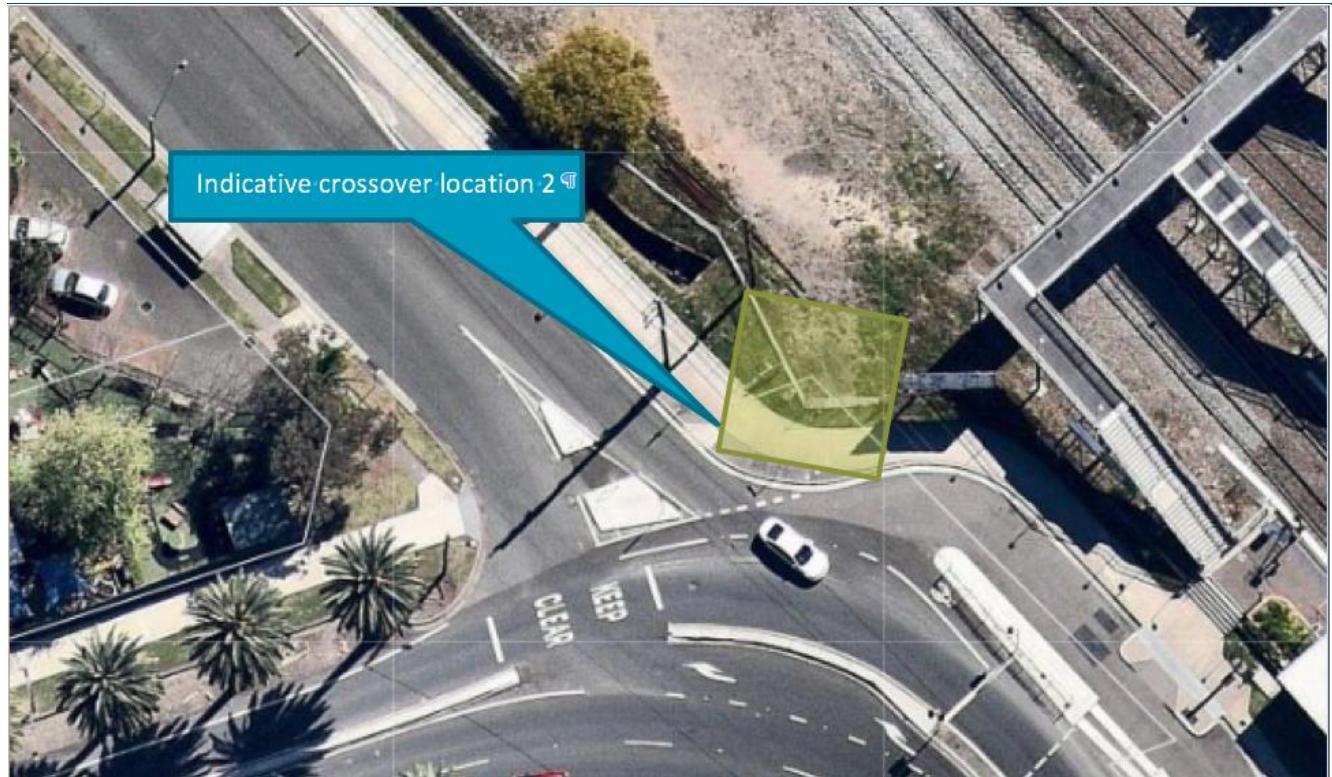
Existing double-line marking in Platt Street opposite the crossover would have to be removed to legally permit right turn movements to/from the compound. Sight lines to/from this location are considered reasonable.

Confirmation will also be required regarding the structural capacity of this existing crossover to ensure that it can accommodate construction traffic loadings.

5.4.2 Construction compound access location 2

Location 2 would require the construction of a new vehicle crossover in the region between the Platt Street, Station Street, and kiss and ride intersections – Figure 17.

Figure 17 Construction compound location 2



v
Given the proximity of this location to other existing intersection conflicts and station facilities, it recommended that it only facilitate left in/left out movements.

The swept path assessment indicates the new crossover could be formed within existing constraints including utility poles and the pedestrian overbridge structure although exiting advertising billboards would have to be removed.

Location 2 would require construction traffic to turn across the shared pedestrian/cycle path where sight lines are constrained given the curved path alignment. The CTMP should consider this issue as it will likely require a more detailed and active control measure to mitigate risks.

Impacts on station users including those using the kiss and ride facility and those transiting to/from the nearby Platt Street bus stop will be impacted. Again, the CTMP should address these risks when more detailed information pertaining to the compound and construction traffic movements is known.

Confirmation will also be required regarding the structural capacity of this possible crossover over the drainage culvert to ensure that it can accommodate construction traffic loadings.

5.5 Active transport impacts

The following impacts to pedestrians, cyclists and station customers are anticipated to arise from construction activities associated with the Proposal:

- closure or reduction in size of shared path along the Platt Street frontage of the station may require users to dismount and potentially deviate around construction works associated with the pedestrian overpass and Platform 2
- increased safety risk due to the interaction of cyclists, pedestrians and construction vehicles at the proposed site compound access/s on Platt Street (see Sections 5.4.1 and 5.4.2)
- uneven surfaces and detours required during footpath upgrade and platform resurfacing works
- increased platform congestion due to localised platform closures and dedications during the resurfacing and regrading of the platform surfaces
- potential confusion and loss of amenity for customers due to the temporary relocation of station accesses and facilities
- detours required for potential footpath closures on Hanbury Street due to works associated with the pedestrian overpass and nearby kiss and ride/taxi facilities.

These impacts are deemed to be manageable subject to the preparation and implementation of a CTMP and TCPs by a suitably qualified Contractor outlining how safety issues and other impacts may be mitigated.

5.6 Public transport impacts

Train services would be affected during track possessions although these are not specific to this project and would occur regardless and accordingly are not impacts arising from the Proposal. Buses would replace trains during rail possession periods. Accordingly, any construction activities occurring during possessions must consider additional buses and users. This should be addressed as part of the CTMP and TCPs.

Beyond track possession periods, the Proposal's impact on public transport services is expected to be minor, as summarised below:

- increased safety risk due to the interaction of bus users at the proposed site compound access/s on Platt Street (see Sections 5.4.1 and 5.4.2)
- temporary lowering of speed limits for work safety along Platt Street, Railway Terrace and Hanbury Street may slightly increase travel times for bus services travelling along the site frontages
- bus services may also be delayed due to the interaction with construction vehicles entering and exiting the site compound on Platt Street
- seating at the surrounding bus stops is likely to be temporarily unavailable as the seating is replaced.

5.7 Traffic impacts

Traffic generated by construction activities includes construction worker light vehicles (including utility vans), as well as heavy vehicles for periodic delivery and removal of materials, and construction plant and equipment. Vehicle types and sizes would vary depending on the required use, but typically include medium and large rigid vehicles and articulated vehicles for import of bulk materials or spoil removal as well as for the transportation of plant and equipment.

The amount of fill material or spoil/demolition spoil would be minor due to the limited extent of excavation required for the Proposal. Specific oversize vehicles may be required for prefabricated / precast elements such as lift shaft structure components, and steel beams and precast concrete deck slabs for the elevated walkway access to Platform 1 lift. In such cases, specific permits would be required, and advance route planning would need to be undertaken in order to ensure that a suitable route with sufficient geometric capacity to accommodate these vehicles is chosen.

The traffic generated as a part of the construction works is not expected to exceed 25 light vehicles and 15 heavy vehicles per day during peak construction periods. Given the traffic demands observed on the adjacent road segments, this construction demand is unlikely to cause any significant impact to traffic flow or operational performance.

5.8 Parking impacts

The temporary construction compound is proposed to be located to the northwest of the station on vacant land within the existing rail corridor, and would house a site office, amenities as well as a laydown and storage area for materials and plant. Access to the compound is being investigated via two possible locations. Should location 1 be progressed, the existing crossover will need to be widened and it is likely that there will be a temporary loss approximately two to four on-street parking spaces.

Whilst this number of spaces lost represents a material proportion of the existing Platt Street supply, it is considered that there is sufficient spare capacity available in the surrounding streets within a reasonable walking distance to the station.

No parking loss is projected with construction access location 2.

It is recommended that the design of the construction compound includes facilities for worker parking although the impact of construction workers using public on-street parking could be further reduced by encouraging workers to travel to and from the site via active or public transport modes or through carpooling with colleagues. This would then maintain convenience for station customers by not impeding their access to the most convenient parking facilities.

5.9 Kiss and ride/taxi impacts

Construction of the Proposal is expected to have only a minor impact on the operation and capacity of the kiss and ride/taxi facilities on either side of the station. This is likely to be limited to closure of these facilities during the proposed line marking works, which may be completed within a relatively short timeframe.

It is also understood that TfNSW plans to utilise the Railway Terrace kiss and ride/taxi facility as a staging area for cranes when required 15. Seeing as the crane would likely only be deployed for use for major lifting activities - which would require a track possession and thus would be expected to occur outside of peak travel periods - the closure of this facility would only be required on an occasional basis.

Furthermore, given the lack of demand observed at these facilities, it is concluded that any closure or other restrictions required within the two kiss and ride/taxi facilities is unlikely to have any impact on passenger throughput or traffic conditions on the adjacent road network.

5.10 Property access impacts

Property accesses are to be maintained and unaffected by construction works where possible, however temporary obstruction of accesses may be possible during activities such as the loading and unloading of oversize materials and plant. Should this be necessary all affected properties are to be notified in advance of disruptions.

5.11 Construction impact mitigation

To assist in minimising and mitigating any construction impacts on the operation of the surrounding active, public and vehicular transport networks, a CMP would be required for submission to RMS and/or the City of Newcastle in preparation for the proposed works. Preparation and submission of a CMP should be the responsibility of the nominated Contractor for each phase of construction, and should specify the following at a minimum:

- construction approach and staging
- additional traffic demands associated with the construction works
- parking strategy for workers, heavy vehicles and plant
- construction vehicle travel routes, including details of any road closures and alternative routes
- design and location of the site compound ingress and egress location/s
- temporary relocation of existing facilities such as crossings, parking or kiss and ride/taxi zones, including associated signage.

This plan would also incorporate additional detail on specific mitigation measures within a Traffic Control Plan (TCP) with the aim of not compromising the safety or amenity of the road network during construction. To achieve this, a TCP would include details of the following:

- signage to inform motorists and users of the surrounding active and public transport infrastructure of temporary changes to accommodate construction activity, including any static and variable signage and line marking to be installed in advance of and within the construction area to provide warning of any changes in conditions
- specific traffic measures required during the works, including lane and path closures, diversions, speed limit and other regulatory changes, temporary stoppage of traffic as well as other traffic control measures.

The construction planning should also include advance communication to the surrounding community regarding upcoming disruptions to traffic, transport and/or access arrangements as well as significant vehicle and plant movements. Works and disruptions should also be timed to occur outside of peak travel periods wherever possible in order to reduce any adverse traffic, transport or access impacts.

6 Summary, conclusions and recommendations

The relatively minor scope of the Proposal is not anticipated to result in any material operational impacts. The Proposal would improve pedestrian connectivity and amenity, for all users including persons who experience mobility impairments.

- Enhanced kiss and ride/taxi facility on Railway Terrace would provide an improved amenity for customers travelling to/from the station as a vehicle passenger
- new accessible ramp at the Platt Street entrance would improve user accessibility and amenity by providing an alternative that doesn't require travel via stairs
- new accessible parking space on Platt Street would provide proximate opportunity for persons with a disability to park near the new lift
- new lifts would improve user accessibility and amenity by providing an alternative to stairs to all platforms and also for travel across the rail line that is not related to rail travel
- upgraded footpaths (quality and width) would improve accessibility and amenity for persons accessing the station and transferring to either nearby bus services or new accessible parking.

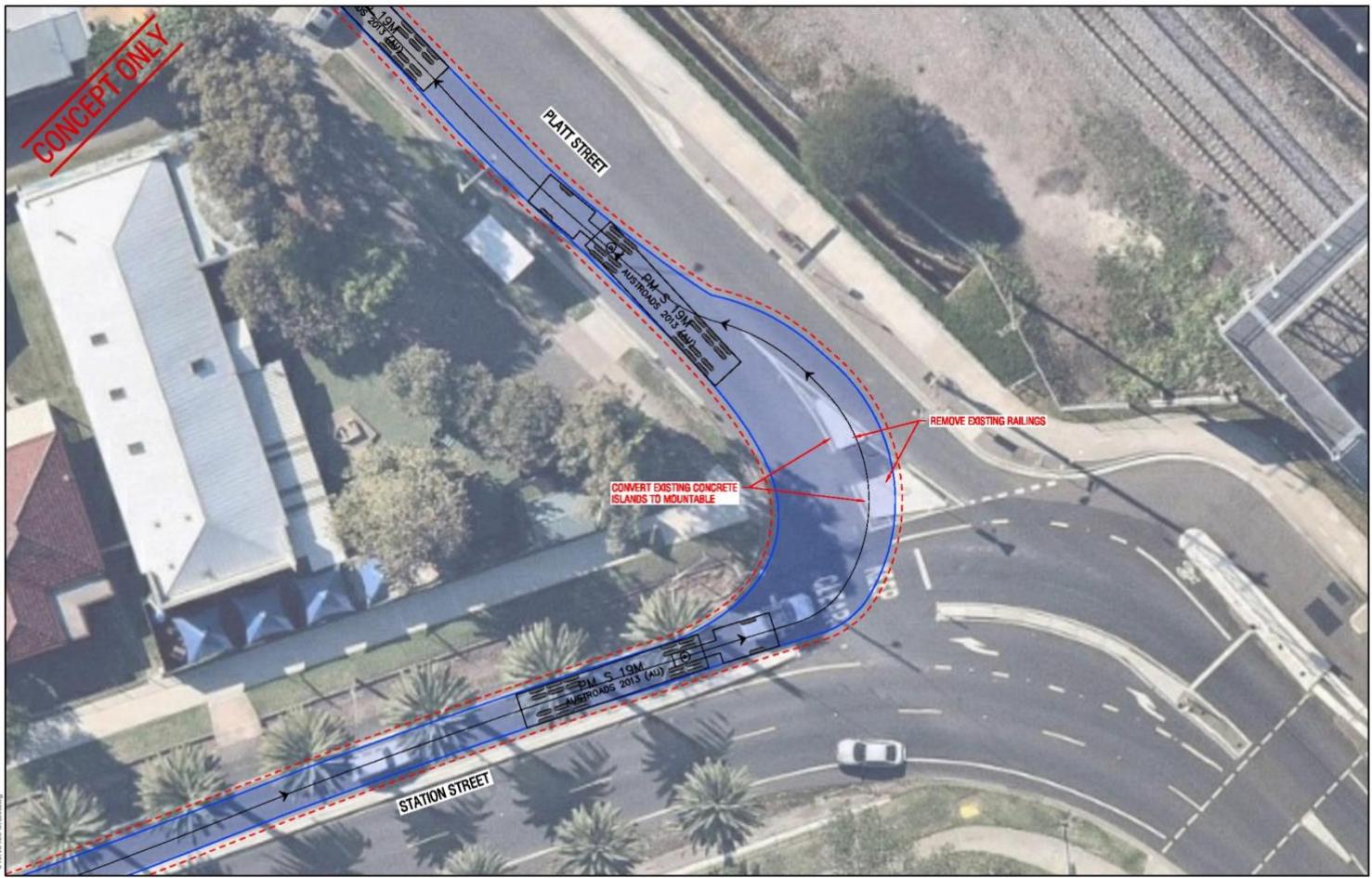
The following key construction-stage impacts are likely to be generated:

- increased construction vehicle traffic including light and heavy vehicles within the station precinct and along local streets, most notably Platt Street between Station Street and Turon Road
- conflict with pedestrians and cyclists travelling along the shared pathway situated within the northern Platt Street verge
- temporary loss of two to four existing untimed on-street car parking spaces along the eastern side of Platt Street so as to facilitate a new driveway crossover to the planned construction compound
- increased demand for all-day parking for construction staff assuming the planned construction compound cannot provide sufficient staff parking
- potential confusion and loss of amenity to customers accessing the station via temporary and changed facilities during construction
- minor travel delays on account of likely TCP implementation requiring some users to stop for construction traffic.

It is recommended that a Construction Traffic Management Plan be prepared during detailed design prior to construction.

APPENDIX A

Vehicle Swept Path Plans



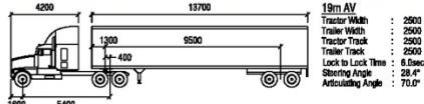
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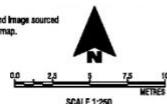
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- VEHICLE BODY
- VEHICLE PATH
- - - VEHICLE CLEARANCE (500mm)
- VEHICLE

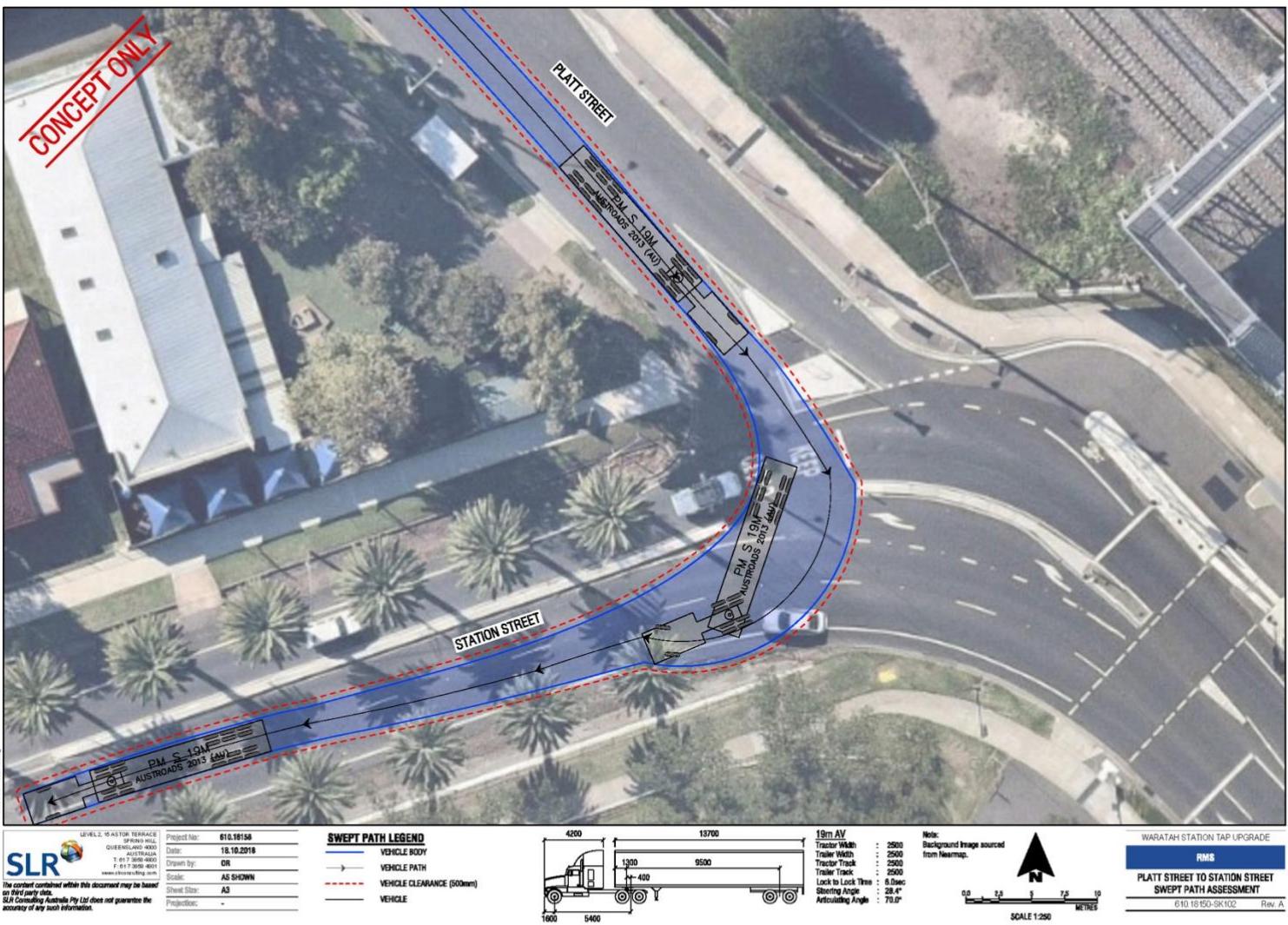


19m AV
Tractor Width: 2500
Trailer Width: 2500
Tractor Track: 2500
Trailer Track: 2500
Lorry to Lock Turn Radius: 28.4°
Steering Angle: 70.0°

Note: Background image sourced from Nearmap.



WARATAH STATION TAP UPGRADE
RMS
STATION STREET TO PLATT STREET
SWEEP PATH ASSESSMENT
610.18158-SK101 Rev A



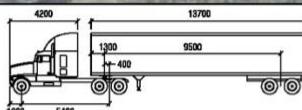
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SWEEP PATH LEGEND

- VEHICLE BODY
- VEHICLE PATH
- - - VEHICLE CLEARANCE (500mm)
- VEHICLE



19m AV

Tractor Width	:	2500
Trailer Width	:	2500
Trailer Track	:	2500
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Steering Angle	:	28.4°
Articulating Angle	:	70.0°

Note:
Background Image sourced
from Nearmap.



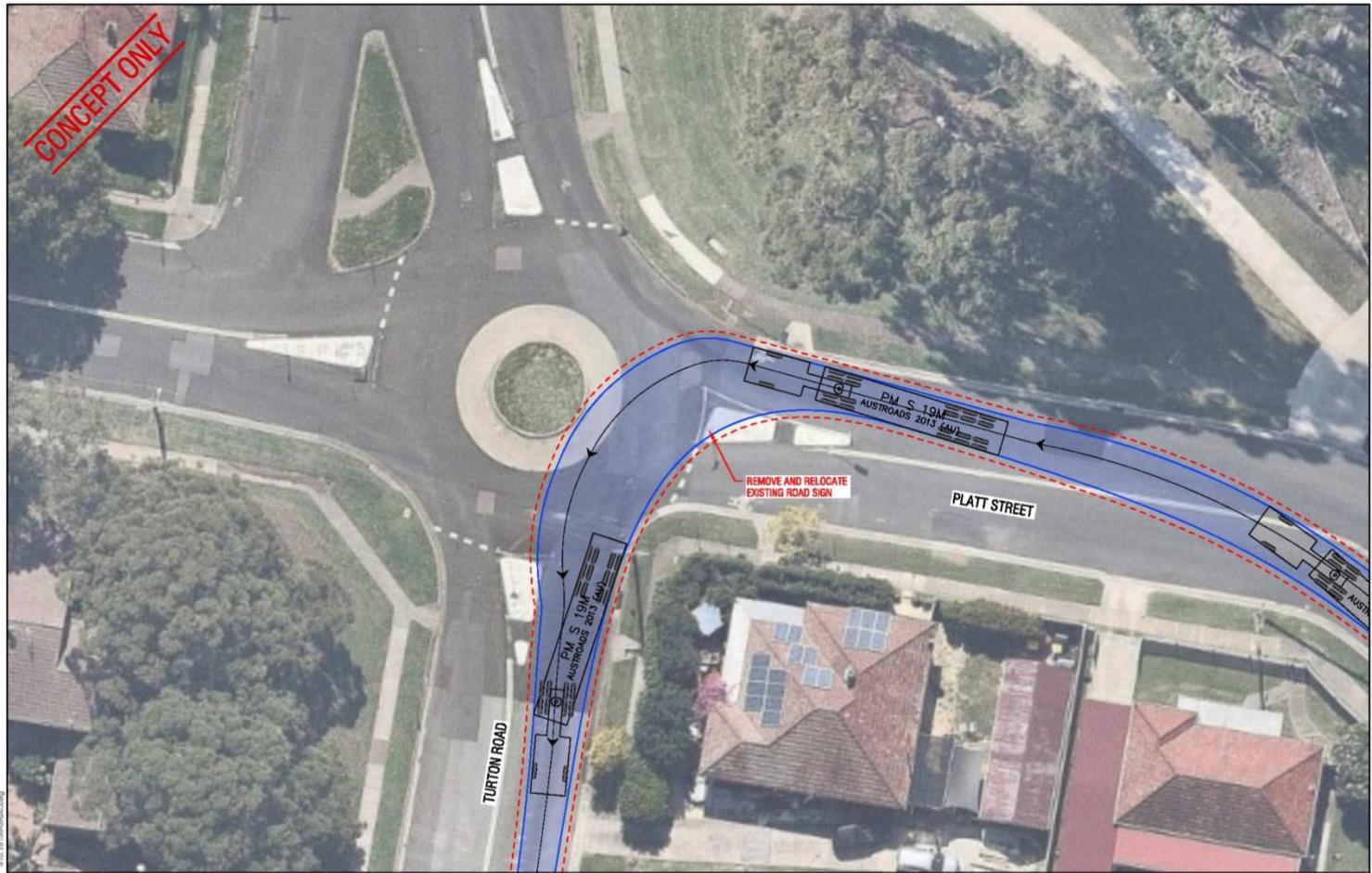
WARRATAH STATION TAP UPGRADE

RMS

PLATT STREET TO STATION STREET

SWEPT PATH ASSESSMENT

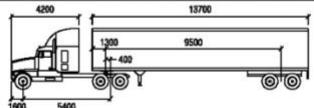
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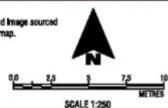
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SWEEP PATH LEGEND
 — VEHICLE BODY
 — VEHICLE PATH
 - - - VEHICLE CLEARANCE (500mm)
 — VEHICLE

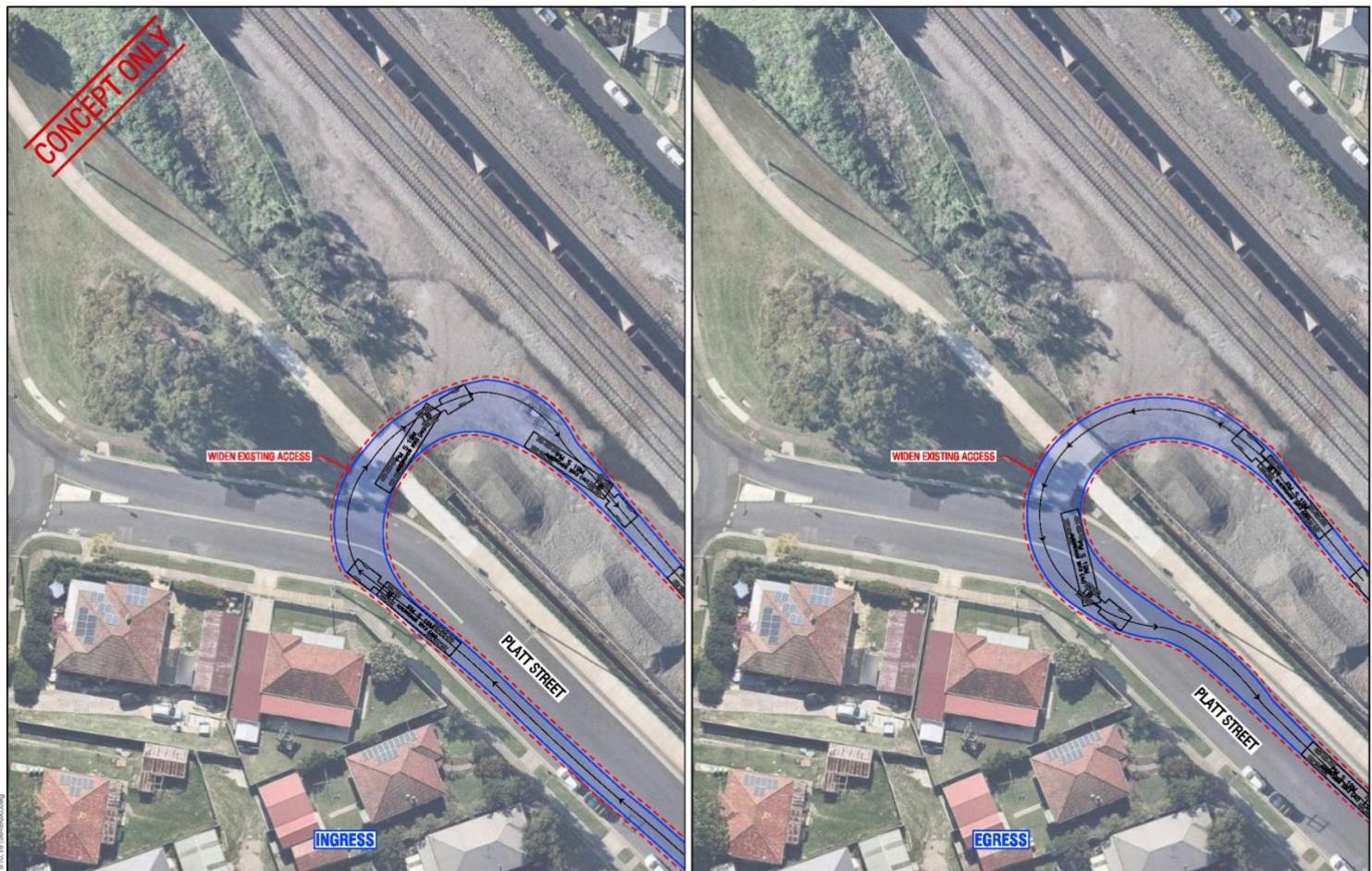


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 Tractor Width: 2500
 Tractor Length: 2500
 Tractor Track: 2500
 Trailer Track: 2500
 Lock to Lock Time: 6.0sec
 Steering Angle: 28°
 Articulating Angle: 70.0°

Note:
Background Image sourced
from Neimap.



WARATAH STATION TAP UPGRADE
RMS
PLATT STREET TO TURTON ROAD
SWEEP PATH ASSESSMENT
610.18158-SK103 Rev. A

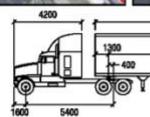


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SWEPT PATH LEGEND

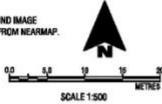
- VEHICLE BODY
- VEHICLE PATH
- VEHICLE CLEARANCE (500mm)
- VEHICLE



19m AV

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Trailer Length	: 2500
Lock to Lock Time	: 0.0sec
Steering Angle	: 28.4°
Articulating Angle	: 70.0°

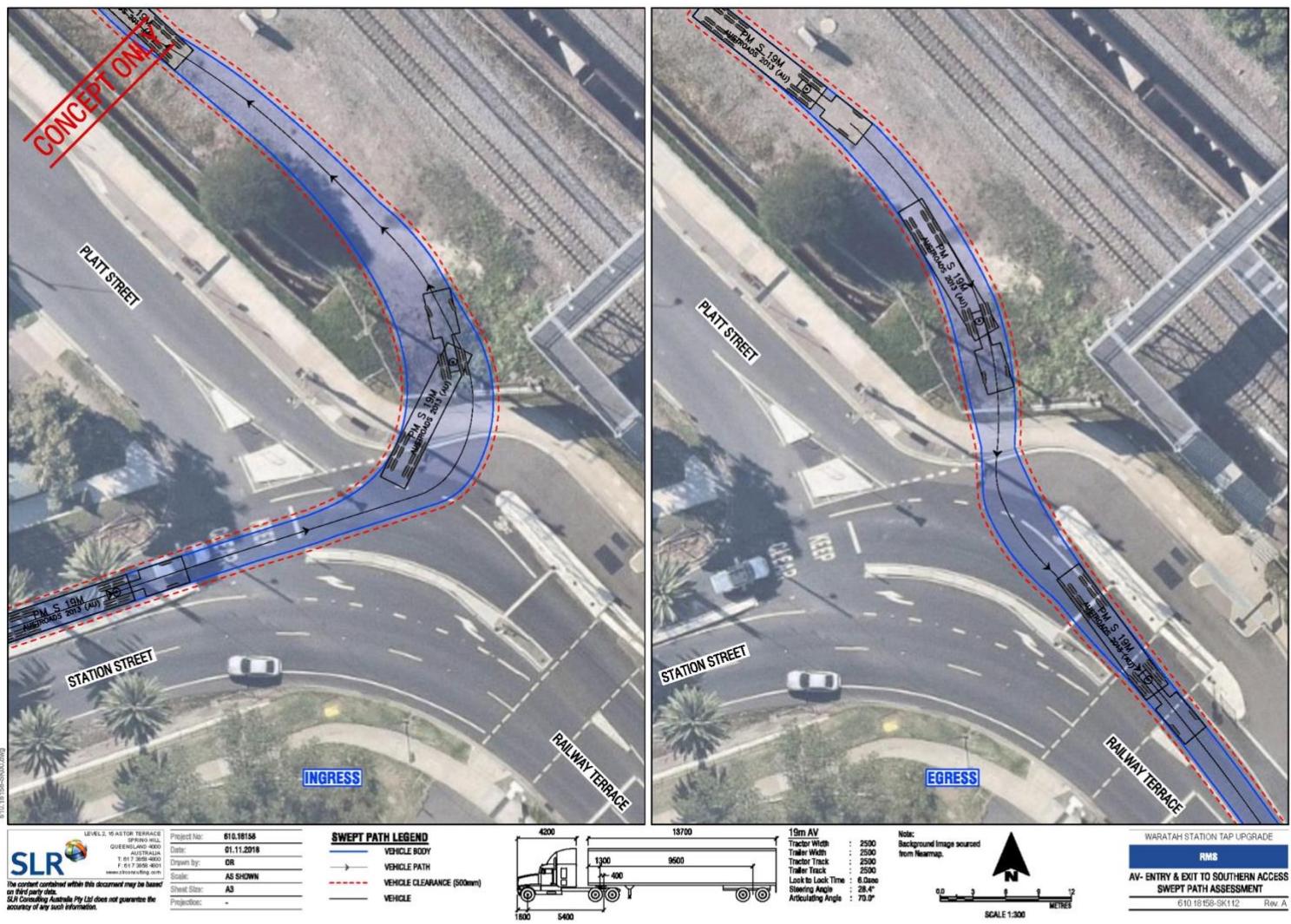
NOTE:
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SOURCED FROM NEARMAP.



WARATAH STATION TAP UPGRADE

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AV - EXISTING ACCESS
SWEPT PATH ASSESSMENT
610.18158-SK105 Rev A

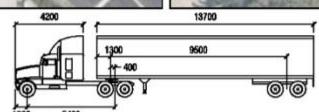
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SWEEP PATH LEGEND
 — Vehicle Body
 → Vehicle Path
 - - - Vehicle Clearance (500mm)
 — Vehicle



19m AV
 Tractor Width : 2500
 Tractor Length : 2500
 Tractor Track : 2500
 Tractor Track : 2500
 Lott to Lock Time : 6.0sec
 Steering Angle : 28.4°
 Articulating Angle : 73.0°

Note:
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WARATAH STATION TAP UPGRADE
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AV- ENTRY & EXIT TO SOUTHERN ACCESS
SWEPT PATH ASSESSMENT
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