



# Penrith Commuter Car Park Project Traffic, Transport and Access Impact Assessment

**Client //** Transport for New South Wales  
**Office //** NSW  
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# Penrith Commuter Car Park Project

## Traffic, Transport and Access Impact Assessment

Issue: A 01/06/16

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### Quality Record

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## Abbreviations

Term	Meaning
CEMP	Construction Environmental Management Plan
Council	Penrith City Council
CTMP	Construction Traffic Management Plan
EPA	Environment Protection Authority
EPL	Environment Protection Licence
HV	Heavy vehicles
I & S	Infrastructure and Services, a division of Transport for NSW (formerly Transport Projects Division)
km	kilometres
LGA	Local Government Area
m	metres
min	minutes
mm	millimetres
NSW	State of New South Wales
OOHW	Out of Hours Works
PCC	Penrith City Council
REF	Review of Environmental Factors
RMS	Roads and Maritime Services
Roads Act	<i>Roads Act 1993</i>
TAP	Transport Access Program – an initiative of Transport for NSW to provide a better experience for transport customers by delivering accessible, modern, secure and integrated transport infrastructure.
TCP	Traffic Control Plan
TfNSW	Transport for New South Wales
TMC	Transport Management Centre
TT&AIA	Traffic, Transport and Access Impact Assessment (this report)

# Executive Summary

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## Background

Transport for New South Wales (TfNSW) is proposing to upgrade the existing car park located to the north of Penrith Station along Combewood Avenue, by way of extending the structure to incorporate the adjoining at-grade car park. Both existing car parks (multi-storey and at-grade) are currently utilised as commuter car parking, with direct pedestrian connections to the Penrith Railway Station across Combewood Avenue.

The proposed upgrade is part of the Transport Access Program (TAP), which is a NSW Government initiative involving transport facility upgrades throughout NSW.

The main objective of TAP is to provide better access to, within and around public transport interchanges, railway stations and surrounding station precincts, along with improvements in station amenities and general customer facilities.

Penrith Station, located in Western Sydney, has also been earmarked for a station upgrade to improve the customer experience and accessibility, including modal interchange facilities. A separate but related assessment for the proposed station upgrade, encompassing the station and the associated transport interchange facilities to the south has been previously exhibited. These documents can be accessed via the TfNSW [website](#).

## Proposed Upgrade

The proposed upgrade works include the following indicative key scope items:

The Proposal would include:

- extension of the existing multi-storey commuter car park to the north-west. The extended car park would comprise one ground level, one middle level and one roof parking level and would include the following features:
  - two sets of stairs on the northern and southern sides of the extended car park to cater for the additional pedestrian demand. The new stairs would match existing stairs in fabric and materials
  - provision of approximately 350 additional car parking spaces
  - installation of new cladding around the car park to match the existing cladding
  - would utilise existing ramps
  - would have 50 percent or greater natural ventilation
- integration works on the existing multi-storey car park including:
  - installation of a new lift (with a capacity for 17 passengers) and lift shaft adjacent to the existing lift in the south-eastern corner of the existing multi-storey car park to cater for the additional pedestrian
  - removal of existing cladding and upstand on the western façade of the existing building to integrate the new car park
  - conversion of approximately 12 commuter car parking spaces to accessible car parking spaces at the ground level of the existing car park
- existing vehicular exit and entrance would be retained.
- site access would include minor kerb and gutter adjustments

- provision of an accessible path between the car park and Penrith Station
- ancillary works including utility adjustments, provision of lighting, extension of CCTV coverage, line marking, improved wayfinding signage, minor road works and provision of landscaping.

Overall, the upgrade will increase the available car parking spaces at the car park from the current 712 spaces to approximately 1,060 spaces, or approximately 350 additional parking spaces.

Access to and egress from the proposed upgraded car park would be the same as the existing access arrangements (i.e. retaining all vehicle flow arrangements), with no additional access locations proposed.

## Existing Conditions

The existing commuter car park currently has capacity for 712 parking spaces. During regular weekdays, the car park is fully utilised, with excess parking demand spilling over to adjoining streets. It has been observed that a number of customers also park illegally within the existing parking structure, occupying driveways and aisles.

Some streets within the Thornton residential development have been signposted with 4-hour parking limits, presumably to discourage all-day parking by commuters using the railway station.

## Impacts during Operation

The proposed upgrade will increase the existing car park capacity by 50 per cent, which would contribute to the availability of all-day parking to the north of the station, and mitigate excess parking demand spilling over to nearby streets, at least in the short and medium term. The additional capacity will also contribute towards making public transport become a more attractive transport option, in-line with the objectives of the NSW Long-Term Transport Master Plan.

During its operation, it is estimated that approximately 321 additional vehicles will enter the expanded car park in the AM peak hour and 178 additional vehicles will exit the site during the PM peak hour.

The proposed parking layout is consistent with the dimensional requirements as set out in the Australian/New Zealand Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009).

Overall, the additional car parking proposed is not expected to have a significant impact on the operation of the surrounding road network.

## Impacts during Construction

Construction works would result in the temporary loss of approximately 230 commuter car parking spaces due to the complete closure of the at-grade car park and works required within the multi-storey car park.

Construction traffic expected to be generated by the proposal is about 20 heavy vehicle and 120 light vehicle movements for each working day. Construction vehicles would use designated approach and departure routes, with appropriate measures to maintain safety for all users at all times, especially at the site accesses, within the site and through local areas. Construction traffic generation is expected to be limited and have a negligible impact on existing traffic conditions.

It is anticipated that the primary construction activity would occur via Combewood Avenue and Thornton Drive linking with Coreen Avenue and with Castlereagh Road, in-turn linking with Mulgoa Road or The Northern Road (Parker Street) to the M4 Western Motorway or the Great Western Highway to access the wider arterial road network.

The following impacts to pedestrians/ transport customers are anticipated as a result of construction activities:

- likely longer walk distances for pedestrians between the car park and the station entry as a result having to avoid construction areas
- decrease in available car parking supply, as a result of the at-grade car park being closed off to make way for the new structure
- increased demand for car parking generated by construction staff
- higher road safety risk levels associated with construction vehicle and pedestrian interaction.

These impacts are considered to be manageable, with a Construction Environmental Management Plan to be prepared by the contractor outlining how the potential hazards relating to pedestrian and vehicle access would be addressed.

Notwithstanding the likely limited impacts of construction on the operation of the surrounding transport network, a Construction Traffic Management Plan and Traffic Control Plans (TCPs) would likely need to be prepared and submitted to the RMS/ TMC and/or Penrith City Council's Traffic Committee, to appropriately manage the use of the designated construction routes and site interfaces. On-street parking impacts as a result of localised construction activities would need to be appropriately managed, given the high demand for existing parking by rail users accessing Penrith Station.

# 1. Introduction

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## 1.1 Background

Transport for New South Wales (TfNSW), through the Infrastructure and Services Division (I&S), is proposing to upgrade Penrith Station, including transport interchange facilities in the station precinct, as part of the Transport Access Program (TAP), which is a NSW Government initiative involving a number of public transport facility upgrades throughout NSW.

The main objective of the TAP is to provide better access to, within and around public transport interchanges, railway stations and surrounding station precincts, along with improvements in station amenities and general customer facilities. This would assist in ensuring an enhanced experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

The planning and delivery of transport infrastructure as part of TAP would focus on the following:

- upgrading existing railway stations to improve access, particularly for those with a disability, the elderly and parents with prams
- providing modern buildings and facilities for all modes that meet the needs of a growing population
- providing transport interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- improving safety and security measures, such as extra lighting, help points, fences and other security features
- improving signage and wayfinding.

The TAP has funding to deliver a series of projects ranging from small works such as ramp and access upgrades, through to larger projects including new stations, whole of station upgrades, transport interchanges and multi-deck commuter car parks.

The proposed Penrith Station Upgrade covers improvements to the station, the associated transport interchange facilities to the south and expanding the commuter car park to the north. Transport for NSW engaged GTA Consultants to prepare a Traffic, Transport and Access Impact Assessment (TT&AIA) for the proposed Penrith Commuter Car Park (the 'Proposal') to the north of the railway corridor, to inform the preparation of a Review of Environmental Factors (REF).

A separate assessment has already been undertaken for the station and southern interchange components of the upgrade. The documents relating to this can be accessed via the [TfNSW website](#).

## 1.2 Program Objectives

The overall objectives of the TAP include:

- modern interchanges that support an integrated network and allow seamless transfers between all modes for all customers
- modern buildings and facilities for all modes that meet the needs of a growing population
- stations that are accessible to the disabled, ageing and parents with prams
- 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
- other improvements and maintenance such as painting, new fencing and roof replacements.

### 1.3 Scope

This report sets out an assessment of the anticipated traffic, transport and access implications of the proposed multi-storey car park development, including consideration of the following:

- existing traffic and transport conditions and facilities in the vicinity of the site
- future traffic generated by the proposed commuter car park
- vehicular access strategies associated with the facility
- potential mitigation measures required as a result of the impacts, both during the construction of the Proposal and during its operation.

It is noted that transport, traffic and access impacts associated with the proposed upgrade of Penrith Station, including construction of a new pedestrian footbridge, stairs, new paid concourse accessible from the pedestrian footbridge with relocated ticket gates, replacement lifts, reconfiguration of the southern transport interchange and other ancillary works have been assessed in the *Penrith Station Upgrade – Traffic, Transport and Access Impact Assessment*<sup>1</sup> (GTA Consultants, October 2015).

The scope of this report is limited to the traffic, transport and access impacts associated with only the proposed commuter car park upgrade to the north of the railway corridor.

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<sup>1</sup> Accessible via the Transport for NSW [website](#) for the Penrith Station Upgrade [Project](#).

## 2. Existing Conditions

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### 2.1 Road Network

#### Coreen Avenue

Coreen Avenue runs in an east-west direction, generally with one travel lane and kerbside parking in each direction. It is a regional road and carries approximately 12,000 vehicles per day. Coreen Avenue currently provides the only access road to the site coming from the east (The Northern Road) or the west (Castlereagh Road) via Lord Sheffield Circuit. It also provides access to various kerbside parking facilities, particularly through the Thornton residential development.

Within the vicinity of the site, Coreen Avenue has posted speed limit of 60km/h.

#### Lord Sheffield Circuit

Lord Sheffield Circuit is a two-way local road which loops through the Thornton residential development and is accessed via Coreen Avenue. Lord Sheffield Circuit is configured with one travel lane in each direction and has a combination of restricted and unrestricted parking along both sides, with the exception of parking bans close to the car park entrance and Penrith Station.

#### Thornton Drive

Thornton Drive has been constructed to connect with the Castlereagh Road/ Peachtree Road signalised intersection. Thornton Drive and Combewood Avenue intersects in to a priority control intersection (Combewood Avenue has priority) north of the site to provide an alternative access. Thornton Drive is a two-way local road with one travel lane in each direction with time-restricted kerbside parking east of Combewood Avenue and unrestricted kerbside parking west of Combewood Avenue.

#### Combewood Avenue

Combewood Avenue is a two-way local road configured with one travel lane in each direction serving as an access/egress road and connecting with Thornton in the north and Coreen Avenue further north. Combewood Avenue transforms in to a one-way street circulating around the commuter car park, providing multiple access points to the car park facilities. There is a dedicated 10 km/h shared zone along the southern boundary of the car park on Combewood Avenue.

#### Dunshea Street

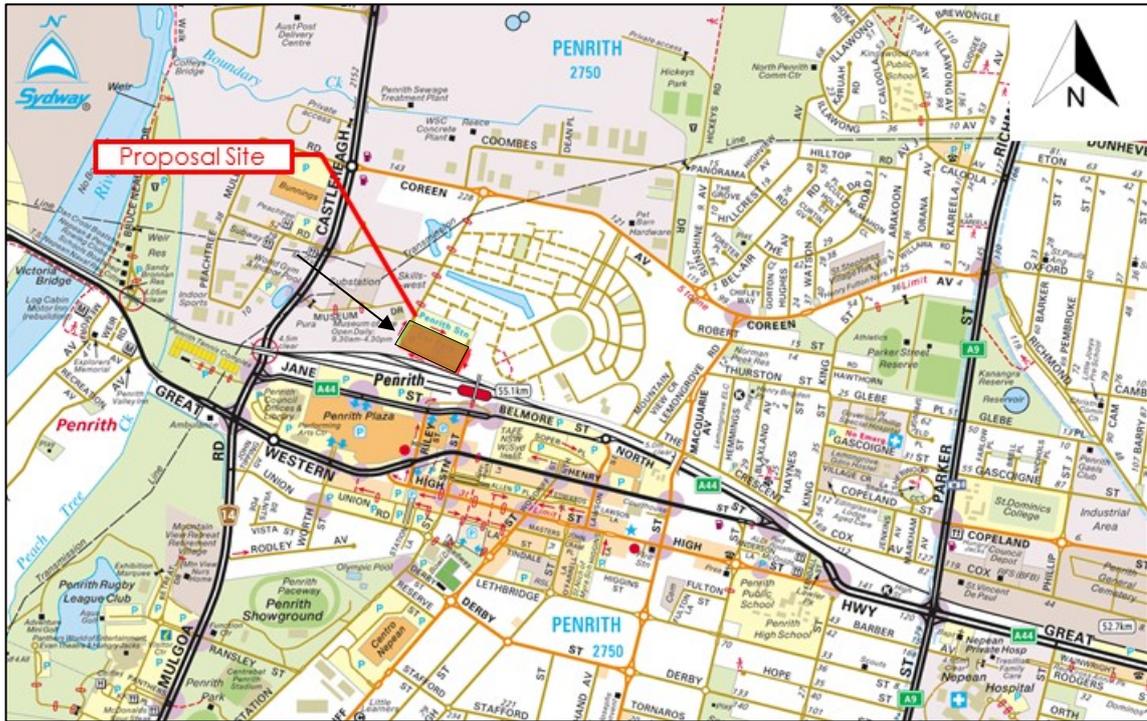
Dunshea Street is a combination of both one-way and two-way local road, serving as an access/egress road for the commuter car park with one travel lane per direction. Dunshea Street connects with Combewood Avenue in the south and Lord Sheffield Circuit in the north.

#### Future Access Roads

There are also numerous local roads under construction as part of the Thornton residential development to the east, providing several alternative access routes to the site.

Figure 1 shows the road network in the precinct surrounding the proposed multi-storey car park project.

Figure 2.1: Road Network in Car Park Precinct



Basemap source: Sydway

## 2.2 Traffic Volumes

GTA Consultants undertook selected traffic movement counts of the directions leading to/ from the car park site, to inform the traffic generation estimates arising from the Proposal. The counts were undertaken on Tuesday 05 April 2016 at the following intersections:

- Peachtree Road/ Thornton Drive/ Castlereagh Road signalised intersection
- Coreen Avenue/ Combewood Avenue roundabout.

Surveys were undertaken between 6:30–8:00am and 4:30–6:30pm. The counts obtained turning movements related to traffic using the access roads to access/ egress the site.

Peak hour traffic periods were identified to be:

- AM Peak: 6:30–7:30am
- PM Peak: 5:30–6:30pm.

The AM and PM peak hour traffic volumes are summarised in Figure 2.2 and Figure 2.3.

Figure 2.2: AM Peak Hour Traffic Volumes

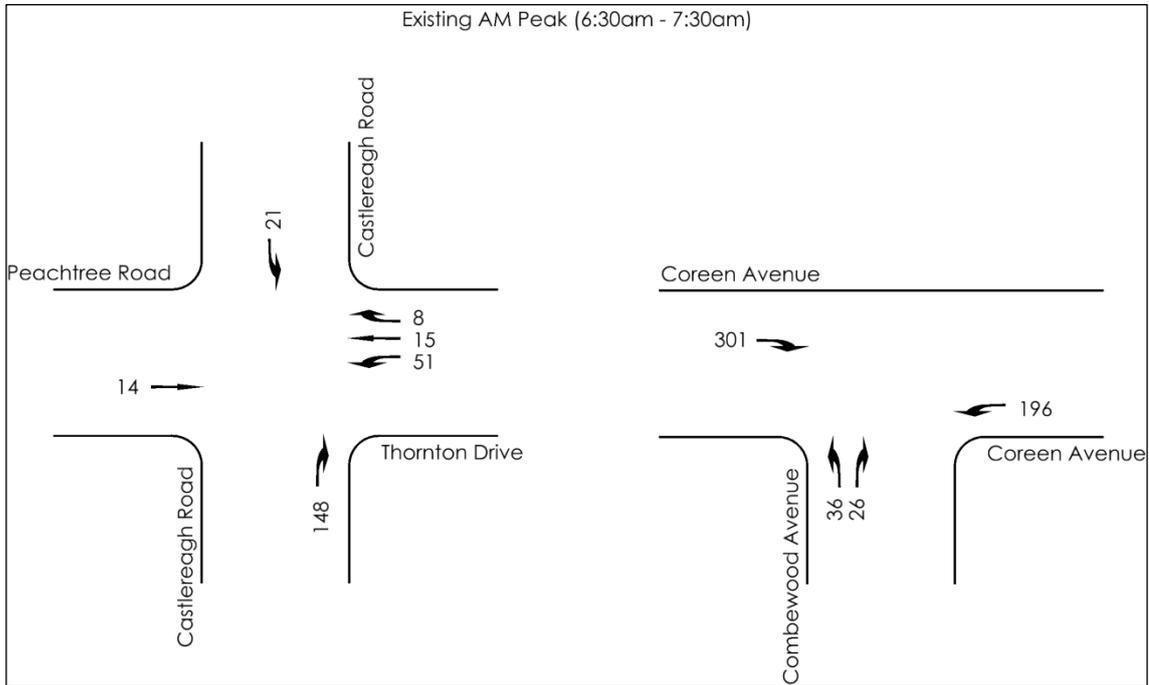
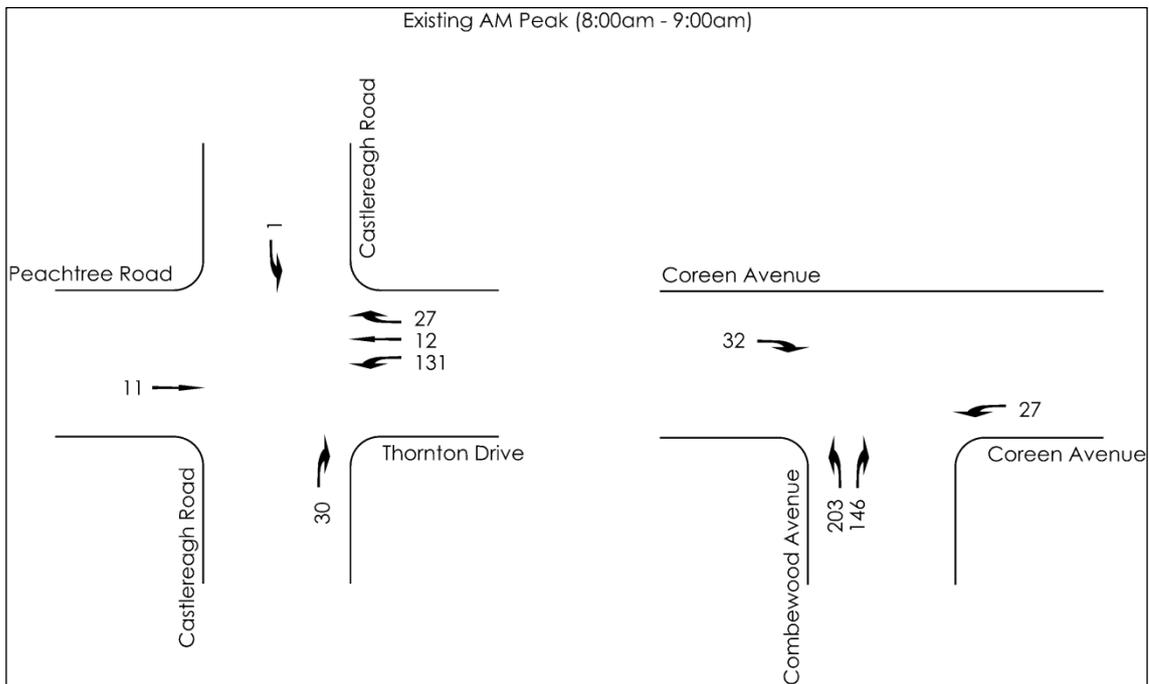


Figure 2.3: PM Peak Hour Traffic Volumes



## 2.3 Car Parking

### 2.3.1 Existing Facility Utilisation

During an inspection of the site undertaken on Tuesday 05 April 2016, estimates of parking occupancy were obtained for the existing on-site car parking facilities (both at-grade and multi-deck). The observations indicated the following levels of parking occupancy:

- 6:30am: 40% occupied at-grade / 50% occupied multi-deck
- 8:00am: 100% occupied at-grade / 100% occupied multi-deck.

The observations also apply to the car parking occupancy levels of the at-grade car park to the immediate north of the proposal site.

Further, it was observed that as a result of high demand for parking, commuters were resorting to illegally parking within circulation lanes, as shown in Figure 2.4 and Figure 2.5, at the end of most parking aisles.

Figure 2.4: Illegal Travel Lane Parking



Figure 2.5: Illegal Travel Lane Parking



### 2.3.2 Surrounding Parking Inventory

A previous inventory of existing kerbside parking in streets surrounding the proposal site indicated approximately 180 informal and formal spaces. Since this inventory was prepared, sections of local roads in the Thornton precinct (including Lord Sheffield Circuit), which have been previously closed to traffic due to construction activities, have been opened. This has contributed to a slight increase in available kerbside parking spaces in the precinct.

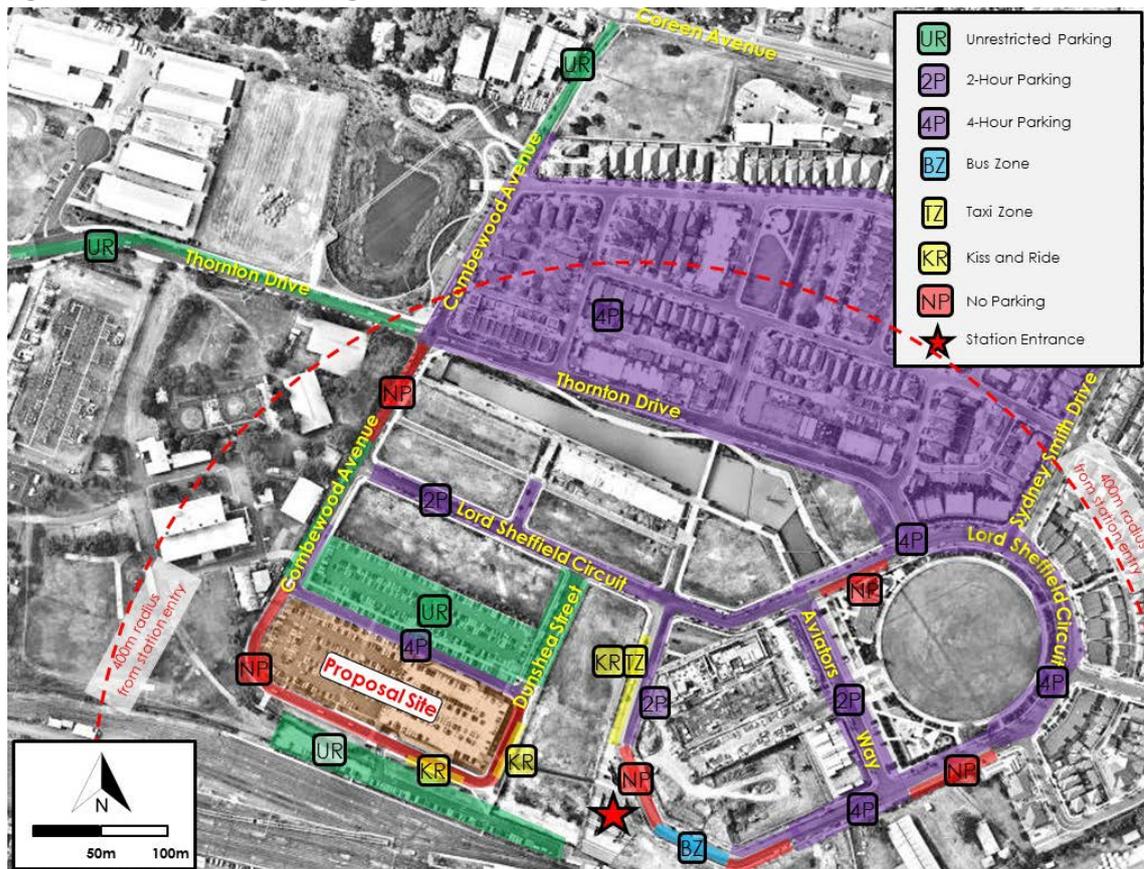
A number of street sections within the residential areas of the precinct are signposted with the designated time restrictions. However, the parking spaces are not linemarked, and with the

presence of numerous private driveways along these streets contributes to a varying number of available on-street car parking spaces.

Restrictions on these spaces includes a combination of unrestricted, 2-hour parking and 4-hour parking (during peak times), as summarised in Figure 2.6.

It was observed that the on-street car parking accommodates excess car parking demand from the existing parking facility, with the surrounding on-street parking spaces fully occupied by about 9:30am on weekdays.

Figure 2.6: Surrounding Parking Areas



Basemap source: Nearmap (used under licence, viewed 22 March 2016)

## 2.4 Kiss and Ride Facilities

As shown in Figure 2.6, three kiss and ride facilities are currently available in the vicinity of the subject site, being:

- Dunshea Street (eastern side): 4 spaces
- Combewood Avenue (southern side): 9 spaces
- Lord Sheffield Circuit (new northern plaza): 8 spaces (shared with Taxi Zone)

The facilities on Combewood Avenue are separated by a 'No Stopping' zone. However, on-site observations identified significant use of the 'No Stopping' zone as a Kiss and Ride facility. Due to the proximity to the station access, this zone was observed to be the preferred drop-off and pick-up location.

Additional informal drop-off and pick-up activity was observed south of the Dunshea Street kiss and ride facility, with this also identified as the current preferred location due to the proximity to the northern station access. An example of this practice is shown in Figure 2.7.

Figure 2.7: Informal Kiss and Ride Activity Adjacent to Thornton Development



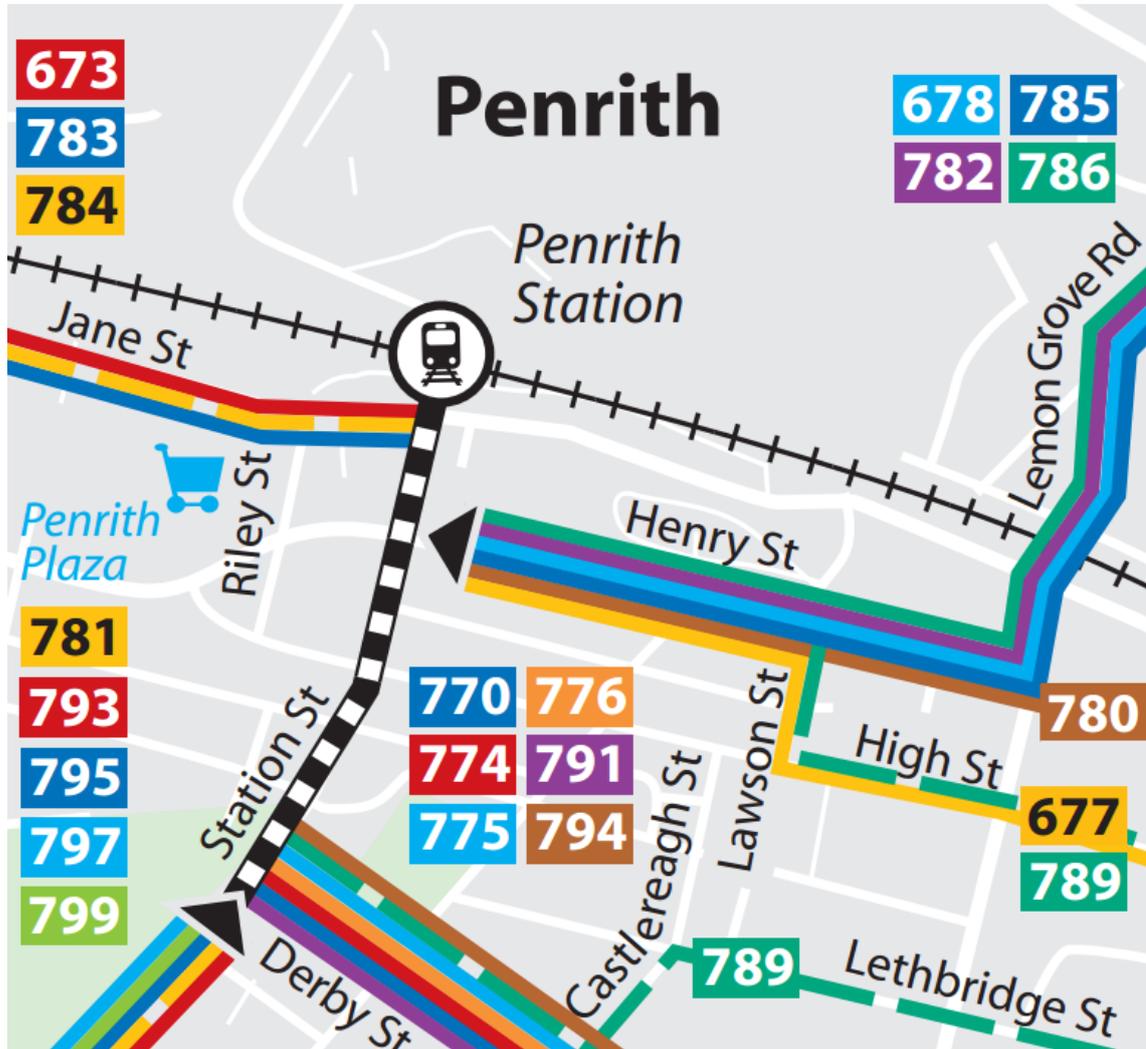
## 2.5 Bus Services

There are no bus routes serving the northern side of Penrith Station, as indicated in the Busways Penrith bus network map shown in Figure 2.8.

The existing bus services operating at the Penrith Station Bus Interchange (south of the railway corridor) have been discussed in the *Penrith Station Upgrade – Traffic, Transport and Access Impact Assessment*<sup>2</sup> Final Report (GTA Consultants, October 2015). These bus services will not be impacted by the proposed car park.

<sup>2</sup> Accessed via <http://www.transport.nsw.gov.au/sites/default/files/b2b/projects/Penrith%20Station%20ITT%26AIA%20-%20Final%20Report.pdf> on 18 April 2016.

Figure 2.8: Penrith Bus Network Map



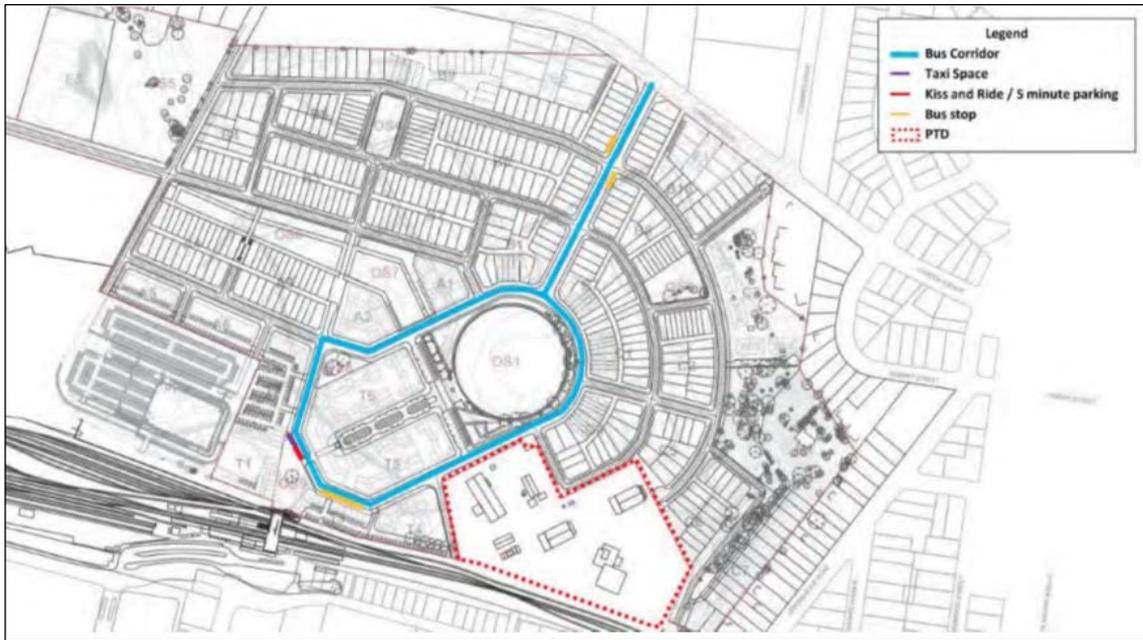
Source: [Busways](#)

Parsons Brinckerhoff proposed both interim and long-term bus options through the Thornton Redevelopment Project (then referred to as North Penrith) in the *North Penrith Transport Management and Accessibility Plan*<sup>3</sup> (Parsons Brinckerhoff, 2010) as shown in Figure 2.9 and Figure 2.10.

The *North Penrith Transport Management and Accessibility Plan* (Parsons Brinckerhoff, 2010) indicated that there would potentially be 40 additional bus services during peak periods over the next 25 years, spread around the bus routes in the Penrith area.

<sup>3</sup> Accessed via [https://majorprojects.affinitylive.com/public/35557aeb225c5b253ea77a9e4c5e836d/22\\_Appendix\\_V\\_Transport%20Mobility%20and%20Accessibility%20Plan\\_part%200001.pdf](https://majorprojects.affinitylive.com/public/35557aeb225c5b253ea77a9e4c5e836d/22_Appendix_V_Transport%20Mobility%20and%20Accessibility%20Plan_part%200001.pdf) on 18 April 2016.

Figure 2.9: Interim Bus Corridor Option



Source: North Penrith Transport Management and Accessibility Plan (Parsons Brinckerhoff, 2010)

Figure 2.10: Long-Term Bus Corridor Option



Source: North Penrith Transport Management and Accessibility Plan (Parsons Brinckerhoff, 2010)

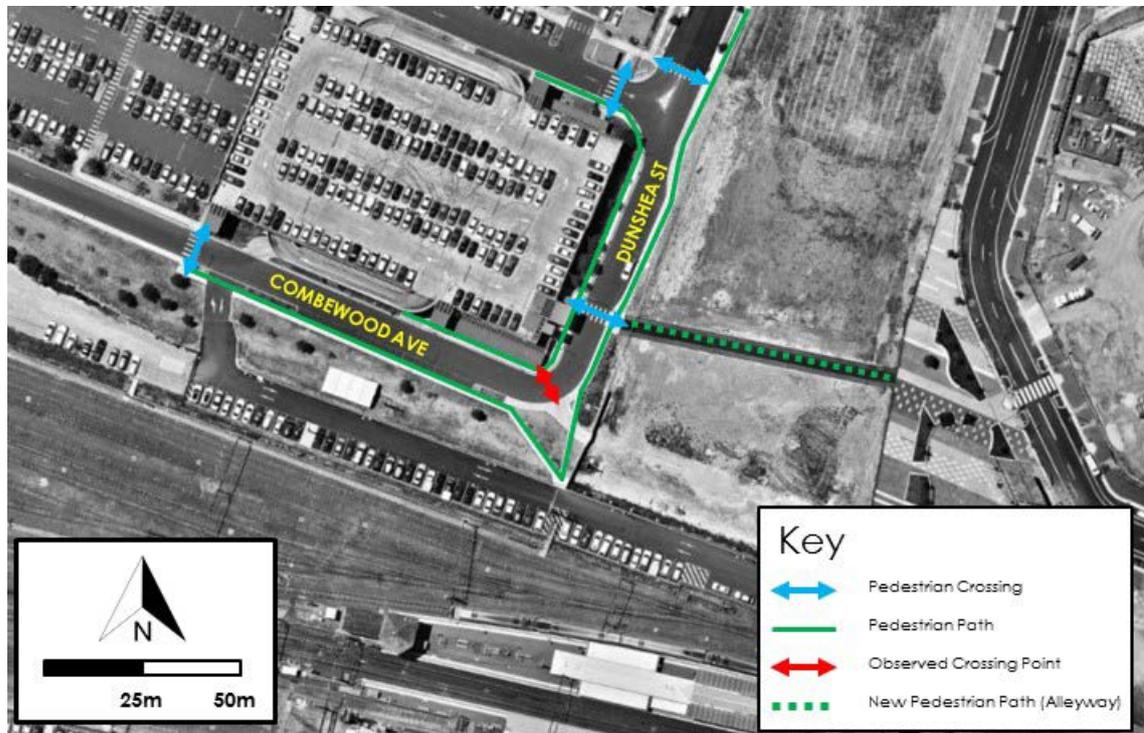
## 2.6 Pedestrian Access and Infrastructure

Dedicated pedestrian paths currently link the existing multi-deck and at-grade car parking facilities to the Penrith Train Station. Two designated pedestrian crossing points are provided on Combewood Avenue to allow for pedestrian priority. The existing pedestrian facilities in the vicinity of the car park site are shown in Figure 2.11.

Site observations indicate that the recently constructed pedestrian alleyway is the preferred method for commuters to access the train station. It was also observed that a significant number

of pedestrians are crossing Dunshea Street at the road bend where no crossing facilities are provided, which allows for the shortest path of travel.

Figure 2.11: Existing Pedestrian Facilities



Basemap source: Nearmap

## 2.7 Cycle Infrastructure

There are no designated cycle routes in the immediate vicinity of the site. The nearest designated cycle route is the on-road/ shared lane facility along Henry Street, approximately 250 metres south of the site across the railway corridor.

The existing multi-storey commuter car park also has provisions for bicycle parking facilities including 10 inverted U-rails and 8 secure bicycle lockers.

At the time of the site visits, it was observed that only two of the bicycle inverted U-rails were used.

## 2.8 Road Safety

A review of crash statistics for the road network surrounding the subject site between 1 January 2010 – 31 December 2014 identified no crash data as the roads immediately surrounding the site were not constructed during the review period.

It is noted that on-site observations did not identify any significant existing hazards to commuters, cyclists or pedestrians in the vicinity of the proposal site.

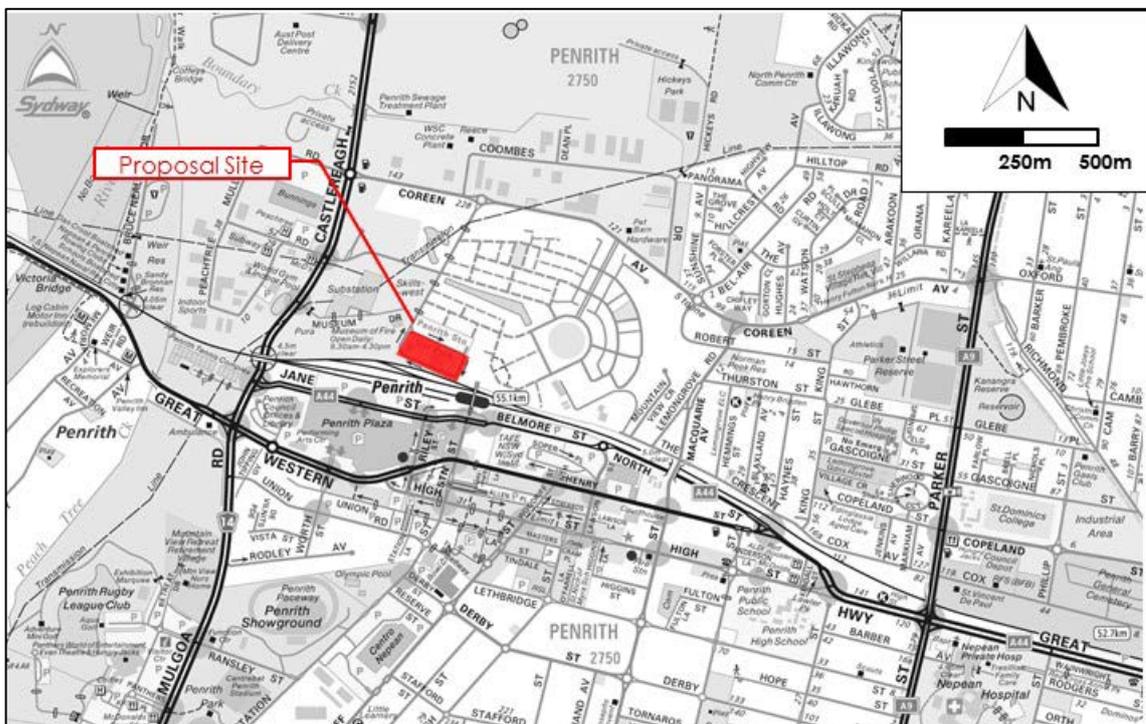
### 3. The Proposal

#### 3.1 Overview

The Proposal involves upgrading the existing multi-storey car park located to the north of Penrith Station along Dunshea Street/ Combewood Avenue, by way of extending the structure to incorporate the adjoining at-grade car park. Both existing car parks (multi-storey and at-grade) are currently utilised as commuter car parking, with direct pedestrian connections to the northern plaza of Penrith Station across Combewood Avenue.

The location of the subject site and context within the surrounding Penrith Transport Interchange are shown in Figure 3.1 and Figure 3.2.

Figure 3.1: Site Location



Basemap source: Sydney Publishing Pty Ltd

Figure 3.2: Site Location and Surrounding Facilities



Base image source: Nearmap

The proposed multi-storey car park project is expected to result in a net increase of 356 car parking spaces, as summarised in Table 3.1.

Table 3.1: Number of Car Parking Spaces

Type/Location	Existing Spaces	Proposed Spaces	Change
Ground level of existing multi-deck – accessible spaces	30	38	+8
Ground level of existing at-grade section	117	105	-12
Ground level of existing multi-deck	219	243	+24
Level 1 of multi-deck	164	330	+166
Level 2 of multi-deck	182	352	+170
<b>Total</b>	<b>712</b>	<b>1,068</b>	<b>+356</b>

In particular, the proposed upgrade works involve the following:

- extension of the first and second floor levels of the existing multi-storey car park by about 75 metres over the existing at-grade parking to the west
- retention of the existing bicycle facilities (eight lockers and 10 inverted U-rails)
- retention of the nine existing motorcycle spaces at the multi-deck car park
- provision of two new stair cases for the extension
- provision of a new lift on the south-eastern side of the car park
- provision of new lift located adjacent to the existing lift
- retention of existing ramps for vehicle access, circulation and egress
- provision of approximately eight new accessible parking spaces within the existing multi-storey car park to bring the total to 38 accessible spaces (as indicated in Table 3.1).

Access to and egress from the proposed upgraded car park would be the same as the existing access arrangements (i.e. retaining all vehicle flow arrangements), with no additional access locations proposed.

## 3.2 Surrounding Facilities

From information in train usage statistics published by the Bureau of Transport Statistics, Penrith Station is currently the 33rd busiest station in the Sydney Trains network. It was accessed by more than 15,000 rail users during an average weekday in 2014, with about 5,000 of them using the station during the 3.5 hour AM peak period (6:00–9:30am).

In addition to the station, existing transport facilities around the station include:

- bus interchange
- taxi facilities
- bicycle parking facilities
- kiss and ride zones
- various commuter and staff car parking areas.

TfNSW is currently delivering various upgrades to the transport facilities within the Penrith Station site, focusing on improving pedestrian access and circulation, improving interchange operations for buses and taxis and ancillary works such as altering traffic signals, installation of station communication systems and adjustments to lighting and seating.

Full details regarding these works are reported in *Penrith Station Upgrade – Traffic, Transport and Access Impact Assessment* (GTA Consultants, 2015), a copy of which could be accessed via the Transport for NSW website for the proposed Penrith Station Upgrade<sup>4</sup>.

The proposal site is located adjacent to the Thornton residential development; the southern portion of which is still in under construction. This includes ongoing construction activities for residential buildings as part of Thornton Central. As a result, sections of the local road network remain closed to traffic. However, construction activities relating to the northern station portal have been completed, and a section of the access road has recently been opened to traffic.

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<sup>4</sup> <http://www.transport.nsw.gov.au/projects-tap/current-works/penrith>

## 4. Operational Impact Assessment

### 4.1 Traffic Generation Rates

GTA Consultants estimated the traffic generation of the proposal based on a review of similar existing commuter car park facilities, including documentation for other assessments as indicated in Table 4.1.

Table 4.1: Commuter Car Parks Traffic Generation

Commuter Car Park	AM Peak Traffic Generation	PM Peak Traffic Generation
Padstow	0.9 vehicles/ parking space	0.75 vehicles/ parking space
Holsworthy	0.74 vehicles/ parking space	0.48 vehicles/ parking space

Adopting a conservative approach to the assessment, the higher traffic generation rates were adopted for the proposed Penrith Station Multi-Storey Car Park Project, as follows:

- AM peak: 0.9 vehicles/ space
- PM peak: 0.5 vehicles / space.

Considering the location of Penrith Station in the rail network, being about 55 kilometres away from Central Station, it is likely that the commuter car park traffic generation will peak earlier than the network peak in the morning, and later than the network peak in the afternoon. As such, the impacts from the associated traffic generation of the Proposal during the peak hours will generally not be as pronounced as the impacts from traffic generation using the assumed rates.

### 4.2 Traffic Generation

On the basis of the conservatively assumed traffic generation rates, the addition of approximately 350 car parking spaces arising from the Proposal could be expected to generate an additional 321 and 178 vehicle movements during the AM and PM peak periods respectively.

### 4.3 Traffic Distribution

The distribution of traffic entering and exiting the site has been assumed to be consistent with the existing distribution of traffic at the surveyed intersections. The traffic distribution for the AM and PM peak hours (as per traffic surveys) is represented in Figure 4.1 and Figure 4.2 respectively.

Based on the traffic distribution and generation detailed above, estimates of the additional traffic generated by the extension works are shown in Figure 4.3 and Figure 4.4 for the AM peak hour and the PM peak hour respectively.

Figure 4.1: AM Peak Inbound Traffic Distribution

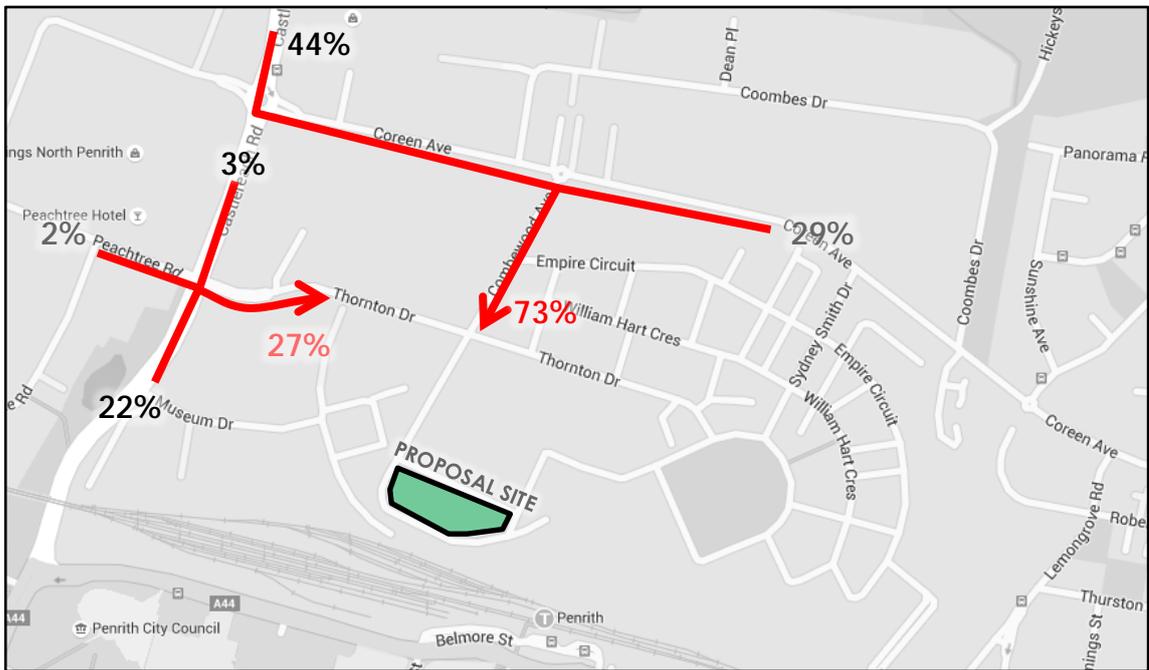


Figure 4.2: PM Peak Outbound Traffic Distribution

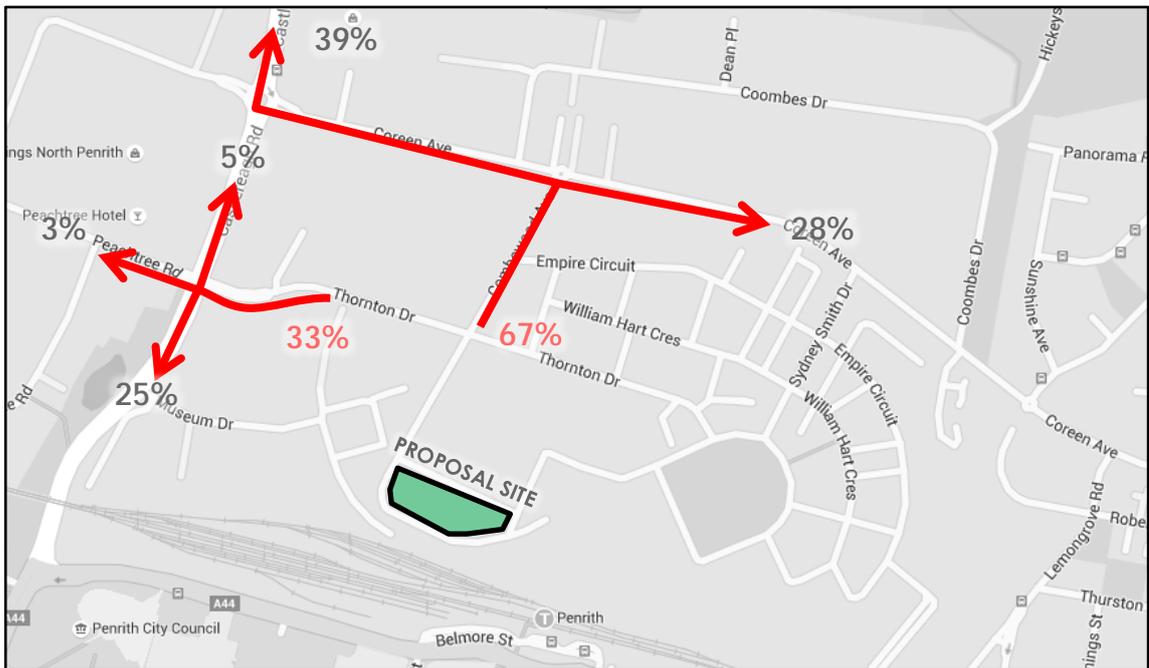


Figure 4.3: Distribution of Additional AM Peak Traffic

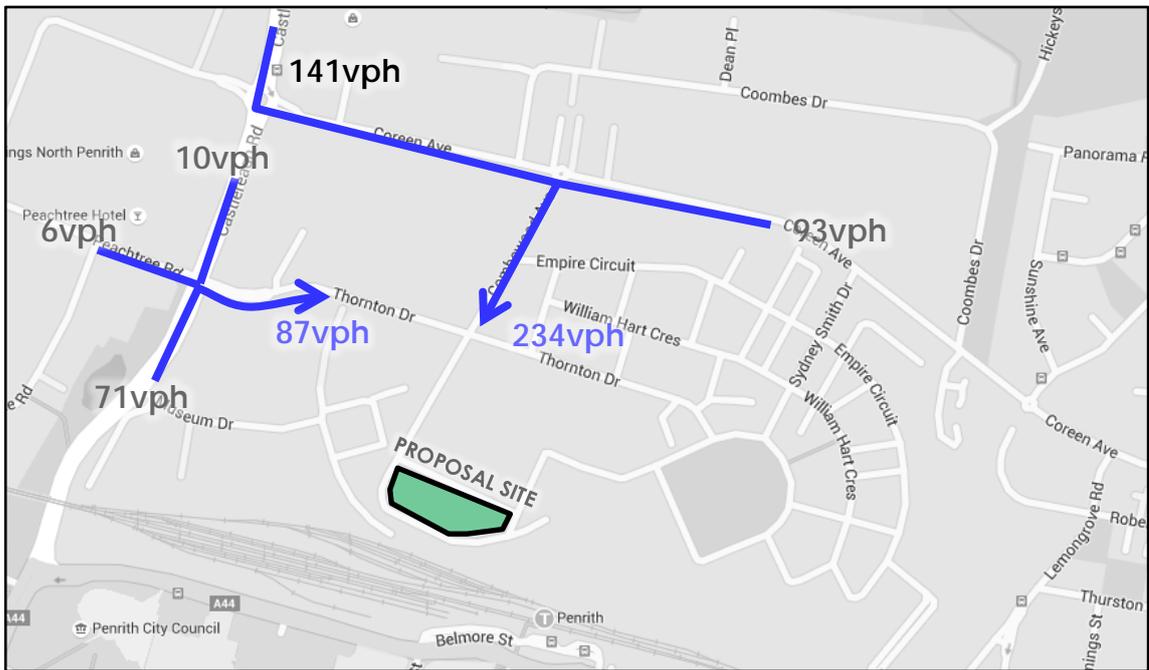
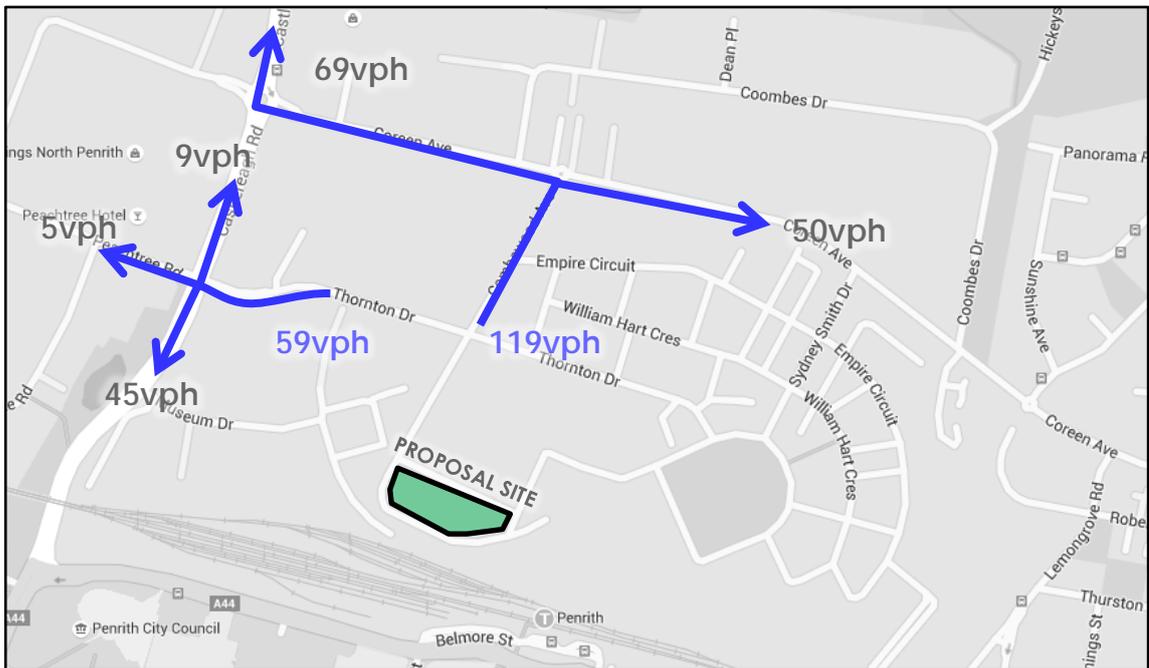


Figure 4.4: Distribution of Additional PM Peak Traffic



## 4.4 Road Network Impacts

Parsons Brinckerhoff conducted traffic movement counts for the AM and PM peaks in 2010 as part of the *North Penrith Transport Management and Accessibility Plan*<sup>5</sup> (Parsons Brinckerhoff, 2010). The study included counts along key roads in the North Penrith study area.

In relation to the Proposal, the relevant traffic counts include:

- 1,290 vehicles northbound and 1,499 southbound during the AM peak along Castlereagh Road
- 1,352 vehicles northbound and 1,273 southbound during the PM peak along Castlereagh Road
- 608 vehicles eastbound and 528 westbound during the AM peak along Coreen Avenue
- 521 vehicles eastbound and 461 westbound during the PM peak along Coreen Avenue.

An estimate of the peak hour traffic volume increases arising from the Proposal to Castlereagh Road and Coreen Avenue, based on 2010 volumes from the *North Penrith TMAP* (PB, 2010) indicated above, are shown in Table 4.2.

**Table 4.2: Relative Traffic Impacts of Proposal**

Road / Direction	AM Peak	PM Peak
Castlereagh Road northbound	6%	0%
Castlereagh Road southbound	1%	4%
Coreen Avenue eastbound	23%	10%
Coreen Avenue westbound	18%	15%

It is noted that current background traffic volumes are expected to be higher than those in 2010, reducing the actual peak hour traffic impacts shown in Table 4.2. Further, the conservative approach used in estimating traffic generation, as discussed in Section 4.1, could further reduce the relative traffic impacts of the Proposal.

It is expected that the traffic generation of up to approximately 320 vehicle movements in a peak hour would have a minor impact on the roads in the immediate surrounds of the proposal site (i.e. Combewood Avenue and Lord Sheffield Circuit). While these roads are local in nature, they are typically designed to accommodate larger traffic volumes than could be expected following the upgrade of the car park. Traffic operation is improved by the strong directional bias of commuter car park activity (i.e. majority of cars entering the car park in the AM peak period and exiting the car park in the PM peak), which reduces conflicting vehicle movements at car park access points. Further, Combewood Avenue will likely remain the preferred access route to the car park, being a more direct route to the car park entry, compared with a more circuitous access route via Lord Sheffield Circuit.

The following considerations are also noted:

- The provision of additional car parking is not expected to generate a significant increase in new trips on the road network when compared to the total existing network traffic volumes. Rather, commuters who are either driving to work, or parking in surrounding streets, will instead be able to park within close proximity to the station.

<sup>5</sup> Accessed via [https://majorprojects.affinitylive.com/public/35557aeb225c5b253ea77a9e4c5e836d/22\\_Appendix\\_V\\_Transport%20Mobility%20and%20Accessibility%20Plan\\_part%200001.pdf](https://majorprojects.affinitylive.com/public/35557aeb225c5b253ea77a9e4c5e836d/22_Appendix_V_Transport%20Mobility%20and%20Accessibility%20Plan_part%200001.pdf) on 18 April 2016.

These trips are likely already on the road network, however will be diverted by the increased car parking supply.

- Due to the expected growth of network traffic since 2010, the relative impacts associated with the traffic to be generated by the Proposal would have decreased.
- The proposed car parking supply is generally consistent with that identified in *Penrith Station Traffic and Transport Assessment (ARUP 2015)*, in the assessment for the concept plan, where it was considered to have a negligible impact on surrounding road network operations.
- Traffic accessing the proposed facility is distributed across multiple access points, mitigating the impact to any one intersection. Further, as identified in *Penrith Station Traffic and Transport Assessment (ARUP 2015)*, the proposed network upgrades in the vicinity of the proposed upgrade are likely to mitigate network impacts.

Additional mitigation measures may include advanced parking availability information through online applications or variable message signs to be installed at major approaches to the car park precinct, which would provide advanced information regarding the availability of car spaces in the commuter car parks surrounding Penrith Station.

## 4.5 Parking Impacts

The proposed expansion will provide approximately 350 additional car parking spaces, located in close proximity to Penrith Station. These additional spaces are expected to improve parking availability in the area.

The proposed expansion is expected to assist in mitigating overflow parking on surrounding streets, and potentially illegal parking within existing facilities.

## 4.6 Impacts to Other Users

### 4.6.1 Rail and Bus

The improved commuter car park is not expected to have any significant impacts on bus or railway operations. It would likely bring about positive impacts in terms of contributing towards making railway transport more accessible to the community by increasing the availability of commuter parking.

### 4.6.2 Walking and Cycling

The operation of the proposed commuter car parks would result in an increase in vehicle movements across the designated pedestrian crossing on Dunshea Street and Combewood Avenue.

Furthermore, pedestrian volumes crossing Dunshea Street and Combewood Avenue are expected to increase, at both designated crossing locations and along identified desire lines.

The provision of additional commuter car parking capacity would also potentially reduce local traffic circulation, in which vehicles drive around the local area in search of parking. This would have an indirect benefit of reducing traffic flows (albeit marginally) on the network, and potentially reducing safety risks associated with vehicle-pedestrian conflicts.

## 4.7 Property Access

The operation of the proposed commuter car parks is not expected to have any impact on existing access to properties in the vicinity of the site.

## 4.8 Mitigating Measures

Based on the operational assessment, the following mitigation measures are recommended for consideration:

- Investigate the ability to provide an additional pedestrian crossing on Combewood Avenue to cater to pedestrian desire lines.
- Undertake a Road Safety Audit.

## 5. Construction Stage Assessment

### 5.1 Construction Activities

#### 5.1.1 Construction Works

The proposed upgrade of the multi-storey car park at Penrith Station includes the following activities:

- clearing and demolition
- potential services relocation
- spoils disposal
- earthworks
- installation of new pavement
- construction of multi-deck concrete structure
- installation of utilities
- installation of signage and pavement markings.

The proposed ancillary facilities and Works Zone during construction is shown in Figure 5.1.

Figure 5.1: Construction Site Plan



Source: Transport for NSW

#### 5.1.2 Construction Schedule

The construction is likely to take place from late 2016 to mid-2017.

#### 5.1.3 Construction Hours

Construction activities are expected to follow standard construction hours, restricted to the following time periods:

- Monday to Friday: 7am to 6pm

- Saturday: 8am to 1pm
- Sundays and Public Holidays: nil.

The following works are permitted outside these standard hours:

- any works which do not cause noise emissions to be more than 5dBA higher than the rating background level at any nearby residential property and/or other noise sensitive receivers
- out of hours work identified and assessed in the EIA or the approved out of hours work protocol (OOHWP)
- the delivery of plant, equipment and materials which is required outside these hours as requested by police or other authorities for safety reasons and with suitable notification to the community as agreed by the PMEM
- emergency work to avoid the loss of lives, property and/or to prevent environmental harm
- any other work as agreed by the PMEM (or nominated delegate) and considered essential to the Project, or as approved by the Environment Protection Authority (where an Environment Protection Licence is in effect).

## 5.2 Construction Traffic

The construction activities are expected to generate about 20 heavy truck movements per working day, as well as approximately 120 light vehicle movements per working day associated with an estimated 60 staff on site.

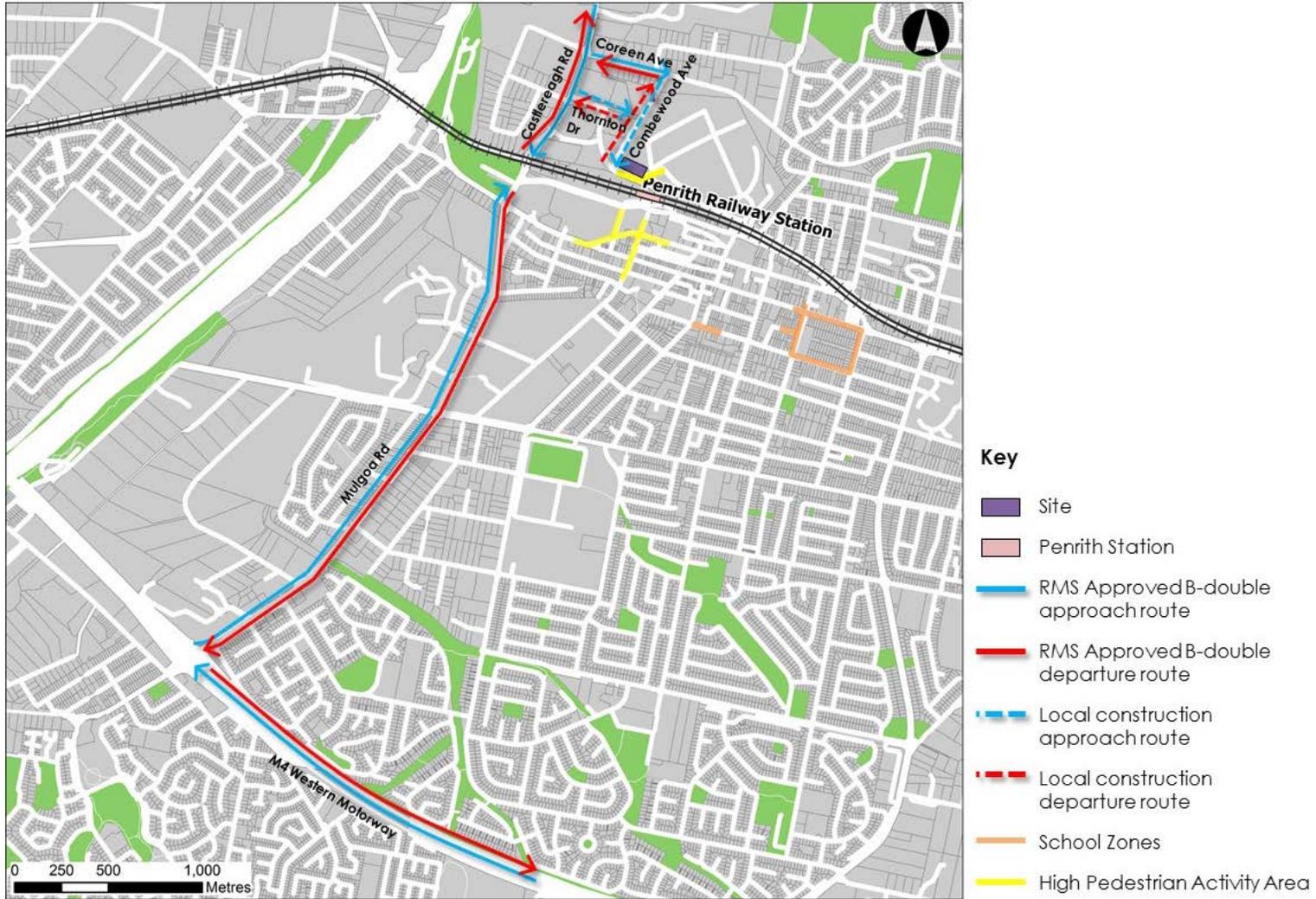
### 5.2.1 Construction Vehicle Routes

The surrounding road network is well established and would provide direct access to/ from the site. Figure 5.2 illustrates the likely access routes to be used by construction vehicles to access the construction site. These routes are RMS approved B-double routes (19 metres / over 50 tonnes) and link to the wider State Road network. These routes include:

- Combewood Avenue
- Coreen Avenue
- M4 Western Motorway
- Mulgoa Road
- Castlereagh Road.

Locally, the primary construction access route to/ from the site is proposed via Combewood Avenue, linking with Coreen Avenue and with Castlereagh Road. Alternatively, the new Peachtree Road/ Castlereagh Road/ Thornton Drive signalised intersection would allow for a viable option for southbound (outbound) construction vehicles.

Figure 5.2: Potential Construction Vehicles Routes



## 5.3 Construction Stage Impacts

### 5.3.1 Pedestrian Flows

The following impacts to pedestrians are anticipated to arise from the construction activities:

- likely longer walking distances resulting from diversions associated with the closure of pedestrians links surrounding the site during construction
- higher road safety risk levels associated with construction vehicle and pedestrian interaction
- potentially higher levels of footpath congestion, arising from the closure of pedestrian links and/ or narrower movement areas.

These impacts are considered to be manageable, with the Construction Environmental Management Plan to be prepared by the Contractor outlining how these impacts would be specifically managed.

### 5.3.2 Cycle Routes

There are no designated cycle routes expected to be affected by the construction works. The existing bicycle parking (inverted U rails) at the multi-storey car park are proposed to remain open and available during the project's construction.

### 5.3.3 Traffic Impacts

During the project's construction, there is expected to be an increase in traffic associated with construction staff vehicles as well as heavy construction vehicles.

The impact of workers vehicles (i.e. light vehicles) is expected to be minimal. As identified in Section 5.2, a total of 60 staff are expected during construction, which may equate to an additional 60 vehicle movements during both the AM and PM peak periods (maximum). This increase in traffic would be less than the additional traffic volumes estimated for car park operation.

The impact of construction vehicles (i.e. heavy vehicles), is expected to be minor. The expected construction vehicle routes do not pass sensitive uses (e.g. schools), and are likely to be consistent with the construction routes being used for on-going construction in the Thornton area.

It is noted that heavy vehicles should be restricted from using Sydney Smith Drive to access the site due to its residential nature and form.

### 5.3.4 Bus Operations

Given there are no bus routes in the immediate vicinity of the proposal site (with the closest route being along Lord Sheffield Circuit within the Thornton development), the construction works are not expected to interfere with any bus operations.

### 5.3.5 Taxi Operations

The construction activities are not expected to impact the existing taxi facility (shared Kiss and Ride facility) on Lord Sheffield Circuit. The construction works are not expected to interfere with any taxi operations. Truck drivers/ site personnel should be made aware that they must make use of the Works Zone provided and cannot park in the taxi facility area at any time.

### 5.3.6 Kiss and Ride Activity

The construction activities are not expected to have any impacts on the existing kiss and ride arrangements along Dunshea Street. Truck drivers/ site personnel must be aware that they must make use of the Works Zone provided and cannot park on the Kiss and Ride areas at any time.

### 5.3.7 Commuter Parking

Current information indicates that the at-grade car park will be closed-off entirely during the construction phase. There may also be periods where the existing multi-storey car park will be partially closed during construction.

Staff parking associated with construction is to be fully contained within the construction site.

The anticipated parking impacts associated with closing off existing car park for construction activities will be an overspill of commuter parking demand to the surrounding streets on the northern side of the station and alternate commuter car parks on the southern side of the station.

## 5.4 Recommended Mitigation Measures

### 5.4.1 Mitigation of Parking Impacts

Alternative parking arrangements, in proximity to the station, are being investigated. However, due to the extent of development underway within the Thornton precinct, there are limited suitable locations available. It is likely that the number of commuter spaces displaced during construction would not be able to fully offset. One option being considered includes temporarily converting restricted parking areas on adjacent streets to unrestricted parking. Although this would not fully offset the loss of parking within the car park, it would assist in maintaining appropriate levels of service adjacent to the station.

Strategies that could also assist in mitigating impacts include:

- encouraging carpooling for construction staff to reduce on-site parking demand
- operation of an off-site commuter car parking area with a shuttle bus link to the station
- providing advanced notice to commuters of any temporary changes to public car parking loss during construction, and encouraging alternate arrangement (e.g. carpooling and Kiss and Ride).

### 5.4.2 Mitigation of Traffic Impacts

Notwithstanding the impacts of construction on traffic, transport and access of the surrounding network, a Traffic Control Plan (TCP) would likely need to be prepared and submitted to RMS and/ or Council to appropriately manage the use of the designated construction routes and site interfaces.

Standard implementation of the TCP would involve the installation of standard signage warning approaching vehicles of the construction activity and heavy vehicle movements. This should include static signage to be in-place in advance of the works. Other possible mitigation measures to minimise traffic impacts during construction include:

- Appropriate traffic management, including static signs, manual traffic control and provision of temporary traffic barriers to control the proposed work areas and minimise delays.

- Establishment of safe access points to the work area from the adjacent road network including safety measures such as barriers and warnings to pedestrians, maintaining safe sight distances and signage.
- Use of traffic controllers to negotiate pedestrian and construction vehicle priority and access, if required.
- Delineation of any barriers or objects on any travel lanes open to public, if any.
- ensuring safe pedestrian connections between car parking areas and the station entry are maintained during construction

The TCP should also outline how potential construction vehicle manoeuvres could be accommodated in and out of the construction sites. In addition, swept path analysis should be conducted to ensure that the largest required vehicle can turn in and out of the work sites.

A standard speed limit of 40 km/h will need to be implemented in the vicinity of the site during construction, including Lord Sheffield Circuit and Combewood Avenue.

### 5.4.3 Workers Induction

All workers and subcontractors engaged on site will be required to undergo a site induction. The induction will include permitted access routes to and from the construction site for all vehicles, as well as standard environmental, OH&S, driver protocols and emergency procedures.

Any workers required to undertake works or traffic control within the public domain shall be suitably trained and will be covered by adequate and appropriate insurances. All traffic control personnel will be required to hold RMS accreditation in accordance with Section 8 of Traffic Control at Worksites.

### 5.4.4 Construction Traffic Management Plan

A Construction Traffic Management Plan would be required to be prepared and submitted to Council's Local Traffic Committee and/ or Roads and Maritime/ Transport Management Centre (TMS). The plan should include a description of:

- final construction traffic approach and departure routes
- locations of access to and from the local road network
- details of construction signage and traffic controllers.

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