



# EPPING PRECINCT 240-244 BEECROFT ROAD

Traffic and Transport Impact  
Assessment

8 JUNE 2018

## Quality Assurance

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# Contents

- Executive Summary ..... i**
- 1.0 Introduction ..... 1**
  - 1.1 Background / context ..... 1
  - 1.2 Purpose of report ..... 2
  - 1.3 Study approach ..... 2
  - 1.4 Report structure ..... 2
- 2.0 Existing conditions ..... 3**
  - 2.1 Travel behaviour ..... 3
    - 2.1.1 Journey to Work Data ..... 3
    - 2.1.2 Household Travel Survey ..... 4
  - 2.2 Walking and cycling ..... 5
    - 2.2.1 Walking facilities ..... 5
    - 2.2.2 Cycling facilities ..... 5
  - 2.3 Public transport ..... 6
  - 2.4 Road network ..... 8
  - 2.5 Existing traffic conditions ..... 10
- 3.0 The proposal ..... 11**
  - 3.1 Epping Town Centre Urban Activation Precinct Structure Plan ..... 11
  - 3.2 Epping Precinct, 240-244 Beecroft Road ..... 13
  - 3.3 Travel Demand Management measures ..... 14
  - 3.4 Proposed access arrangements ..... 15
    - 3.4.1 Vehicular access ..... 15
    - 3.4.2 Public transport access ..... 19
    - 3.4.3 Pedestrian access ..... 20
    - 3.4.4 Cyclist access ..... 20
  - 3.5 Parking requirements and provision ..... 21
    - 3.5.1 Parking guidelines and DCP requirements ..... 21
    - 3.5.2 Proposed parking provision ..... 22
    - 3.5.3 Proposed loading / servicing arrangements ..... 23
  - 3.6 Trip generation and distribution ..... 24
    - 3.6.1 Vehicular trip generation ..... 24
    - 3.6.2 Trip distribution ..... 24
    - 3.6.3 Public transport demand ..... 25
    - 3.6.4 Walking (pedestrian) demand ..... 25
    - 3.6.5 Cycling demand ..... 26
- 4.0 Traffic and transport impact assessment ..... 27**
  - 4.1 Public and active transport ..... 27
    - 4.1.1 Public transport impacts ..... 27
    - 4.1.2 Walking (Pedestrian) impacts ..... 27
    - 4.1.3 Cyclist impacts ..... 27
  - 4.2 Road network ..... 28
  - 4.3 Parking ..... 28
- 5.0 Summary and conclusions ..... 29**
  - 5.1 Summary ..... 29
  - 5.2 Conclusions ..... 29

## List of Figures

Figure 1–1 Location of subject site .....	1
Figure 2–1 Travel zones analysed for the travel behaviour at the Site location.....	3
Figure 2–2 Planned cycle paths in proximity of the Site .....	6
Figure 2–3 Sydney Train Network servicing Epping Station.....	7
Figure 2–4 Bus routes in proximity of the Site .....	7
Figure 2–5 Road network surrounding the Site .....	9
Figure 3–1 Epping Town Centre Land Use and Built Form .....	12
Figure 3–2 Epping Town Centre Access and Movement .....	12
Figure 3–3 Proposed development .....	13
Figure 3–4 Proposed vehicular access and surrounding street hierarchy .....	17
Figure 3–5 Proposed Beecroft Road / Carlingford Road upgrade works by RMS .....	18
Figure 3–6 Proposed Beecroft Road left in / left out access with swept path analysis .....	18
Figure 3–7 Sydney Metro Line including Sydney Metro North West Project .....	19
Figure 3–8 Proposed pedestrian site links .....	20
Figure 3–9 Proposed loading / servicing area .....	23
Figure 3–10 Proposed trip generation and distribution.....	25

## List of Tables

Table 2–1: Household Travel Survey – Residents within Pennant Hills - Epping, Trip purpose .....	4
Table 2–2: Household Travel Survey – Residents within Pennant Hills - Epping, Mode Choice .....	4
Table 2–3: Existing bus routes and service frequencies at Epping Station .....	8
Table 2–4: Performance of critical intersection surrounding the site .....	10
Table 3–1: Vehicular access options considered .....	15
Table 3–2: Residential car parking requirements for residential developments.....	21
Table 3–3: Residential bicycle parking requirements for new developments .....	22
Table 3–4: Distribution of future peak hourly residential traffic.....	24
Table 3–5: Public transport net trip generation for the site, by mode .....	25

## Executive Summary

### *Background and introduction*

The NSW Government is currently constructing Australia's largest public transport project, the Sydney Metro Northwest (SMNW), formerly known as North West Rail Link. The SMNW is Stage 1 of the overall Sydney Metro project and involves the construction and operation of eight new metro stations and supporting infrastructure between Cudgegong Road and Epping. Stage 2 will deliver a new metro rail line from Chatswood through Sydney's CBD to Sydenham (Sydney Metro City and Southwest).

Landcom and the Sydney Metro Delivery Office (SMDO), part of Transport for NSW (TfNSW), are working in collaboration to develop walkable, mixed use precincts around the SMNW stations, including the Epping Station site. The site is currently owned by Transport for NSW, immediately adjacent to the 'Epping Service Facility' (ESF) for the SMNW project. The site is well-connected (within 400m walking distance) to the existing Northern Line (T1) and the future SMNW at Epping Station.

SCT Consulting is engaged to carry out a Traffic and Transport Impact Assessment to support the Concept State Significant Development Application (SSDA) (Reference: SSD 8784) for a proposed residential development of approximately 442 dwellings, at 240-244 Beecroft Road in Epping.

It should be noted that this is a concept proposal and certain details of the development may change with subsequent detailed design DA stage/s.

### *Existing conditions*

The site benefits from excellent access to the public transport system, with Epping Station adjacent and high frequency buses and trains available to both sub-regional centres and to the City throughout the day. Trains travel to Epping Station with a frequency of more than 13 services per hour on the Northern Line during the AM and PM peak periods. Bus services provide accessibility to the City, North Rocks, Manly, Parramatta, Eastwood, Strathfield, Macquarie Centre and Macquarie University.

Epping Station will also be upgraded to metro standards as part of the Sydney Metro network. The increased network coverage, train frequency, journey-time reliability and improved customer offering of the Sydney Metro Project, is likely to encourage public transport patronage and increase journey to work trips by non-car modes of transport for residents within the area.

Moderate difficulty<sup>1</sup> on-road cycle routes are currently provided in the east-west direction along Ray Road, Bridge Street and Pembroke Street, providing cycle connectivity between Macquarie University, Epping and Carlingford, as well as providing connection to the M2 regional cycle network via Kandy Avenue. There are currently no cycle facilities / routes along Ray Road and Rawson Street that provides north-south connectivity to the town centre, station as well as other existing and proposed east-west regional connections. This reflects the limited bicycle riding activities in the vicinity of the site.

As part of Parramatta City Council's Draft Bike Plan 2017-2037, additional cycle routes are proposed in proximity to the site. These include a north-south on-road painted bicycle lane, connection along Ray Road / Rawson Road to the west of the site.

Pedestrian footpaths are available on Ray Road and Beecroft Road (south of Carlingford Road), and is supported by pedestrian facilities across the majority of the town centre and surrounding the train station. Improved pedestrian connections and facilities within the surrounding area are also proposed within the Parramatta DCP and Epping Town Centre Urban Activation Precinct Structure Plan. These upgrades will provide clearer and safer connections within the town centre and across the railway.

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<sup>1</sup> <http://www.rms.nsw.gov.au/roads/bicycles/cyclewayfinder/index.html>

### *Concept Development Proposal*

The proposed development is within the area as part of the Epping Town Centre Structure Plan, prepared to support the planning and development for the Epping Town Centre Precinct. The precinct was endorsed by the NSW Government in March 2013 as an Urban Activation Precinct, for its capacity to produce new housing growth close to existing transport infrastructure and additional connectivity that will be provided by the SMNW Project.

The Concept Proposal is a primarily residential development of approximately 442 dwellings with approximately 700m<sup>2</sup> of non-residential floorspace, located north of Carlingford Road within the Epping Town Centre Urban Activation Precinct. Detailed design of the proposed development will be provided in subsequent stage(s) of the project.

Residents / employees of the proposed development will be located within a 400m walking distance of the new Epping Station of the future SMNW project, which will provide direct access to Chatswood. Sydney Metro Northwest will be open in 2019, and customers will also have a new direct Metro service to Crows Nest, Barangaroo and Martin Place when Sydney Metro City and Southwest opens in 2024.

The proposal will include 356 car spaces, including 45 visitor spaces, three car share spaces and 15 motorcycle parking spaces. A total of 487 secure bicycle racks are proposed, including 45 visitor bicycle parking racks.

The number of car parking spaces provided as part of the Proposal complies with the RMS Guide to Traffic Generating Developments and is supported by the excellent level of access to frequent public transport (rail / metro and buses) within 400m walking distance to the site and good access to alternative cycle parking and facilities provided within the development.

Vehicle access to the development will be available from Ray Road and Beecroft Road, to reduce the need for traffic to travel through the two congested intersections on Carlingford Road.

Overall the proposed development supports best practice transit oriented development principles, by providing increased residential density in proximity to existing and planned transport infrastructure upgrades. The proposed infrastructure upgrades will provide residents with greater access to public transport and employment options, while promoting the use of sustainable travel options.

Internally the proposal encourages sustainable transport use with a permeable layout providing easy access to existing and future pedestrian and bicycle infrastructure. Secure bicycle storage facilities are also provided for both residents and visitors, to rates specified within the Parramatta DCP 2011 Section 4.1 Epping Town Centre.

The planning and implementation of a targeted Travel Plan with the above green travel initiatives / principles will support the delivery of a transit-oriented development at this location that provide significant opportunities for alternative travel options and reduce the need of car travel.

### *Trip generation and traffic impacts*

The proposed development would expect to generate up to 85 vehicular trips in the AM peak hour and 66 vehicular trips in the PM peak hour. This level of trip generation is supported given the site's proximity and accessible to good public transport services and the reduced parking provision.

This level of trip generation represents an increase of less than one percent of total traffic volume on the Beecroft Road / Epping Road corridor. This confirms that there will be negligible impact to the network performance as a result of trips generated from the proposed development in both existing and future year scenarios.

The proposed development would also expect to generate 88 public transport trips in the AM peak, 70 public transport trips in the PM peak and a total of 171 daily public transport trips. The provision of frequent train / metro and bus services in the vicinity of the development are expected to cater for these additional demands.

### *Conclusion*

The traffic and transport impact assessment has concluded that:

- There will not be any adverse traffic or parking implications on the public road as a result of the additional vehicle trips generated by the proposed development.
- The proposed vehicle, pedestrian and cyclist access and proposed servicing arrangements will be suitable and appropriate and promote sustainable transport modes.

## 1.0 Introduction

### 1.1 Background / context

SCT Consulting is engaged to carry out a Traffic and Transport Impact Assessment to support the Concept State Significant Development Application (SSDA) for a proposed residential development at 240-244 Beecroft Road in Epping.

The site is part of the Department of Planning and Environment (DPE) 'Epping Town Centre Priority Precinct' and is currently zoned R4 High Density Residential. The SSDA is seeking approval for a residential development of approximately 442 dwellings, with proposed access from Ray Road and Beecroft Road at Epping. The location of the subject site is shown in **Figure 1-1**.

**Figure 1-1** Location of subject site



Source: Bennett and Trimble, January 2018

The site is located immediately adjacent to the 'Epping Service Facility' (ESF) for the Sydney Metro North West project. The site will be one of subdivided lots from the ESF which is currently owned by Transport for NSW, proposed as part of this DA submission. Stage 1 Application is for the subdivision of the site into two lots for the ESF and the proposed residential flat building development and sub-stratum over the rail corridor.

The site is well-connected (within 400m walking distance) to the existing Northern Line (T1) and the future Sydney Metro North West. It is also connected to the M2 Motorway via Beecroft Road. Employment areas at Macquarie Park, Norwest and Parramatta are in proximity and well-connected to this site via public transport and road. It is also within walking distance to the local employment at Epping Town Centre.

As of May 2016, the site is located wholly within City of Parramatta Council. The site is located outside of the Epping Town Centre as identified in the Parramatta DCP. The site previously sat within Hornsby Shire Council with the Hornsby Shire Council LEP controls remaining in place in the interim.

## 1.2 Purpose of report

The purpose of this Traffic and Transport Study is to support the SSDA for a proposed residential development at 240-244 Beecroft Road in Epping and to address the SEAR requirements prepared by the Department of Planning and Environment to understand the parking and access requirements as well as the likely impacts of the proposed development to the traffic and transport network.

The Traffic and Transport Impact Assessment report has assessed the impact of the net increase in trips generated, connectivity and access to the surrounding road network, car parking requirements, public and active transport requirements and any mitigation measures required as a result of the development.

## 1.3 Study approach

The Traffic and Transport Impact Assessment has considered:

- The existing and future context of the site, the wider Epping Station Precinct and the surrounding transport network.
- The principles of a transit-oriented development and the implementation of targeted travel demand management measures and green travel initiatives to reduce the need and reliance on private vehicle travel. This is developed through meetings with Transport for NSW and SMDO as well as the design team.
- Inputs and feedback from relevant stakeholders to the overall approach of the Traffic and Transport Impact Assessment.

## 1.4 Report structure

This report has been structured into the following sections:

- **Section 2** describes the existing transport conditions for all modes of transport;
- **Section 3** describes the proposed development and its access strategy as well as the likely trip generation as a result of the proposed development;
- **Section 4** describes the likely impacts for all transport modes and parking impacts as a result of the proposed development; and
- **Section 5** summarises the report content and presents the final conclusions.

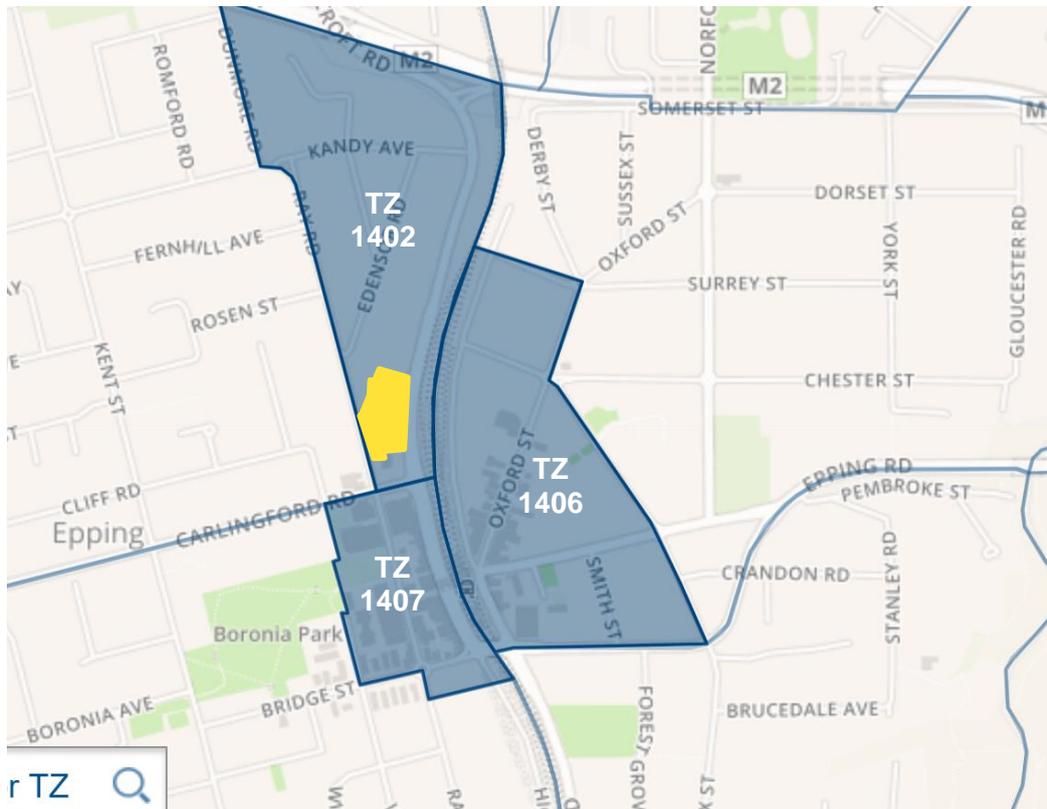
## 2.0 Existing conditions

### 2.1 Travel behaviour

#### 2.1.1 Journey to Work Data

2011 Journey to work data from the Bureau of Transport Statistics was analysed to determine current travel behaviour of the existing residents of Epping and surrounding areas during peak periods. The site is located within Travel Zone 1402, but to get a better understanding of how people travel to and from a nearby, more developed residential area, Travel Zones 1406, and 1407 (which immediately surround the site) were also included in the analysis. The travel zones analysed for travel behaviour are shown in **Figure 2-1**.

**Figure 2-1** Travel zones analysed for the travel behaviour at the Site location



Source: <http://visual.bts.nsw.gov.au/twbasic/>, October 2017

At the time of the journey to work (JTW) data being collected in 2011, approximately 1,486 lived in the three travel zones analysed. Out of these, 45% travel to work by car (of these, 3% are passengers), 42% travel by train, 5% walk only, and 5% of the local residents travel to work by bus. This demonstrates that residents in the area are less reliant on cars than an average Sydney suburb and would be more likely to use public transport or to work / cycle to work.

The most common destinations residents travel to for work include Sydney Inner City (24%), Ryde-Hunters Hill (18%), Pennant Hills-Epping (13%), Chatswood – Lane Cove (8%) and North Sydney-Mosman (5%). A total of 2% of residents have no fixed place of work.

At the time of the JTW data being collected, approximately 3,980 people worked in the three travel zones analysed. To get to work, approximately 72% of employees travelled to work by car (of these, 4% as passengers), while 18% arrived by train and 5% walked only. Only 2% of employees arrived at the three travel zones by bus.

The most common origins employees arrived from included Pennant Hills – Epping (17%), Baulkham Hills (10%), Ryde-Hunters Hill (9%), Carlingford (5%) and Parramatta and Hornsby both at 5%. Other origins included Blacktown, Ku-ring-gai, Chatswood-Lane Cove and Blacktown North.

### 2.1.2 Household Travel Survey

Epping Precinct sits within the statistical area "Pennant Hills - Epping" as defined by the Australian Bureau of Statistic, 2015/2016 Household Travel Survey (HTS).

For the purpose of analysis, it has been assumed that JTW data provides a suitable reflection of the travel characteristics during AM and PM peak hour periods, due to the high proportion of trips during this timeframe associated with journey to work trips.

Analysis of the 2015/2016 Household Travel Survey (HTS), which is reflective of travel characteristics of residents throughout an average weekday, indicates that approximately 49 per cent of daily trips made by residents of statistical area "Pennant Hills - Epping" are likely to be associated with shopping, personal business, social and recreational and education / childcare activities.

Train and bus trips account for approximately nine and three per cent of daily trips respectively. Walk only trips account for 16 per cent, however it is noted that a high proportion of public transport trips are also likely to include walk trips as part the first leg of these trips.

**Table 2-1** and **Table 2-2** provides a summary of the purpose of travel and overall mode choice by residents of Pennant Hills - Epping associated with these trip purposes.

**Table 2-1: Household Travel Survey – Residents within Pennant Hills - Epping, Trip purpose**

Travel by purpose	Percentage
Commute	8%
Work related business	5%
Education / childcare	7%
Shopping	14%
Personal business	4%
Change mode of travel	14%
Social / recreation	24%
Serve passenger	20%
Other	4%

Source: <https://www.transport.nsw.gov.au/performance-and-analytics/passenger-travel/surveys/household-travel-survey/statistical-area-level-3>, accessed 12/11/2017

**Table 2-2: Household Travel Survey – Residents within Pennant Hills - Epping, Mode Choice**

Mode	Percentage
Vehicle (Driver)	48%
Vehicle (Passenger)	21%
Train	9%
Bus	3%
Walk only	16%
Other	3%

Source: <https://www.transport.nsw.gov.au/performance-and-analytics/passenger-travel/surveys/household-travel-survey/statistical-area-level-3>, accessed 12/11/2017

## 2.2 Walking and cycling

### 2.2.1 Walking facilities

Footpaths are currently provided on Ray Road, Rawson Street, Carlingford Road and Beecroft Road (south of Carlingford Road), providing safe pedestrian connectivity between the subject site and train and bus services at the Epping Station as well as the existing town centre. There are currently no footpaths along both side of Beecroft Road, north of Carlingford Road given all pedestrian accesses to development along Beecroft Road are provided via Ray Road.

A signalised pedestrian crossing is provided at the Carlingford Road / Ray Road intersection and a pedestrian footbridge is provided across Beecroft Road further facilitating safe pedestrian access to the public transport services. Pedestrians on Rawson Street could also access Beecroft Road and the station via an existing through site link between Rawson Street and Beecroft Road, just north of the pedestrian footbridge.

Currently, pedestrians experience delays at the signalised intersection of Carlingford Road / Ray Road when access Epping Town Centre and Train Station. The existing footpaths along Ray Road and Rawson Street seems to be wide enough to cater for existing pedestrian demands.

### 2.2.2 Cycling facilities

Moderate difficulty<sup>2</sup> on-road cycle routes are currently provided in the east-west direction along Ray Road, Bridge Street and Pembroke Street, providing cycle connectivity between Macquarie University, Epping and Carlingford, as well as providing connection to the M2 regional cycle network via Kandy Avenue. There are currently no cycle facilities / routes along Ray Road and Rawson Street that provides north-south connectivity to the town centre, station as well as other existing and proposed east-west regional connections. This reflects the limited bicycle riding activities in the vicinity of the site.

The existing cycle routes in the vicinity of the site are generally on-road which are appropriate for commuter cyclists on surrounding local street network that has relatively low traffic volumes. Other cyclists will be riding on the existing footpath network and share with other pedestrians to access Epping Town Centre and Train Station.

As part of Parramatta City Council's Draft Bike Plan 2017-2037, additional cycle routes in proximity of the site are proposed. These include a north south on-road painted bicycle lane, connection along Ray Road / Rawson Street to the west of the site. This north-south connection continues to east-west links along Ray Road, Kandy Avenue and Bridge Street providing connectivity towards Carlingford and Eastwood.

To the east of the rail line, an off-road separated cycle path is proposed along Epping Road, while an on-road cycle link is proposed on Pembroke Street, increasing connectivity to the east and toward Macquarie University. The implementation of the links identified in the Bike Plan would significantly improve cycling access to the Site.

The proposed routes as part of the Parramatta Draft Bike Plan 2017-2037 in proximity of the Site are shown in **Figure 2-2**.

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<sup>2</sup> <http://www.rms.nsw.gov.au/roads/bicycles/cyclewayfinder/index.html>

Figure 2–2 Planned cycle paths in proximity of the Site



Source: Parramatta Draft Bike Plan, 2017 - 2037

### 2.3 Public transport

The existing bus and train services in proximity of the site are shown in **Figure 2–3** and **Figure 2–4**. It is evident that the subject site has significant access to the public transport system with frequent bus and train services travelling immediately adjacent, providing access to surrounding sub-regional centres and to the City throughout the day.

The nearest train station to the site is Epping Station, on the T1 North Shore Line and T1 Northern Line. In addition to the Sydney Train Network, Epping Station is on the Intercity Train Network: Central Coast and Newcastle Line.

Trains travel to this station with a frequency of more than 13 services per hour on the Northern Line during the AM and PM peak periods, and interconnect to the wider train network.

There are nine public bus service routes providing access to the site, these services include routes 140, 288, 290, 291, 295, 541, 546, 549 and Metrobus M54. The bus services provide good accessibility between the site and other key destinations such as the City, North Rocks, Manly, Parramatta, Eastwood, Strathfield, Macquarie Centre and Macquarie University. Routes 546 and 549 stop immediately adjacent to the site on Ray Road.

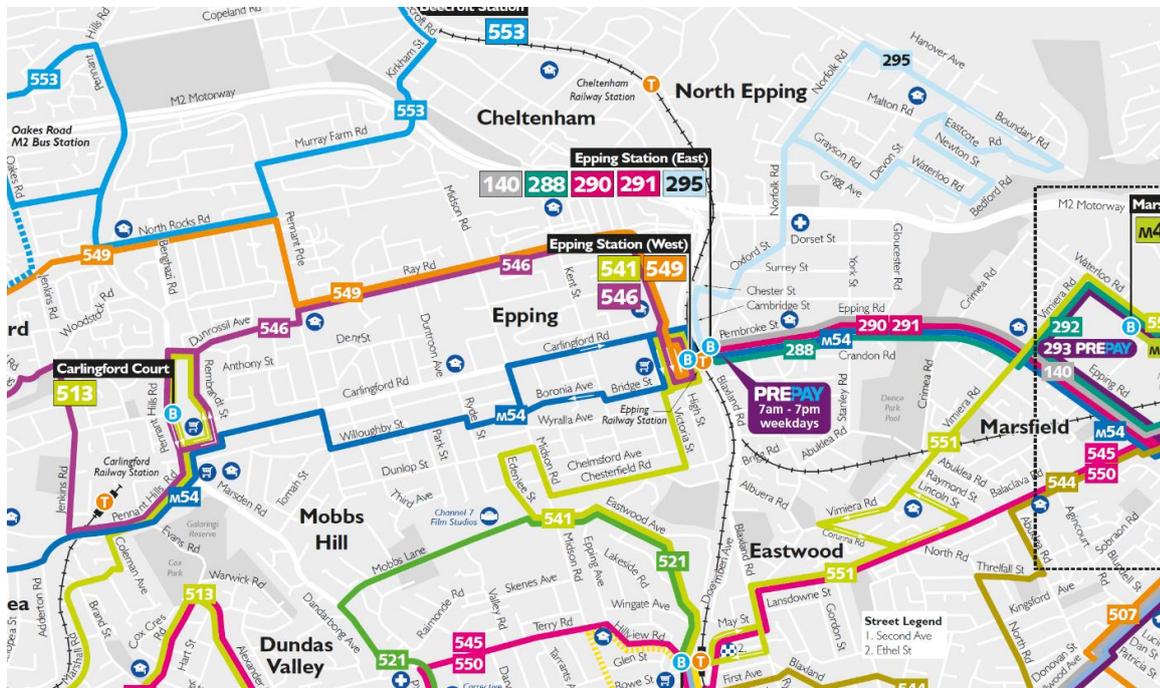
There are approximately 20 bus services stopping at Epping Station per hour during AM and PM peak hours. The most frequent service is offered by Metrobus M54: Parramatta to Macquarie Park, offering 4 to 6 services per hour during weekdays. The frequency of public transport services available in proximity of the site are shown in **Table 2–3**.

Figure 2-3 Sydney Train Network servicing Epping Station



Source: [http://www.sydneytrains.info/stations/pdf/suburban\\_map.pdf](http://www.sydneytrains.info/stations/pdf/suburban_map.pdf), February 2018

Figure 2-4 Bus routes in proximity of the Site



Source: <https://transportnsw.info/document/1697/region-guide-sydney-north-shore-west.pdf>, October 2017

Table 2-3: Existing bus routes and service frequencies at Epping Station

Route	Corridor	To	From	Average number of services			
				Weekday		Weekend	
				AM (6-9am)	PM (3-7pm)	Sat (6am-9pm)	Sun (6am-9pm)
140	Cambridge St Epping Station (east)	Manly via Macquarie University	Epping	1 trip	2 trips	-	-
288	Cambridge St Epping Station (east)	City	Epping	2 trips / hour	2 trips / hour	2 trips / hour	2 trips / hour
290	Cambridge St Epping Station (east)	City via Macquarie University & North Sydney	Epping	3 trips	1 trips	1 trip	3 trips
291	Cambridge St Epping Station (east)	McMahons Point	Epping	2 trips / hour	2 trips / hour	1 trip / hour	1 trip / hour
295	Cambridge St Epping Station (east)	Macquarie Centre (North Epping Loop)	Epping	3-4 trips / hour	4 trips / hour	1 trip / hour	1 trip / hour
541	Beecroft Rd Epping Station (west)	Eastwood	Epping	1-2 trips / hour	1-2 trips / hour	-	-
546	Beecroft Rd Epping Station (west)	North Rocks & Parramatta	Epping	1-2 trips / hour	2-3 trips / hour	1 trip / hour	1 trip / 2 hours
549	Beecroft Rd Epping Station (west)	Parramatta via North Rocks	Epping	2-3 trips / hour	2-3 trips / hour	1 trip / hour	1 trip / 2 hours
M54	Beecroft Rd Epping Station (west)	Macquarie Park	Parramatta	4-6 trips / hour	4-6 trips / hour	3 trips / hour	2-3 trips / hour
N80	Beecroft Rd Epping Station (west)	City Town Hall via Strathfield	Hornsby	1 daily service	1 daily service	1 daily service	1 daily service

Source: <https://transportnsw.info/routes#/>, August 2017

## 2.4 Road network

The site is bounded by Ray Road to the east, Beecroft Road to the west and Carlingford Road to the south, all providing access to the surrounding centres and strategic road network. The proposed development will have access to the wider strategic network via direct access to the M2 Motorway, which runs to the north of the study area.

The characteristics of the key road network, as shown in **Figure 2-5**, surrounding the subject site are:

- Ray Road – a two lane, two-way collector road that travels in the north-south direction adjacent to the site, and in the east-west direction to the north, linking Carlingford Road through to Pennant Parade through the suburb of Epping. The route traverses predominantly residential dwellings and is utilised by regular bus services and permits parking on both sides of the road.
- Beecroft Road – a north-south four lane arterial road between Epping Road and through to Beecroft and the Cumberland Highway (Pennant Hills Road) to the north. It is a major route connecting Pennant Hills with Epping Road and M2 Motorway to the City. The road is divided in parts, and is utilised by bus services within the area.
- Carlingford Road – an east west four lane arterial road between Beecroft Road and Pennant Hills Road, and Carlingford, to the west. It is a main road connecting Epping with Carlingford and part of Carlingford Road is used by the Metrobus M54 connecting Parramatta with Macquarie Park.
- Epping Road – an east-west arterial road connecting Beecroft Road, to the south of Epping Station to Pacific Highway at Lane Cove. It has two lanes in each direction between Beecroft Road and Terrys Creek, providing a strategic link to the City via several regional centres including Macquarie Park. Its capacity is heavily constrained with its current cross-section over the rail line at Epping Station and Terrys Creek.

Figure 2-5 Road network surrounding the Site



Source: SCT Consulting, February 2018

## 2.5 Existing traffic conditions

The Epping Town Centre Transport Study Outcomes Report (Halcrow Pacific Pty Ltd, 2011) highlighted a number of key issues and findings with traffic in the study area in 2011. These findings include:

- High volumes of traffic travel through the study area primarily along Epping Road, Beecroft Road, Carlingford Road and Blaxland Road.
- A high proportion (89%) of trips over the rail overpass bridge during peak periods is through traffic.
- Significant traffic delays occur in both the morning and afternoon network peak hours, with a travel time of 12 minutes to travel through Epping Town Centre from west to east during peak hours and 9 minutes to travel from north to south. This is compared with around 2.5 minutes to travel through the area in either direction outside of peak hours.
- The network experiences long traffic queues and congestion along arterial roads during peak periods. Significant delays are caused by bottlenecks in the road network at the Epping Road / Blaxland Road / Langston Place intersection and the Beecroft Road / Carlingford Road intersection.

The Interim Traffic Modelling Report for Epping Town Centre (EMM, 2017) indicated that travel times through the Epping Town Centre area, have increased as follows to:

- 15 minutes for the regional traffic travelling from west to east during the morning peak period 7-9AM.
- 12 minutes for the regional traffic travelling from north to south during the morning peak period 7-9AM.

To quantify the current road network performance, modelling analysis was undertaken by EMM using traffic surveys collected in March 2017. The existing network performance, as indicated within the report, is summarised in **Table 2–4**.

**Table 2–4: Performance of critical intersection surrounding the site**

Intersection location	2017 Average Traffic Delay (seconds)	Level of Service
Beecroft Road/Carlingford Road	542	F
Epping Road/Blaxland Road	184	F
Carlingford Road/Rawson Street	178	F

Source: EMM, 2017

The intersection modelling indicated that the three key intersections adjacent to the proposed site (and on four major traffic routes (via Epping Road, Beecroft Road, Carlingford Road and Blaxland Road) are all operating at over saturated traffic levels (in March 2017) during both the morning and afternoon peak hour peak direction traffic flow movements.

Roads and Maritime is addressing the congestion issues around Epping Town Centre with the Stage 1 (and Stage 2) Epping Town Centre Road Upgrades (to be further discussed in **Section 3.4.1**). Sydney Metro is also a major public transport infrastructure project that will significant delivering modal shift away from private vehicle travel in Sydney's North West including travelling to and from Epping (to be further discussed in **Section 3.4.2**).

## 3.0 The proposal

### 3.1 Epping Town Centre Urban Activation Precinct Structure Plan

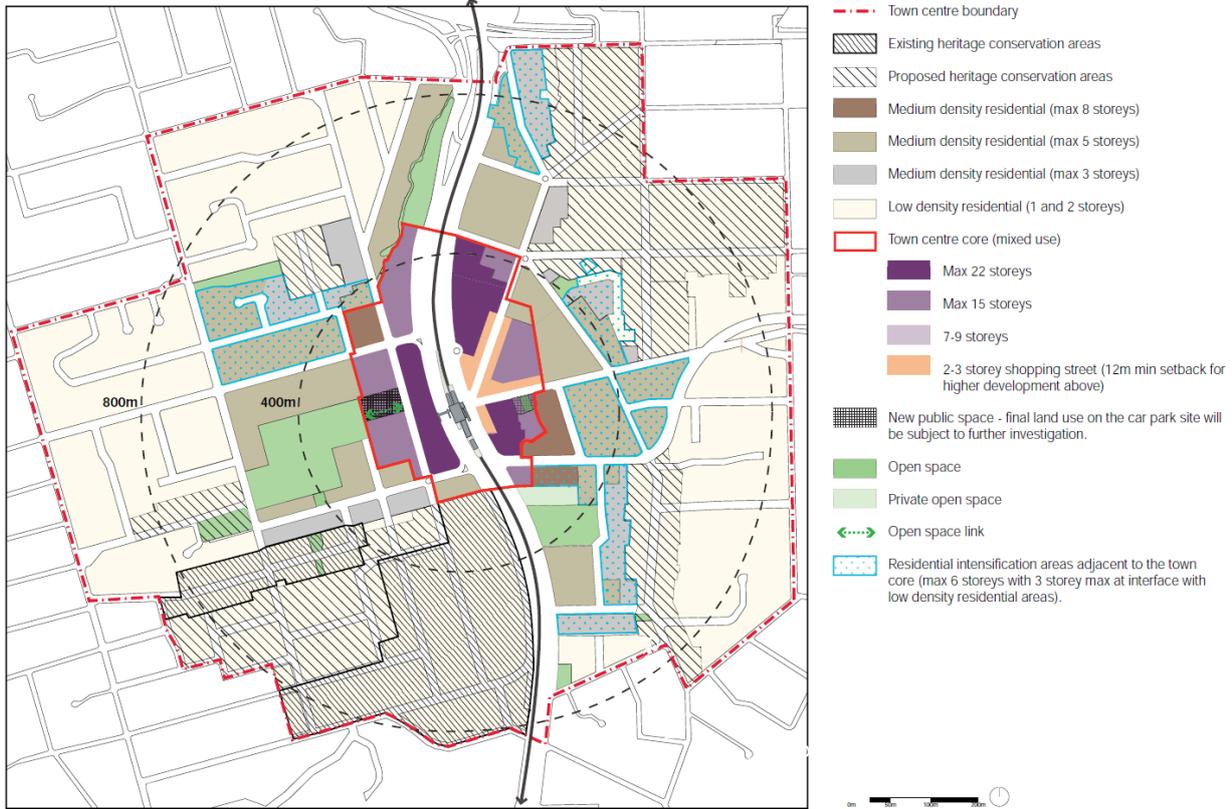
The Epping Town Centre Structure Plan was prepared to support the planning for the Epping Town Centre Precinct. The precinct was endorsed by the NSW Government in March 2013 as an Urban Activation Precinct, for its capacity to produce new housing growth close to existing transport infrastructure and additional connectivity that will be provided by the Sydney Metro North West Project.

The vision for the Epping Town Centre includes:

- A compact, high density town centre core
  - The majority of new dwellings in the core
  - Taller buildings above podium levels set back from the key streets
  - A range of retail and commercial activities at lower levels including fronting the street to serve the local population
- Increased residential densities adjoining the town centre core to allow for
  - 2-6 storey apartment buildings in five new residential areas close to the town centre core
  - Retention of the existing high and medium residential areas and the low density areas in the remainder of the precinct.
- Heritage conservation areas and heritage items not to be subject to increased dwelling density
- Revitalised public domains to create a lively centre where people enjoy spending time
  - Improvements to Rawson and Oxford Streets
  - Potential new public plaza in Rawson Street
  - Potential new town square in Pembroke Street near existing Epping Branch Library
- Improved connections, especially for pedestrians and cyclists
  - Clearer, safer connections through blocks to the station
  - Improved connections across the railway in the longer term
  - Better connections to Boronia Park
  - Safer routes for cyclists.
  - Improved range of open space areas.

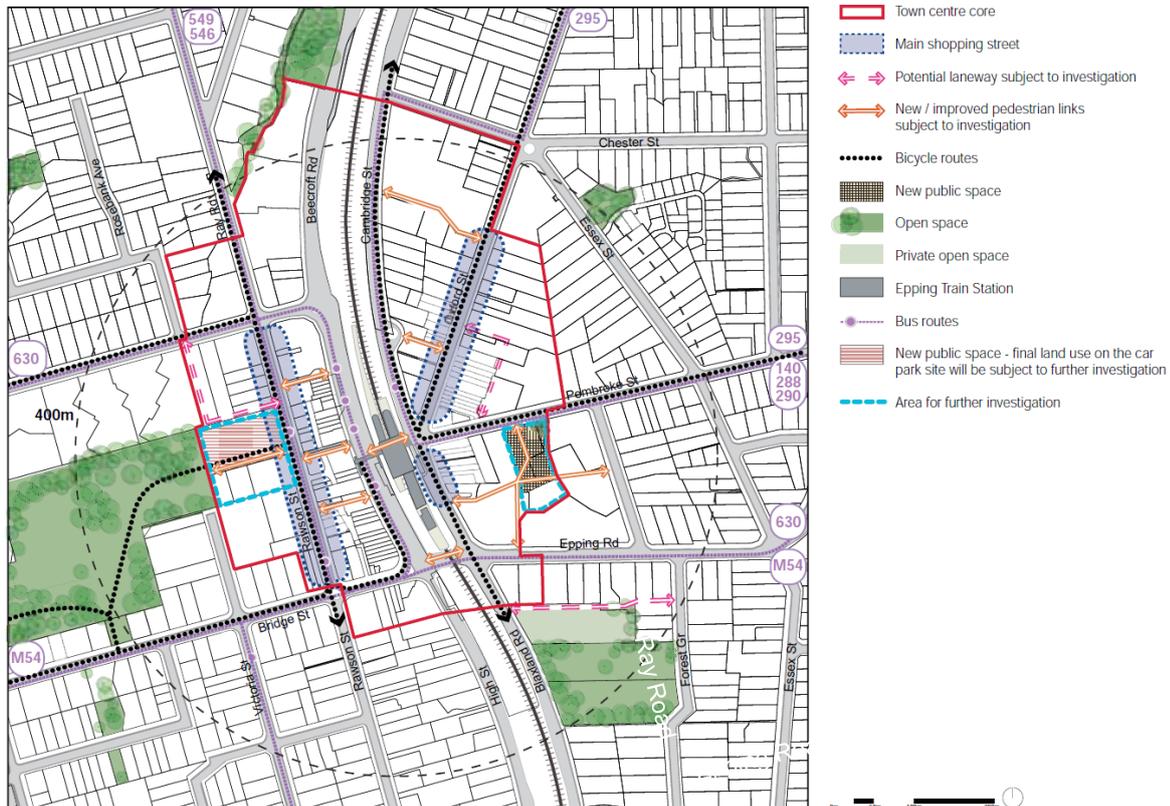
The proposed land use and built form as well as access and movement framework for the Epping Town Centre is illustrated in **Figure 3–1** and **Figure 3–2**.

Figure 3-1 Epping Town Centre Land Use and Built Form



Source: Epping Town Centre UAP Structure Plan, March 2013

Figure 3-2 Epping Town Centre Access and Movement



Source: Epping Town Centre UAP Structure Plan, March 2013

### 3.2 Epping Precinct, 240-244 Beecroft Road

240-244 Beecroft Road is a Transport for NSW owned site currently being used a staging area for the construction of the Sydney Metro Northwest. A permanent metro service facility is located to the north of the site, with the southern portion of the site primarily proposed for residential uses – the subject of this development application.

A Concept Design for the site has been developed to test massing and urban form within planning controls, capacity and yield, ADG compliance for cross ventilation and daylight provisions, and typical floorplate efficiency. They have been tested to demonstrate a development model that maximises the development yield within setback and building separation controls, the ADG, and the height limit, and that is commercially realistic in this market.

The Concept SSDA seeks consent for the development for a residential flat development comprising:

- Building envelope with a maximum height up to RL 48m
- Residential yield of approximately 442 dwellings (including a minimum of 5% affordable housing units)
- Maximum residential gross floor area (GFA) of around 39,000m<sup>2</sup>
- Car parking for approximately 356 spaces within the basement
- Loading, vehicular and pedestrian access arrangements.

Proposed access to the development is from Ray Road and Beecroft Road at Epping. The location and context of the proposed development is shown in **Figure 3–3**.

**Figure 3–3 Proposed development**



Source: Bennet and Trimble, May 2018

### 3.3 Travel Demand Management measures

It is acknowledged that the SEARs require preparation of a Green Travel Plan. Given the preliminary nature of the SSDA, it is expected that any approval of the SSDA will include a consent condition requiring preparation of a Green Travel Plan to accompany Stage 1 DA. This section outlines the key principles and initiatives for travel demand management measures and provides a framework for the preparation of a Green Travel Plan for the Stage 1 DA.

Sustainable transport and Travel Demand Management (TDM) strategies involve the application of policies, objectives, measures and targets to influence travel behaviour, to encourage uptake of sustainable forms of transport, i.e. non-car modes, wherever possible. TDM measures have proven to reduce congestion created by growth within urban areas and unlock urban renewal opportunities. They result in travel behaviour that uses less road space than single occupant vehicle commute and takes advantage of spare transport capacity outside the morning and afternoon peaks.

TDM strategies generally guide all relevant customers (residents, employees and visitors) in changing the travel behaviour in the following ways:

- Reduce travel;
- Re-mode (consideration of travel via alternative modes);
- Re-time (consideration of travel at alternative times); and
- Re-route.

The TDM principles and initiatives developed below are appropriate to support a Concept Development to deliver best practice travel programs and initiatives to manage travel demand for a transit-oriented development. A Travel Plan should be developed as the design evolves and monitored for this development to ensure the measures are tailored for the development. Key initiatives and measures could be developed to:

- Reduce the need to travel
  - Planning of the development as a mix-used community with the provision of retail and community services on site to maximise trip containment in the Epping Precinct and encourage use of active transport (walking and cycling) for short trips.
  - Use of internet to reduce the need to travel such as Australia Post, parcel drop-off /pick-up facilities.
  - Use of internet and technology to facilitate remote working via smart work hubs with high quality facilities or working from home.
  - Develop and use of carpooling app for wider precinct and community.
- Re-think the mode of travel
  - Walking and cycling:
    - A highly permeable and safe pedestrian network throughout the development.
    - Dedicated cycle routes that connects to the regional routes and major transport hubs.
    - Key design principles to integrate walking and cycling network and facilities into the planning and delivery of the development.
    - High quality, safe and accessible end-of-trip facilities (centralised cycle hubs that are integrated within development at convenient locations, on-street secure bicycle storage located conveniently at end of cycle destinations, parking hubs for shared bikes, lockers and showers).
    - Promotion of bicycle initiatives – NSW bicycle week, cycle to work day, free bike check-up events.
    - Establishment of a Bicycle User / Consultation Group
  - Public transport:
    - Investigate on-demand public transport options to service travel demand in areas / at times that cannot be served by regular bus routes.
    - Early provision of frequent public transport services to establish a non-car travel behaviour.
    - Good quality public transport stops in the vicinity of the development.

- Tailored information with clear mapping and walking catchments at public transport stops.
- Provision of public transport information from home via television channel or community app.
- Parking measures as a mean to encourage alternative modes of travel:
  - Reduced parking rates with flexibility in parking arrangements such as decoupled parking, shared vehicles parking to accommodate parking needs of all residents.
  - No dedicated parking space for small (1-bedroom) apartments to increase housing affordability. Car travel needs can be addressed via carpooling and / or using shared vehicles.
  - Parking spaces dedicated to electric vehicles, with charging stations.
  - Parking spaces dedicated to car share scheme and community car-share vehicles, both on-street and incorporated in easily-accessed public car parks.
- Re-time and Re-route journeys:
  - Development of specific community app / community engagement program to enable changing travel behaviour which includes:
    - Active and public transport maps
    - Personalised journey planner
    - Notifications to latest travel information
    - Shared vehicles information
    - Car-pooling opportunities
    - Other precinct-related information
  - Real-time information embedded into development and public transport stops.
  - Employers to promote and encourage flexible working hours and arrangements.

While it is important to develop a Travel Plan that is aimed at managing travel demand and reducing reliance on car travel, it is more important to monitor and evaluate the effectiveness of individual measures and the need to adjust the measures. The planning and implementation of a targeted Travel Plan with the above green travel initiatives / principles will support the delivery of a transit-oriented development at this location that provide significant opportunities for alternative travel options and reduce the need of car travel.

## 3.4 Proposed access arrangements

### 3.4.1 Vehicular access

A number of vehicular access options were considered during the Concept Plan development and these options considered are summarised in **Table 3–1**.

**Table 3–1: Vehicular access options considered**

Access options	Considerations
Combined driveway with ESF at Beecroft Road	Timing of ESF approved slip lane would be fully constructed before the proposed site would commence any early works, therefore, unable to combine the driveways of the proposed development and ESF.
Access at Ray Road only	All development traffic has to go through the congested intersections at Carlingford Road with Ray Road and Beecroft Road. Right turn bans at Ray Road (from Carlingford Road) also limits access to the development during the peak hours.

Access options	Considerations
Access at Beecroft Road (and Ray Road)	<p>Reducing the need for all development traffic to travel through two set of busy signalised intersections at Carlingford Road.</p> <p>All movements at this access at Beecroft Road via a new signalised intersection was considered not feasible due to the proximity to existing intersection of Beecroft Road / Carlingford Road.</p> <p>Therefore, a left-in left-out intersection with a deceleration lane was considered most feasible option to take forward to maximise accessibility to the site.</p>

Source: SCT Consulting & Landcom, Nov 2017

Vehicular accesses to the development are proposed at Ray Road and Beecroft Road. Both accesses are interconnected via the internal car park and the combination of the accesses will provide easy and direct connections to and from the surrounding road network in all directions.

Proposed access at Ray Road will be an all-movement permitted intersection. Safe access and egress can be made on Ray Road due to the lower order speed environment of the corridor and traffic throughput, providing ample opportunities for vehicles to safely egress.

The proposed access to and from Beecroft Road will be a left in / left out priority intersection to minimise conflicts with traffic on a State arterial road. The concept and the design of proposed access at Beecroft Road has been developed in consultation with Roads and Maritime. A range of factors were taken into account to determine the preferred location of the proposed secondary access on Beecroft Road, such as:

- Ramp down to the basement car park stays clear of the substratum rail corridor.
- Timing of ESF approved slip lane would be fully constructed before the proposed site would commence any early works, therefore, unable to combine the driveways of the proposed development and ESF.
- Scope of Roads and Maritime Epping Town Centre Upgrades (Stage 1).
- Location of existing petrol station driveway.
- Sufficient allowance for deceleration lane based on relevant design guidelines.

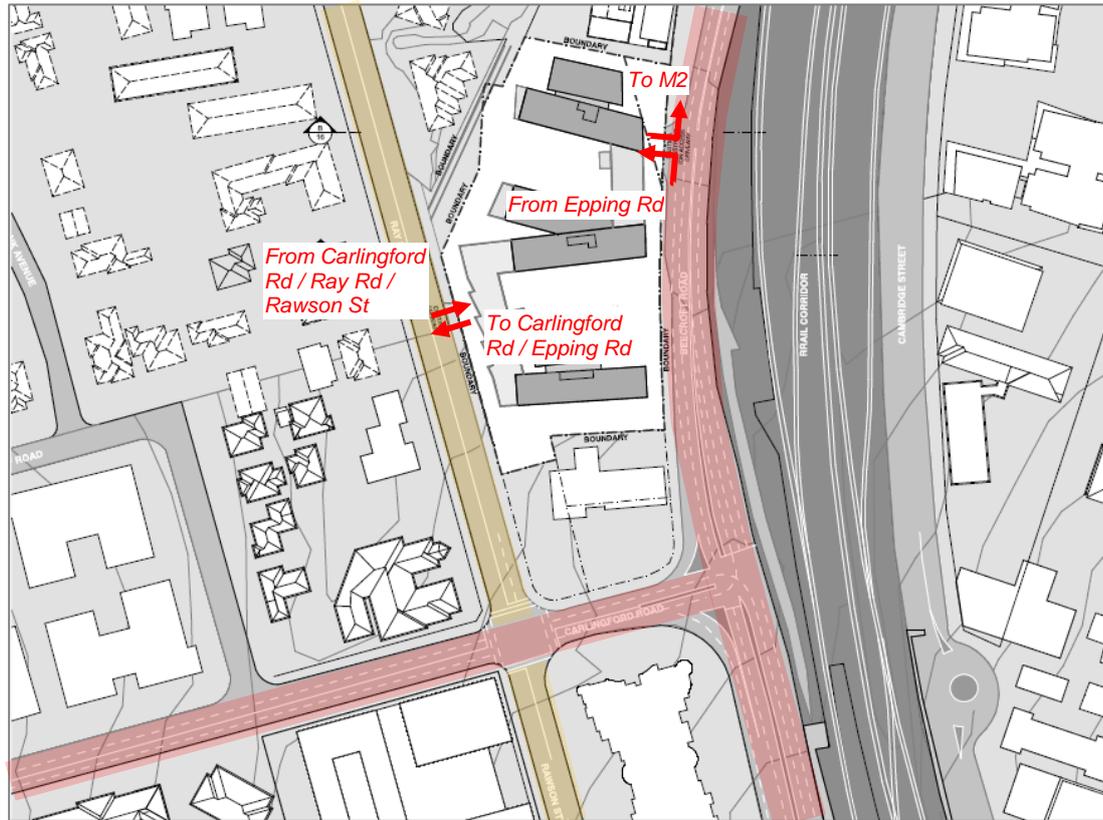
The proposed left in movement on Beecroft Road will be provided via a deceleration lane of approximately 75m long, to allow entering traffic to slow down without interfering with through traffic on Beecroft Road. Speed control / speed reduction option could be further investigated along the deceleration lane to deter ESF-related vehicles getting into the lane as well as to reduce vehicle speed and decrease the severity of potential crashes should confusion occur with adjacent driveways.

Vehicles exiting from the development can only turn left onto Beecroft Road. They will have clear sightlines to oncoming vehicles on Beecroft Road travelling northbound or traffic entering the ESF, before safely merging right onto Beecroft Road traffic. Due to the small number of vehicles expected to turn left from the driveway access (less than 10 veh/hr during the peak), the potential conflicts with traffic entering the site or ESF as well as traffic on Beecroft Road is considered minimal.

The proposed access arrangements together with surrounding street hierarchy is illustrated in **Figure 3–4**. The proposed deceleration lane and a new footpath will be accommodated within the future road reserve.

Residents / visitors accessing the site from the south can enter via the Beecroft Road entry, located to the north of the signalised intersection of Beecroft Road / Carlingford Road, reducing the need to travel through two set of busy signalised intersections.

Figure 3-4 Proposed vehicular access and surrounding street hierarchy

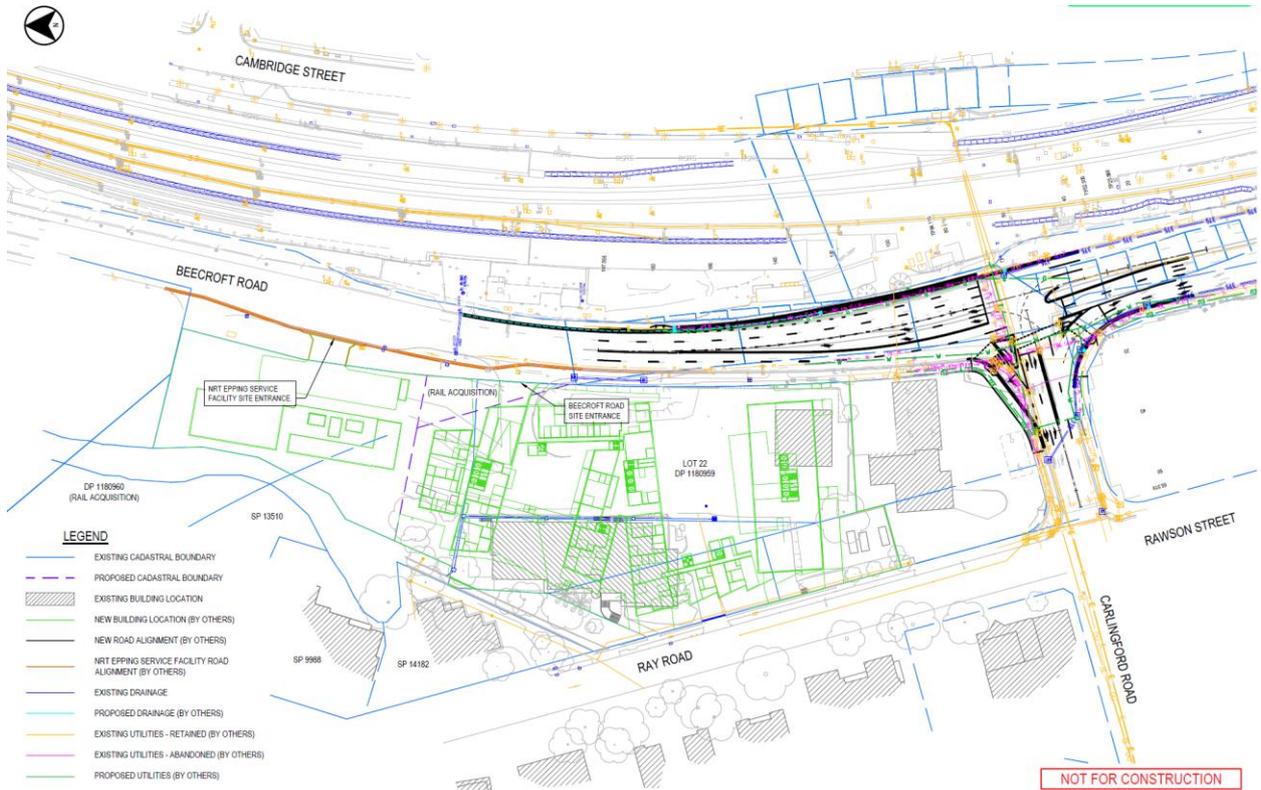


Source: Bennet and Trimble, January 2018

As part of the Roads and Maritime Services Stage 1 Epping Town Centre Upgrades which is currently underway (refer **Figure 3-5**), additional capacity is proposed at the intersection of Beecroft Road / Carlingford Road with an additional southbound through lane and an additional southbound right turn lane (a total of three through lanes and two right turn lanes).

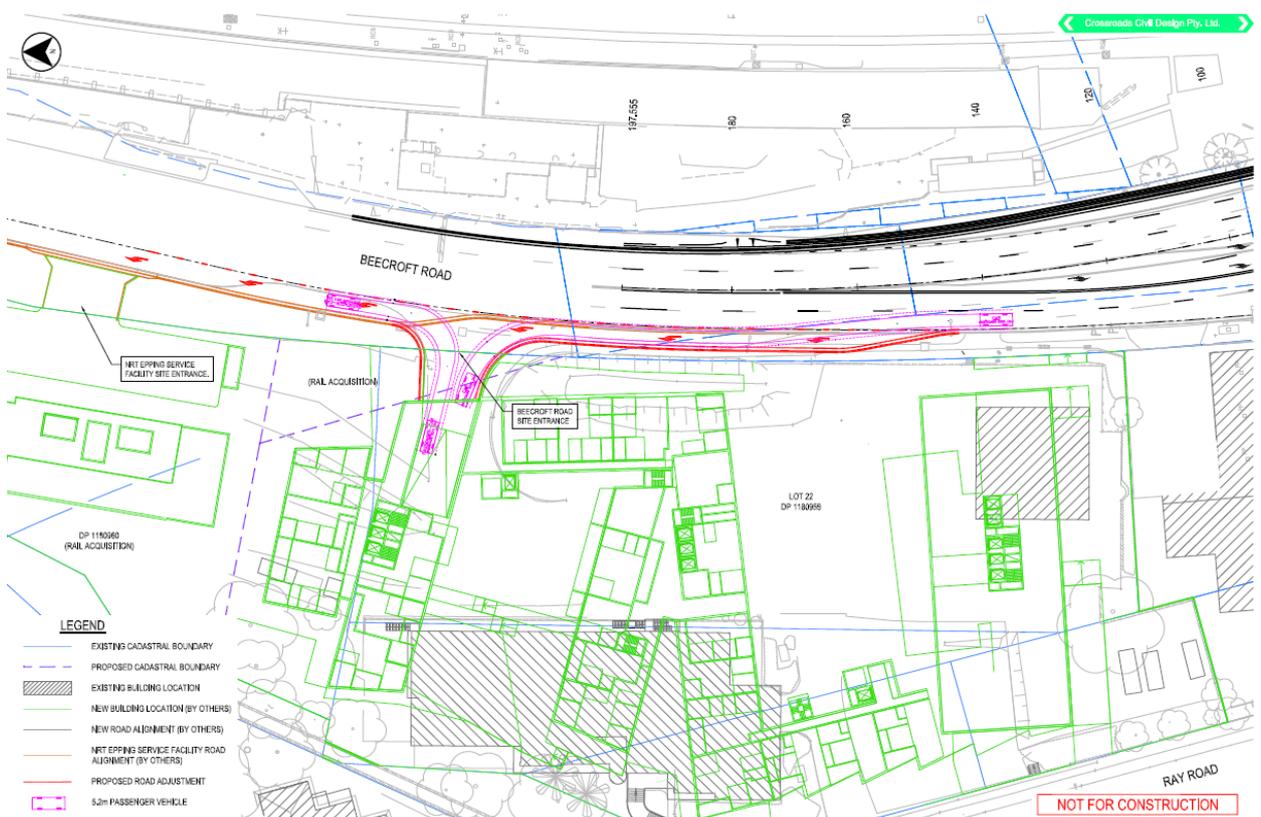
The proposed upgrade of the left turn from Carlingford Road to Beecroft Road is a high angle entry left turn lane, with traffic giving way to through traffic on Beecroft Road. This implies the removal of the existing northbound continuous lane from the Carlingford Road slip lane into Beecroft Road. Therefore, the proposed deceleration lane as part of the left-in entry to the development will commence north of the left turn slip lane from Carlingford Road, thereby allowing the safe and efficient entry of vehicles into the development without introducing any risk of weaving across a new traffic stream. **Figure 3-6** illustrates the left-in left-out access to and from the development at Beecroft Road and associated swept path movements.

Figure 3-5 Proposed Beecroft Road / Carlingford Road upgrade works by RMS



Source: SCT Consulting, February 2018

Figure 3-6 Proposed Beecroft Road left in / left out access with swept path analysis



Source: SCT Consulting, February 2018

In addition to the Stage 1 Epping Town Centre Upgrades, Roads and Maritime Services is also investigating Stage 2 upgrade works to widen Epping Road in the westbound direction between Blaxland Road and Essex Street, including the upgrade of the intersection at Epping Road and Essex Street.

Both stages of the road upgrades will aim to improve traffic flow and road safety as well as help to reduce traffic delays and congestion of the surrounding road network.

### 3.4.2 Public transport access

Residents within the proposed development will be located within 400m walking distance of existing Epping Station, and will benefit from existing public transport (bus and rail) services available, together with future upgrades associated with the SMNW Project.

Epping is one of five current railway stations which will be upgraded to metro standards as part of the Sydney Metro network. The number of train services to Chatswood alone will increase to fifteen in an hour during the peak. Sydney Metro Northwest will be open in 2019 and available to residents within Epping. Customers will also have a new direct metro service to Crows Nest, Barangaroo and Martin Place when Sydney Metro City and Southwest opens in 2024.

The increased network coverage, train frequency, journey-time reliability and improved customer offering of the Sydney Metro Project, is likely to encourage public transport usage and increase journey to work trips by non-car modes which are already high in the Epping area.

Figure 3-7 Sydney Metro Line including Sydney Metro North West Project



Source: Sydney Metro, March 2018

The proposed development supports best practice transit oriented development principles, by providing increased residential density in proximity to existing and planned transport infrastructure upgrades. The proposed infrastructure upgrades will provide residents with greater access to public transport and employment options, while promoting the use of sustainable travel options.

### 3.4.3 Pedestrian access

Pedestrian accesses to the subject site will be via the existing footpath on Ray Road and new footpath on Beecroft Road extended to the site (to be constructed as part of the new deceleration lane into the proposed development car park). These footpaths will be connected to existing pedestrian facilities that are provided across the majority of the town centre and surrounding the train station.

As part of the Epping Town Centre road upgrades, pedestrian access will be improved through the provision of an additional signalised pedestrian crossing at the intersection of Carlingford Road / Beecroft Road and new pedestrian pathway to link with the existing footpath to the east of Beecroft Road. These upgrades will improve opportunities and safety for pedestrians accessing between the development and the Epping Town Centre and Train (future Metro) Station.

### 3.4.4 Cyclist access

Cyclist access is available via surrounding on-road-mixed traffic routes, with a lack of north-south cycle routes providing safe connections to the town centre, station as well as existing and future east-west regional connects.

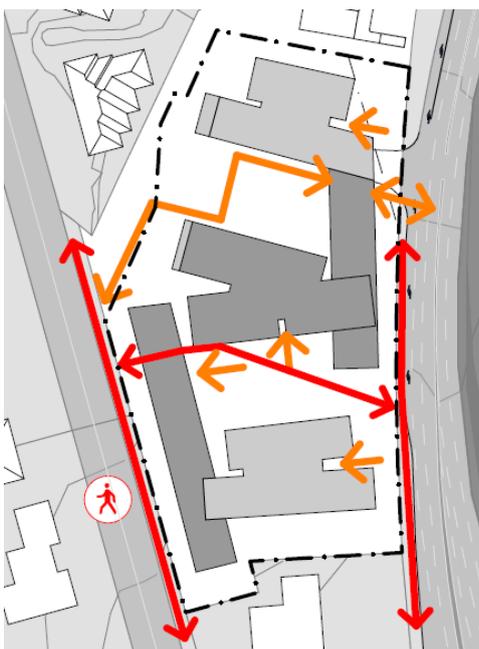
As identified in **Section 2.2**, the Parramatta Draft Bike Plan 2017-2037 indicates a future on-road painted bicycle lane on Ray Road, connecting through to various regional connections. The option for a shared pedestrian and bicycle path on Ray Road outside of the development has been investigated, however, implementation of a connected cycleway requires the proposed connection along Ray Road and Rawson Street to be first established. To establish a transit-oriented development and mode shift to cycling and walking, detailed implementation proposal of shared pedestrian and bicycle path on Ray Road is strongly encouraged in the subsequent DA stage/s of the development through consultation with City of Parramatta.

It is not expected that there will be a significant demand for cycling trips between the development and the station given the development is within the walking catchment to the station. However, the delivery of cycle routes on Ray Road and Rawson Street will enable safe cycle connections to wider regional networks. This together with provision of safe and convenient cycle parking / storage facilities within the development will encourage future residents to cycle and not relying on private vehicle use, especially for shorter trips.

The additional signalised pedestrian crossing at the intersection of Carlingford Road / Beecroft Road will also improve opportunities and safety for cyclists accessing between the development and the Epping Town Centre and Train (future Metro) Station.

Internally the proposed development promotes pedestrian and cyclist movements with a primary through site link and a permeable internal layout as illustrated in **Figure 3–8**.

**Figure 3–8 Proposed pedestrian site links**



Source: Bennet and Trimble, May 2018

## 3.5 Parking requirements and provision

### 3.5.1 Parking guidelines and DCP requirements

Guidance on parking rates in a number of relevant state and local planning frameworks as well as RMS Guide to Traffic Generating Developments could be applied to estimate likely parking provision for the site.

In accordance with the Epping Town Centre Urban Activation Precinct Structure Plan, future development proposals must aim to adopt car parking rates that provide a balance between meeting car parking demand whilst encouraging sustainable and active transport by residents. New developments are encouraged to minimise car parking provision and demonstrate the inclusion of transport alternatives or strategies to discourage private motor vehicle use.

#### Car and motorcycle parking

A summary of the parking rates applicable to the site is summarised in **Table 3–2**.

**Table 3–2: Residential car parking requirements for residential developments**

Dwelling type	Proposed no. of units	Number of parking spaces required				
		Epping Town Centre UAP Structure Plan (maximum rates)	Hornsby DCP 2013 – Epping Town Centre Core (minimum rates)	Parramatta DCP 2011 (minimum rates)	Parramatta DCP 2011, Section 4.1 – Epping Town Centre (maximum rates)	RMS Guide to Traffic Generating Developments <sup>3</sup> (minimum rates)
Studio	44	0 spaces	0.5 spaces	0 spaces	0.5 spaces	0 spaces
1 Bed	97	1 space	0.75 spaces	1 space	0.75 spaces	0.4 spaces
2 Bed	242	1 space	1 space	1 space	1 space	0.7 spaces
3+ bed	59	1 space	1.5 spaces	1.2 spaces	1.5 spaces	1.2 spaces
Visitor spaces		1 space per 10 dwellings	1 space per 10 dwellings	0.25 space per dwelling	1 space per 10 dwellings	1 space per 7 dwelling
<b>Total</b>	<b>442</b>	<b>442 (max.)</b>	<b>469 (min.)</b>	<b>520 (min.)</b>	<b>469 (max.)</b>	<b>342 (min)</b>

The parking rates as identified within DCP 2011, Epping Town Centre are identified as maximum parking rates. Further, the Epping Town Centre UAP Structure Plan stipulates that the precinct, including the proposed site, requires less parking than the Parramatta DCP 2011 given the proximity of most new dwellings to public transport, retail and other services in the town centre core.

By applying the car parking requirements of State Environmental Planning Policy No 65 - Design Quality of Residential Apartment Development (SEPP 65) and the Apartment Design Guide, it states that:

*“Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas”*

*“For development on sites that are within 800m of a railway station or light rail stop in the Sydney Metropolitan Area the minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less”*

Given the transit oriented nature of the development and the excellent access from the site to future transport infrastructure, the RMS Guidelines for Metro Regional CBD Centres are considered appropriate when determining the required number of parking spaces. Based on a review of all relevant parking guidelines to the site, the estimated number of parking spaces to be provided should be approximately 350 spaces.

Reduced car parking provision would encourage a balance between meeting car parking demand whilst encouraging sustainable and active transport by residents. The car parking needs of future residents can still be met through a number of flexible and sustainable parking management measures / options such as:

- Decoupled parking, shared vehicles parking to accommodate parking needs of all residents.
- No dedicated parking space for small (1-bedroom) apartments to increase housing affordability. Car travel needs can be addressed via carpooling and / or using shared vehicles.

<sup>3</sup> the Apartment Design Guide applies a minimum requirement that is the lesser of either the relevant rate set out in the Guide to Traffic Generating Developments (GTTGD) or the council car parking requirement for residential apartment development. <http://www.planning.nsw.gov.au/~media/72B2BB114A32434099A6C53A1CCB4888.ashx>

- Parking spaces dedicated to electric vehicles, with charging stations.
- Parking spaces dedicated to car share scheme and community car-share vehicles, both on-street and incorporated in easily-accessed public car parks.

The Epping Town Centre section of the Parramatta DCP 2011 also recommends one motorcycle parking space to be provided with every 25 car parking spaces.

A minimum of one space is to be allocated to car share for developments with 50 or more dwellings. If agreement with a car share provider is not obtained then the car share space is to be used for additional visitor parking until such time as a car share provider agreement is obtained. Every car share space provided would replace three normal car parking spaces.

The Parramatta City Council DCP Part 3 - Parking and Vehicular Access also states the following with regards to car parking:

- Parking spaces are to be designed to ensure ease of access, egress and manoeuvring on-site and to be designed in accordance with AS 2890;
- Visitor parking is to be marked or signposted to enable easy recognition; and
- The development must provide safe vehicle access and adequate sight distances.

### Bicycle parking

For residential developments within the study area, the minimum number of bicycle parking spaces is specified by the Parramatta DCP 2011 and the Parramatta DCP, Section 4.1, these rates are summarised in **Table 3–3**.

**Table 3–3: Residential bicycle parking requirements for new developments**

Dwelling type	Number of bicycle parking spaces required	
	DCP 2011	DCP 2011, Section 4.1
Residential	1 per 2 dwellings	1 per dwelling
Residential - Visitor	-	1 space per 10 dwellings

Source: Parramatta DCP, 2017

The Parramatta City Council DCP Part 3 - Parking and Vehicular Access also states the following with regards to bicycle parking for residential flat buildings:

- New developments are required to provide adequate, safe and secure bicycle parking;
- Bicycle parking is to be provided in the form of Class 2 compounds, as specified in AS 2890.3 – Bicycle Parking Facilities. These facilities may be located in storage areas if good access is provided.

### 3.5.2 Proposed parking provision

#### Car and motorcycle parking

Given the development is immediately adjacent to Epping Station as part of the future Sydney Metro and proximity to Epping Town Centre, parking provision for the proposed development should be minimised to leverage off these opportunities and to reduce the future residents' reliance on private vehicle use such that the development will not add to the congestion currently experienced on the surrounding road network.

Based on the above principles that align with the principles of the TDM measures, the development proposes provision of 356 car parking spaces, inclusive of approximately 298 resident parking spaces, 45 visitor parking spaces. The parking spaces are located across three levels (lower ground, level 1 and level 2) of the proposed development with access from both Beecroft Road and Ray Road.

This level of parking provision complies with the RMS Guide to Traffic Generating Developments and is supported by the excellent level of access to frequent public transport (rail / metro and buses) within 400m walking distance to the site and good access to alternative cycle parking and facilities provided within the development.

Further to resident parking, a total of three car share spaces will be provided allowing for one car share space per building. 15 motorcycle parking spaces are also provided according to the DCP requirements.

Apart from the residential use which forms the majority of the proposal, the development also proposes approximately 700m<sup>2</sup> of unspecified non-residential uses. Given its proximity to the town centre, it is expected the non-residential uses could be local shops that serves the proposed development or residents within a walking catchment. Therefore, it is unlikely that the non-residential uses would generate parking demands, except for the shop owners and / or staffs. The proposed development has allowed for 10 parking spaces for the non-residential uses, which is equivalent to 1 space per 70m<sup>2</sup> of GFA of non-residential uses complying with the requirements of Epping Town Centre DCP of City of Parramatta.

### Bicycle parking

Continuing to promote sustainable travel, the higher bicycle parking rates from the Parramatta DCP 2011, Section 4.1: Epping Town Centre have been adopted. Applying these bicycle parking rates to the three buildings proposed on site would result in 487 bicycle parking spaces being required.

The provision and easy access of significant amount of bicycle parking spaces to future residents is another means to reduce their reliance on private vehicles and congestion on the road network. This also aligns with the principles of the TDM measures proposed in **Section 3.3**.

### 3.5.3 Proposed loading / servicing arrangements

Off-street loading / servicing area as well as garbage collection area is provided within the car park with access to and from Ray Road as shown in **Figure 3–9**.

Figure 3–9 Proposed loading / servicing area



Source: Bennet and Trimble, May 2018

## 3.6 Trip generation and distribution

### 3.6.1 Vehicular trip generation

The average trip rate for high density residential flat dwellings that have good access to public transport services within Sydney urban areas, as published by the Roads and Maritime Services<sup>4</sup>, is identified as 0.19 and 0.15 trips per dwelling within the AM and PM peak hour periods respectively and 1.52 daily trips per dwelling.

Given the site's proximity and accessible to good public transport services, implementation of TDM measures as included in **Section 3.3** including the reduced parking provision for a transit-oriented development, the above peak hour vehicular trip rates are considered most appropriate. Additional analysis was also undertaken using the Roads and Maritime traffic surveys done for high density developments<sup>5</sup> close to public transport to draw some relationships between trip generation and parking provision. The analysis shows that on average trip rates used are based on sites that have an average of 1.25 spaces per apartment. Based on this car parking provision and trip generation relationship, our car park provision is 0.85 space per unit should generate even lower trip rates than 0.19 and 0.15 trips per dwelling within the AM and PM peak hour periods.

However, for the purpose of a conservative assessment, we have adopted the average trip rates of 0.19 and 0.15 trips per dwelling within the AM and PM peak hour periods. Therefore, the proposed development would expect to generate up to 85 trips in the AM peak hour and 66 trips in the PM peak hour. The daily trip generation would expect to be a total of 672 trips.

Given the adjacent town centre, customers to the proposed retail component of the development are intended to be residents on levels above and / or in the immediately surrounding locality and unlikely to generate vehicle trips. The retail component of the proposal is therefore considered to have negligible impact on trip generation associated with the development.

### 3.6.2 Trip distribution

According to the traffic modelling assumptions used in the EMM report for future residential development, over 60% travelling via the Epping Bridge, either to or from the east, in the respective morning and afternoon peak hourly traffic periods. A summary of the trip distribution of future peak hourly residential traffic for the proposed development is highlighted in **Table 3-4**.

**Table 3-4: Distribution of future peak hourly residential traffic**

Traffic route / travel direction	Outbound AM peak %	Inbound PM peak %
Epping Road / Blaxland Road (east)	67	61
Carlingford Road (west)	16	18
Beecroft Road (north)	12	15
Ray Road (north)	3	3
Rawson Street (south)	2	3
<b>Total</b>	<b>100</b>	<b>100</b>

Source: EMM, 2017

Assuming the ratio of inbound to outbound trips in the AM peak to be 10%:90%, and PM peak to be 90%:10% and based on the trip distribution pattern as shown in **Table 3-4**, the expected vehicular trip increase during the AM and PM peak hours on the surrounding road network as a result of the proposed development is shown in **Figure 3-10**.

During the AM peak hour, the maximum increase on the surrounding road network is along Ray Road and Beecroft Road (south of Carlingford Road) – which has an increase of approximately 60 vehicles per hour (just one vehicle per minute). The highest increase of traffic during the PM peak is along Beecroft Road, which has an increase of approximately 45 vehicles per hour (less than one vehicle per minute).

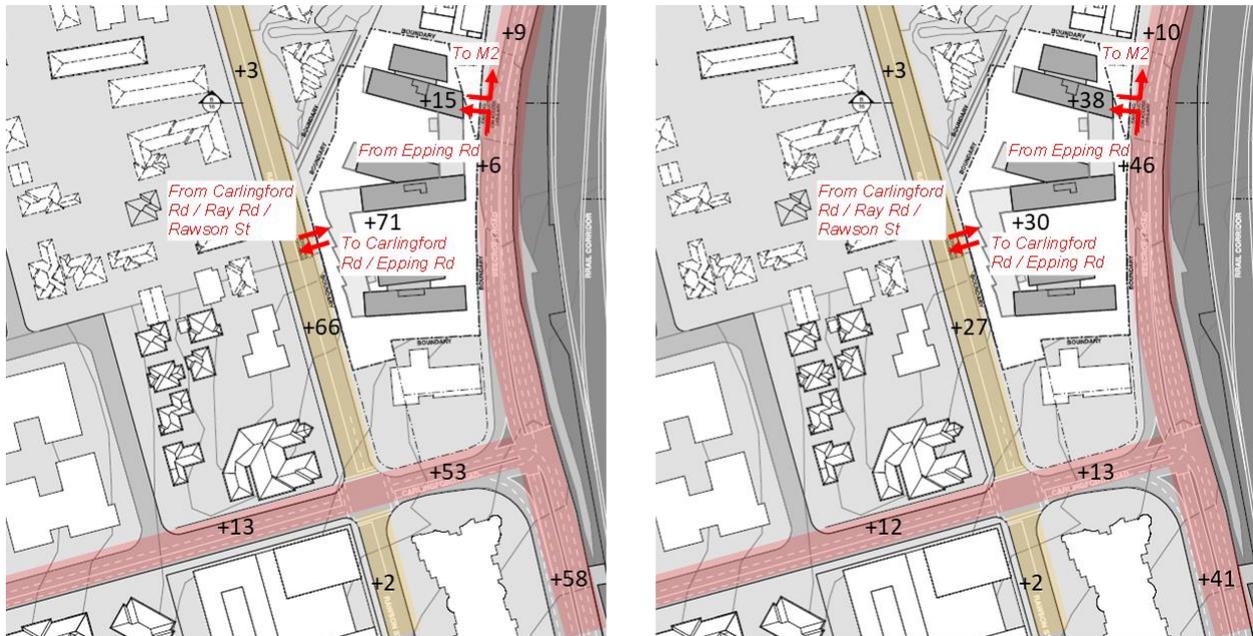
<sup>4</sup> Technical Direction TDT 2013/04a, Guide to Traffic Generating Developments – Updated traffic surveys (Roads and Maritime Services, 2013)

<sup>5</sup> Technical Direction TDT 2013/04a, Guide to Traffic Generating Developments – Updated traffic surveys (Roads and Maritime Services, 2013)

**Figure 3–10 Proposed trip generation and distribution**

AM Peak – 85 trips (76 outbound & 9 inbound trips)

PM Peak – 66 trips (6 outbound & 60 inbound trips)



Source: SCT Consulting, 2018

### 3.6.3 Public transport demand

Journey to work travel mode data indicates that during the peak hour period public transport trips accounts for approximately 47 per cent outbound trips and 20 per cent of inbound trips. Train trips account for 42 per cent and 18 per cent of these trips respectively, whilst bus trips account for the remaining five per cent of outbound and two per cent of inbound trips. Household travel data indicates that approximately nine per cent of all daily trips are undertaken by train, while three per cent of all trips throughout the day are undertaken by bus.

On this basis, **Table 3–5** provides a summary of the number of additional train and bus trips that are likely to be generated by the proposed development. At full development, this accounts for 88 trips in the AM peak, 70 trips in the PM peak and a total of 171 daily trips.

**Table 3–5: Public transport net trip generation for the site, by mode**

Public Transport	AM Peak <sup>6</sup>		PM Peak <sup>7</sup>		Daily <sup>8</sup>
	Inbound	Outbound	Inbound	Outbound	
Train / Metro	2	77	61	2	128
Bus	0	9	7	0	43

Source: SCT Consulting; 2017

### 3.6.4 Walking (pedestrian) demand

Journey to work travel mode data indicates that during the peak hour period “walked only” trips accounts for approximately five per cent of both inbound and trips during the peak hour periods.

In addition to the five percent walk only trips, residents and visitors to Epping would also walk in order to access public transport trips within the Epping Station precinct and surrounds. Therefore, it is expected that the proposed development would generate up to 100 walking trips during the peak hours (inclusive of the first / last legs of the public transport trips).

<sup>6</sup> Based on JTW Data

<sup>7</sup> Based on JTW Data

<sup>8</sup> Based on HTS Data

### **3.6.5 Cycling demand**

On the other hand, journey to work travel mode data does not specifically highlight cycling trips. Assuming there will be similar amount of cycling to walking trips, the proposed development would generate up to 10 cycling trips during the peak hours.

## 4.0 Traffic and transport impact assessment

### 4.1 Public and active transport

#### 4.1.1 Public transport impacts

As described in **Section 3.4.2**, the residents of the proposed development will have excellent access to the public transport system with frequent bus and train services providing access to surrounding sub-regional centres and to the City. These services are available within a 400m walking distance to and from the proposed development.

In addition to the existing train services, Epping will be upgraded to metro standards as part of the Sydney Metro network. The increased network coverage, train frequency, journey-time reliability and improved customer offering of the Sydney Metro Project, is likely to encourage public transport patronage and increase journey to work trips by non-car modes.

The proposed development supports best practice transit oriented development principles, by providing increased residential density in proximity to existing and planned transport infrastructure upgrades. The Sydney Metro will provide residents with greater access to public transport and employment options, while promoting the use of sustainable travel options.

On this basis, **Table 3–5** provides a summary of the number of additional train and bus trips that are likely to be generated by the proposed development. At full development, this accounts for 88 trips in the AM peak, 70 trips in the PM peak and a total of 171 daily trips.

As detailed in **Section 2.3**, Epping Station facilitates over 13 services during peak hour periods, which equates to approximately 6 passengers per train trip within the AM peak and 5 additional passengers during the PM peak. The Sydney Train Network has capacity to cater for the proposed increase in travel demand.

Similarly, there are over 20 bus services per hour in the peak travel demand direction during AM and PM peak hour periods, at full development this would equate less than one additional passengers per bus service. It is therefore anticipated that the bus network can cater for this increase in demand.

#### 4.1.2 Walking (Pedestrian) impacts

Pedestrian access to the subject site will be via the existing footpaths on Ray Road and Beecroft Road (south of Carlingford Road), and is supported by pedestrian facilities that are provided across the majority of the town centre and surrounding the train station. Improved pedestrian connections and facilities within the surrounding area are also proposed within the Parramatta DCP and Epping Town Centre Urban Activation Precinct Structure Plan. These upgrades will provide clearer and safer connections for residents of the proposal to the town centre and across the railway and improve the range of open space areas available.

As discussed in **Section 3.6.4**, the proposed development could generate up to 100 walking trips during a typical peak hour. This level of demand is equivalent to an additional of two pedestrians per minute or four pedestrians per cycle at the signalised pedestrian crossing at Carlingford Road / Ray Road intersection. The surrounding footpath network and facilities are expected to be able to handle this level of demands.

Despite the potential delays currently experienced by pedestrian at the signalised intersection of Carlingford Road / Ray Road, pedestrians be able to access the train station in less than eight minutes, as the rest of their walking trip to the station are unhindered through existing and proposed footpaths between the development and the Epping Town Centre and the Train (future Metro) Station.

#### 4.1.3 Cyclist impacts

The Parramatta Draft Bike Plan 2017-2037 indicates a future on-road painted bicycle lane on Ray Road, connecting through to various regional connections. The option for a shared pedestrian and bicycle path on Ray Road outside of the development has been investigated, however, implementation of a connected cycleway requires the proposed connection along Ray Road and Rawson Street to be first established. To establish a transit-oriented development and mode shift to cycling and walking, detailed implementation proposal of shared pedestrian and bicycle path on Ray Road is strongly encouraged in the subsequent DA stage/s of the development through consultation with City of Parramatta.

It is not expected that there will be a significant demand for cycling trips between the development and the station given the development is within the walking catchment to the station. However, the delivery of cycle routes on Ray Road and Rawson Street will enable safe cycle connections to wider regional networks. This together with provision

of safe and convenient cycle parking / storage facilities within the development will encourage future residents to cycle and not relying on private vehicle use, especially for shorter trips.

As discussed in **Section 3.6.4**, the proposed development could generate up to 10 cycling trips during a typical peak hour. The surrounding cycle network and improved cycle facilities is expected to be able to handle this level of demands.

## 4.2 Road network

According to previous traffic studies, traffic volumes on Beecroft Road and Epping Road are in the order of 55,000 vehicles per day. Traffic modelling indicated that the three key intersections adjacent to the proposed site (and on four major traffic routes (via Epping Road, Beecroft Road, Carlingford Road and Blaxland Road) are all operating at over saturated traffic levels (in March 2017) during both the morning and afternoon peak hour peak direction traffic flow movements.

Roads and Maritime is addressing the congestion issues around Epping Town Centre with the Stage 1 (and Stage 2) Epping Town Centre Road Upgrades (further discussed in **Section 3.4.1**). Sydney Metro is also a major public transport infrastructure project that will significant delivering modal shift away from private vehicle travel in Sydney's North West including travelling to and from Epping (further discussed in **Section 3.4.2**).

It is expected an increase of 45-65 peak hourly trips (typically 450-650 daily trips) as result of the proposed development, however this will only account for approximately one per cent of increase in total traffic volume on this corridor.

On this basis, vehicle trips generated from the proposed development are considered to have negligible impact on the corridor performance, and critical and already congested intersections of Carlingford Road / Ray Road / Rawson Street and Carlingford Road / Beecroft Road. The provision of dual vehicular accesses on both Ray Road and Beecroft Road is also aimed to reduce the amount of traffic going through these two congested intersections.

The likely increase of traffic at each of the access points is also expected to have negligible impacts to the operations of Ray Road and Beecroft Road. The access at Ray Road is expected to generate up to 70 vehicles during the AM peak hour and is expected to operate satisfactorily as a typical give-way priority intersection. The proposed access at Beecroft Road is expected to generate up to 40 vehicles during the PM peak hour with majority of these vehicles entering the development via a deceleration lane.

## 4.3 Parking

The number of car parking spaces provided as part of the Proposal complies with the RMS Guide to Traffic Generating Developments and is supported by the excellent level of access to frequent public transport (rail / metro and buses) within 400m walking distance to the site and good access to alternative cycle parking and facilities provided within the development. As discussed in **Section 3.5.2**, the Proposal is not considered to have an adverse impact on the surrounding on-street parking, while encouraging sustainable transport use.

The Proposal currently complies with Council DCP by providing 1.1 cycle parking space per apartment as well as provisions of good and convenient design of bicycle parking infrastructure within the development will encourage residents to adopt sustainable transport modes.

## 5.0 Summary and conclusions

### 5.1 Summary

This report has been prepared by SCT Consulting for Landcom to assess the likely traffic and transport implications associated with a proposed residential development at 240-244 Beecroft Road in Epping. The report will support a Concept State Significant Development Application (SSDA) to be submitted to the Department of Planning and Environment for a residential development of approximately 442 dwellings, with proposed access from Ray Road and Beecroft Road at Epping.

It should be noted that this is a concept proposal and certain details of the development may change with subsequent detailed design DA stage/s.

In summary:

- The proposal is supported by a targeted Travel Plan with a number of green travel initiatives / principles developed specifically for a transit-oriented development at this location that provide significant opportunities for alternative travel options and reduce the need of car travel.
- The proposal is supported by existing pedestrian facilities that are provided on Ray Road, Rawson Street and Beecroft Road (south of Carlingford Road) and across the majority of the town centre and surrounding the train station. The proposal encourages sustainable transport use with a permeable internal layout and ground floor activation (through non-residential uses).
- A total of 487 bicycle spaces will be provisioned, equivalent to a rate of one space per apartment plus one visitor space per 10 apartments as per Parramatta DCP 2011, Section 4.1 Town and Neighbourhood Centres. This will be supported by future cycle links to the surrounding locality and sub-regional centres.
- Residents of the proposed development will have excellent access to the public transport system with frequent bus and train services available within a 400m walking distance at Epping Station. Further, Epping Station will be upgraded to metro standards as part of the Sydney Metro network. The increased network coverage, train frequency, journey-time reliability and improved customer offering of the Sydney Metro Project, is likely to encourage public transport patronage and increase journey to work trips by non-car modes.
- Vehicle access to the development will be available from Ray Road and Beecroft Road, to reduce the need for traffic to travel through the two congested intersections on Carlingford Road.
- The proposed development would expect to generate up to 85 vehicular trips in the AM peak hour and 66 vehicular trips in the PM peak hour, an increase of less than one percent of total traffic volume on the Beecroft Road / Epping Road corridor. This indicates that there will be negligible impact to the network performance as a result of trips generated from the proposed development in both existing and future year scenarios.
- The proposed development would also expect to generate 88 public transport trips in the AM peak, 70 public transport trips in the PM peak and a total of 171 daily public transport trips. The provision of frequent train / metro and bus services in the vicinity of the development are expected to cater for these additional demands.

### 5.2 Conclusions

The traffic and transport impact assessment has concluded that:

- There will not be any adverse traffic or parking implications on the public road as a result of the additional vehicle trips generated by the proposed development.
- The proposed vehicle, pedestrian and cyclist access and proposed servicing arrangements will be suitable and appropriate and promote sustainable transport modes.

